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IMPROVED TURBINE WATER WHEEL.

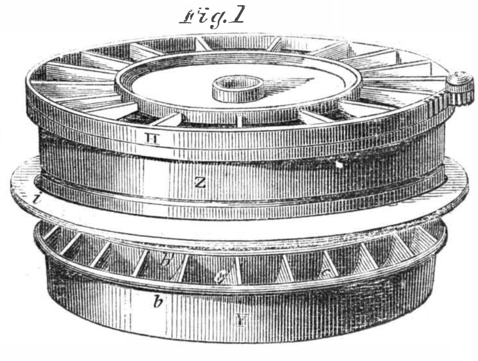
If any of our readers who do not understand the turbine water wheel would like to inform themselves respecting its peculiarities, they could not have a better opportunity than is furnished by the accompanying engravings.

In the perspective view, Fig. 1, Y is the wheel fastened rigidly on the shaft which runs loosely through the guide box, Z. The wheel is formed of two bands, *b* and *b′*, with the floats, *c c c*, between them, reaching from one band to the other, inclined and curved, as shown in Fig. 3. This wheel is placed in a vertical cylinder, through which the water flows downward, and as the water presses against the inclined floats it drives the wheel around. In order to secure more fully the impact of the water against the floats, the stationary guide box, Z, is placed just above the wheel with the guides, *o o*, of a construction similar to the floats, curved and inclined downward so as to guide the water nearly perpendicularly against the face of the floats, in the direction in which the wheel is running. In the perspective view, the guide box is represented as raised a little above the wheel out of its true position in order to show the buckets.

With this general view of the turbine wheel, the reader will be prepared to appreciate the improvements which it is the object of the annexed cuts to illustrate. They were invented by James P. Collins, of Troy, N. Y., and patented, through the Scientific American Patent Agency, on Dec. 6, 1859. As the guide box is stationary while the wheel revolves, it is necessary that the connection between the two should be loose, and this permits an escape of water before it has performed its work on the wheel. The first point in this invention is the arrangement for preventing this escape of water between the wheel, and the guide box. A groove is made in the enclosing cylinder opposite the upper surface of the wheel and the loose ring, *i*, is placed in this groove, nearly water-tight, but capable of receiving a slight lateral motion to yield to any variation of the wheel from an exact center.

But the great objection to the turbine wheel has been the difficulty of varying its power with the varying amount of machinery which it was required to drive. Though, when the size of the turbine has been exactly adapted to the resistance which it was necessary to overcome, it has yielded more power in proportion to the water required to drive it than any other water wheel; none of the efforts yet made to proportion the quantity of water discharged to varying loads of machinery have been successful, and to accomplish this is one of the principal aims in this invention. To this end, a plate, J, is placed directly below the wheel, and by raising or lowering this plate the amount of water discharged is regulated at pleasure. The mode in which the plate is raised or lowered is clearly shown in Fig. 3. The plate is furnished with a hollow hub loosely surrounding the step, C, this hub having in it inclined slits, which receive the ends of pins inserted in the step. It will be seen that, by turning the plate, it is carried either

Fig. 1



up or down by the pins pressing upon the inclined slits. The turning of the plate is effected by means of a toothed segment upon its edge, which gears into a pinion upon the shaft that has a hand wheel upon its upper end.

Another difficulty with the turbine wheel has been the great friction upon the step resulting from the downward pressure of the water upon the buckets added to the weight of the wheel. In the wheel here described, this downward pressure is diminished to any desired extent by fastening the plate, L, rigidly to the upper portion of the shaft, so that it may be pressed upward by the water, thus tending to lift the wheel and counteracting the downward pressure of the water. Of course this plate cannot run quite water-tight within the cylinder, and the tube, *v′*, is provided to conduct off any water which may leak through between the plate and the cylinder. Two radial slits, *l l*, are made in the central chamber of the wheel to carry off any water that may leak into the central chamber of the guide box by which the wheel is relieved of all downward pressure of the water upon its central portion.

The water is let into the guide box and so down into the wheel through a series of vertical slits in the upper plate of the guide box, and these slits are closed at pleasure by means of a plate, H, which is placed directly over the guide box, and which has radial slits that may be so turned as to register with the slits in the guide box when it is desired to start the wheel, or that may be turned from over these slits when it is desired to stop the wheel. The plate, H, is turned by means of a toothed segment upon its edge, which meshes into a pinion on the end of the rod, with the crank on its top.

The advantages of this wheel will be readily perceived from the foregoing description; the principal one being the power to vary the discharge of the water in accordance with the work demanded, without altering very much the yield of power in proportion to the water used. The manufacturers say that they have nearly 200 of these turbines in successful operation, scattered over the country from Maine to Mexico, and that they give universal satisfaction. This wheel yielded .7962 of the power at the Philadelphia experiments.

Further information in relation to this popular turbine may be obtained by addressing the manufacturers, Messrs. Collins, Haydock & Wildman, at Troy, N. Y.

