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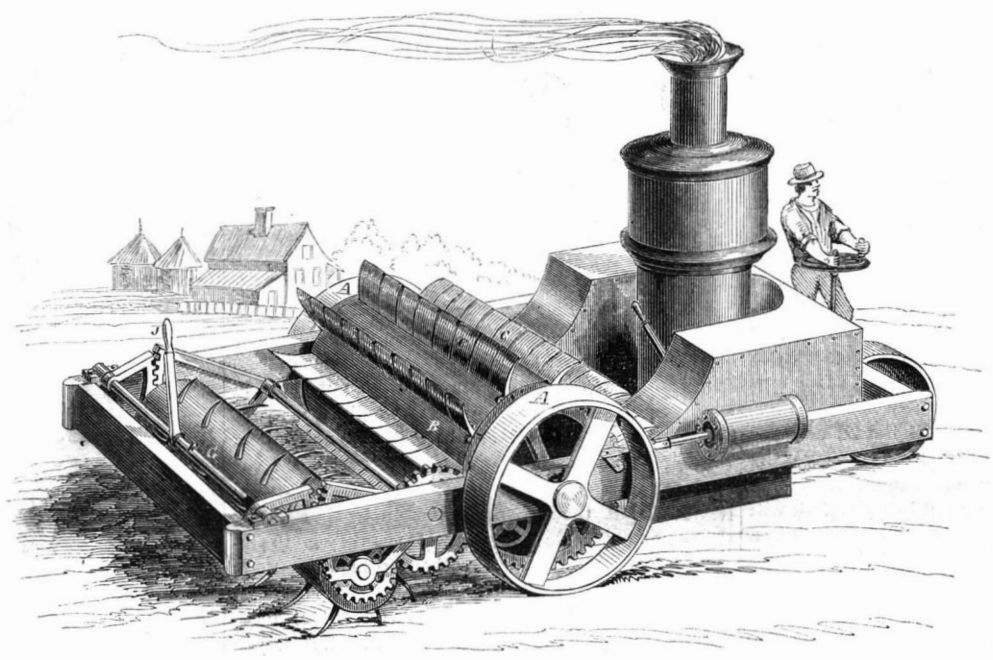
Light for Animals.

A correspondent of the *Homestead*, in an article on fattening hogs, gives the following advice:—"One more important item of advice, and that is, locate your pen where your hogs can have the benefit of light. I don't mean merely daylight, but the full, bright light of the sun; it will add to their cheerful contentment, as it does to the human species, and physiologists declare that, other things being equal, families who occupy apartments in the sunny side of dwellings are the most healthy and happy. Although the comparison may, to sensitive nerves, appear odious, still it is beyond our power or province to change the established laws of Nature. I never knew of a hog, or any other animal, kept under the north side of a barn or other building where the darkness is never penetrated by the sun's rays, and where the animal was employed as the scavenger for other animals, to be sleek-looking, fat, clean or quiet. I have seen many a pen where the mud and offal was two or three feet deep, and no place of retreat left for the poor occupants upon a higher spot, excepting the bed floor, and that unfurnished by straw." The rays of the sun have a very powerful effect in modifying the functions of both animal and vegetable life. Many plants require a strong light, that they may perfect their organizations; others less; but few plants ever come to perfection without a full supply of light; common observation proves this. The potato growing in a cellar is colorless, fragile and worthless. The apple growing on the inside of the tree is often green, tasteless and imperfect, and the peach that has not been kissed by the rays of the sun has not that high flavor requisite to its perfection. Without the sun, the leaves could never decompose carbonic acid from the air and assimilate its oxygen. With animals, the same is true. The sun does as much toward painting roses on the cheek as does a bracing air. The skin of those persons exposed freely to the light performs its functions vigorously, while that of those too much shaded is feeble and easily disturbed. Physicians assert that people living on the shaded side of streets in towns are more liable to sickness and less vigorous than those living on the side influenced by the sun. We have often noticed that children reared in shaded and damp situations were scrofulous, imperfectly developed and deficient in vitality. Rooms in which the sun never shines are gloomy and unpleasant.

THE formula of water, according to recent discoveries, must soon be changed from HO to H_2O.

Improved Rotary Spader and Pulverizer.

The object of the invention here illustrated is to introduce the great advantages of the rotary motion into mechanism for cultivating the earth, none of the various plans heretofore proposed for this purpose having come into general use. The principal feature of this invention consists in the combination of revolving spades with scraping plates to remove the earth from the spades as they rise from the ground.



WADSWORTH'S ROTARY SPADER AND PULVERIZER.

Fig. 1 of the annexed cuts represents a perspective view of the machine, propelled by steam, and Fig. 2 is a longitudinal vertical section of the principal parts. To the axle of the large supporting wheels, A A, is rigidly secured the long drum, B, from the periphery of which the spades, C C, project in rows extending across the machine. As the machinery is propelled forward, the spades are pressed into the ground, and, if the soil is adhesive, they commence their ascent with loads of it upon their upper sides. To secure the removal of the earth from the spades, scraping plates, E E (Fig. 2), are arranged between the several rows of spades, these plates being hinged to the drum at one edge, so that the other edge may swing outward, and thus scrape the soil from the spades. Upon the ends of the plates, E E, are firmly fastened the cam plates, D D, which come in contact, as the spades leave the ground, with the friction wheels, F, and are thus pressed outward, carrying the scraping plates with them. The plates, E E, fall back upon the drum by their own gravity, and as the spades are forced into the soil these plates yield upward to the pressure of the earth. The drum, B, is so connected with the frame that it may be raised or lowered to adjust the penetration of the spades to any depth desired.

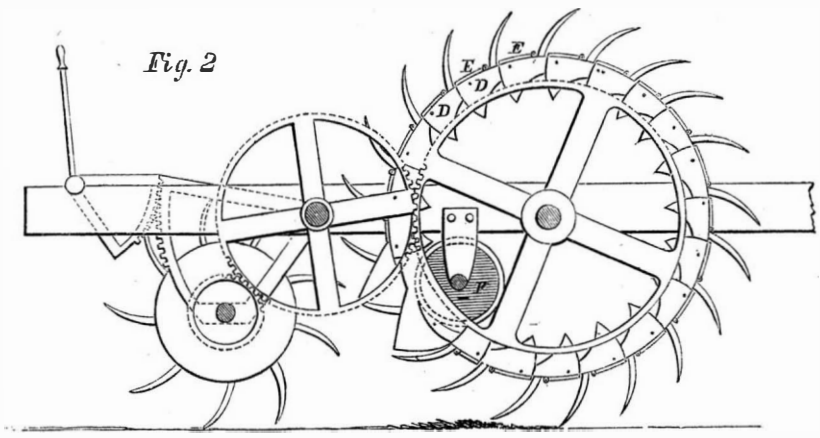


Fig. 2

A second feature in this invention is the combination, with the other parts, of a toothed revolving drum for finely pulverizing the ground in cases where this may be desirable. This drum, G, suitably provided with iron or steel teeth, is connected by gearing with the driving wheels, so as to receive a rotary motion in a direction opposite to that of the cylinder which carries the spades. The axis of the drum, G, has its bearings in a toothed segment, which is concentric with the gear wheel, H, and this segment meshes into a similar one on the rockshaft, I; so that by turning down the lever, I, the drum, G, can be lifted clear off the ground, and thus thrown out of operation when it is not needed. The machine may be propelled by either animal or steam power as may be deemed best.

Application for a patent for this invention has been made through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, W. Wadsworth, at San Francisco, Cal.

DESERVED PRIZE.—M. de Montigny, who introduced into France the oak of Mantchouria, on the leaves of which silk worms feed, and also the ignaure, sorgho and bamboo, has received the order of a Medal of Honor from the Society of Acclimation. The medal is to be executed by M. Dubois, who has designed all the medals in gold, silver and bronze which the society distributes annually. On one side of the medal is to be the portrait of M. de Montigny, and on the other an appropriate inscription, surrounded by a wreath of leaves of the oak and the plants brought to France by him.

UNINFLAMMABLE FABRICS.—A patent has been taken out in England by M. J. Latta, for the employment of the sulphate, carbonate, or chloride of magnesia, mixed with starch, for muslin and linen, so as to render them uninflammable after being dressed. One part of any of these substances is mixed with three parts (by weight) of the starch; these proportions answer well.

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THE CHEMICAL HISTORY OF A CANDLE.

By Professor Faraday.

A Course of Six Lectures (adapted to a Juvenile Audience) Delivered before the Royal Institution of Great Britain.

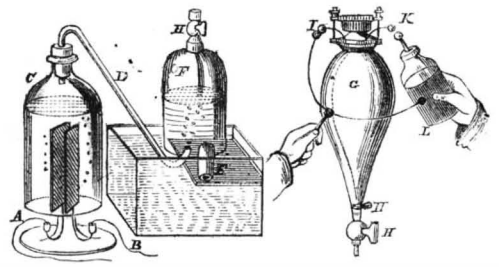
LECTURE IV.

Products: Water from the Combustion—Nature of Water—A Compound—Hydrogen.

I see you are not tired of the candle yet, or I am sure you would not be interested in the subject in the way you are. When our candle was burning we found it produced water exactly like the water we have around us; and by further examination of this water we found in it that curious body, hydrogen—that light substance of which there is some in this jar. We afterward saw the burning powers of that hydrogen, and that it produced water. And I think I introduced to your notice an apparatus which I very briefly said was an arrangement of chemical force, or power, or energy, so adjusted as to convey its power to us in these wires; and I said I should use that force to pull the water to pieces, to see what else there was in the water besides hydrogen; because, you remember, when we passed the water through the iron tube, we by no means got the weight of water back which we put in in the form of steam, though we had a very large quantity of gas evolved. We have now to see what is the other substance present. That you may understand the character and use of this instrument, let us make an experiment or two. Let us put together, first of all, some substances, knowing what they are, and then see what that instrument does to them. There is some copper (observe the various changes which it can undergo), and here is some nitric acid, and you will find that this, being a strong chemical agent, will act very much when I add it to the copper. It is now sending forth a beautiful red vapor; but as we do not want that vapor, Mr. Anderson will hold it near the chimney for a short time, that we may have the use and beauty of the experiment without the annoyance. The copper which I have put into the flask will dissolve; it will change the acid and the water into a blue fluid containing copper and other things, and I purpose then showing you how this voltaic battery deals with it; and in the meantime we will arrange another kind of experiment for you to see what power it has. This is a substance which is to us like water—that is to say, it contains bodies which we do not know of as yet, as water contains a body which we do not know as yet. Now this solution of a salt I will put upon paper and spread about, and apply the power of the battery to it, and observe what will happen. Three or four important things will happen which we shall take advantage of. I place this wetted paper upon a sheet of tin foil, which is convenient for keeping all clean, and also for the advantageous application of the power; and this solution, you see, is not at all affected by being put upon paper or tin foil, nor by anything else I have brought in contact with it, and which, therefore, is free to us to use as regards that instrument. But first let us see that our instrment is in order. Here are our wires. Let us see whether it is in the state in which it was last time. We can soon tell. As yet, when I bring them together, we have no power, because the conveyers—what we call the electrodes—the passages or ways for the electricity—are stopped; but now Mr. Anderson by that [referring to a sudden flash at the ends of the wires] has given me a telegram to say that it is ready. Before I begin our experiment I will get Mr. Anderson to break contact again at the battery behind me, and we will put a platinum wire across to connect the poles, and then if I find I can ignite a pretty good length of this wire we shall be safe in our experiment. Now you will see the power. [The connection was established and the intermediate wire became red hot.] There is the power running beautifully through the wire, which I have made thin on purpose to show you that we have those powerful forces; and now, having that power, we will proceed with it to the examination of water.

I have here two pieces of platinum, and if I lay them down upon this piece of paper [the moistened paper on the tin foil] you will see no action; and if I take them up there is no change that you can see, but the arrangement remains just as it was before. But now see what happens; if I take these two poles and put either one or the other of them down separately on the platinum plates, they do nothing for me, both are perfectly without action; but if I let them both be in contact at the same moment, see what happens [a brown spot appeared under each pole of the battery]. Look here at the effect that takes place, and see how I have pulled something apart from the white—something brown; and I have no doubt, if I were to arrange this, and were to put one of the poles to the tinfoil on the other side of the paper, why, I get such a beautiful action upon the paper, that I am going to see whether I cannot write with it—a telegram, if you please [the lecturer here traced the word "juvenile" on the paper with one of the terminal wires]. See there how beautifully we can get our results.

You see we have here drawn something, which we have not known about before, out of this solution. Let us now take that flask from Mr. Anderson's hands, and see what we can draw out of that. This, you know, is a liquid which we have just made up from copper and nitric acid, whilst our other experiments were in hand, and though I am making this experiment very hastily, and may bungle a little, yet I prefer to let



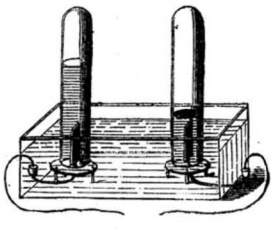
you see what I do rather than prepare it beforehand.

Now see what happens. These two platinum plates are the two ends (or I will make them so immediately) of this apparatus; and I am about to put them in contact with that solution, just as we did a moment ago on the paper. It does not matter to us whether the solution be on the paper or whether it be in the jar, so long as we bring the ends of the apparatus to it. If I put the two platinums in by themselves, they come out as clean and as white as they go in [inserting them into the fluid without connecting them with the battery]; but when we take the power and lay that on [the platinums were connected with the battery and again dipped into the solution], this, you see [exhibiting one of the platinums] is at once turned into copper, as it were; it has become like a plate of copper; and that [exhibiting the other piece of platinum] has come out quite clean. If I take this coppered piece and change sides, the copper will leave the right-hand side and come over to the left-hand side; what was before the coppered side comes out clean, and the plate which was clean comes out coated with copper; and you thus see that what copper we put into this solution we can also take out of it by means of this instrument.

Putting that solution aside, let us now see what effect this instrument will have upon water. Here are two little platinum plates which I intend to make the ends of the battery, and this, C, is a little vessel so shaped as to enable me to take it to pieces, and show you its construction. In these two cups, A and B, I pour mercury, which touches the ends of the wires connected with the platinum plates. In the vessel, C, I pour some water containing a little acid (but which is put only for the purpose of facilitating the action—it undergoes no change in the process), and connected with the top of the vessel is a bent glass tube, D, which may remind you of the pipe which was connected with the gun barrel in our furnace experiment, and which now passes under the jar, F. I have now adjusted this apparatus, and we will proceed to affect the water in some way or other. In the other case, I sent the water through a tube which was made red hot; I am now going to pass the electricity through the inside of this vessel. Perhaps I may boil the water; if I do boil the water I shall get steam; and you know that steam condenses when it gets cold, and you will therefore see, by that, whether I do boil the water or not. Perhaps, however, I shall not boil the water, but produce some other effect. You shall have the experiment and see. There is one wire which I will put to this side, A, and here is the other wire which I will put to the other side, B, and you will soon see whether any disturbance takes place. Here it is seeming to boil up famously; but does it boil? Let us see whether that which goes out is steam or not. I think you will soon see the jar, F, will be filled with vapor, if that which rises from the water is steam. But can it be steam? Why, certainly not; because there it remains, you see, unchanged. There it is standing over the water, and it therefore cannot be steam, but must be a permanent gas of some sort. What is it? Is it hydrogen; is it steam; is it anything else? Well, we will examine it. If it is hydrogen it will burn. [The lecturer then ignited the gas collected, which burnt with an explosion.] It is certainly something combustible, but not combustible in the way that hydrogen is. Hydrogen would not have given you that noise, but the color of that light when the thing did burn was like that of hydrogen; it will, however, burn without contact with the air. That is why I have chosen this other form of apparatus for the purpose of pointing out to you what are the particular circumstances of this experiment. In place of an open vessel, I have taken one that is closed; (our battery is so beautifully strong, that we are even boiling the mercury, and getting all things right—not wrong, but vigorously right); and I am going to show you that that gas, whatever it may be, can burn without air; and in that respect differs from a candle, which cannot burn without the air. And our manner of doing that is as follows:—I have here a glass vessel, G, which is fitted with two platinum wires, I K, through which I can apply electricity; and we can put the vessel on the air pump and exhaust the air, and when we have taken the air out we can bring it here and fasten it on to this jar, F, and let that gas into the vessel which was formed by the action of the voltaic battery upon the water, and which we have produced by changing the water into it—for I may go so far as this, and say we have merely, by that experiment, changed the water into that gas. We have not only altered its condition, but we have changed it really and truly into that gaseous substance; and all water is there which was decomposed by the experiment. As I screw this vessel, G H, on here, H′, and make the tubes well connected, and when I open the stop cocks, H H H′, if you watch the level of the water in F, you will see that that gas will rise. Now, I will close the stop cocks, as I have drawn up as much as that vessel can hold, and being safely conveyed into that chamber, I will pass into it an electric spark from this Leyden jar, L, and the vessel, which is now quite clear and bright, will become dim. There will be no sound, for the vessel is strong enough to confine the explosion. [A spark was then passed through the jar, when the explosive mixture was ignited.] Did you see that brillant light? If I again screw the vessel on to the jar, and open these stop cocks, you will see that the gas will rise a second time. [The stop cocks were then opened.] Those gases [referring to the gases first collected in the jar, and which had just been ignited by the electric spark] have disappeared, as you see; their place is vacant, and fresh gas has gone in. Water has been formed of them; and if we repeat our operation [repeating the last experiment], I shall have another vacancy, as you will see by that water rising. I always have an empty vessel after the explosion, because the vapor or gas into which the water has been resolved by the battery, explodes under the influence of the spark, and changes into water; and by and by you will see in this upper vessel some drops of water trickling down the sides and collecting at the bottom.

We are here dealing with water entirely, without reference to the atmosphere. The water of the candle had the atmosphere helping to produce it; but in this way it can be produced independently of the air. Water, therefore, ought to contain that other substance which the candle takes from the air, and which, combining with the hydrogen, produces water.

Now, you saw that one end of this battery took hold of the copper, extracting it from the vessel which con-



tained the blue solution. It was effected by this wire; and surely we may say if the battery has such power with a metallic solution which we made and unmade, may we not think that it is possible that it can split

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asunder the component parts of the water, and put them into this place and that place? Suppose I take the poles—the metallic ends of this battery—and see what will happen with the water in this apparatus, where we have separated the two ends far apart. I place one here (at A), and the other there (at B), and I have little shelves with holes which I can put upon each pole, and so arrange them that whatever escapes from the two ends of the battery will appear as separate gases; for you saw that the water did not become vaporous but gaseous. The wires are now in perfect and proper connection with the vessel containing the water, and you see the bubbles rising; let us collect these bubbles and see what they are. Here is a glass cylinder, O, I fill it with water and put it over one end, A, of the pile, and I will take another, H, and put it over the other end, B, of the pile. And so now we have a double apparatus, with both places delivering gas. Both these jars will fill with gas. There they go, that to the right (H) filling very rapidly; the one to the left (O) filling not so rapidly; and though I have allowed some bubbles to escape, yet still the action is going on pretty regularly, and were it not that one is rather smaller than the other, you would see that I should have twice as much in this (H) as I have in that (O). Both these gases are colorless; they stand over the water without condensing; they are alike in all things—I mean in all *apparent* things; and we have here an opportunity of examining these bodies and seeing what they are. Their bulk is large, and we can easily apply experiments to them. I will take this jar (H) first, and will ask you to be prepared to recognize hydrogen.

Think of all its qualities—the light gas which stood well in inverted vessels, burning with a pale flame at the mouth of the jar, and see whether this gas does not satisfy all these conditions. If it be hydrogen, it will remain here while I hold this jar inverted. [A light was then applied and the hydrogen burned.] What is there now in the other jar? You know that the two together made an explosive mixture. But what can this be which we find as the other constituent in water, and which must, therefore, be that substance which made the hydrogen burn? We know that the water we put into the vessel consisted of the two things together. We find one of these is hydrogen; what must that other be which was in the water before the experiment, and which we have now by itself? I am about to put this lighted splinter of wood into the gas. The gas itself will not burn, but it will make the splinter of wood burn. [The lecturer ignited the end of the wood and introduced it into the jar of gas.] See how it invigorates the combustion of the wood, and how it makes it burn far better than the air would make it burn, and now you see by itself that every other substance which is contained in the water, and which, when the water was formed by the burning of the candle, must have been taken from the atmosphere. What shall we call it, A, B, or C? Let us call it O—call it "Oxygen;" it is a very good distinct-sounding name. This, then, is the oxygen which was present in the water, forming so large a part of it.

Great Importance of a Smooth and Solid Track for Railroads.

The following weighty remarks by Mr. Holley, in his recent work on "Railway Practice," are certainly worthy of the attention of every person who is interested in the construction of railroads:—

In a former work, Mr. Zerah Colburn and the author laid before the public, in considerable detail, the comparative working expenses of European and American railways. It was shown that the cost of maintaining the permanent way, and of maintaining and working the trains, was, in round numbers, one-half as much on English as on American lines; and that the economy of the former was due chiefly to smoother and more permanent way-bed and superstructure.

The excessive first cost of the British railway system was shown to consist chiefly in land and parliamentary expenses; in tunnels, bridges, viaducts and stations, far exceeding in magnitude and cost the actual requirements of at least American lines, and in other items which do not contribute to the economical movement of trains.

The simple "track" of a first-class English line was found to have cost about $1,500 per mile more than that of an ordinary American line, at the respective prices of material and labor in the two counrties.

However greatly individual American lines may have been improved within the last two or three years, it is evident that the same differences in construction and working still characterize the systems of the two countries. But the European system is practically acknowledged to be quite imperfect by the many attempts made to improve it, by the extensive experiments now in process with each promising new invention and adaptation, and by the increasing diversity in the practice of different lines.

Extension of Hoe's Patent in England.

The *London American* announces that the Judicial Committee of the Privy Council extended Hoe's English patent for printing machines. Mr. Richard M. Hoe, of New York, was the inventor; but the nominal patentee, and one of the petitioners, was Mr. William Newton. Mr. Grove, the counsel for the petitioners, stated to the Committee the advantages possessed by this printing press over the celebrated Applegarth machine. Both are used by the *Times*, the latter, however, only as "aids." He described the nature of the invention, and stated that one of Mr. Hoe's ten-feeder machines could print from 20,000 to 25,000 newspapers in an hour. The efforts made by the patentee had involved a vast amount of industry and skill. Mr. Hoe came over to this country in 1847, but it was nine years from the date of his patent before he could get anything done, and English sales had been only fourteen machines. By the inventor's accounts, which were presented, it seems that the profits from the patent, were £7,000, but of this £4,000 went to Mr. Hoe's partners, and he had only received £3,000, which was a most inadequate remuneration for an invention of such importance, especially to the cheap press, which was obliged to use thin paper, for which Applegarth's machine is not applicable.

Several eminent engineers bore testimony to the value of the invention, and Mr. Welsby, on behalf of the Crown, made no opposition.

Lord Cranworth delivered the judgment of their lordships, who, he said, were all satisfied that this was a most useful invention—one of great merit and simplicity, as far as simplicity could apply to such an invention. They thought that the inventor had not derived that reasonable profit which he had a right to expect. He had been for several years without profit, and in his accounts he had placed many charges on the debtor side of the account with which he might have credited himself. Under all the circumstances, their lordships would advise Her Majesty to extend the patent.

The Streets of London.

Some of the facts stated by Mr. Gough, in his lecture on the "Streets of London," are very curious. He says the population is increasing at the rate of 1,000 per week; from this it follows that, in the average, in every hour of the day and night there are six persons in London more than there were the hour before. The city is 60 miles in circumference, and has 5,000 miles of paved streets. Land in the vicinity of Cornhill and the Exchange has been sold for $5,000,000 per acre. The fog of London had never been adequately described. It was an odd sensation, when he was speaking in Exeter Hall, produced in the course of a few minutes, not to be able to see one in the crowded galleries—to be speaking to people, and see nobody there. If you go out in the streets, it seems as if you were wading in an illuminated sea of pea soup. These fogs never rise higher than 200 feet above the city; they come in December, and are never seen after February. They are supposed to be caused by the smoke of bituminous coal issuing from innumerable chimneys. As an illustration of the benevolence of London, the lecturer instanced the amount raised for the soldiers in the Crimea—$6,500,000 in less than six months by subscription. In the prisons the prisoners said they could not give money, but they would give their provisions, and they starved themselves twenty-four hours so that the amount of a day's provisions could go into the sum. The lecturer described the ragged schools, of which there are 170, with 25,000 pupils; also the various shifts made to get a living. Nothing is wasted in London—the hoofs and nostrils of dead horses serve to make a fine gelatine, and the blood is used to give a particularly nice flavor to catsup. Mr. Gough closed with a humorous account of the celebration of Guy Fawkes's day, the 5th of November.

ESSENCE OF VERBENA LEAF.—A sweet and refreshing perfume for the handkerchief. Take rectified spirits of wine, half a pint; otto ofverbena, half a drachm; otto of bergamot, one drachm; and tincture of tolu, a quarter of an ounce. Mix them together, and it is ready for use. This sweet scent does not stain the handkerchief, and is very economical. No one must suppose for a moment that this essence will be good unless it is made of pure ingredients.

Turkey and American Civilization.

A series of deeply interesting lectures have lately been given in New York and Brooklyn, by Rev. Cyrus Hamlin, D D., who has been a resident of Constantinople for the past twenty years. There is no Christian living, we believe, who understands the Moslem character and the affairs of Turkey better than Dr. Hamlin, or who has done so much to introduce the agents of modern civilization—science and the useful arts—among the Turks of Constantinople. He has a thorough appreciation of the value of improved machinery, as we understand he was a practical mechanic in his younger days, and worked at his trade in Bangor, Maine. Having formed a resolution to preach the Gospel as a missionary, he studied theology and acquired a scientific education, and when he went to Constantinople, he took out working models of several improved American machines, the uses of which he explained to the Sultan, to whom he was introduced for the purpose, and who has ever been friendly toward him.

At one period a number of converts, principally mechanics, from the Armenian Church, were subjected to a silent, but very crushing persecution from their own people, by secret measures being carried out to prevent their obtaining employment, but the Yankee genius and enterprise of Dr. Hamlin met and overcame the evil. With the material assistance of some good friends, he erected a grist mill and bakery, and made flour and bread of a superior quality. By these means he gave the persecuted Armenian converts honest and profitable employment, and it was through his agency that the allied army in the vicinity of Constantinople was supplied with fresh bread during the Crimean war. The British soldiers, who had been formerly fed on musty biscuits that could almost walk alone, received their first supplies of Dr. Hamlin's bread with almost frantic rejoicings. The loaves were stuck upon the ends of their bayonets, raised aloft above their heads, cheers were given for the American missionary baker, and away went their old musky biscuits pell mell into the river.

Dr. Hamlin intends to return again to Turkey, and will take a number of American machines with him. He purposes to complete an American College in Constantinople on a commanding elevation, and thus with the holy influence of Christian education, he will carry our useful arts to the banks of the Bosphorus.

Substitute for Rifled Cannon.

A method has been invented of dispensing with rifling cannons, and, at the same time, securing long range and unerring accuracy of flight. The particulars given of this invention are as follows:—First, the breech is bored, say one-eighth of an inch larger than the bore of the gun, the projectile, which is elongated, being constructed to fit the breech; second, the projectile is coated with a soft metal, with a hole through the center from end to end; third, immediately when the projectile enters the gun, it meets with a shoulder which takes off a shaving, thus molding it to the exact size of the gun, thereby precluding all windage; fourth, on the projectile leaving the gun, the air forces out the "bevel" plug at the back; the air then, having a free passage through the projectile, prevents the possibility of its diverging either left or right, or turning over; on the contrary, it causes it to travel with astonishing and unerring precision. The sudden expansion of air at the back considerably assists its onward course.

We have seen the above in several of our cotemporaries; it is very liable to mislead those who are not acquainted with the subject. It is not the prevention of windage which gives the rifle ball such accuracy in comparison with smooth-bored firearms, but its rotary motion, by which it is made to rotate around an axis during its entire flight. No provision is made in the above construction of cannon and ball, as described, to give the latter a spinning motion; consequently, the invention cannot be a substitute for rifled cannon.

NEW COATING FOR TELEGRAPH WIRES.—Mr. J. Macintosh, of London, in the patent taken out recently by him, says: "When telegraph wires are insulated with gutta-percha, minute pores exist in the covering, and when insulated with india-rubber, it absorbs from 18 to 25 per cent of water." To remedy these defects Mr. Macintosh mixes gutta-percha and india-rubber with parafine or stearic acid. The proportions are about 75 parts of gutta-percha or india-rubber, to 25 parts by weight of stearic acid. These substances, in such proportions, are mixed together by grinding it in the common manner and applying it hot to cover the wires.

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BAGASSE AS A FUEL.

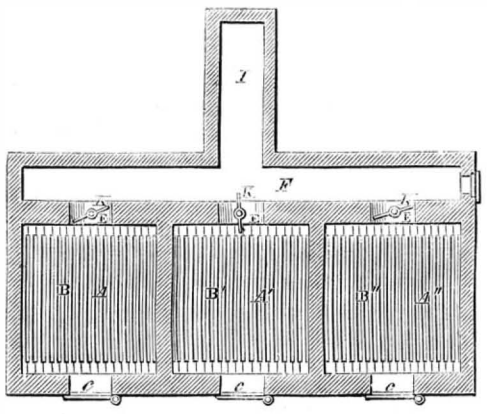
The following communication was addressed to us by an esteemed correspondent, resident in Louisiana, a long time ago. We intended to have given it an earlier reply, but circumstances have prevented. Perhaps it is "better late than never":—

The suit of "Moses Thompson *vs.* A. Lesseps and others," was tried in the United States Circuit Court—Judge McCalop presiding—in New Orleans, some time ago, and resulted in the jury not agreeing.

The principal grounds upon which this case hangs is, that Moses Thompson claims to be the original discoverer of the principal of decomposing the water contained in wet fuel, and using the oxygen resulting from said decomposition for the support of the combustion of the said wet fuel, he having his furnace closed and not admitting atmospheric air, except as occasion may require; and he uses a series of chambers (air-tight) to continue his process. Mr. Thompson claims that no person can burn bagasse or other wet fuel to produce any good result without violating his patent; therefore he has brought suit against the planters who are using Hagar & Allyn's furnace, and also Skelly's and Gilman's. This suit is of the utmost importance to the sugar planters of this and other soutliern States, and involves interests of some hundreds of thousands of dollars, as well as deterring all parties from erecting furnaces until its final decision. I am of opinion that Mr. Thompson's claim cannot be sustained; because, if so, then all parties who use any kind of wet wood or other fuel in any kind of perfect furnace that consumes the gases with any degree approaching perfection, would be in violation of Mr. Thompson's patent, and good furnaces of this description have been at work for various mechanical, chemical and scientific uses ever since human ingenuity began its researches and developments.

Yours, very respectfully,
A. J. CHAPMAN.

Our correspondent is slightly in error in respect to Mr. Thompson's claim and invention. The decomposition of water in the burning of fuel is so very old that no person could claim that principle, broadly, at the present day. In Thompson's first patent (1855) three separate furnace chambers, A A′ A″, are arranged



side by side. These furnaces have the usual ashpits and doors in front; while at their rear ends, there is a short flue, E, and a damper, K. The flues all open into a large chamber, F, called a mixing chamber, which communicates with the chimney. All the furnaces discharge their products of combustion into the mixing chamber, and the steam boiler which is to be heated is placed at I, in or near the mixing chamber, so as to receive the heat occasioned by the combustion of the gases.

The furnaces are first intensely heated with dry fuel; the bagasse or other wet fuel is now thrown into the two outer furnaces, A and A″, and their front doors closed to prevent the admission of air, and their dampers, K, nearly closed. But the hot fire in the central furnace, A′, is maintained; its front door, for the admission of air, is opened; so is its damper, K. The flames and heated air from this central furnace, therefore, drive into the mixing chamber, F, and supply with oxygen and ignite the gases that are escaping from the partially closed chambers, A A″. For the success of this furnace, it is requisite that there shall be at least one hot fire plentifully supplied with oxygen, constantly discharging flame and air into the mixing chamber, F.

The chambers into which the fresh bagasse or other wet fuel is placed serve to a certain extent as retorts, in which the fuel is dried and partially distilled, and the water contained in the fuel is partially decomposed; the resultant gases being ignited in the mixing chamber in the manner before described. After the distillation is complete the dampers, K, are opened, and the fire burns like other dry fuel fires. Two of the furnaces are left charged with wet fuel, while one is alternately left burning with a strong flame, as before mentioned.

Thompson's furnace, so far as we can learn, is a useful invention, and serves a good purpose for the burning of tan bark bagasse and other wet fuels. But it is by no means the only practical and serviceable furnace that may be employed for this purpose.

Annexed we give engravings of some devices for consuming the gases of fuels, either of which could, no doubt, be made serviceable in the burning of wet fuels. As these are English patents, not secured in this country so far as we know, any person has the right to make and use them. Of course, the mere idea of burning bagasse or tan bark in a furnace is not patentable; it has been practised more or less, probably, for fifty years past.

Thomas Hall—English Patent Granted Feb. 21, 1839.

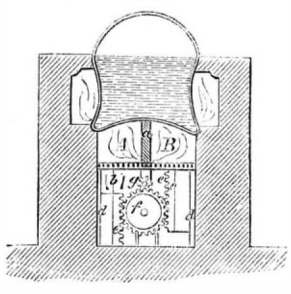
This invention consists in a peculiar arrangement of two or more fire places under one boiler, with the flues or dampers necessary for their effective operation, whereby the smoke and gases arising from the combination of a fresh supply of fuel become consumed by passing over the surface of a glowing fire in the fire place contiguous.

This is effected by dividing the furnace longitudinally into two or more parts in order to form two or more distinct fire places which are to be supplied with fresh fuel alternately, allowing that in the adjoining fire place, over which the fresh smoke is to be directed, to have become completely red.

The direction of the smoke and gases is to be regulated by dampers placed at the end of the furnaces, in order that the communication with the flue may be cut off from such fire place while the fresh fuel is introducing and the smoke emitted is driven over the red hot fuel of the next fire place through a lateral opening, by which means the smoke becomes consumed.

In the accompanying engravings Fig. 1 is a transverse

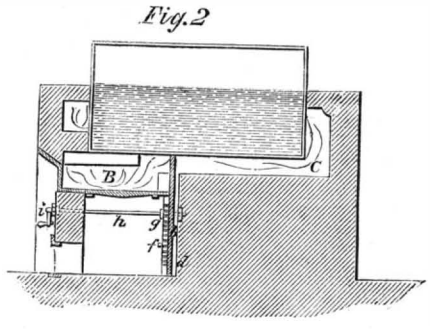
Fig. 1



section, taken about through the middle of one of the improved furnaces.

Fig. 2 is a longitudinal section of the same.

Fig. 2



The furnace is divided in two compartments, A and B, by a longitudinal partition, *a*; *b* are the dampers which slide in grooves, *d*, and which are operated by toothed racks, *e*, that are secured to the dampers, and which gear in a cog-wheel, *f*, which is actuated by a pinion, *g*, fixed on the shaft, *h*, and revolved by a crank, *i*.

Fig. 1 represents the fire, B, having received a fresh supply; damper *c* is up and damper *b* down. The fire, A, burns brightly. The claim is on the arrangement of the parts of furnaces for steam boilers, &c., or the division of the furnace into two or more fire places by means of a longitudinal partition or partitions, having a lateral aperture or apertures communicating from one fire place to the next fire place adjoining, with movable dampers at the ends of the respective fire places for occasionally stopping the flues, in order that the dense volume of smoke and combustible vapor evolved at every fresh supply of fuel may be conducted into the adjoining fire place, where, by passing over the ignited red hot fuel, it may become burned and consumed.

James Bristow and Henry Atwood—English Patent Granted April 29, 1853.

This invention relates to a mode of constructing or arranging the flues of adjacent furnaces or fire places, so that the smoke or gases of combustion arising from one fire place or furnace may be conducted over the bright fire of another fire place, and be thereby consumed.

This object is obtained by bringing the several adjacent furnaces into communication with a flue or flues provided with dampers. When fresh fuel is thrown on to one of the fires, the damper in the exit flue of that furnace is closed, and the smoke or gases generated are directed into the flue which connects with all the other furnaces, and thereby admitted into a furnace having a bright fire to be there consumed. When no smoke is given up from the recently charged fire place, the damper in the exit flue is opened and communication with the smoke-conducting flue is cut off. Any number of fire places or furnaces can be thus connected together, so as to admit of the smoke and gases from any one fire place of the series being conducted to any other fire place to be consumed.

In the accompanying engraving Fig. 1 is a longitudina vertical section.

Fig. 2 is a horizontal section.

Fig. 1

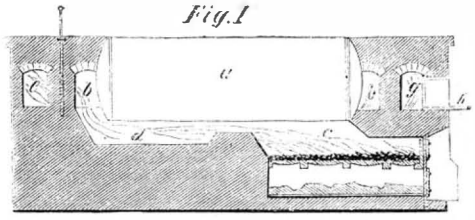
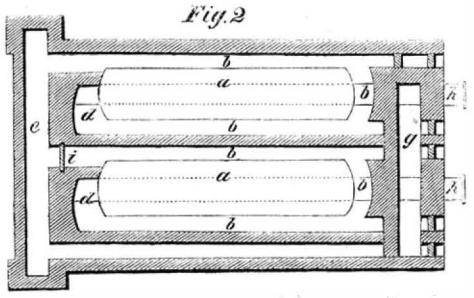


Fig. 2



The boilers, *a a*, are set in brickwork, with a flue, *b*, around each in the ordinary manner. Into this flue the smoke and gases from the fire place, *c*, pass by a flue, *d*, which runs under the boiler, and the gases having circulated through the flue, *b*, escape into a common flue, *e*, and finally make their exit through the chimney, *f*. Immediately over the fire place, *c*, in each furnace is an opening which leads to a flue, *g*, formed in the brickwork and running from end to end of the furnace.

Dampers *h*, when closed, cut off the communication between the several furnaces and the flue, *g*.

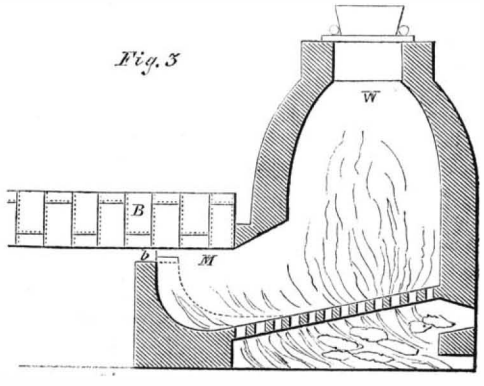
The flues, *b*, are provided with dampers, *i*, for cutting off the communication of their several furnaces with the flue, *e*.

The inventor says:—"I disclaim the broad principle of diverting the smoke, but I claim the means herein described, by which any two of a series of furnaces may be readily brought into connection with each other for the purpose of effecting the combustion of the smoke given off from the successive charges of coal supplied to each furnace.

We might recite many other instances in which furnaces have been made for consuming the gases arising from the burning of the fuel, whether wet or dry. The very earliest practical device for this purpose was probably that invented by the celebrated James Watt in 1785. It is thus described by him in his specification: "My newly improved methods of constructing furnaces or fire places, consist in causing the smoke or flame of the fresh fuel, in its way to the flues or chimney, to pass, together with a current of fresh air, through, over, or among fuel which has already ceased to smoke, or which is converted into coke, charcoal or cinders, and which is intensely hot; by which means the smoke and grosser parts of the flame, by coming into close contact with, or by being brought near unto the said intensely hot fuel, and by being mixed with the current of fresh or unburned air, are consumed or converted into heat, or into pure flame, free from smoke. I put this in practice, first, by stopping up every avenue or passage to the chimney or flues, except such as are left in the interstices of the fuel, by placing the fresh fuel above or nearer to the external air than that which is already converted into coke or charcoal; and by constructing the fire places in such manner that the flame and the air which animate the fire must pass downward, or laterally, or horizontally, through the burning fuel, and pass from the lower part or internal end or side of the fire place to the flues or chimney."

In 1857 Mr. Thompson obtained a second patent, of which Fig. 3 represents a side elevation. Two furnaces are built side by side, the fires being divided by a partition. Each furnace has two grates. The bagasse

Fig. 3



is fed in at W and falls upon the inclined grate, below which a strong fire of dry fuel is made. The heat and

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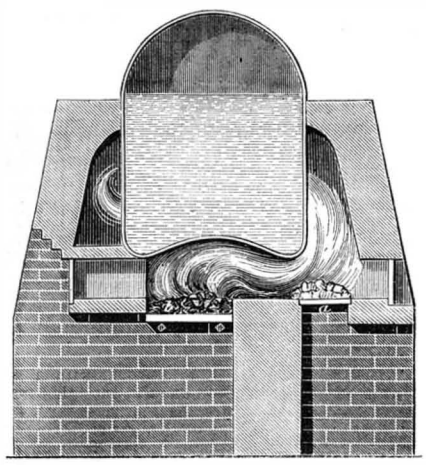
gases from the dry fuel fire pass through the bagasse, drying the latter and carrying its gases into a mixing chamber at M.

The idea of using two fires in the combustion of fuel is not new. We annex a sketch of a method invented in 1785 by James Watt, and intended to facilitate the ignition of the volatile portions of bituminous coal. This device can perhaps be successfully employed in the burning of wet fuels.



Mr. Watt observes:—"In some cases I place the fresh fuel on a grate, as at *a*, and beyond that grate, at or near the place where the flame passes into the flues or chimneys, I place another smaller grate, *b*, on which I maintain a fire of charcoal, coke or coals, which have been previously burned, until they have ceased to smoke, which by giving intense heat, and admitting some fresh air, consumes the smoke of the last fire."

Electrical Atmospheric Phenomena and Disease.

At a late meeting of the Manchester (England) Philosophical Society a paper was read by Thomas Moffat, M. D., on the prevalence of certain forms of disease in connection with snow, hail and rain storms. During observations made for eight years it was found that persons subject to apoplexy, paralysis, and vertigo were affected in a most marked manner when hail and snow storms prevailed. A table had been formed of 236 cases of the above diseases and upwards of one thousand observations were made with the electrometer, and it was shown that the nervous centers were affected according to the electrical condition of the atmosphere. On the approach of great storms the air was electrically negative, and diseases of the nervous centers and convulsions were common. Other forms of disease also frequently accompanied such electrical conditions of the atmosphere, such as cramps, vertigo, and diarrhœa. It therefore appears that negative electricity in the atmosphere plays an important part in relation to the morbid conditions of the human system.

As in England so in America, the condition of the atmosphere affects the human system almost in the same manner as related in the above abstract of Dr. Moffat's paper; and although we are not aware of any observations having been made to determine the electrical condition of our atmosphere during storms, we have no doubt but the causes are the same on both continents. During the prevalance of east, northeast, and southeast winds on the American Atlantic coast, persons subject to rheumatic and nervous diseases generally suffer acutely. Is there any remedy for this?

A Four Thousand-Dollar Prize.—The French government has founded a biennial prize of 20,000 francs for the work or the discovery most worthy of honoring the national genius, to be decreed in the public annual session of the five academies of the institute. In the recent meeting of the five academies, when the subject of decreeing the first of these prizes was brought up, it was decided, with remarkable promptness and unanimity, to bestow it upon Mr. Fizeau, in consideration of his beautiful researches on the rapidity of light, measured on the surface of the earth.

Patents under the New Law.—The patent claims published under the proper head, on another page, are the first issued under the new law, and therefore are granted for seventeen years.

ROMANCE OF THE STEAM ENGINE.

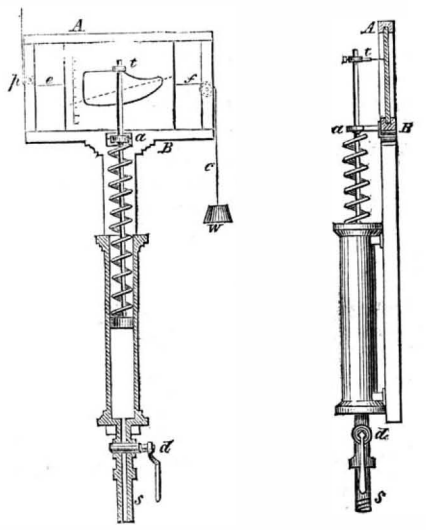
Article XV.

WATT'S INDICATOR.

The actual power of a steam engine is ascertained by a little instrument called the "Indicator," which consists of a small cylinder with a piston in it, moving against a spring, and compressing it to an extent corresponding to that of the steam pressure. This instrument is also due to the genius of Watt, and by it what are called "indicator cards" are taken from an engine. In America, Stillman's indicators are in quite common use, in England, McNaughton's, but we give a representation in two figures—a vertical section and a side elevation—of the one said to be constructed as designed by Watt.

A small brass cylinder is shown, with a piston inside, and having its rod surrounded with a spiral spring abutting on a button above. This rod passes through a collar at *a*, and it has a pencil holder at *t*. It is screwed at the foot, *s*, into a hole on the top of the cylinder of the engine. *d* is the cock by which communication may be opened or closed between the indicator and the steam cylinder.

When the indicator piston rises, the spring is compressed; and when it falls, the spring is extended. The spring is in equilibrio when the piston is at the middle of the cylinder, and the space through which it rises and falls is proportional to the force which presses the piston upward or downward. When both



extremities of the cylinder are open to the atmosphere, the spring is at rest, and the piston in the middle of the cylinder; but when steam is allowed to pass from the cylinder to the indicator, by opening the stopcock, *d*, such steam will press the piston upward, and compress the spring with a force equal to the excess of the steam above that of the atmosphere. When, on the other hand, a vacuum is produced in the engine cylinder, by the condensation of the steam, the same vacuum will be produced under the piston in the indicator, and the piston will be forced downward by the excess of the pressure of the atmosphere above that of the uncondensed vapor in the cylinder.

An index is placed near the extremity of the piston rod, and *t*, the pencil, ascending and descending on this index, indicates by the space through which it ascends the excess of the pressure of the steam over that of the atmosphere, and by the space through which it descends, the excess of the pressure of the atmosphere over that of the uncondensed vapor. Both spaces added together, or the entire play of the piston, will therefore indicate the excess of the pressure of the steam above the pressure of the uncondensed vapor which resists it, and, therefore, the effective force of the piston, exclusive of friction.

The engine itself records the above effects, as the indicator is a self-registering instrument. The small square, A B, has a card capable of sliding in a horizontal direction in grooves; a string, *e*, is fastened to the side of the card, and, passing over a pulley, is carried upward toward *p*, and attached to some part of the machinery which rises and falls with the piston of the engine. Another string, *f*, is attached to the other side of the card, and carried over a pulley is fixed to a small weight, W. When the piston rises, the string, *e*, is drawn to the left, the card is drawn in the same direction, and the weight, W, rises. When the piston falls, the weight, W, acting on the string, *f*, draws the cord to the right. Thus, as the piston rises and falls, the card is drawn alternately through a certain space left and right.

Let us now suppose steam admitted above the piston of the engine, pressing the piston down. This steam presses the piston of the indicator up, and the pencil, *t*, passing on the card, would, if the card were at rest, mark upon it a straight line, the length of which would indicate the pressure of the steam; but as the card is drawn from left to right while the piston falls, the pencil will describe upon it a curve by the combined effects of the vertical motion of the pencil and the horizontal motion of the card. The suddenness of the curvature thus described will indicate the rapidity of the action of the steam on the piston.

When the piston has reached the bottom of the cylinder, and the upper exhausting valve is closed, a vacuum is produced in the cylinder, which vacuum extends to the indicator, the piston of which therefore descends, the pencil, *t*, descending at the same time and at the same rate. While this takes place, the card is traced from right to left, and has a corresponding curve described upon it by the pencil, the curvature of which will indicate the suddenness with which the vacuum is produced, as well as its degree of perfection.

From what has been stated it will appear that in a single ascent and descent of the piston, or in one stroke, as it is technically called, a diagram is formed upon the card, which will exhibit not only the entire mechanical effect of the steam acting on one side against the uncondensed vapor on the other, but will show the entire character of its progressive action at every point of the stroke.

Cleaning Platinum Vessels and Wires.

Platinum vessels, such as crucibles, that are much used and exposed to a high heat, gradually become tarnished, and the surface acquires a gray coating. When this is examined with a microscope, the metal is found to have acquired a rough surface, which may be removed, as follows, without injury: Take a small lump of soda amalgam, and rub it gently over the tarnished surface with a cloth until the whole surface is brilliantly metallic. Water is then applied; this oxydizes the sodium, and the mercury can then be easily wiped off, when the platinum surface is found to be in an excellent condition for burnishing with a proper tool. Sodium possesses the property of imparting to mercury a power to wet platinum, while the latter does not undergo the least trace of amalgamation. Platinum wires, which are frequently ignited in a gas flame—for example, the triangles which are used to support crucibles—become, as is known, gray and brittle. If such wire is strongly and perseveringly rubbed with sand, the cracks disappear, and the wire becomes smooth and polished; for the grains of sand, acting like burnishers, restore the original tenacity of the metal, very little of its substance being rubbed off meanwhile.

Crucibles may also be rubbed with sand and treated like wires, and they will become as good as new again. This is a more simple method than the amalgam process described above; but we give both methods for the sake of variety. The sand used for rubbing should be well worn—rounded.

Illinois Central Railroad.—From the report of the President of this great work it seems that the total expenditures have been $33,221,720, of which $4,996,213 was for interest. Of this sum $15,654,980 was paid by stockholders; the remainder having been borrowed on various kinds of bonds, of which $1,746,500 have been cancelled. The income of the road has just reached a point at which it will pay the interest on the bonds, so that the suicidal policy of hiring money to pay the interest will be discontinued. The company have sold 1,260,273 acres of land at an average of $12.67 per acre, and they have 1,334.727 acres on hand. They hold $12,598,083 of land notes, and it is estimated that these, with the proceeds of the unsold lands, will be far more than sufficient to pay off all the indebtedness and all the stock, leaving the company in possession of their road, which, including its branches, is 707 miles long, entirely free of cost.

The oil wells of the Birman Empire yield annually 400,000 barrels of oil.

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THE NEW PATENT LAW.

AN ACT

In Addition to "An Act to Promote the Progress of the Useful Arts."

SECTION 1. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Commissioner of Patents may establish rules for taking affidavits and depositions required in cases pending in the Patent Office, and such affidavits and depositions may be taken before any justice of the peace, or other officer authorized by law to take depositions to be used in the courts of the United States, or in the State courts of any State where such officer shall reside; and in any contested case pending in the Patent Office it shall be lawful for the clerk of any court of the United States for any district or Territory, and he is hereby required, upon the application of any party to such contested case, or the agent or attorney of such party, to issue subpœnas for any witnesses residing or being within the said district or Territory, commanding such witnesses to appear and testify before any justice of the peace, or other officer as aforesaid, residing within the said district or Territory, at any time and place in the subpœna to be stated; and if any witness, after being duly served with such subpœna, shall refuse or neglect to appear, or, after appearing, shall refuse to testify (not being privileged from giving testimony), such refusal or neglect being proved to the satisfaction of any judge of the court whose clerk shall have issued such subpœna, said judge may thereupon proceed to enforce obedience to the process, or to punish the disobedience in like manner as any court of the United States may do in case of disobedience to process of subpœna and testificandum issued by such court; and witnesses in such cases shall be allowed the same compensation as is allowed to witnesses attending the courts of the United States: *Provided*, That no witness shall be required to attend at any place more than forty miles from the place where the subpœna shall be served upon him to give a deposition under this law: *Provided, also*, That no witness shall be deemed guilty of contempt for refusing to disclose any secret invention made or owned by him: *And provided, further*, That no witness shall be deemed guilty of contempt for disobeying any subpœna directed to him by virtue of this act, unless his fees for going to, returning from, and one day's attendance at the place of examination shall be paid or tendered to him at the time of the service of the subpœna.

SEC. 2. *And be it further enacted*, That, for the purpose of securing greater uniformity of action in the grant and refusal of Letters Patent, there shall be appointed by the President, by and with the advice and consent of the Senate, three Examiners-in-Chief, at an annual salary of three thousand dollars each, to be composed of persons of competent legal knowledge and scientific ability, whose duty it shall be, on the written petition of the applicant for that purpose being filed, to revise and determine upon the validity of decisions made by Examiners when adverse to the grant of Letters Patent; and also to revise and determine in like manner upon the validity of the decisions of Examiners in interference cases, and when required by the Commissioner in applications for the extension of patents, and to perform such other duties as may be assigned to them by the Commissioner; that from their decisions appeals may be taken to the Commissioner of Patents in person, upon payment of the fee hereinafter prescribed; that the said Examiners-in-Chief shall be governed in their action by the rules to be prescribed by the Commissioner of Patents.

SEC. 3. *And be it further enacted*, That no appeal shall be allowed to the Examiners-in-Chief from the decisions of the Primary Examiners, except in interference cases, until after the application shall have been twice rejected; and the second examination of the application by the Primary Examiner shall not be had until the applicant, in view of the references given on the first rejection, shall have renewed the oath of invention, as provided for in the seventh section of the act entitled "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," approved July fourth, eighteen hundred and thirty-six.

SEC. 4. *And be it further enacted*, That the salary of the Commissioner of Patents, from and after the passage of this act, shall be four thousand five hundred dollars per annum, and the salary of the Chief Clerk of the Patent Office shall be two thousand five hundred dollars, and the salary of the Librarian of the Patent Office shall be one thousand eight hundred dollars.

SEC. 5. *And be it further enacted*, That the Commissioner of Patents is authorized to restore to the respective applicants, or when not removed by them, to otherwise dispose of such of the models belonging to rejected applications as he shall not think necessary to be preserved. The same authority is also given in relation to all models accompanying applications for designs. He is further authorized to dispense in future with models of designs when the design can be sufficiently represented by a drawing.

SEC. 6. *And be it further enacted*, That the tenth section of the act approved the third of March, eighteen hundred and thirty-seven, authorizing the appointment of agents for the transportation of models and specimens to the Patent Office, is hereby repealed.

SEC. 7. *And be it further enacted*, That the Commissioner is further authorized, from time to time, to appoint, in the manner already provided for by law, such an additional number of principal Examiners, First Assistant Examiners, and Second Assistant Examiners as may be required to transact the current business of the office with dispatch, provided the whole number of additional Examiners shall not exceed four of each class, and that the total annual expenses of the Patent Office shall not exceed the annual receipts.

SEC. 8. *And be it further enacted*, That the Commissioner may require all papers filed in the Patent Office if not correctly, legibly, and clearly written, to be printed at the cost of the parties filing such papers; and for gross misconduct he may refuse to recognize any person as a patent agent, either generally or in any particular case; but the reasons of the Commissioner for such refusal shall be duly recorded, and subject to the approval of the President of the United States.

SEC. 9. *And be it further enacted*, That no money paid as a fee on any application for a patent after the passage of this act shall be withdrawn or refunded, nor shall the fee paid on filing a caveat be considered as part of the sum required to be paid on filing a subsequent application for a patent for the same invention.

That the three months' notice given to any caveator, in pursuance of the requirements of the twelfth section of the act of July fourth, eighteen hundred and thirty-six, shall be computed from the day on which such notice is deposited in the post office at Washington, with the regular time for the transmission of the same added thereto, which time shall be indorsed on the notice; and that so much of the thirteenth section of the act of Congress, approved July fourth, eighteen hundred and thirty-six, as authorizes the annexing to letters patent of the description and specification of additional improvements is hereby repealed, and in all cases where additional improvements would now be admissible independent patents must be applied for.

SEC. 10. *And be it further enacted*, That all laws now in force fixing the rates of the Patent Office fees to be paid and discriminating between the inhabitants of the United States and those of other countries which shall not discriminate against the inhabitants of the United States are hereby repealed, and in their stead the following rates are established:—

On filing each caveat, ten dollars;

On filing each original application for a patent except for a design, fifteen dollars;

On issuing each original patent, twenty dollars;

On every appeal from the Examiners-in-Chief to the Commissioner, twenty dollars;

On every application for the reissue of a patent, thirty dollars;

On every application for the extension of a patent, fifty dollars; and fifty dollars, in addition, on the granting of every extension;

On filing each disclaimer, ten dollars;

For certified copies of patents, and other papers, ten cents per hundred words;

For recording every assignment, agreement, power of attorney, and other papers, of three hundred words or under, one dollar;

For recording every assignment, and other papers, over three hundred and under one thousand words, two dollars;

For recording every assignment or other writing, if over one thousand words, three dollars;

For copies of drawings, the reasonable cost of making the same.

SEC. 11. *And be it further enacted*, That any citizen or citizens, or alien or aliens having resided one year in the United States, and taken the oath of his her or their intention to become a citizen or citizens, who by his, her, or their own industry, genius, efforts, and expense, may have invented or produced any new and original design for a manufacture, whether of metal or materials and original design for a bust, statue, or bass relief, or composition in alto or basso relievo, or any new and original impression or ornament, or to be placed on any article of manufacture, the same being formed in marble or other material, or any new and useful pattern, or print, or picture, to be either worked into or worked on, or printed, or painted, or cast, or otherwise fixed on any article of manufacture, or any new and original shape or configuration of any article of manufacture, not known or used by others before his, her, or their invention or production thereof, and prior to the time of his, her, or their application for a patent therefor, and who shall desire to obtain an exclusive property or right therein to make, use, and sell, and vend the same, or copies of the same, to others, by them to be made, used, and sold, may make application in writing, to the Commissioner of Patents, expressing such desire; and the Commissioner, on due proceedings had, may grant a patent therefor, as in the case now of application for a patent, for the term of three and one-half years, or for the term of seven years, or for the term of fourteen years, as the said applicant may elect in his application: *Provided*, That the fee to be paid in such application shall be, for the term of three years and six months ten dollars, for seven years fifteen dollars, and for fourteen years thirty dollars: *And provided*, That the patentees of designs under this act shall be entitled to the extension of their respective patents, for the term of seven years from the day on which said patents shall expire, upon the same terms and restrictions as are now provided for the extension of Letters Patent.

SEC. 12. *And be it further enacted*, That all applications for patents shall be completed and prepared for examination within two years after the filing of the petition, and in default thereof, they shall be regarded as abandoned by the parties thereto, unless it be shown to the satisfaction of the Commissioner that such delay was unavoidable, and all applications now pending shall be treated as if filed after the passage of this act; and all applications for the extension of patents shall be filed at least ninety days before the expiration thereof; and notice of the day set for the hearing of the case shall be published, as now required by law, for at least sixty days.

SEC. 13. *And be it further enacted*, That in all cases where an article is made or vended by any person under the protection of Letters Patent, it shall be the duty of such person to give sufficient notice to the public that said article is so patented, either by fixing thereon the word patented, together with the day and year the patent was granted; or when, from the character of the article patented, that may be impracticable, by enveloping one or more of the said articles, and affixing a label to the package, or otherwise attaching thereto a label on which the notice, with the date, is printed; on failure of which, in any suit for the infringement of Letters Patent by the party failing so to mark the article the right to which is infringed upon, no damage shall be recovered by the plaintiff, except on proof that the defendant was duly notified of the infringement, and continued after such notice to make or vend the article patented. And the sixth section of the act entitled "An act in addition to an act to promote the progress of the useful arts," and so forth, approved the twenty-ninth day of August, eighteen hundred and forty-two, be, and the same is hereby, repealed.

SEC. 14. *And be it further enacted*, That the Commissioner of Patents be, and is hereby authorized to print, or, in his discretion, to cause to be printed, ten copies of the description and claims of all patents which may hereafter be granted, and ten copies of the drawings of the same, when drawings shall accompany the patents, provided the cost of printing the text of said descriptions and claims shall not exceed, exclusive of stationery, the sum of two cents per hundred words for each of said copies, and the cost of the drawings

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hall not exceed fifty cents per copy; one copy of the bove number shall be printed on parchment, to be ffixed to the Letters Patent; the work shall be under he direction, and subject to the approval of the Commissioner of Patents, and the expense of the said copies shall be paid out of the patent fund.

SEC. 15. *And be it further enacted*, That printed copies of the Letters Patent of the United States, with the seal of the Patent Office affixed thereto, and certified and signed by the Commissioner of Patents, shall be legal evidence of the contents of said Letters Patent in all cases.

SEC. 16. *And be it further enacted*, All patents hereafter granted shall remain in force for the term of seventeen years from the date of issue, and all extensions of such patents are hereby prohibited.

SEC. 17. *And be it further enacted*, That all acts and parts of acts heretofore passed which are inconsistent with the provisions of this act be, and the same are thereby, repealed.

Nebraska—Salt Wells and Burning Bluff.

The following extracts are taken from a late repor of a committee of the Nebraska Legislature on the mines and minerals of that Territory :—

On the eastern borders of Lancaster county, in a basin or marsh enclosed by a semi-circular range of bluffs, are a dozen or more of these springs, of unusual strength and value, which pour their waters into Salt Creek, which runs through the basin in such quantities as to render the saline quantity of its waters readily apparent, and traceable by the eye for a long distance below where they fall into the Platte. These springs are represented by parties who have visited them to be of immense value, pouring forth a large volume of water containing an extraordinary per centage of pure salt, which has impregnated the land surrounding them for quite a distance. And as they are only some forty miles from the Missouri river, the day may not be far distant when they will prove a source of great wealth to the Territory.

So rich are the waters of these springs that a thick crust of pure salt forms around their edges and on the margins of the streams by which their waters flow into the creek. Persons living in that locality gather this crust by the wagon load and bring it into Nebraska City, where it finds ready sale. By a little refinement to remove the earth attached to it, it is made to excel in quality the finest article of dairy salt imported into the territory.

A few miles from Concord, and about eight miles northwest of Ponca, in Dixon county, is a locality known in that region as the Burning Bluff. And even when the thermometer is at its lowest, by reason of intense cold, the face of this bluff is comparatively hot. It abounds in small holes or cavities, from whence issues a kind of steam or vapor, with a temperature so high as to be painful to the hand of the visitor exposed to it. At the foot of this bluff, presenting the appearance of having been blown, as it were, from the holes and cavities in the face of the bluff, lie large quantities of alum. Strange as it may appear, this fact, though generally known among those well informed with reference to the eastern portion of our Territory, has attracted little or no attention. Who can tell what wealth may lie hidden there?

The western portion of Nebraska, extending to the Rocky Mountains, is rich in gold, silver, lead, copper, cinnebar, coal and gypsum. The people of the eastern section desire that the mining region should be formed into a separate government. It is assumed in the report that the gold of Nebraska for 1860 amounted to $20,000,000. This great Territory contains within its limits sufficient land to form half a dozen of large States. The Platte Valley stretches westward for 600 miles, until it reaches the Rocky Mountains. It is a broad, level and fertile valley, furnishing an easy route for a railroad, and it is really fit for an empire in itself. Nebraska is rapidly filling up with an industrious, intelligent and moral population.

The Prospects of the Atlantic Telegraph.

A writer in the *Edinburgh Review*, after giving a complete history of the Atlantic telegraph cable, comes to the following conclusion in regard to the causes of its failure :—

The account which we have given shows that its failure was in a great measure owing to the absence of a proper preliminary experimental inquiry into the conditions required in the construction of such a cable. But the more immediate causes of its failure were, 1st, The absence of sufficient care in the manufacture of the cable from the limited time allowed for its completion; 2d, The injury that the cable received by repeated handling between the time when it was constructed and the time when it was laid; 3d, The insufficient protection of the outer covering against corrosion; 4th, The insufficient size of the conductor and its insulating covering in proportion to the length of the cable—a want which necessitated the use of high battery power."

The same writer says that all the lines of ocean telegraphs which have received government aid have failed, while quite a number which depend entirely on their own business for support are entirely successful. He expresses the opinion that, "At no very distant period, submarine telegraphs, established on sound principles and in a durable manner, will encircle the globe."

Our Correspondence.

Buckwheat—Its Poisonous Effects—The Honey Bee.

MESSRS. EDITORS:—There is in buckwheat an essence or medicinal principle upon which its irritating qualities depend, and is called *apis venenum* or "bee poison." This is one of the sources from whence the common honey bee obtains its poison; hence, the same disagreeable effects follow the immoderate use of honey when obtained from the buckwheat.

The bee takes from the flower a portion of its medicinal virtues with the saccharine matter of the plant, which, by passing through the internal laboratory of the insect, becomes separated into its primary constituents of *apis venenum* and honey; the one being deposited in cells for the sustenance of the insect, and the other laid by within itself as a means of defence.

Now, in making this separation in the chemical laboratory of the insect (or by accident where dead bees are in the honey while being rendered), it often occurs that portions of this poison are mixed with the honey, producing all the disagreeable effects which would result from the use of buckwheat itself.

There is, perhaps, no article containing as great a per centage of this poisonous principle used for food as buckwheat in its various forms; and the sameness of its aroma with that given off by the common honey bee is a proof of its identity.

All poisonous insects and reptiles are healthy, active and virulent in proportion to the plentiful supply of the poison they are enabled to derive from their food; and while feeding on such articles as yield them this supply, their stings or bites are more virulent than at other times. This I saw fully demonstrated last winter, in transporting the honey bee over the Isthmus to California from the cold regions of the North. The sting from those bees, in the most unhealthy state, produced but little sensation or effect upon the human flesh.

The nervous, warlike habits of the honey bee during the period of the flowering of buckwheat fully corroborate the doctrine that this plant contains considerable quantities of poison, and it is on this principle that its irritating qualities depend.

The best remedy to prevent the disagreeable burning and itching sensation of the skin caused by a free use of buckwheat cakes, is carbonate of soda (or an alkali of a similar nature), used in their raising, or taken internally when the itching has taken place in consequence of having eaten too freely of the cakes. And here let me state that an alkali of the above chemical nature, immediately taken and applied to the skin after a bite or sting of the most poisonous insect or reptile, is a good antidote, and will, in most cases, save the unfortunate victim from any serious harm.

Racine, Wis., Feb. 28, 1861. S. W. JEWETT.

What a Couple of Patentees Say.

We publish the annexed letters as specimens of the flattering testimonials we are daily receiving from inventors whose patents were taken out through this office:—

GENTLEMEN:—I received Letters Patent for my second Beehive a few days since, and return you my thanks for your successful efforts—especially so as you have procured a recognition of *all* the claims. I can cheerfully recommend your agency to all inventors and those applying for patents, who wish their business attended to with promptness and dispatch. I have reason to believe that your agency is not only more prompt and successful in this business, but that the expenses attending it are less than when left to others.

I expect soon to send you another application; and, from the confidence I have in you, I shall entertain no doubt but that you will succeed in that also.

Yours, truly, S. R. BRYANT.

Waterford, Pa., March 6, 1861.

GENTLEMEN:—My patent came to hand last night, and am thankful for your promptness in this case. I shall ever remember your kindness, and recommend your agency above all others. O. C. TAYLOR.

Herrickville, Pa., March 4, 1861.

The French System of Weights and Measures.

MESSRS. EDITORS:—It is somewhat surprising that your lynx-eyed correspondents in Maine do not keep you posted up in the resolutions of that go-ahead State.

On the 2d of February, the Governor of Wisconsin delivered to the Legislature the resolutions of Maine, in regard to a uniform system of weights, measures and currency. The ball is rolling from Maine to Texas—on the one side truth, on the other error. Which shall prevail? JAMES EDI.

Verona, Wis., Feb. 29, 1851.

Column of Varieties.

Every person in Great Britain pays annually an average about three pounds sterling for the support of the government.

In 1558 the aggregate tunnage of the whole English navy was only 11,820 tuns, or about one half of the *Great Eastern*.

It costs from four hundred to five hundred dollars to inflate a balloon thirty feet in diameter with hydrogen gas.

About $100,000 worth of hard india-rubber, for the manufacture of combs, is imported annually from the United States into England.

The population of Canada West, by the last census taken, amounts to 1,460,000, that of Canada East 1,300,000—making a total of 2,760,000.

The steamship *Adriatic*, the last vessel built by the late George Steers, and which, from first to last, cost $1,200,000 to build and finish, has been sold to the Galway Company for $436,000.

The ship *Saranak* lately sailed from Philadelphia for Liverpool, having on board 48 cars for city railroads in England. These cars were built in Philadelphia, and contain arrangements for burning gas.

The new Houses of Parliament in London are going to decay rapidly. The ammonia in the fogs which arise from the river Thames this acts upon the stones of the buildings and dissolves them.

Telegraph lines have been carried from Russia in Europe into Asia, and they are now progressing with extraordinary rapidity. Siberia will soon be traversed with them, and it is currently reported that the emperor intends to carry them by a submarine cable to his North American possessions. It is possible that our latest news from London may yet be obtained by the way of Oregon.

The American *Bee Journal* states that the nectar of flowers, as gathered by bees, is a watery solution of cane sugar. In the process of this transformation, the cane sugar is decomposed into three different kinds, which constitute honey. The heat which the bees maintain in the hive causes this change; weak acids, as well as heat and moisture, can effect a similar conversion of cane sugar.

The Philadelphia *Ledger* advocates steam power as a substitute for horses on railroads in that city. We know that steam would be more economical and believe equally safe on city as on country railroads, and the day is not far distant when it will be generally used on them. Some arrangements must be devised, however, to obviate overheating each car by the boiler in warm weather. In winter such heat is desirable; in summer the reverse.

The London *Mechanics' Magazine* states that John Chedgey, of that city, has succeeded in turning and boring glass, and has thus rendered it more applicable to a great variety of useful purposes. He makes glass cylinders perfectly round and smooth; also very strong glass pipes as substitutes for metal in conveying acids and alkalies, and his cylinders are eminently adapted for the barrels of pumps. Glass tubes of moderate bore are quite common, but they are never made with a uniform size of bore.

On the Chicago and Milwaukie Railroad a very beautiful application of the photographic art is use on the "season passes" and "commutation tickets" to prevent their illegal transfer. When a person applies for a season pass or ticket, he incloses his photograph taken on a small gummed label, and this is pasted on the card which he receives. The conductor of the train can thus see at a glance whether the bearer of a pass or ticket carries the evidence of "the right man being in the right place."

About the best known preparation for friction matches consists of gum arabic, 16 parts by weight; phosphorus, 9 parts; niter, 14; peroxyd of manganese, in powder, 16 parts. The gum is first made into a mucilage with water, then the manganese, then the phosphorus, and the whole is heated to about 130° Fah. When the phosphorus is melted, the niter is added, and the whole is thoroughly stirred until the mass is a uniform paste. The wooden matches prepared first with sulphur, are then dipped in this and afterwards dried in the air. Friction papers, for carrying in the pocket, may be made in the same manner, and by adding some gum benzoin to the mucilage they will have an agreeable odor when ignited.

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Improved Self-acting Wagon Brake.

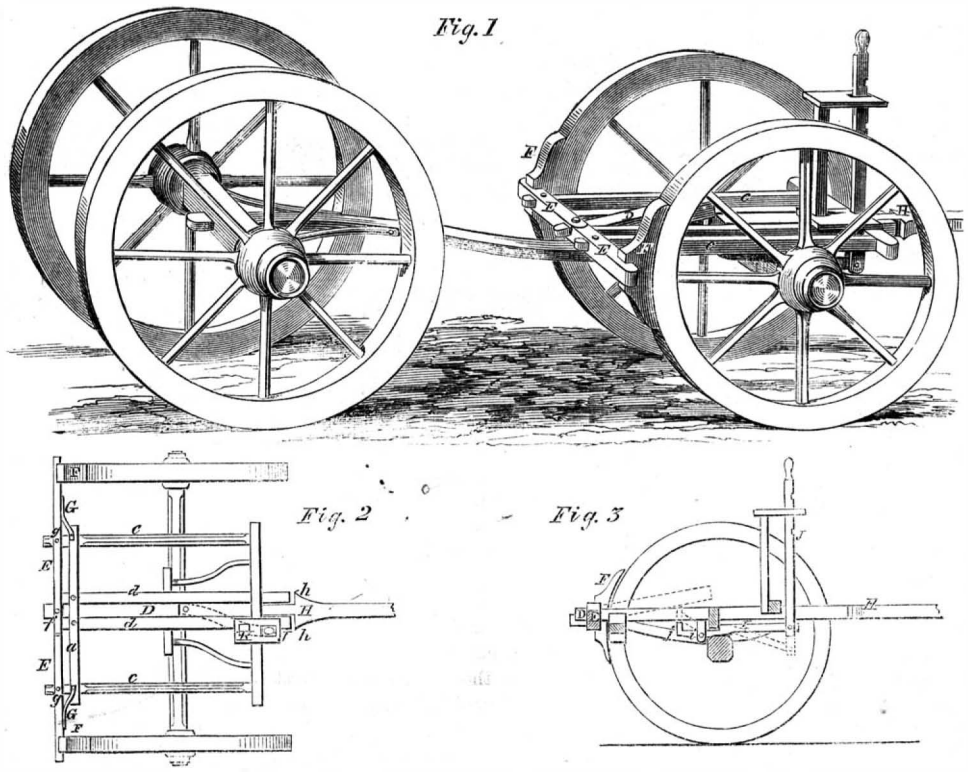
In vehicles to be driven over rough roads simplicity of construction is of prime importance; still, the additional safety and great relief to the team obtained by brakes have caused these appliances to come into general use in heavy wagons, notwithstanding the complication which they introduce into the structure. To reduce this complication to the lowest point has been, for several years, an object of study on the part of numerous inventors. This is the special aim of the invention which we here illustrate. Brakes which are actuated by the team in holding back the vehicle without any attention on the part of the driver are of course the most convenient, but they are subject to the objection of coming into play whenever there is occasion to run the wagon back, unless some arrangement is made for throwing them out of operation. Many such arrangements have been invented, and the only claim to superiority advanced by the inventor of the one here presented is its greater simplicity.

There is no claim to novelty in the brake itself. Two levers, E E, Figs. 2 and 3, are connected by pivots, *g g*, to the bars, *c c*, which are firmly fastened to the front axle, A. The outer ends of the levers, E E, are furnished with shoes to be pressed against the tires of the front wheels, thus increasing the friction and checking the motion of the carriage. The inner ends of these levers are connected by the pivot, *f*, to the short bar, D. The rear end of the draught pole, H, is fitted to slide between the bars, *d d*, and as it is pushed inward by the team holding back when the wagon is descending a hill by its own gravity, it will force back the bar, D, and thus press the shoes, F F, against the wheels. When the pole is drawn forward the shoes, F F, are carried away from the wheels by the pressure of the springs, G G, against the levers, E E.

When it is desired to run the wagon back, the brake is thrown out of action by turning the end of the bar, D, up above the end of the draught pole, H, thus allowing the shoulders *h h*, of the pole to come against the ends of the bars, *d d*. For this purpose the lever, I, is secured by its fulcrum pin, *i*, below the bar, D, the forward end of this lever being bent out to one side of the pole, as shown in Fig. 2. A projection, *j*, is formed on the back end of lever, I, and from its forward end the rod, J, rises up by the side of the driver's seat. Thus it will be seen that, by pressing down the rod, J, the end of the bar, D, is raised, as shown in dotted lines in Fig. 2, when it may be held in place by securing the rod by means of the notches in its front edge.

It will thus be seen that, while this brake acts with perfect certainty to check the wagon in going down hill, it may be very readily thrown out of operation when it is desired to run the wagon back by the power of the team. This has however been accomplished by several previous inventions, and the claim of superiority for this brake rests entirely on its remarkable simplicity, in combination with the certainty and efficiency of its operation, and the ease and convenience with which it is thrown out of action.

The patent for this invention was granted, through the Scientific American Patent Agency, Feb. 7, 1860, and further information in relation to it may be obtained by addressing the inventor, William A. Gibson, Box 319, New York city.



GIBSON'S IMPROVED SELF-ACTING WAGON BRAKE.

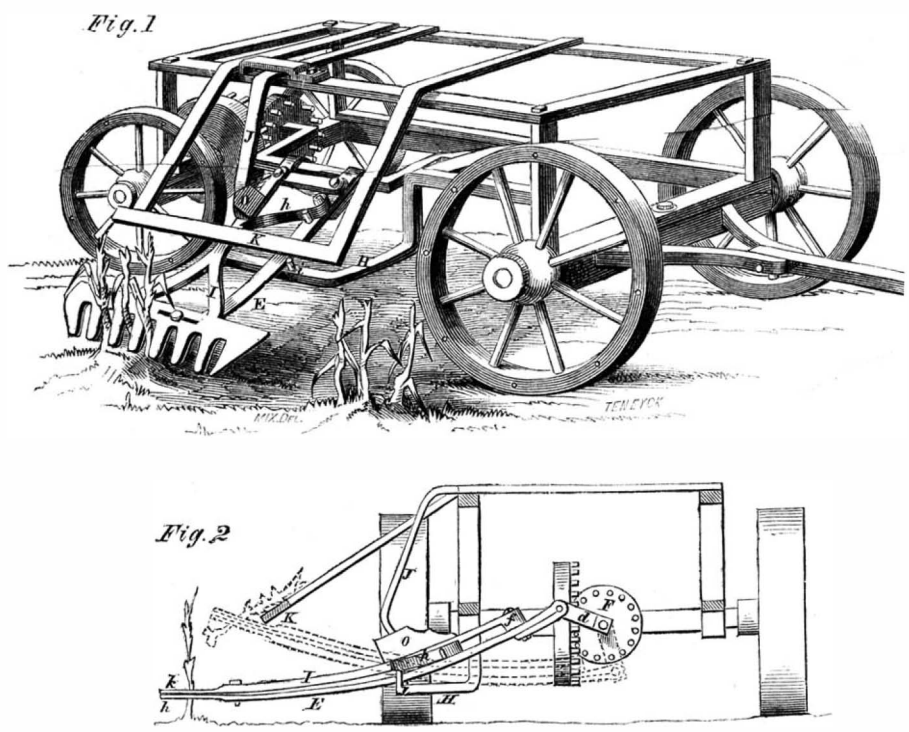
Improved Cotton and Corn Stump Puller.

The roots of the cotton plant penetrate so deeply into the earth that they offer a serious obstruction to the operation of plowing, and this is the case sometimes even with Indian corn stalks, especially in rich soil. The accompanying engraving illustrates a machine recently invented by Josiah Bishop, of Texas, for pulling corn and cotton stumps by means of horse-power.

To a double set of rounded fingers, *h* and *k*, Figs. 1 and 2, a lateral and then an upward motion is imparted by means of the crank, *d*, to which the inner ends of the rods, I and E, carrying these fingers are connected by journals. The upper set of fingers is connected with the lower one by means of a slot and screw, so that it may have a lateral motion in order to press the stalks sideways between the two sets of fingers. This motion is imparted by means of a cam-like projection, *o*, upon the upper rod, I, the side of which, as the rod is pushed outward by the crank, comes in contact with the end of rod, J, and as the fingers are raised by the turning down of the crank this projection is carried away from contact with the rod, J, when the spring, *p*, presses the upper teeth back again into register with the lower ones, thus relaxing the grasp of the teeth upon the stalks. The continued revolution of the crank carries the teeth upward and inward, scraping their upper side against the lower side of the stationary bar, K, and thus effectually clearing them from the stalks which they hold.

Motion is imparted to the crank, *d*, from the back wheels of the carriage by suitable gearing, which must be adapted to the distance apart of the hills in the field. This adjustment is readily altered by having gear wheels of different sizes.

The patent for this invention was procured, through the Scientific American Patent Agency, Feb. 26, 1861, and further information in relation to it may be received by addressing the inventor, Josiah Bishop, at Austin, Texas.



BISHOP'S IMPROVED COTTON AND CORN STUMP PULLER.

Glass Cask.

A patent has been taken out by A. Iubert and U. Cantillon, of Liege, in Belgium, for making small casks and barrels of glass. The idea is to apply glass in the formation of casks of five gallons capacity and downward. They blow the glass in a mold of wood or iron, the mold being in two parts of the form of the cask. A certain portion of the molten glass is introduced into the mold on the end of the glass blower's staff; then the mold is closed and the glass is blown until it assumes the form of the mold and is hollow inside. The tap hole is pierced in the cask with a red hot iron. Small flasks of a barrel-shape made of glass are common, but casks of five-gallon size appear to be an extension of glass application to this particular purpose, and for holding ether, oils, &c. In situations where they are not required to be moved about they will answer a most excellent purpose.

POCKET MATCH SAFE.—A. B. Childs, of London, has taken out a patent for a little safe to carry matches in the pocket. It is so constructed that one match at a time, when required, drops by its own weight to the bottom of the safe, and while being drawn out, it is made to rub against a rough surface and is at once ignited.

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VOL. IV. NO. 12.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, MARCH 23, 1861.

COMMENTS ON THE NEW PATENT LAW.

It is well known to the readers of the SCIENTIFIC AMERICAN, that for years past we have strenuously advocated a reformation in the Patent Laws. We have never contended for a radical, sweeping change, but for some simple modifications, such as the progress of events had rendered necessary. We have always maintained that the United States patent system was the most perfect one extant (when well administered) to secure the ends in view, viz., to promote the progress o the useful arts. One of the most objectionable features of our patent system hitherto, has been the odious discrimination against foreign inventors; so odious, indeed, that foreigners of every other nationality were regarded with more favor than British subjects. Thus an English inventor was compelled to pay $500 on presenting an application, while a Frenchman, or any other foreign inventor, was obliged to pay but $300. This feature of our generally excellent patent system was adopted in 1836, not, however, as some suppose, as a rap at Great Britain, but simply because that government charged a $500 patent fee, while France required in the aggregate about $300, neither government, however, discriminating against foreigners. It is said that the continual dropping of water will wear a stone, so continual opposition to unwise and unjust laws will ultimately cause their repeal. We have for years denounced this partial feature of our patent system, and are now able to rejoice over the fact that it is swept forever from the statute book. It will be seen by reference to the new Patent Law, published on another page, *that inventors of all nations are now placed on the same footing in this respect, "except those of countries which discriminate against the inhabitants of the United States."* The only inventors who will be excluded under this provision are our Canadian neighbors, who refuse, in this enlightened day, to allow patents, except to resident subjects, who must be the inventors also of the object for which the patent is sought. We hope the Canadian Parliament will no longer hold on to a system so unwise and ungenerous.

We do not propose to discuss every provision of the new law; it is before our readers in simple legal phraseology, and will be readily understood in all its essential details. We will, however, refer to a few additional points, such as most deeply concern inventors at the present time:—

The schedule of fees is entirely changed, and the awkward system of allowing a withdrawal of a portion of the patent fee in cases of rejection is abolished. This, however, does not apply to cases rejected before the passage of this Act. Inventors are now required to pay the small fee of $15, instead of $30, as heretofore, and if, on examination, Letters Patent are allowed, $20 more will be required before the patent is delivered. This is an increase of $5 on all patents now issued, *but it is no more than just, since the law allows the patent to exist seventeen, instead of fourteen years.* We think inventors generally will be satisfied with this change. The fee on filing a caveat is reduced to $10, but this sum will not apply toward the patent fee when an application for a patent is completed. This change was rendered necessary in view of the alteration made in the rate of fees, but it would have been still more satisfactory if, under these circumstances, the caveat fee had been reduced to $5.

All patents granted, and now in force, previous to the passage of this Act, can be extended for seven years from date of expiration, upon the same conditions as have hitherto existed, except in the amount of fees, which are clearly stated in the Bill. An attempt was made by the small lobbyists, and it was palmed off upon the Conference Committee of the House, to deprive patentees under the old system of the right of extension, seeming to forget that this right was solemnly guaranteed to them when they secured their patents. All patents (except for designs) issued under the new Bill, will exist for seventeen years, but cannot be renewed. This is, in some respects, a wise provision, as it will stop a great deal of filibustering and scheming, not only at the Patent Office, but also in Congress, as the people will expect that august body to obey its own laws. We need not trouble ourselves, however, about the matter, as the evils thus to be remedied will not cease till the 4th of March, 1878, and we may all be dead before that time.

One of the most important changes in the laws is that which relates to designs. It opens a very wide field not only for the protection, but also for the display of the esthetic talent of our people, and will, no doubt, attract much attention. We consider it a valuable change, and one that will stimulate the taste for the fine arts and afford a constantly-widening field for the encouragement of artists and inventors.

We cannot close our brief comments on this law without an expression of gratitude on behalf of inventors of every liberal country on earth to Hon. William Bigler, ex-Senator from Pennsylvania, and Hon. Wm. E. Niblack, ex-member of the House of Representatives from Indiana, and now Chief-Justice of Nebraska, for their untiring devotion to this work. But for the zeal of these gentlemen, the Bill would have slept on in the dusty pigeon-holes of the committee room.

COAL AND WOOD-BURNING LOCOMOTIVES.

By a late report of John O. Sterns, Esq., Superintendent of the New Jersey Central Railroad, we learn that very fair tests have been made with wood and coal-burning engines on that road, all of which have terminated favorably for coal, as it regards economy. There are thirty-eight locomotives, six of which have been altered from wood to bituminous coal-burners; twenty-four burn wood, and eight anthracite coal.

During the last two years and nine months, the wood-burning engines have run 1,353,909 miles; the anthracite coal engines 165,585, and the bituminous engines 112,757 miles. Regarding the performance of these three classes of engines, Mr. Sterns says:—"The three comparatively perfect anthracite engines make a saving in fuel of seven cents per mile over three equally good wood engines, and the difference in cost for repairs cannot exceed three cents per mile, leaving a net saving of four cents per mile run by substituting anthracite coal for wood." * * "From our past experience, I am satisfied there is a saving by using bituminous coal instead of wood, of about three cents per mile, and that it is expedient to alter several of our wood-burning freight engines to burn bituminous coal, especially as the change is easily and cheaply made."

The wood used by this company is oak, rated at $5 per cord; the bituminous coal is the same cost per tun, while the anthracite is set down at $3 per tun. The wood-burning engines run at the rate of 28.3 miles per cord; three good anthracite coal engines average 31 miles to a tun of coal. It will always be a source of satisfaction to us that the SCIENTIFIC AMERICAN early directed the attention of our railroad companies to the use of coal as an economical substitute for wood as fuel. Had our advice been taken ten years ago by several companies, millions of dollars would have been saved to them. Mr. Sterns states that if all the freight trains on the New Jersey Central Railroad had been drawn by good anthracite coal engines, $20,000 would have been saved to the company last year alone. Where wood is very cheap, as in Canada and on some of the Southern railroads, of course it is preferable to use it; but wherever it can be shown that coal is cheaper than wood on any railroad, those who have the management of affairs are culpable if they run wood-burning engines.

THE NEW PATENT LAW FOR DESIGNS, TRADE MARKS, PATTERNS, &c.

The recently-enacted changes in the Patent Law will affect the interests of many classes of our citizens in many important respects.

Artists may, under the new law, obtain *patents for their paintings*, and thus put an end to that extensive system of piracy upon the efforts of home genius which now prevails. Scarcely a good picture has heretofore been produced without being immediately duplicated by second rate copyists, and the original artist thus measurably deprived of the fruits of his own work. Pictures, prints, and artistic designs of every possible description, may now be patented, and no person can use or duplicate the same without the consent of the originator. Architects, draughtsmen, engineers, photographers and designers may patent their plans, and every new specimen of their work; new designs for bank notes, certificates of stocks, bonds, and all combinations of an artistic character, may be patented.

The new law also provides that any *new form* of any article of manufacture may be patented. Thus, the invention of a new form of basket, bell, chair, table, bedstead, bookcase, piano, cup, pitcher, dish, or any other new article of household furniture, may be patented; makers of such articles will therefore be encouraged to exercise ingenuity in producing improved forms, so as to enjoy a monopoly in the sale thereof. All works of arts, such as statues, busts, works in *alto-relievo*, designs for stove plates, clock-cases, new forms of picture frames, all new forms of articles in glass or other material, new styles of gas fixtures, buttons, jewelry, fancy goods, &c., &c., may be patented.

Merchants may also obtain patents upon their *trade marks*, and even upon *the labels* which they affix to their goods. Druggists will thus receive important advantages. Another highly important provision is that new patterns of printed and woven goods, oil cloths and carpets, paperhangings and window shades; in fact, ornamental designs on any fabric or material may be patented for from 3½ to 14 years, as the applicant may elect when applying for the patent.

Bookbinders may secure new designs for covers, and printers new designs for type. Every new style of article, tool or pattern, used or produced in any trade or profession may now become the subject of a patent.

Patents may also be obtained for all kinds of ornaments and decorations in plaster for ceilings and façades Also new moldings in wood, plaster or other material, either for interior or exterior decorations. New forms of fences, posts, railings, stairs and banisters may also be secured.

Every new form or description of planished and plated ware, tea sets, waiters, lamps, cans, boxes and envelops for goods may be secured. Also new designs for hardware, tin-ware or any other metal, musical instruments, toys, canes, umbrellas and like articles of innumerable variety may be patented under the new design act.

The new law was put in force on the 4th of March, and we have the most extensive arrangements made for conducting business under it.

Patents can be taken out, as above, under the new patent act for 3½, 7 or 14 years, as the applicant desires, and the following is the government tariff:—

For a patent of 3½ years..... $10
For a patent of 7 years..... $15
For a patent of 14 years..... $30

The documents required are petition, affidavit, specification and drawings; no model being required.

Parties wishing to take out patents of this kind may have all the business properly done, on the most moderate terms, at the office of this paper. Persons desiring further information may address MUNN & Co., No. 37 Park-row, New York.

PATENT NURSING.—During the last stages of Congress the Patent Bill was referred to two Committees of Conference to settle some disputable points, and in the nursing which it received from the various gentlemen composing these Committees, some slight crudities crept in, but nothing that renders the law inoperative in any of its sections. Of the distinguished nurses who sat up with the bill just previous to its passage, we may mention Senators Douglas, Cameron and Rice, and Representatives Niblack, Hoard and Cox.

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THE CONDITION OF LABOR IN THE CITY.

We have recently had a tour of inspection made among the machine shops and foundries of the city, for the purpose of ascertaining the actual state of affairs as they now exist, with reference to the number of men employed at the present time as compared with last year. The results, which are gratifying, are appended.

The Architectural Iron Works, foot of Fourteenth-street, D. D. Badger, Superintendent, was the first place entered by our reporter. Their business is to make patent rolling iron shutters, store fronts and all cast iron work required for building purposes. They state that their present force—consisting of mechanics of various trades, pattern makers, molders, blacksmiths and others—amounts to 225 men. At the same period of last year, the number employed was a little less than the force now engaged. Their orders to be filled during the coming season amount to $250,000, embracing an iron store front for I. S. & E. Condit, of White-street; the same for A. Higgins, Reade-street, this city; a large grain warehouse to be erected in Brooklyn, and miscellaneous work not yet begun upon; the orders last year did not exceed $100,000.

At the Novelty Iron Works, foot of Twelfth-street, after temporary suspension for shop repairs, they resumed work on Monday, the 18th of February. At present, they employ 600 men, mechanics and laborers; force at the same time last year not stated. There are now going forward two beam engines of 80 inches diameter of cylinder by 12 feet stroke, for the Norwich and Stonington route; one marine beam engine of 105 inches diameter of cylinder by 12 feet stroke, for the Pacific Mail Steamship Company; some quartz rock-crushing machinery for South America; an iron stern-wheel boat, fitted with two horizontal high-pressure engines and boilers; and hydraulic pumps and presses for a fish oil factory in the Eastern States, beside the usual repairs at this season of the year. Working time at present, nine hours per day.

At the Dry Dock Iron Works (I. S. Underhill & Co.), business was not very pressing; they employ about 30 men at present. Mr. Underhill is of opinion that, in a month or six weeks, there will be an abundance of work.

The Morgan Iron Works, foot of Ninth-street, E. R., employ between 500 and 600 men; for the same month last year, about the same. They have underway one marine beam engine of 80 inches diameter of cylinder by 11 feet stroke, for Messrs. Spofford & Tileston; one beam engine, 70-inch cylinder and 11 feet stroke, for the New Haven Steamboat Company; one 38-inch cylinder, 10 feet stroke, beam engine for the Sag Harbor and Greenport (L. I.) route; one inclined engine, 36-inch cylinder by 9 feet stroke, and machine for making ice, building for Professor Twining; in addition, they are repairing the steamers *North America* and *Granite State*, and making a pair of boilers for the Spanish steamboat *Christobal Colon*. Castings for the water pipe over High Bridge are also being delivered from these works.

At the Neptune Iron Works (Boardman, Holbrook & Co.) are now building one marine beam engine of 66 inches diameter of cylinder by 11 feet stroke, for trade between this port and Cuba; one engine, 36 inches diameter of cylinder, 10 feet stroke, for a Boston firm; one pair of beam engines, 32 inches diameter of cylinder by 8 feet stroke, for the South American trade; one engine, 36 inches diameter of cylinder by 8 feet stroke, for the cattle trade between Honduras and Cuba; also, one engine of 30 inches diameter of cylinder by 6 feet stroke, for a ferry boat; castings for a propeller engine, and boilers for the steamboats *Yankee* and *Underwriter*, with the usual repairs, comprise the list of operations in these works. The present force employed is 200 men; last year at this time there were but half of that number.

The Allaire Works (Cherry-street) have in a state of forwardness two steam engines of 50 inches diameter of cylinder by 10 feet stroke—parties for whom they are built not designated; one marine beam engine, of 76 inches diameter of cylinder by 12 feet stroke, for the Florida Railroad Company; one 42 inches by 9 feet stroke, for the Hoboken Ferry Company, and the necessary boilers for the above-named engines, with repairs on the steamer *John P. King*, finish this list. They employ at present 600 men; force last year not stated.

James Murphy & Co. (Fulton Iron Works) employ 300 men. Work now underway: four low-pressure boilers, with smoke pipes and general repairing, for the North river boat *Francis Skiddy;* one low-pressure boiler for the steamer *Rapido*, Havana; six oil reservoirs, to hold 35,000 gallons each; sixteen locomotive and high-pressure boilers; three sawmill engines and boilers; and three other high-pressure engines of respectively 30, 50 and 80-horse power.

R. Hoe & Co., machinists and press makers, Sheriff-street, employ at present about 400 men. They have orders to fill amounting to about $80,000; there is a very slight decrease in the number at work now, as compared with a year ago.

It will be seen that the prospects, so far from being discouraging and depressed, are the reverse. The shops which our reporter visited are those which employ the greatest number of men, and who are generally busy the year round. At the same time last year, there was not so much business going forward in the various shops as there is at the present moment, and the proportion of men discharged is not in excess of those who are generally idle at this season of the year.

Mason and Dixon's Line.

This is the boundary between Maryland and Virginia. It was surveyed by Charles Mason and Jeremiah Dixon, two distinguished English mathematicians, during the four years from 1763 to 1767.

In the early settlement of this country, grants of land were ignorantly made and arbitrarily revoked by the Stuart sovereigns of England, causing frequent conflicts of jurisdiction. At one time all the English settlements were in the hands of two companies, the territories being divided by the parallel of 40°, which is very nearly the latitude of Philadelphia; all south of this line being called Virginia, and all north, New England.

On the 20th of June, 1632, Charles I. granted to Cecilius Calvert, Lord Baltimore, the lands between the Chesapeake Bay and the Potomac, and a portion of those east of the bay, extending north to the "40th degree of latitude, where New England terminates." In 1681, Charles II. granted to William Penn the territory of Pennsylvania, and from that time, for more than seventy years, there was a constant dispute between the heirs of Penn and those of Lord Baltimore, in regard to the boundary line between their possessions. In 1732, they made an agreement; but this soon became the subject of lawsuits between them, which were not finally settled till 1760. The line finally agreed upon was to be a due east and west line in latitude twelve miles south of the southernmost part of Philadelphia. This part of the line is that which divides Maryland from Pennsylvania, and is now known as Mason and Dixon's line. It was fixed by a very simple plan, but that part of the line which separated Maryland from the portion of Pennsylvania that now forms the State of Delaware was determined by a very complicated arrangement.

In 1760, a company of surveyors, of whom John Lukens and Archibald McClean, with his six brothers, were the chiefs, were sent out to run the lines. They commenced by measuring the circle around Newcastle, and running the lines which form the boundaries between Maryland and Delaware. Their labors in the woods and swamps were so slow that, in three years, their employers became dissatisfied with their progress, and sent out Mason and Dixon to supersede them. These gentlemen commenced by going over the work already done, which they found to be correct. They then began that east and west line which will probably bear their names down to the latest time. This portion of the survey occupied them from 1764 to 1767. At first the Indians were troublesome, but a treaty was made, and a large escort of friendly Indians employed; these, with the chain men, ax men, &c., made quite a numerous and very motley company. When the party arrived within thirty-six miles of the western boundary, they came to a noted war path, and here, their Indian escort told them, it was the will of the Six Nations that the surveys should terminate. As they were completely in the power of the Indians, they had no resource but to return.

In the course of these surveys, Mason and Dixon measured a degree of longitude, one of those few measurements of degrees by which the size and shape of the earth have been determined.

The stone at the northeast corner of Maryland having been removed, and a desire having arisen to have the old surveys revised, in 1849, commissioners were appointed by the States of Maryland, Pennsylvania and Delaware, and they employed Lieut. Colonel James D. Graham, of the United States Topographical Engineers, to go over the work with the more accurate instruments now in use. Colonel Graham found that the twelve mile radius of the circle around Newcastle was 2 feet 4 inches too short; the tangent point had been placed 157 feet too far to the north, and the point of intersection of the three States 143 feet too far to the south. This resulted in giving Maryland 1⅞ acres more land than she received by Mason and Dixon's surveys. The other lines were found to be correct. The latitude of Mason and Dixon's line is 39° 43′ 26.3″, very near the old southern boundary of New England.

Wood and Wold—The Scientific Difference.

It is not surprising to witness frequent errors committed by those who write upon scientific subjects without being themselves acquainted with science. Nothing else can be expected, especially as scientific distinctions are sometimes so exceedingly subtle to the uninitiated, while they may be very plain to the skillful. An example illustrative of this is to be found in the New York *World*, of the 1st inst. In an account of some transactions which lately took place in the Paris Academy of Sciences, the following occurs:—

M. M. Schartzenberger and Parof sent in a communication on *luteoline*, the coloring matter of *wood*. The *wood* is first exhausted by alcohol; the solution thus obtained is then heated in water, raised to a temperature of 546 Fah. (two and a half times that of boiling water) in a cylinder of cast steel, closed by a steel screw. After the fluid has cooled, the inner surface of the cylinder is found covered with yellow crystals in the form of needles, and at the bottom there is a button of resinous matter. These crystals, when purified and analyzed, yield 62.5 of carbon, 3.8 of hydrogen, and 33.7 of oxygen per cent.

The great error in this simple extract is the substitution of one letter for another in the word *wood;* it should have been *wold*. Various kinds of wood contain as many peculiar substances.

Weld or wold is not a tree, but a plant which is cultivated in France and some other parts of Europe, for the purpose of dyeing yellow. Both the seeds and stalks are used, and the coloring matter approaches very nearly the American quercitron—yellow oak bark. Of all vegetable dyes, it is perhaps least acted on by acids and alkalies, but it soon fades when exposed to solar light. It is chiefly used in France for coloring silks and fine woolen fabrics; so far as we know, it is not used in America. The coloring principle *luteoline* has been long known, but until now its elementary composition remained undiscovered.

Whitewash for Stables.

Mr. Whitewash should always be appointed Chairman of the General House-Cleaning Committee. His qualifications for filling this situation are unquestionably great. His sanitary influence is undoubted, and he imparts an air of cleanliness and cheerfulness wherever he appears. The best way to initiate him into his situation is as follows: "Take a clean watertight barrel or other suitable cask, and put into it half a bushel of lime. Slack it by pouring water over it, boiling hot, and in sufficient quantity to cover it five inches deep, and stir it briskly till thoroughly slacked. When the lime has been slacked, dissolve it in water, and add two pounds of sulphate of zinc, and one of common salt. These will cause the wash to harden, and prevent its cracking, which gives an unseemly appearance to the work. If desirable, a beautiful cream color may be communicated to the above wash, by adding three pounds of yellow ochre; or a good pearl or lead color, by the addition of lamp, vine, or ivory black. For fawn color, add four pounds umber—Turkish or American—the latter is the cheaper—one pound Indian red, and one pound of common lampblack. For common stone color, add four pounds raw umber, and two pounds lampblack. When applied to the outside of outhouses and to fences, it is rendered more durable by adding sweet milk, or some mucilage from flaxseed; about a pint to the gallon will suffice." All stables should be whitewashed once or twice every year, as the increased white light which it reflects tends to promote the health of animals. Hand round this information to every man who owns a horse or a cow; because for one stable that is whitewashed there are a hundred on the walls of which no brush was ever laid.

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THE POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported for the Scientific American.]

The usual weekly meeting of the Polytechnic Association of the American Institute was held, at their room, in the Cooper Building, this city, on Wednesday evening, March 6, 1861, Professor Mason in the chair.

PLAN OF OPERATIONS.

Mr. LAWTON extended an invitation to members to coöperate with the Farmers' Club of the American Institute, not only by meeting with them, but by discussing here scientific questions relating to agriculture.

Mr. VEDDER said that the fundamental question of growth would be an interesting subject of discussion.

The PRESIDENT took occasion to allude to the improving prospects of the American Institute with regard to the practical accomplishmeut of scientific work. The proceedings of this Association were now reported, and 200,000 impressions circulated every week. These reports were copied from the SCIENTIFIC AMERICAN into more than a hundred country papers each week. And he believed that the American Institute would before long have a permanent home, with a laboratory devoted to scientific investigation. He was confident that men of wealth would be glad to sustain permanently in such a laboratory the best investigator that could be found. We might hope, therefore, to obtain new light upon fundamental questions which yet remain unanswered as they were in the days of Newton and of the elder Bacon, the questions of vital force, and the beginning of the encroachment of vitality upon the regions of purely elementary matter, what are it laws, and how they operate.

ELECTRIC TELEGRAPH.

The Association proceeded to the consideration of the "Electric Telegraph and Telegraphing Apparatus."

Mr. DIBBEN said that in the first employment of telegraphing apparatus the spark was used. The first experiments were generally made by Germans. The next step was the discovery that a current of electricity would deflect the magnetic needle; and this was applied to the transmission of messages, and is the basis now of the English system of telegraphing. About the year 1826, Mr. Harrison Gray Dyer, of Long Island, used a registering apparatus, which produced a chemical effect from the spark upon prepared paper, somewhat similar to the plan Bain used afterward. Cook and Wheatstone invented an apparatus, in which they used a double-line alphabet, making the alphabet much more brief by its combinations, and also a temporary and a permanent magnet somewhat resembling the plan of Mr. Holcomb. After that came the electro-magnetic telegraph, invented by Professor Morse, or, as others say, by Professor Henry, or perhaps by some other person. At any rate Professor Morse made the first practical instrument, and being aided by the government in trying the experiment, that experiment was the beginning of practically sending messages by the electric telegraph. Then came the House telegraph, using a type-wheel, printing the message in common type, instead of using the Morse alphabet of dots and strokes. The American system of telegraphing has been far in advance of that of any other country; one reason for which is the fact that wires are elevated more, and thus the prime current is not induced to leave the wire so rapidly. The Atlantic telegraph should theoretically have worked; but the gutta-percha insulation was so defective that the prime current soon found its way to the iron wires, and thus the insulation was destroyed. There are two theories of electricity; the first, that of Ampère and others, that the elementary molecules of matter possess inherent in their substances and inseparable from them, quantities of electric fluid. Those substances that possess negative electricity, such as oxygen and chlorine, are called electro-negatives, and have in practice a tendency to appear at the positive pole of the battery in electrical decomposition. The metals, and hydrogen, are electro-positives. The other theory accounts for all the phenomena of electricity by physical action, by a certain force set free during chemical action. When we decompose zinc, we set free a positive energy that before was the combining force holding the particles of zinc together in their peculiar position. This force is not a fluid passing through the conducting wire, but acts upon the first particle of matter, that acting upon the second, that upon the third, and so on through. Mr. Holcomb's method uses a permanent as well as a temporary magnet. Assuming the power of the electro-magnet to be two, and of the permanent magnet to be four, it would seem that the power of the two combined should be six; but instead of that we find it to be sixteen. It would seem from Faraday's law, that the decomposition of a certain amount of zinc will generate a certain force, that with the combination there should be a greater consumption of zinc; but while he had, by trying it over and over again, ascertained beyond all possible doubt, that the power was thus increased, he had been unable to determine whether there was really any more zinc used.

Mr. JOHNSON stated that by placing a galvanometer between the battery and the magnet, it appeared that the magnet did not act upon the battery at all.

Mr. DIBBEN said that it might be that the resistance at the end was overcome, and that there was a faster current although no stronger. He could not conceive of any other rational explanation of the increased power than an increased consumption of the zinc.

Mr. HOLCOMB exhibited specimens of chemical electro-magnet printing, a mode which has now nearly gone out of use. As the time required for the printing is less than that required for manipulation, perforated paper is used to complete and break the circuit, the paper being prepared by operators, and passed rapidly through the instrument. He had devised a new method of preparing chemical paper, by freeing it from glutinous matter and then wetting it with a solution of the nitrate of silver, which is much more sensitive than the prussiate of potash. The impression is fixed by dipping the paper into the iodide of potassium, which changes the nitrate of silver into an iodide of silver. As to his invention, now before the Committee, he had been for some time very doubtful of the fact of the increase of power, for the reason that there were no known laws to account for it. The nearest experiment made by others, was that of Prof. Faraday, of placing a permanent magnet in a coil, and endeavoring to ascertain whether it produced any effect upon the current. Prof. Faraday thought it did not.

Mr. JOHNSON said that it was Oërsted who discovered that when a needle was brought into proximity to the wire, it was deflected to the east or west, depending upon its position above or below the wire. Ampère afterwards increased the number of turns and made it available as a multiplier. He proceeded to give an account of experiments in telegraphing which he had made in 1837. He had put up a wire, three miles in length, in a yard, crossing back and forth, and found that a single drop of acid would act through the wire, the entire amount of the wire being uninsulated. It had previously been supposed to be necessary to wind it. He had tried various methods of recording, by sand, by iron filings, and by ink.

The PRESIDENT remarked that the Chinese claim to have used the magnetic needle as a means of guiding their wagons long before they had any roads. It seemed remarkable that a power so long known had never been made available for any other purpose, excepting to find a protection against it in lightning rods, than as a means of carrying messages.

Mr. BLISS suggested that it was used medicinally.

The PRESIDENT replied that it had not secured the assent of the medical profession.

Mr. JOHNSON said that electro-metallurgy was now taking a very wide range in the arts.

Mr. ROWELL stated that over 400 perfect messages were transmitted through the Atlantic telegraph cable, after it was laid. The failure was in consequence of the defective state of the wire when it was laid. Twenty miles of it were cut out; but they did not cut out enough. He had been assured by the book-keeper of Mr. Cyrus W. Field that the 400 messages referred to had been testified to under oath.

Mr. HOLCOMB said that the great difficulties in telegraphing were the adjustment of the relay magnets; and the interference of other powers beside that of the battery, as electricity from other sources. If some means could be devised to discharge the induced electricity, or opposite electricity, from the outer coating of the wire, it would very much facilitate telegraphing. These difficulties are so great and so variable that it is impracticable to work with repeaters. For very long distances, it was found to be necessary for some person to be continually adjusting the relay magnets; and the result had been that the repeaters had been laid aside, and the messages were now repeated with the fingers.

Mr. VEDDER suggested that if the action of the current is vibratory, it would require liberty of the wire; and there might therefore be an advantage of passing the wire loosely through insulating tubes at the poles.

NEW STEAM BRAKE.

Dr. VAN DER WEYDE, in behalf of the inventor, exhibited drawings of a brake for car-wheels, to be operated by steam from the locomotive, and capable of stopping the train within a distance of 60 feet. Dr. V. remarked that, without having investigated it, he should think it dangerous to apply such a brake. The inventor proposes to use the steam also to warm the cars. He also adds a hook to the locomotive, so that the engineer can hook on cars or release them at will. He asked for a committee to investigate his inventions.

Mr. DIBBEN said that a train moving at the rate of 40 miles an hour could not be stopped within 60 feet. The Creamer brake, operating by a spring, was effective in stopping the train as quickly as was compatible with safety.

The PRESIDENT said that stopping a train moving 40 miles an hour within 300 feet, was as much as could be borne without the destruction of the train itself. This had been ascertained by experiment upon the Hudson River Railroad.

Mr. DIBBEN said that this corresponded with the experience of other countries.

Mr. VEDDER would rather run the risk of stopping the train a little more suddenly than to have a collision, or to have the train plunged into the Hudson river; and moved that a committee be appointed.

The PRESIDENT appointed Messrs. Vedder, Seely and Rowell.

NEW SUBJECTS.

The subject of the "Electric Telegraph" was continued for another evening; and it is expected that the microscopical examination of cotton and other fibers will be taken up during the miscellaneous business.

The following subjects were proposed for future consideration:—

"The Manufacture and Refining of Steel," by Mr. Bliss.

"The Relation of Climate to Invention, and the Applications of Inventions," by Prof. Mason.

"Spontaneous Movements among Unorganized Bodies," by Prof. Mason.

"The Unity of the Human Family," by Mr. Nash.

"The Appropriate Place for the Several Metals and Minerals in the Geological Series," by Mr. Nash.

"The Variety of Food Desirable for the Human Race in Different Climates, and its Effects upon the Physical and Mental Condition," by Messrs. Vedder and Nash.

"The Effects of Alcohol upon the System in Large or Small Quantities," by Mr. Lawton.

On motion, the meeting adjourned until half-past seven o'clock on Thursday evening the 14th inst.

GIVE THE CHILDREN FRESH AIR.—Some parents make the great mistake of keeping their children in-doors during cold weather. Such a practice is pernicious in many respects. It enfeebles the bodies of children, and renders them peculiarly liable to be attacked by colds and coughs. A child should have its feet well shod with socks and boots, its body well wrapped in warm clothing, its head and ears securely protected from the cold, and then be let loose to play in the keen, bracing, winter air. By this means its body will become robust, and its spirits be kept bright and cheerful; whereas, if a child be shut up in the house, it will become fretful and feverish, and perhaps wind up with a severe attack of illness. The coroners' inquests in London daily show that every week, in that city, children are suffocated in bed, or under the shawls of mothers. They die, as the coroner is constantly stating, in consequence of inhaling their own breath, which is a compound of carbonic acid gas. They are, in fact, in the same situation as a person who is locked up in a room which is full of the fumes of charcoal. The children are gradually overpowered by the deleterious atmosphere, and die without a struggle, it being thought that they were in a sound sleep.

THE average duration of human life in Paris is 28 years; in all France it is 36 years.

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Recent American Inventions.

The following inventions are among the most useful improvements lately patented:—

BRUSH.

This invention refers to an improvement in the construction of round, square or oval brushes, where the tuft of bristles is secured around the end of a stick or handle, the object of which improvement is to more firmly secure the bristles or brush part to the handle than hitherto, by the employment of a flanged cap which is screwed on the handle over the head of the brush and imbedded into the cemented bristles. This invention is patented by Daniel Fleming, of Brooklyn, N. Y.

CALENDAR CLOCK.

This invention consists in the arrangement of a compound dial, in combination with an ordinary clock, said compound dial being composed of an ordinary clock dial, provided with suitable apertures and surrounded by a circle having the figures, from 1 to 31, marked on it at regular intervals, and provided with two additional movable dials, one of which is marked with the names of the week days and the other with the names of the months, and each dial being made to rotate independent of the other around the common center of the common dial in such a manner that one hand attached to the central arbor of the clock movement indicates the days of the week and the date or the day of the month, and that, at the end of each month, the required change can easily be effected by shifting said hand and also the dials in order to bring the name of the next succeeding month, and the name of the proper day of the week, before the respective apertures in the face of the clock. The credit of this contrivance is due to G. Maranville, Hampton Corners, N. Y.

STEAM BOILER.

This invention consists in a detachable fire box, constructed and applied in combination with the body of the boiler, in a manner to obtain a portable boiler which may be made of large capacity, is easily set, is little liable to get out of repair and is a very effective steam operator. John Porter, of Jefferson, Texas, is the patentee of this invention.

DRAWER.

This invention relates to an improvement in drawers for the use of grocers and other merchants whose stock is weighty and kept in quite large receptacles. The object of the invention is to supersede the ordinary bins and barrels by obtaining the capacity of the latter with a greater ease of adjustment than the ordinary drawer, and the enabling of the invention to be placed one over the other in rows, so as to economize in space. The invention consists in having the drawer placed on a crosspiece, in such a way that it may be tilted thereon, and its contents rendered accessible, instead of being drawn out bodily as hitherto. This device was patented by S. B. Schultz of Princeton, Ill.

IMPROVEMENT IN JOINTS OF TELEGRAPH CABLES.

Much difficulty has been hitherto experienced in making perfectly insulated joints in the gutta-percha insulated telegraph wires or cables employed as submerged conductors at the crossings of rivers and other waters. The method generally adopted of making the joints has been to strip off the gutta-percha covering from the terminal portions of the conducting wire or wires, taper off the said covering for some distance from the stripped portions, and after twisting the uncovered portions of the wire or wires together, to cover the connection thus formed with gutta-percha, by warming a lump of the latter sufficiently to make it plastic and adhesive, and working it round the connection with the hand. By that method, however, it is difficult to make the gutta-percha covering free from crevices, and, in many cases, when the insulation of the joint appears perfect, it will prove not to be so a short time after it has been submerged. This invention consists in enveloping the connection formed as above described, with a wrapper of sheet gutta-percha or india-rubber, or of cloth coated with either of those substances, having one or both surfaces covered with a cement composed of said substances reduced to a plastic state with naphtha or other solvent, such wrapper being applied by rolling it around the connection. The patentee of this invention is J. N. Power, of New York City.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MARCH 5, 1861.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

580.—Clark Alvord, of Westford, Wis., for an Improvement in Binding Attachment to Harvesters:

I claim, first, The reciprocating gavel carrier, A, constructed and operating as described for the purposes set forth.

Second, I claim the combined pressers, D and E, constructed and operating as described and for the purposes set forth.

Third, I claim the combination of the reciprocating gavel carrier, A, with the pressing apparatus, D and E, at both ends of the machine or at but one end, as set forth,

581.—Wm. W. Austin and F. Creasy, of Carrollton, Mo., for an Improvement in Hemp Breaks:

We claim the above-mentioned arrangement of the swords or splitters, h h, and breaking slats, g g, upon the cylinder, G, for the purposes shown and described.

[This invention has for its object the preparing of hemp or flax without rotting, and to separate the liquous matter from the fibers in a more rapid and better manner than can be done with breaking machines now in use. It consists in so arranging on a rotary cylinder a suitnble number of swords or knives and breaking slats that half their length will be brought to act upon the stalks alternately, thus equalizing to a greater degree the movement of the cylinder, and consequently lessening the power required to drive the machine than if the slats and swords run continuously from end to end of the cylinder.]

582.—Wm. R. Axe, of Beloit, Wis., for an Improved Mop-holder:

I claim, first, Confining the cloth on a needle bar, c, formed on one of the jaws, a, in combination with an interlocking jaw, b, the whole constructed and operating substantially as described.

Second, I claim adjusting and securing the jaws, a and b, in their proper relative positions with each other and the handle by means of a single screw, B, in combination with the concave recesses, 1 and 2, and correspondingly convex shanks, the whole constructed and operating as described.

583.—Benjamin Best, of Dayton, Ohio, for a Composition to Prevent the Premature Decay of Trees, Wires, &c.:

I claim the compound mixture of the above materials and its application and use to and for trees, vines and other growing vegetation.

584.—Cyrus Chambers, Jr., of Philadelphia, Pa., for an Improvement in Machines for Folding, Pasting and Cutting Paper:

I claim, first, The combination of the arms, L and M and N, lever, O, pawl, P, arm, Q, and treadle, R, or equivalent mechanism, for the purpose of arresting the motion of the paster wheel to prevent its coming in contact with the paper when this is not properly placed on the machine, as described.

Second, So connecting the paster wheel with the first folding knife that both can be simultaneously arrested by the same mechanism, substantially as specified.

Third, Trimming off the heads or edges of pamphlets or signatures during the process of folding, substantially as set forth.

Fourth, So regulating the position of the cutters by means of the stop that both may be simultaneously adjusted to sheets of different sizes, as specified.

Fifth, Adjusting the end of the folding blade to correspond with the position of the stop and cutters, as and for the purpose described.

Sixth, Combining in one machine the mechanism for pasting, folding and trimming off the heads or edges of pamphlets or signatures, substantially as specified.

Seventh, The combination in a folding blade of a serrated and curved or angular concave edge for the purpose of preventing the sheet from slipping on the knife, and also to introduce the edges of the paper between the rollers slightly in advance of the middle as described.

585.—Samuel Clark, of New York City, for an Improvement in Tuning Pins for Musical Instruments:

I claim a tuning pin for stringed instruments, when the same is constructed in the manner substantially as described.

586.—B. Coe and M. Geon, of Dalton, Ohio, for an Improvement in Vessels for Evaporating Saccharine Juices:

We claim the evaporator in combination with the protectors to the furnace, as shown in Fig. 3, the shaft, B, the pinions, b b, the segments, c c, the sliding loops, E E, the ratchet wheel, A, lock, d, and the pivot, D, as shown in Fig. 1, as described and for the purpose set forth.

587.—E. Davis and Alonzo Palmer, of Hudson, Mich., for an Improvement in Grain Separators:

We claim the employment, in connection with the shoe, of the connecting rod, a, the spring, d, the rod, e, attached eccentrically to the fan shaft pulley, G, the bar, F, and the rod, i, when arranged as shown, by means of which a lateral and longitudinal, and at the same time a partially circular motion is communicated to said shoe, substantially as set forth.

Second, The arrangement of the sliding section, H, of the fan case with the trap door, I, spring, m, and strap, n, for the purpose of directing and regulating the draft at the head of the shoe, substantially as set forth.

588.—W. E. Doubleday and S. H. Lyon, of Brooklyn. N. Y., for an Improved Die for Pressing Hats:

We claim the crown die, b, fitted to be raised or lowered in the brim die, a, for the purposes and as set forth.

And in combination with the adjustable crown die, b, we claim the adjustable tip die, f, in the die, e, for the purposes and as specified.

589.—Daniel Fleming, of Brooklyn, N. Y., for an Improved Brush:

I claim the screw cap, D, or its equivalent, combined with a brush, essentially as and for the purposes described.

590.—G. W. T. Grant, of Winona couuty, Minn., for an Improvement in Picket Fences:

I claim the construction of a picket fence with only one rail to the panel, having the rails supported on the shouldered pickets, and being placed at a sufficient angle with each other consecutively, to give the necessary strength to the fence to resist lateral pressure, the pickets fitting loosely in the holes of the rails and the lower ends of the pickets sunk sunk sufficiently into the earth to prevent them from being moved laterally out of place, all in the manner and for the purpose set forth and described.

591.—John Griffin, of Louisville, Ky., for an Improved Mode of Regulating the Speed of Vehicles Moved by Mechanical Power:

I claim the arrangement of the two connecting rods, K M, attached respectively to the cranks, L N, of the axles, D, and shafts, O, the latter, when in use, being connected to the axles by the gearing, g h Q, substantially as and for the purpose set forth.

592.—John Griffin, of Louisville, Ky., for an Improvement in Cotton Pickers:

I claim The arrangement of the tubes, A D, cylinder, E, and valves, c F, substantially as and for the purposes set forth.

593.—D. D. Hardy and J. J. Morris, of Cincinnati, Ohio, for an Improvement in Rotary Pumps:

We claim the employment of the rotary pistons, B B′, formed of two semi-cylinders of different diameters, in combination with the two central inner tongues or projections, D D′, of the case, A, substantially as shown and described.

[This invention consists in the employment of two rotary pistons each formed of two semi-cylinders of different diameters, in combination with two central inner tongues or projections within the shell or case; the whole being constructed and operated in such a way as to overcome the difficulties attending the operation of rotary pumps, both as regards durability and the amount of work performed in a given time, as well as the power required to operate them.]

594.—John Hastings and L. P. Gautier, of San Francisco, Cal., for an Improvement in the Process of Treating Gold and Silver Ores:

We claim the manner of extracting gold and silver from their ores by the use, in the manner set forth, of chloride of copper, whether prepared in the manner described or by any other means.

595.—G. E. Hayes, of Buffalo, N. Y., for an Improved Apparatus for Vulcanizing Caoutchouc:

I claim, first, So constructing and using a vulcanizing vessel with a flattened bottom as that the plaster mold, containing the rubber compound, shall lie in contact with the inside of the lower part of the vessel, so that the heat from the lamp, or other heating body, shall be applied directly to that part of the vessel upon which the mold lies, for the purposes and substantially as set forth.

Second, I claim a mercury chamber formed in the upper section, the same being constructed and arranged with the thermometer substantially as set forth.

Third, I claim the opening, c, in combination with the bottom, A, band, D, and cover, E, substantially as described.

596.—J. S. Hooton, of New Carlisle, Ind., for an Improved Condenser and Water Heater for Steam Engines:

I claim the arrangement of the induction and eduction pipes, A and B, the induction and eduction pipes, I and O, the waste water pipe, S, and the alternating opposite plates or shelves, x x, with each other and with the vertical box or tube of the apparatus, when the said plates or shelves are placed at such distances from each other that the water can be made to fall in succession from one shelf to another in broadly expanded and thin sheets, and, whilst thus falling, be acted upon by the ascending steam within the apparatus, in the manner set forth.

597.—J. W. Howlett, of Greensboro', N. C., for an Improvement in Sewing Machines:

I claim, first, Producing the necessary tension of the upper needle thread, N′, by passing it between two glass plates, M′ M′, held in dovetail slots at the end of a bent spring, J, when this spring is combined with an adjustable clamp screw, L′, substantially as and for the purposes set forth.

Second, Making the tension plates of glass, substantially as and for the purposes set forth.

Third, The arrangement of a rod, W, with a tapering face, U V, and spiral spring, Y, in combination with a vertical and horizontal reciprocating needle, substantially as and for the purposes set forth.

[This invention consists, first, in an improved construction of clamp for maintaining the requisite tension of the upper needle thread, and, second, in an ingenious and effective device to insure the correct looping action of the lower needle.]

598.—Josiah Howell, of Sacramento, Cal., for an Improvement in Hemming Guides:

I claim the division of the tube in three parts, a d and b c, of which the two lower parts, a and d, are connected together by a bar, F, passing over the plate, D, of which the upper portion, b e, forms part, the whole arranged and applied substantially as set forth.

[This invention relates to hemmers of the tubular kind. It consists in a certain construction of the tube of the hemmer in three pieces, whereby the hemmer is made adjustable so as to turn hems of various widths, in a very simple manner and without the complication of parts found in adjustable hemmers of other construction.]

599.—R. M. Hughes, of Pleasant Grove, Pa., for an Improvement in Railroad Car Couplings:

I claim a car coupling consisting of a link and pin combined in one piece and pivoted or swung near the middle, one end serving as a link and the other as a catch, so constructed and arranged as to be self-coupling and detachable by means of a lever or other equivalent device, substantially as described.

600.—J. L. Hyde, of New York City, for an Improvement in Sewing Machines:

I claim the combination of a foot plate with the shank of the presser foot, by means of a foot frame open at one side so as to permit the introduction of the foot plate edgewise therein, substantially as described.

601.—George Ives, of Detroit, Mich., for an Improved Wood Saw Horse:

I claim the application to saw horses of a pedal with hook and spring attached, for the purposes mentioned, namely, the better means of making firm and holding secure in its place any stick of wood or other articles to be sawn, using for such purpose any style of hook and means of turning the same, or any kind of spring that will produce, by the aid of the pedal or otherwise, the intended effect.

602.—Josiah James, of Ogdensburgh, N. Y., for an Improvement in Mechanical Movements:

I claim as my invention the joint walking beam as shown in Fig. 1, consisting of the jaws or upper and lower portions of joint, as shown in A A′ and A″, the end of the lever or other portions of the joints, as shown in B B′ and B″, together with the pin, C.

I claim as my invention the joint placed at the point where the walking beam is poised, to give a compound or rotary motion to the end of the walking beam, inserted in the fly or balance wheel, E.

603.—Mathaus Kæfer, of Factoryville, N. Y., for an Improvement in Transmitting Motion:

I claim the arrangement of the shaft, A, guide rods, E E, and fly wheel, B, with the arms, F F, and rockshaft, b, in the manner and for the purpose shown and described.

[This invention consists in arranging the fly wheel shaft of a steam engine or other device in the ends of two arms or pendents, which swing on a rockshaft in such a manner that the same, with its appendages, oscillates in an arc described around the center of said rockshaft, and that all the friction created by the oscillating or reciprocating motion of the fly wheel and its shaft are thrown on the journals of the rockshaft.]

604.—Jacob Kleiber, of Memphis, Tenn., for an Improvement in Swimming Propellers:

I claim the arrangement and combination of the hollow shank, D, with its flanged part, H, the rod, E, and spiral spring, f, when used in connection with arms, K, rods, l, and a waterproof covering, A—the whole being made and operated in the manner and for the purpose set forth.

605.—W. A. Lightall, of New York City, for an Improved Method of Supplying Water to Steam Vessels, for the Purpose of Condensing Steam or Cooling Water:

I claim the arrangement of the hoods, D D′, constructed as shown, in their relation to the condenser or cooler, C, and the vessel, A, as described and for the purpose set forth.

606.—R. Little, of Middle Branch, Ohio, for an Improved Device to Prevent Hogs from Rooting:

I claim, as an improved article of manufacture, a device for preventing hogs from rooting, formed from a single piece of wire, in the manner described and as fully shown in Fig. 1 of the accompanying drawings.

607.—G. B. Mallette, of Millport, N. Y., for an Improvement in Portable Field Fences:

I claim the stakes, C C, armed with the splice pieces, c c, when pivoted to their supporting stretcher bar, B, and provided with the notches, i i, in their inner edges or sides, in combination with the sections, A A substantially as and for the purpose specified.

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608.—Galusha Maranville, of Hampton Corners, N. Y., for an Improvement in Calendar Clocks:

I claim the combination of the independently adjustable dials, B C, face plate, A, and hand, D, the latter being actuated by clock movement, and the whole arranged and adapted to operate in connection in manner substantially as and for the purposes shown and described.

609.—T. J. Mayall, of Roxbury, Mass., for an Improvement in Brushes:

I claim my new mode of securing bristles or other materials used in brushes, by fixing them in a setting or stock of india-rubber or gutta-percha, substantially in the manner described, so that the said bristles shall be firmly held in their places and clasped by virtue of the elastic force of the india-rubber or gutta-percha, and their setting protected against the action of water or other agents to which they might be exposed in the use of the brush.

610.—T. J. Mayall, of Roxbury, Mass., for an Improvement in Waterproof Hose:

I claim forming a hose or tubing in two flat pieces or sides of cloth or woven fabric, coated with rubber or gutta-percha, in one or more layers or thicknesses, and united at their edges by sewing, riveting, or otherwise, substantially as set forth.

611.—F. J. Miller, of Buford, Ga., for an Improvement in Machinery for Making Rope:

I claim the combination of the folding platform, A, and sliding frame, C′, with its wheels, I I′, with the stationary frame, C, with its wheels, H G G G, and grooved self-adjusting regulator, D, arranged for operation as and for the purposes set forth.

612.—E. J. y Patrullo, of Merida, Yucatan, Mexico, for an Improvement in Machines for Dressing the Leaves of the Agave Plant:

I claim the described arrangement of alternate comb-edged and smooth-edged beaters, B B′, on the circumference of a rotary drum, A, in combination with feed rollers, D D′, and with an adjustable hinged apron, F, constructed and operating in the manner and for the purpose set forth.

[This invention consists of a series of alternate comb-edged and smooth-edged beaters arranged on a rotary drum, in combination with suitable feed rollers and with an adjustable hinged apron, which keeps the ends of the leaves to the beaters.]

613.—Francis Peabody, of Salem, Mass., for an Improvement in Looms:

I claim, in combination with the reed and race beam of a loom, a series of projections extending from the reed and over the race beam, in such a manner as not only to operate while the shuttle is being driven longitudinally across the race beam in maintaining the said shuttle in its proper path relatively to the race beam or the reed, or both, but to allow the warps to extend and work between the said projections, substantially as specified.

I also claim the improved arrangement of each spring stopper of the race beam, relatively to the upper surface of the said race beam, viz., in manner and so as to press the shuttle down upon the said surface, substantially as described.

I also claim my improved mode of constructing the shuttle, viz., with its mouth inclined relatively to the base, and provided with the retaining lip, or its equivalent, arranged at its upper edge, substantially as and for the purpose specified.

614.—J. M. Perkins of Cleveland, Ohio, for an Improvement in Water Elevators:

I claim the buckets, E E, attached to the windlass, B, as shown, and provided with the recesses, d, in connection with the spout, F, provided with the curved rods or hooks, G, arranged in such relation with the buckets to operate as and for the purpose set forth.

[This invention has for its object the drawing of water for domestic purposes by a very simple arrangement of means, which may be operated with the greatest facility, be cheaply constructed and applied, and not liable to get out of repair or become inoperative by use. The invention consists in the use of two buckets, connected by ropes or chains, to a windlass in such a way that one bucket will rise as the other falls, and using in connection with the buckets thus arranged, a spout or discharge trough provided with curved rods, to serve as stops, and placed in such relation with the buckets as to tilt the same as they reach their culminating point, and discharge their contents into the discharge spout.]

615.—Charles Perley, of New York City, for an Improved Ship's Capstan:

I claim the capstan or other barrel for ropes or chains, provided with the circular recesses, 1 and 3, receiving the nests of balls, 2 and 4, in the manner and for the purposes specified.

616.—John Porter, of Jefferson, Texas, for an Improved Steam Boiler:

I claim the detachable fire box, constructed of the form and applied, in combination with the body of the boiler, substantially as described.

617.—Charles Potter, Jr., of Westerly, R. I., for an Improvement in Printing Presses:

I claim the combination of the oscillating platen and bed, connected and operated as described, when the former is provided with a pin and the latter with a corresponding socket, operating together substantially in the manner shown, for the purpose of securing an accurate register and preventing slur, as described.

618.—J. N. Power, of New York City, for an Improved Method of Jointing Telegraph Connectors:

claim, in joining telegraph cables, the use of a sheet gutta-percha wrapper covered with india-rubber cement, in the manner and for the purpose shown and described.

619.—S. S. Putnam, of Dorchester, Mass., for an Improved Curtain Fixture:

I claim a curtain fixture consisting of the bracket, b, with its slot, f, and roll, C, the journal, i, of which, by rolling along on the bottom edge of the slot, carries the roll or its spool into contact with a stationary stop, substantially as set forth.

620.—D. F. Randall, of Hartford, Conn., for an Improvement in Tatting Frames:

I claim, as a new article of manufacture, the tatting frame described.

621.—C. B. Richards, of Brooklyn, N. Y., for an Improvement in Sewing Machines:

I claim the employment of a rocking shuttle-driving lever, operated by a crank and slide, or their equivalents, in the manner set forth, in combination with a pin, or its equivalent, attached to said slide, and driving the needle arm substantially in the manner described.

622.—F. B. Richards, of Boston, Mass., for an Improvement in Enema Syringes:

I claim my new and improved bulb and tube connection as made in two separate tubular parts, b c, and respectively inserted in or applied to the elastic bulb and the tube or connection of the valve chambers, and so as to operate therewith or connect the bulb and valve chambers, substantially in the manner and for the purpose as described.

623.—J. R. Robinson, of Boston, Mass., for an Improvement in Steam Boiler Furnaces:

I claim the gas-mixing chamber, B, constructed in rear of the bridge, C, with a covering arch, F, and openings, d d, in the said arch, substantially as specified.

And, in combination with the chamber, B, constructed as described, I claim the trunk, e, elevated above the said arch for the reception of the lighter gases, substantially as specified.

624.—I. M. Rose, of New York City, for an Improvement in Sewing Machines:

I claim, first, A needle with a globular head, b, wheel, c, and hooks, d, constructed and arranged as described, and for the purpose stated.

Second, The clamp, f, with the sheet of rubber contained therein when used for the purpose of giving rotation to the wheel, c, for the purpose set forth.

Third, The arm, 1, in combination with the needle, a, and wheel, c, when used in the manner and for the purpose specified.

Fourth, The wheel, c, with its hooks, d, in combination with the spring holder, e, and head, b, for the purposes shown.

Fifth, The spring holder, e, with the head, b, and groove, g, when used and combined for the purpose of holding the needle in place, and at the same time, permitting the thread to pass over the head, b, and between it and the spring clamp, e, in the manner and for the purpose shown.

625.—J. H. Scott, of Millport, N. Y., for an Improved Steam Valve:

I claim the construction of the valve with the chamber, y, ports, o o, exhaust chamber, E, and stem, R, as set forth, in combination with the case, c c, feed pipe, F, tubes or pipes, a a and x, lever, r, set screws, s s, and strap, B, the whole constructed and arranged substantially as and for the purposes described.

626.—John Seitz, Sr., of Bloom, Ohio, for an Improvement in Presses:

I claim the combination, with the two loaded adjustable levers, 1 1, of the perforated disks, 2 2, upon the same axis of motion as the levers, the said disks and levers being so combined and attached as to render the levers capable of adjustment, as described, and the disks and levers being upon the same axis of motion as the pinions which drive the follower, as described.

627.—Peter Shearer, of Reading, Pa., for an Improved Apparatus for Generating Power:

I claim, first, The combination of the cylinder, E, piston, 31, piston, S, and the heater or heaters, substantially as described, the parts being so constructed and arranged, with reference to each other, as to accomplish the result stated.

Second, The combination of the air chamber, D, with the heater, B, or other suitable device for heating fluid used, for the purpose of maintaining proper and elastic pressure upon the fluid, as set forth, the heater and air chamber being connected as stated, or in any other appropriate manner.

Third, The combination of the auxiliary cylinder, I, and piston, 30, with the cylinder, E, and piston, 31, for the purpose of facilitating the process of starting the machine, said pistons being connected to each other, and the cylinder, I, being provided with valves and other appendages, substantially as described, and accomplishing the purpose stated.

Fourth, The combination of the thermometric regulator, y, or its equivalent, with dampers, r and q, arranged in connection with the smoke stack or chimney and the flues, substantially as described, for the purpose stated.

628.—Hermann Shlarbaum, of New York City, for an Improvement in Water Gages for Steam Boilers:

I claim connecting the glass tube thereof with the metallic parts, by means of india-rubber sleeves or muffles, substantially in the manner as set forth.

629.—S. B. Shultz, of Princeton, Ill., for an Improved Shop Bin or Substitute for Drawers:

I claim arranging or placing a drawer, B, within its case or box, A on a cross bar, C, or its equivalent, to admit of the opening and closing of the drawer by the tilting of the same, substantially as set forth.

630.—E. G. Stevens, of Biddeford, Maine, for an Improvement in Enema Syringes:

I claim the valvular mechanism described, for reversing the currents, consisting of the valve seat case, with its openings, S S′, the conical valve seat with its valves, o v, as shown in Figs. 1 and 2, the screw, p, neck, r, when used in combination with the pipe, B C, and bulb, D, or their equivalent, substantially in the manner set forth and specified.

631.—U. T. Stuart and C. E. Stewart, of Fayette county, Tenn., for an Improvement in Straw Cutters:

We claim the arrangement of the plunger, I, rope, H, lever, G, and spring, F, when used in connection with the cutters, A A, and plates, C and D D, as and for the purpose substantially as set forth.

632.—C. E. Toop, of New York City, for an Improved Washing Machine:

I claim, first, The combination of the corrugated bed, 1, and corrugated washboard, 3, arranged as described, with the gearing for giving motion to said bed, the whole being so arranged and combined as to violently agitate the clothes at the same time that they are gradually turned over, so as to bring a different portion of the mass successively in contact with the washboard and bed.

Second, The combination, with the above-mentioned devices, of the two rails or side pieces, 2 2, corrugated as described and represented, for the purpose specified.

633.—G. R. Walker, of Washington, D. C., for an Improvement in Corn Huskers:

I claim, 1st, The employment of a grinding wheel to remove the buts of the husks in contradistinction to a wheel armed with cutters, said wheel also serving as a guard for the ears of corn, substantially as described.

Second, I claim the combination of the grinding wheel, B, cogged wheel, A, and springs, C, or their equivalent, substantially as described.

Third, I claim the combination of the endless apron, L, wheels, A and B, endless aprons, D and O, springs, C, and hinged apron, J, the whole being constructed and operated in the manner and for the purpose set forth.

634.—N. D. Wetmore, of Cleveland, Ohio, for an Improvement in the Mode of Preserving Butter:

I claim the mode of preserving butter by compressing it in vessels, and then hermetically sealing the joints at C and H, and then encasing the whole with gypsum when in a plastic state, all in the manner and for the purposes described.

635.—D. A. Woodward, of Baltimore, Md., for an Improvement in the Mode of Operating the Reflector of a Solar Camera:

I claim, first, The arrangement and combinatton of the pivotal axes of the mirror with the lever, G, and connecting rod, H, for elevating or depressing the mirror, substantially as specified.

Secondly, I claim combining with the revolving collar, B, the adjustable rail, I, and its traverse, e, substantially as and for the purposes set forth.

636.—A. R. Wyeth, of West Middletown, Pa., for an Improvement in Tanning:

I claim the described process for tanning hides or skins, consisting in first soaking them in a warm solution of potash and salsoda, then, after rinsing, working and sweating, subjecting them to the vapor of spent damp tan bark, damp horse dung and rotten wood; then soak them in a tanning liquor composed of bark solution sumach divi divi and alum, which liquor is afterward strengthened with japonica, glauber salts and common salts, all in the manner and in the proportions set forth and described for the purpose specified.

[This invention consists in exposing the hides or skins to the consecutive action of certain liquors or vapors combined with a series of manipulations, whereby the tanning process is greatly facilitated and a good and tough leather produced in a much shorter time than by the ordinary tanning process.]

637.—T. C. Zulich, of Schuylkill Haven, Pa., for an Improvement in Potato-diggers:

I claim combining with an inclined cylindrical screen, D, as described, the spiral or screw conveyer, K, substantially as and for the purposes described.

[This invention consists in combining, with a suitable shovel plow adapted to the digging of potatoes and other roots, a rotating cylindrical sieve, so arranged with relation to said plow that the earth mixed with potatoes loosened by the plow will be deposited in the front end of this cylinder, and as this cylinder is rotated the earth will be separated from the potatoes and the potatoes discharged at the rear end of the cylinder. It also consists in arranging said rotating cylindrical sieve in a position inclining from the rear to the front end of the machine, and in employing, in combination with this cylinder as a means for conveying the potatoes backward, a spiral propeller of a suitable construction.]

638.—J. E. Earle, of Brooklyn, N. Y., assignor to himself and Samuel Hathaway, of New York City, for an Improvement in Sewing Machines:

I claim the combination of the needle arm, a, pulley clutch, F, levers, G H and K, and trip, I, constructed, arranged and operating substantially as set forth, to disconnect the power on the loosening of the thread.

639.—T. G. Harold, of Brooklyn, N. Y., assignor to himself and G. L. Kelty, of New York City, for an Improved Curtain Fixture:

I claim a lever, e, fitted upon a pin and guided by the spool on the curtain roller, in such a manner that the lever is always kept in its correct position for stopping the curtain regardless of the position of th spool relatively to the bracket.

And I claim arresting the movement of the spool and curtain by a blocking piece, pall or stop passing in between and acting against the sides of the spool.

640.—L. W. Lathrop and L. B. Justice, of Philadelphia, Pa., assignors to L. W. Lathrop aforesaid, for an Improvement in Sewing Machines:

We claim, first, Passing a loop of needle thread over a stationary spool case containing an ordinary spool by means of a continuously revolving hooked ring adapted to receive the said spool case, when the latter, as well as the ring and its hook, are so constructed that the loop, in passing over the case, shall be free from contact with the edge of the case as well as with the inside edge of the ring, as set forth, for the purpose specified.

Second, We claim the reciprocating hook, arranged and operating as set forth, so as to control the loop of needle thread after it has passed over the spool, and prevent it from being twisted, knotted or otherwise disarranged as it is being drawn into the fabric.

641.—Clark Marsh (assignor to the Wheeler & Wilson Manufacturing Company), of Bridgeport, Conn., for an Improvement in Hemming Guides for Sewing Machines:

I claim A hemmer foot plate, constructed substantially as described, and capable of being secured to and detached from the shank of the presser-foot of a sewing machine, substantially as described.

642.—John Moulson, of Philadelphia, Pa., assignor to A. B. Elliott, of Troy, N. Y., for an Improvement in Sewing Machines:

I claim a transparent presser-foot for a sewing machine, which is a combination of a transparent foot plate with a shank by means of a frame that holds the foot-plate and connects it with the shank, substantially as described.

I also claim the combination of a presser-foot frame with a transparent perforated foot-plate of convex form, substantially as and for the purpose described.

643.—Orson Parkhurst (assignor to H. D. Fuller and R. Safely), of Cohoes, N. Y., for an Improvement in Knitting Machines:

I claim the combination of the vibrating lever, E, with the lever, C, its adjusting weight, W, and point, g, operating to and with each other in manner and form as described, so as to disengage the operating power through ring, R, upon the droppping of a stitch or loading of the needles, or any false operation of the machinery by which the integrity of the fabric knit is affected, substantially as the same is set forth and described in the specification.

644.—G. E. Vanderburgh (assignor to the Liquid Quartz Company), of New York City, for an Improvement in Silicated Soaps:

I claim the use of a liquid silicate in the production of an improved quality of soap; but this I only claim when the liquid silicate thus employed contains, by weight, a larger proportion of silex than it does of the alkaline base of the same.

645.—Turner Williams (assignor to himself and David Heaton, 2d), of Providence, R. I., for an Improvement in Converting Reciprocating into Rotary Motion. Ante-dated Sept. 5, 1860:

I claim the peculiar friction pawls, e and s, constructed in the manner substantially as described, for the purpose specified.

I also claim the combination of the said friction pawls or their equivalent with the surfaces, g g, of the driving wheel, arranged and operating substantially as described, for the purpose set forth.

646.—Carlos Garcia, of New Orleans, La., Administrator of the Estate of Felix Garcia (deceased), late of same place, for an Improvement in Decalcifying Liquids. Patented in Belgium Oct. 22, 1855:

I claim the within-described method of treating saccharine and other liquids, first with an excess of time, and afterwards with soap, substantially in the manner and for the purpose set forth.

[This invention consists in treating saccharine or other liquids first with an excess of lime and afterwards with some saponificable substance, so that by the action of the lime the impurities contained in the liquid are separated from the same, and by the subsequent action of the saponificable substance the lime, together with the impurities are reduced to such a state that they can easily be separated from the liquid, leaving the latter in all its purity.]

647.—H. D. Deming and P. G. Walker, of Delmar, Pa. assignors to P. G. Walker and Wesley Pitts, of Charleston, Pa., for an Improvement in Animal Traps:

I claim the construction and arrangement of the above-described trap, the same being provided with the index, T, and trip, H, and having sheet metal side wall, rotary partitions, and coiled springs, all combined and operating together substantially as set forth, for the purposes described.

RE-ISSUES.

43.—Ira Kinman, of Freeport, Ill., for an Improvement in Measuring Faucets. Patented May 3, 1859:

I claim the construction of the faucet with the rotating slide, F, and an eccentric barrel, C, operating substantially as shown and described, in combination with the described device to register accurately and automatically the number of rotations of the slide, and to arrest it when the desired quantity of fluid is discharged, as set forth.

I also claim the employment of an endless screw, in combination with the rotary slide, F, and eccentric chamber, E, arranged and operating in the manner and for the purposes substantially as set forth.

[This invention, as re-issued, covers the use of an endless screw arranged within the tube of a faucet, for facilitating the flow of thick, viscous liquids through the faucet, whether the screw be combined with the measuring chamber, as before, or not.]

44.—Frederick Nishwitz, of Brooklyn, N. Y., for an Improvement in Harvesters. Patented Feb. 16, 1858:

I claim the arrangement of an adjustable lever directly connected with the the tongue or pole, for elevating the cutting apparatus, and to hold it at any desired hight, as and for the purpose set forth.

Second, I claim said lever, in combination with the pole, chain or cord, the frame or finger bar, said pole being attached at its rear end near the center of the machine, as and for the purpose set forth.

Third, I claim, in combination with the said lever and pole, the pawl and treadle operating jointly in the manner and for the purpose specified.

Fourth, I also claim the combination of the lever, pawl and treadle with the adjustable stop, K, substantially as described, for the purposes specified.

EXTENSIONS.

Eunice B. Hussey, Administratrix of Obed Hussey (deceased), late of Baltimore, Md., for an Improvement in Reaping Machines. Patent dated August 7, 1847. Re-issue 449, dated April 14, 1857:

I claim as my invention the combination of a vibrating scolloped cutter, the indentations of whose edge act as a series of moving shear blades, with slotted guard fingers, the sides of which act as a corresponding series of fixed shear blades; the parts of such fingers forming the slot being connected at the front ends only, leaving the rear of the slot open and free for the escape of material that would otherwise clog the cutter, substantially as described.

Eunice B. Hussey, Administratrix of Obed Hussey (deceased), late of Baltimore, Md., for an Improvement in Reaping Machines. Patent dated August 7, 1847. Re-issue 451, dated April 14, 1857:

I claim, as my invention, the combination of a slot formed between the long and short parts of the guard finger, with an opening in the rear of the short part, substantially as described.

Eunice B. Hussey, Administratrix of Obed Hussey (deceased), late of Baltimore, Md., for an Improvement in Reaping Machines. Patent dated August 7, 1847. Re-issue 742, dated June 21, 1859:

I claim, as my invention, the combination of the side and cross bearings of the guards, with flush edges at or near the forks of the blades substantially as described.

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Eunice B. Hussey, Administratrix of Obed Hussey (deceased), late of Baltimore, Md., for an Improvement in Reaping Machines. Patent dated August 7, 1847. Reissue 917, dated February 28, 1860:

I claim the combination of the finger beam (without a platform), the short, open slot fingers having small projections below the cutter—the scolloped cutter—and the guides for the cutter; these parts being constructed and combined substantially as described; the cutter vibrating in a straight line, each scollop having an edge sliding in close proximity to an angular corner of the finger, and forming therewith a nipping angle, substantially as described.

Henry Jenkins, of Brooklyn, N. Y., formerly of Pottsville, Pa., for an Improvement in Machinery for Weaving Wire Grating. Patented March 6, 1847:

I claim manufacturing screens or other articles from metallic wires or bars that are bent or crinkled at the point of intersection previously to being laid or woven up, whereby I am enabled to form meshes of any desired size or shape by such intersecting bars or wires, so that they shall be rigid and durable, as set forth, and this I claim irrespective of the mechanism for bending or crinkling said wires, or interweaving them to form the requisite meshes.

DESIGNS.

23.—N. S. Vedder, of Troy, N. Y., for a Design for a Cook Stoves.

24.—N. S. Vedder and E. Ripley (assignors to N. S. Vedder), of Troy, N. Y., for a Design for a Stove.

Notes and Queries

F. C., of Mass.—You state that, in order to increase the speed of your cider mill, you reduced the size of the small pulley one-half, but now find that it takes double the power to drive it, and you wish to know the reason why and how to make the pulleys so as to remedy the evil. Of course, since you have doubled the speed of your mill, the power required to drive it must be proportional, because you have twice the amount of work to do.

L. R., of N. Y.—There is no other mode of blueing articles of iron and steel known to us than by submitting them, when polished, to heat on an iron plate on the top of a furnace. They will pass through various shades of color, according to the temperature to which they are raised; whenever they attain to the blue shade, take them off and cool instantly. They must be exposed freely to the air while being heated, or you will fail to obtain the desired color.

A. J. W., of Mass.—To your question, "What is the best bait for foxes?" we are not able to reply positively. We know that the body of a rabbit or of a pullet is sometimes used. We should suppose that tying a live chicken to a low roost, and setting two or three traps just out of its reach, would be an excellent plan. Wolves are caught at the West by setting a trap in the ashes where a pile of wood has been burned, and then scattering pieces of meat about among the ashes.

R. R. H., of N. Y.—The bronze medals which we have examined are not coated with an artificial bronze varnish. By boiling tarnished bronze medals for a few seconds in dilute sulphuric acid, then washing them well in hot water, they will become bright; they should then be dried, and if you desire to prevent them from oxydizing, give them a thin coat of white varnish.

A. M. B., of N. Y.—A wagon will run easier when its wheels are placed on small iron axles than if placed on large wooden ones. The cheapest and easiest way to extinguish fire in a brick kiln is to shut it up as tight as possible. A little steam allowed to flow through the flues will tend to extinguish the fire, but will injure the quality of the brick.

J. B. J., of C. E.—Articles of iron are now case-hardened with a composition of powdered prussiate of potash and flour or meal in equal parts, made into a paste with water, and applied first to the surface of the article, then allowed to dry. The article is now raised to a low red heat in a clear fire, and then plunged into cold water. The prussiate of potash is the main agent; the flour is simply a vehicle for its application.

H. E. T., of Wis.—Your suggestion to give the hole through Hewett's projectile a spiral twist is a very natural one, but we believe that all attempts to rotate missiles by the resistance of the air must be failures. The rotation must be given before the shot leaves the gun, and then it will continue without any further assistance to the end of its flight.

J. H., of N. Y.—The Buhr-stone, of which millstones are made, is a natural deposit of cellular quartz, formerly supposed to be found in considerable quantity only in the mineral basin of Paris and the adjoining districts. The best quarry is at La Ferté-sous-Jouarre. The stones are quarried and broken into rectangular blocks, called "panes," which are made up into millstones and bound together with iron hoops. About eight years ago we received some excellent samples of buhr-stone from a quarry just opened in Georgia, which was said to be of inexhaustible extent. We know of no way to wash bolting cloths to prevent the ravages of insects.

T. L. B., of Ind.—In the Wesson rifle, which has never been surpassed for length of range and accuracy of firing, the ball, or rather cone, is swedged through a false muzzle which is removed before the gun is discharged. This swedging alters the shape of the missile, causing it to fill the grooves of the rifle, and preventing all windage. But we have never heard any advantage claimed for merely compressing the lead.

G. S., of Ill.—An overshot wheel 8 feet in diameter, with 225 lbs. of water on the loaded side, running 6 revolutions per minute, would discharge 1,350 lbs. per minute. This, falling 8 feet, would be equal to 10,000 lbs. falling 1 foot; and, as a horse-power is measured by 33,000 lbs. falling 1 foot per minute, your stream is just about one-third of one horse-power. An allowance of 40 per cent for friction, leakage, inertia of the water, &c., leaves about one-fifth of a horse-power for all that you could possibly utilize.

J. S., of Ohio.—An electric engine can be made to work on your principle.

J. P., of Cal.—Your ingenious lightning rod insulator is received. We shall not have it engraved.

R. N., of Ga.—All the fire companies in this city are under the command of the Chief Engineer and his Assistants, whose orders are supreme at fires. The first man at the engine house is entitled to hold the pipe at a fire; this is the custom, but fire companies can make such rules as they please about their minor duties. A complete revolution is going on in all our cities, in substituting steam for hand engines; and with this change a new system of firemen's tactics is also being introduced. Frame buildings are never blown up with powder to stop the ravages of a fire; they are usually torn down with hooks and levers. Excepting upon one occasion, we never saw a brick building blown up to arrest a fire.

C. H., of N. Y.—Several plans have been suggested for causing projectiles from cannon to rotate by the resistance of the air against wings on the outside, and among them a screw on the point of the projectile. It seems to us that Mr. Stetson's objection to these is perfectly sound; the rotary motion must be given to the missile before it leaves the gun. It seems to us, also, that there is a great deal of force in Mr. Stetson's remark, that the rifling of cannon has altogether too short a twist. If the velocity of the bolt is 1,600 feet per second, and it turns round once in 100 feet, it will rotate at the rate of 960 revolutions per minute; and this, we should suppose, would be sufficient. The larger the bolt, the smaller the number of revolutions necessary per minute.

E. F. F., of Mass.—In the nature of things, any substance that will prevent your blacking from drying will prevent it from taking a polish. You must keep it tightly covered.

C. A. S., of Ill.—The best varnish for covering magnets is made with gum shellac dissolved in alcohol. The best for covering iron implements is copal, made with linseed oil. Smee's "Electro-metallurgy," published by J. Wiley, Walker-street, this city, may perhaps answer your purpose. If you make your steel magnets about 8 inches long, 3 wide and about ¼ of an inch in thickness, we believe they will answer for an experimental electro-magnetic machine for producing the electric light.

H. B. N., of N. Y.—All the galvanized iron which we have examined does not seem to withstand the action of salt water or a saline atmosphere but for a short period. Alcohol may be manufactured from corn cobs, but the quantity obtained is small in proportion to their bulk. The quantity of alcohol obtained from corn and malt is exactly in proportion to the sugar contained in them. To obtain alcohol from corn cobs, they must be mashed and fermented exactly like the corn that is used in distillation.

E. B. C., of Ohio.—Nitric, sulphuric and hydrochloric acids will dissolve the solid substances in the human system; but they will effect the dissolution of the system itself at the same time.

J. B. Z., of N. Y.—We have had enough of "hair snakes," unless some one can give us their natural history from careful observation.

B. W. K., of Wis.—The principle of the gyrascope has been repeatedly explained. All the motions result from inertia, or rather from a combination of inertia and gravitation. You will find the general principle very clearly presented on page 193, Vol. III. (new series), of the SCIENTIFIC AMERICAN.

B. F. H., of Mo.—If you want a capitalist to take hold of your steam plow with you, apply to the hardest and sharpest money-maker in your neighborhood. If there is any real virtue in it, that is the sort of man to carry it through; and if there is none, the sooner you abandon it the better.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, March 9, 1861:—

P. M., of Mich., $25; W. A. L., of N. Y., $25; J. C., of N. Y., $50; E. T. H., of L. I., $30; J. H. Van R., of N. Y., $15; T. C., of Cal., $35; F. W., of Mass., $10; H. C. S., of Ohio, $35; F. B., of N. Y., $25; L. P., of Conn., $25; E. J. y P., of Mexico, $40; J. L., of Mass., $25; J. O. F., of Mass., $30; C. L., of Cal., $40; W. F. B., of Ill., $30; L. S., of N. Y., $250; J. A. R., of Pa., $30; E. M., of N. Y., $50; V. C., of Va., $$15; J. F. S., of Va., $25; A. & E., of Texas, $30; G. H. C., of N. Y., $15; J. V., of Mich., $30; A. T., of N. Y., $25; J. A. De B., of N. Y., $25; J. S. S., of N. Y., $25; M. H., of N. Y., $25; J. S. S., of N. Y., $25; J. A. C., of Ohio, $25; J. R., of Conn., $28; W. W. H., of N Y., $15; C. & D., of N. J., $20; J. P. S., of N. Y., $30; L. & W., of N. Y., $25; H. W. M., of Ill., $25; J. B. S., of Conn., $25; H. McD., of Pa., $30; I. W., of Maine, $40; L. C., of N. J., $30; C. K. H., of Cal., $25; J. G. D., of Mich., $30; V. D., of Va., $30; P. P., of N. Y., $43; G. S. C., of Ill., $25; J. C., of Canada, $30; J. S. G., of Maine, $30; N. R. M., of N. Y., $30; W. W., of Pa., $55; B. & D., of N. J., $15; L. & W., of N. Y., $475; C. H. A., of Conn., $15; E. T. S., of Ohio, $23; G. G., of N. Y., $25; W. J. P., of N. Y., $25; C. F., of Mich., $25; A. H. B., of N. Y., $25; H. C. A., of Ill., $25; E. T., of N. Y., $55; C. T P., of N. Y., $40; I. V. B., of N. J., $30; J. R. M., of Texas, $35; W. K., of N. Y., $40; G. & C. B., of Conn., $30; E. F. F., of Tenn., $43; C. T. B., of Mass., $25; A. S., of N. Y., $30; W. H., Jr., of Mass., $35; C. C. H., of N. Y., $30; S. M. D., of Mass., $25; J. M. C., of Mass., $20; J. H., of Ohio, $25; J. McC. & Bros., of N. Y., $25; C. H., of N. H., $30; W. & L., of N. Y., $15; H. T. C., of Conn., $15; L. & P., of Pa., $20; R. McC., of N. Y., $15; J. P., Jr., of N. H., $15; C. T. C., of N. Y., $10; E. R. W., of Maine, $25; J. & R., of N. Y., $25; J. L., of N. J., $28.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending March 9, 1861:—

[The patents on these cases, when issued, will be granted for seventeen years under the new Patent Law.]

J. R., of Conn.; J. T., of N. Y.; G. G., of N. Y.; J. & R., of N. Y.; H. B. & J., of Iowa; J. O. W., of N. Y; J. R. R., of Mass. (2 cases); J. S. S., of N. Y.; A. M., of Maine; J. McC. & Bros., of N. Y.; C. F. C., of N. Y.; E. J. y P., of Mexico; L. & W., of N. Y.; E. T., of N. Y.; S. M. D., of Mass,; J. H., of Ohio; J. A. De B., of N. Y.; H. W. M., of Ill.; J. L., of N. J.; A. S., of N. Y.; J. B. S., of Conn.; W. J. P., of N. Y.; F. W. T., of Mass.; L. P., of Conn.; G. S. C., of Ill.; E. R. W., of Maine; W. K., of N. Y.; E. T. S., of Ohio; C. T. P., of N. Y.; J. J. H., of Ky.; L. L. K., of Mass.; L. S., of Vt.; C. T. B., of Mass.; J. L., of Mass.; S. H. & H., of Mass.; F. B., of N. Y.; G. S. C., of Ill.; C. H. A., of Conn.; P. P., of N. Y.; J. V., of Mich.; G. F. J. C., of N. J.; E. T. H., of L. I.

New Books and Periodicals Received.

THE PRACTICAL DRAUGHTMAN'S BOOK OF INDUSTRIAL DESIGN: Forming a Complete Course of Mechanical, Engineering and Architectural Drawing, Founded Upon the "Nouveau Cours Raisonné de Dessin Industriel" of M. M. Armengaud, ainé, Armengaud, jeune, and Amoroux, Civil Engineers, Paris, Containing Additional Plates and Examples of the Most Useful and Generally Employed Mechanism of the Day; by William Johnson, Asso. Inst. C. E., Editor of "Practical Mechanics' Journal." Second edition, with the French Measures carefully converted into English. Boston: C. B. Russell, No. 12 Tremont-street.

In a previous edition of this standard work, the French measures were preserved, causing some inconvenience, but in the present publication they have all been converted into English, and the work may now be considered perfect. It has been adopted in Yale and other colleges, as the best guide for instruction in mechanical drawing.

THE ATLANTIC MONTHLY: published by Ticknor & Fields, Boston, Mass.

The March number contains the last chapter but one of "The Professor's Story." The secret is whispered, and the end can be seen.

Important Hints to Our Readers.

BACK NUMBERS AND VOLUMES OF THE SCIENTIFIC AMERICAN.—Volumes I., II. and III. (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1.50 per volume by mail, $2—which includes postage. Price in sheets, $1. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

BINDING.—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express or delivered at the office, 40 cents.

RATES OF ADVERTISING.

Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS—PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds, in the quickest time, and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

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Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park-row, New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of *"Hints to Inventors."* Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

FOR SALE—A DOUBLE CYLINDER STEAM ENGINE (20-horse power), with flue, boiler, steam drum, heater, all complete; in good order. Cost $1,400; will be sold for $600. Inquire of WILLIAM GRAY, opposite the railroad station, Tremont, Westchester county, N. Y. 1*

MEND YOUR OWN TINWARE.—AS EVERY ONE can do (even the ladies themselves) when furnished with Root's Improved Portable Soldering Implements. Also suitable for mending brass and copper kettles and broken metals of any kind, with a neatness and dispatch that any tinsmith might envy. Full instructions given for mending jewelry, rings, &c. Implements and materials, with full printed instructions, mailed to any address (postpaid) on receipt of 30 cents; four packages for $1. Agents wanted. Address A. I. ROOT & CO., Manufacturers, Medina, Ohio. 1*

THE GRAEFENBERG THEORY AND PRACTICE OF Medicine.—On the first day of May, 1860, the Graefenberg Company's Salesrooms, Consulting Offices and Medical Institute were removed from No. 34 Park-row to

NO. 2 BOND-STREET, NEW YORK,

(first door from Broadway), in order to afford greater facilities and a more central location, demanded by the rapid increase of confidence in the Graefenberg Theory and Practice. The Graefenberg Theory and Practice, and the use of their medicin s, together with complete symptoms of all diseases incident to this country and climate, the best method for their prevention and cure, will be found in the GRAEFENBERG MANUAL OF HEALTH.

This valuable family medical work, containing 300 pages, has been revised and improved, and elegantly illustrated with beautifully colored engravings of the human system. Sent by mail to any part of the country on receipt of 25 cents. It is a complete guide to all diseases and their cure. Address JOSHUA F. BRIDGE, M. D.,
Resident and Consulting Physician Graefenberg Co.,
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Littlepage's Patent Circular Milldress.

An improvement in a mill dress may appear to a casual observer as a thing of little importance to the community. It may therefore not be amiss to glance at the gain realized by an improved dress, which grinds say 10 per cent more than those usually employed, in quantity, of equal quality, with the same power. This country consumes annually over one hundred and ten million bushels of grain, which keep employed some 30,000 horse-powers of machinery to reduce it into meal and flour. If 1-10th is gained by a superior dress, the amount saved is 3,000 horse-powers, which, at the original cost of $100 per horse-power for the machinery, gives a gain of $300,000. If, in addition, a dress is capable of delivering the flour and meal in a cool state and with a perfect evenness of particles, then the additional gain in the quality of the product, as well as in the quantity produced per bushel, is immense, without counting the power saved in machinery to cool the products before they can be perfectly bolted. If the superiority of the flour and meal thus produced, without heating, amounts to but 10 cents per barrel, the gain annually would be two millions of dollars. Again, it is also well known that when flour is not delivered into the bolting cloth in a cool state, the flour will not readily separate from the bran, and will thereby give out a smaller per centage.

Mill dresses are either straight or circular, and their distinctive actions consist principally in this: The furrows of the straight dress cross each other near the eye, at a large angle, which decreases toward the periphery to a small angle. The effect is that, nearest the eye, the grain travels too much along the furrows, instead of passing across the lands. And near the periphery, the direction of the furrows is too far removed from such a line or curve as would represent the path which a particle, impelled by centrifugal force, would describe over the stones. The meal and flour is therefore too much retarded; and, in consequence, the products are unnecessarily heated, and much power is wasted; the proper circulation of air is also impeded hy these straight furrows

With the circular dress, the angle at which the furrows cross each other is smallest near the eye, and increases towards the periphery; the grain therefore commences to travel across the lands near the eye; and thus the crushing of the grain requiring the most force, is performed where the stones have the most power. Near the periphery, where the products should pass out rapidly, its quick passage is facilitated by an approximation of the direction and curve of the furrows to the line, which a particle, impelled by centrifugal force, would describe over the stones.

The following are the peculiar features of the dress we are about to describe:—

1st, The furrows are double the width of the lands.

2d, The furrows consist of a notch, Fig. 2, each side consisting of a perfect slope. The steep part goes in advance and forms the convex side of the furrows; and while it is the proper shape to receive the particles from the lands and corresponding furrows, it is well adapted to preserve the edges of the stone and furrow. As the furrows cross each other, the grain is forced across the long slopes; and these, while they best preserve the stone and the dress, particularly facilitate the traveling of the grain out of the furrows on to the lands, which otherwise would have a tendency to travel along the furrows, impede the proper circulation of air and expel unground particles. Thus it is evident that the long slopes of the furrows do nearly all the work, the lands merely completing it to an even smooth fineness. For that reason the lands are only half the width of the furrows.

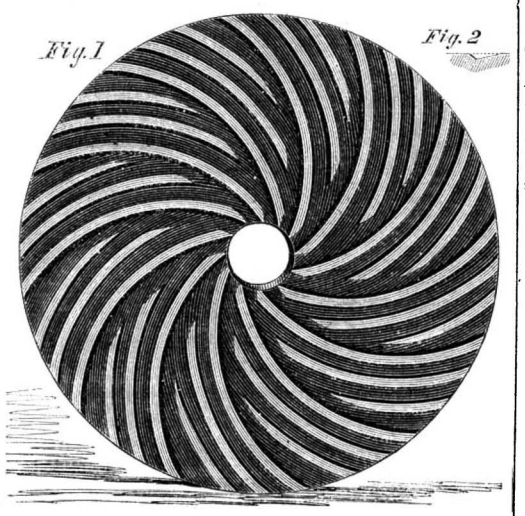
3d, The manner of laying off the dress—with as few secondary furrows as possible—renders these furrows nearer parallel to the leaders than is possible to accomplish by any other plan, while at the same time no part of the stone is unoccupied by furrows. If the leaders and secondary furrows do not approach parallelism, either the former or the latter, or both, must be the more removed from the most favorable curve. Another advantage claimed is that short turns, at the places of meeting of the leaders and secondary furrows, are avoided.

As regards proper ventilation, it will be readily understood that, if a furrow is turned too far forward, the air will enter it at the periphery, and leave the stones at the eye. This would obstruct the passage of the grain, which, even without such obstruction, would have to be crowded through such a furrow.

It is also evident that there is a curve in which, at a defined velocity, there would be no draft—neither one way nor the other.

And again, it is evident that there is a curve in which (at a defined speed), with empty stones, the draft would be the greatest. And this shape of furrow, when grain is admitted, would allow the grain to travel out by the furrows unground; and because the grain would thus fill the furrows, there would be little circulation of air.

This leads to the conclusion that there is a furrow of the right curve which cannot be materially changed without detracting from the efficiency of the stones. This proper shape of the furrows is claimed to be arrived at in this dress. And it must be observed that the remarkably cool state of the products of this dress, the evenness and fineness of such products, together



with the rapid grinding obtained are principally ascribed to that proper curve of the furrows, in combination with the long slopes forming the concave sides of the furrows, the convex side traveling foremost. This slope gives such facility to the grain to travel out of the furrows on to the land, that the furrows can so much the more approximate the path described upon the stones by the course of a particle—impelled by centrifugal force—without causing unground particles to pass out by the furrows, and without obstructing—but on the contrary facilitating—the circulation of air through the furrows. Again, while these furrows—if made with a steep side in place of the long slopes—would obstruct the passage of the grain out of the same on to the lands, they would discharge it imperfectly ground and obstruct the passage of air. Whereas, if made with a long slope, they will cause the grain to travel across the slopes on to the lands into the next furrows where it receives air, and across the next slopes, and so on, while at the same time the grain is rapidly carried towards the periphery by the curve of the furrows.

This dress has been thoroughly tested for producing both meal and flour, and has far surpassed even the expectations of the inventor—a thing not often accomplished. It is well adapted to be cut by machinery of the simplest construction.

The patent for this invention was issued, through the Scientific American Patent Agency, on the 20th day of Mach, 1860, to Caleb V. Littlepage, who, for further information, can be addressed at Austin City, Texas.

Our Correspondence.—Within a short time we have received letters inquiring whether a concert burlesquing different nationalities, to supersede the negro minstrels, would be a profitable speculation?—what is the best bait for catching foxes?—whether the popular opinion about marrying relations is sound doctrine according to Scripture?—and where a man could get a new bridge to his nose!

No less than nine different companies have lately applied for grants to build as many railroads in the city of London. Seven of these roads are to be tunnels, and two viaducts. These schemes are gigantic in their conception, and will cost vast sums to complete, but they will no doubt be carried through, as John Gilpin's descendants are men of boundless capacity.

The Minesota Copper Mine.

We take the following from the *Lake Superior Miner:*

The result of operations at the Minesota mine during the past year is encouraging in the highest degree. The work done is greater than that of any previous year, and the amount of copper produced is larger than that of any similar period of time. They are now working the full extent of their ground upon the conglomerate lode, which is about 2,900 feet in length upon the location, and the openings throughout are carried down at the rate of about 90 feet per annum. Drifts are in progress from two shafts from the CX fathoms level, which is about 850 feet, on the inclination of the vein, from the surface. This brings the bottom of the mine to within 50 or 60 feet of the level of Lake Superior. During the year they have drifted 4,683 feet—sunk 1,365 feet, and sloped 35,918 feet of a fathom width. These figures show an area of nearly six superficial acres (5.91) of the vein which has been broken during the year. The force employed is about 790 men, all told, of whom about 282 were miners proper. The amount of copper produced is 2,150 tuns and 692 lbs. The shipment during the season was 2,221 tuns 1,035 lbs., gross—or 2,178 tuns and 28 lbs., net. This makes the average monthly product 179 tuns 391 lbs., with an average monthly expense of about $27,000.

The Minesota mine has paid to the stockholders twelve hundred and eighty thousand dollars in cash dividends, besides the dividends of shares which now represent the Rockland, Superior, Flint Steel, and Lake Superior mines. The net earnings of the past year will probably enable them to divide at least $180,000 more, which will make their total cash dividends amount to $1,460,000. Now, the total cost to the original stockholders was only $66,000. Truly, the success of this great mine will not suffer in comparison with any similar enterprise in any part of the world.

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