Fig. 2

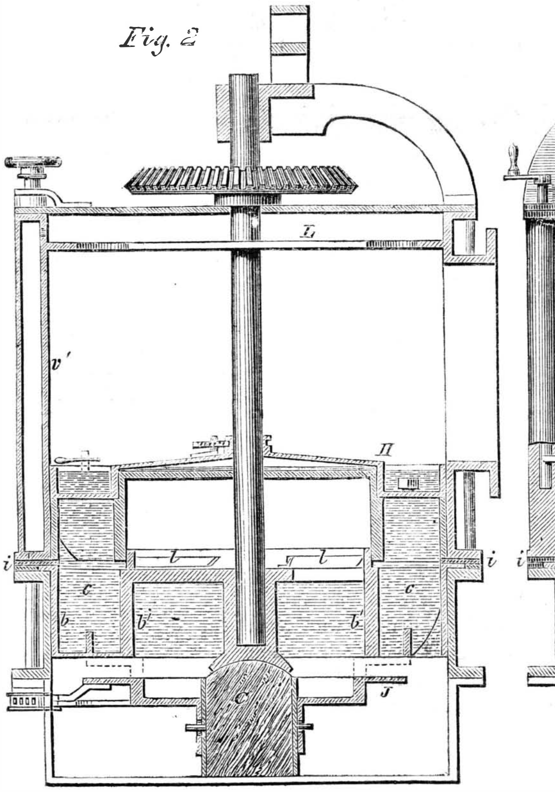
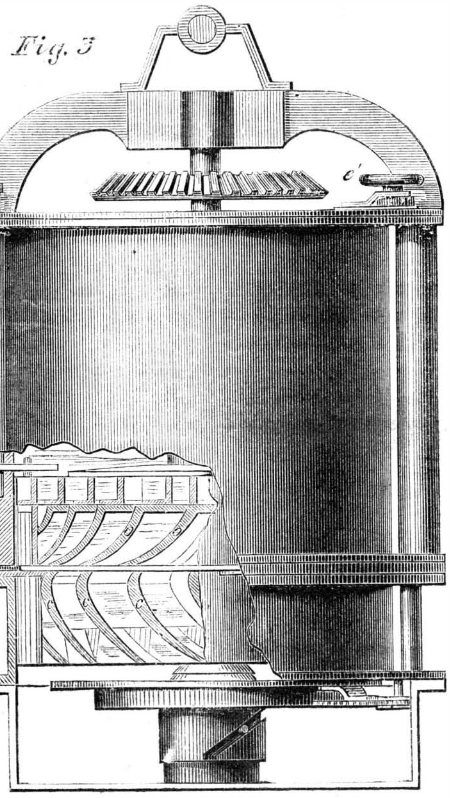


Fig. 3



COLLINS' IMPROVED TURBINE WATER WHEEL.

ANOTHER MONSTER BALLOON.—Our aeronauts seem determined to cross the Atlantic or "perish in the attempt." There is now on exhibition at Palace Garden, in this city, a balloon belonging to Carlos C. Coe, of Rome, Oneida county, N. Y., which is said to surpass in size any that have heretofore been constructed. The gas holder is 290 feet in hight and 118 in diameter; it will hold 1,720,000 cubic feet of gas, and will raise 69,000 lbs. The car is 14 feet in diameter and 22 feet in hight, divided into three stories, the lowest of which will accommodate about 40 persons, the second about 30, and the highest about 20. A life-boat, capable of accommodating about 30 persons, is suspended below the car, and the whole distance from the bottom of the boat to the top of the balloon is about 350 feet. The material for this balloon is French muslin, of which more than 12,000 yards were required. The entire cost of the apparatus is $4,000, and Mr. Coe is the sole proprietor. We are informed that it is his intention to exhibit the balloon as long as the people are interested in it, and next Spring to make the attempt to cross the Atlantic.

THE shock of an earthquake was felt throughout most of the New England States on the morning of the 17th inst. No damage was done, but windows rattled and nerves trembled for the space of 15 seconds.

SCIENCE MADE POPULAR.

PROFESSOR FARADAY'S LECTURES ON THE PHYSICAL FORCES.

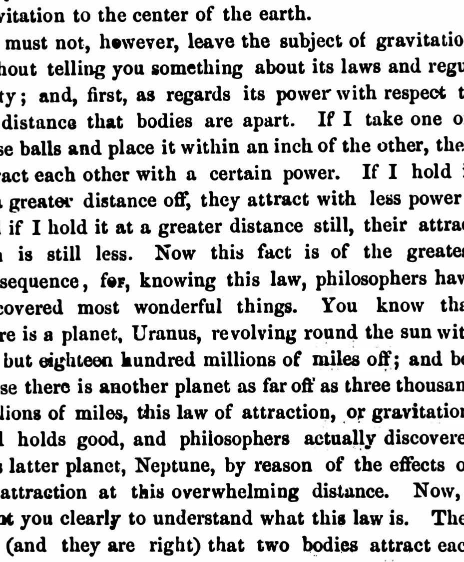
LECTURE II.—GRAVITATION—COHESION.

Do me the favor to pay as much attention as you did at our last meeting, and I shall not repent of that which I have proposed to undertake. It will be impossible for us to consider the Laws of Nature, and what they effect, unless we now and then give our sole attention, so as to obtain a clear idea upon the subject. Give me now that attention, and then I trust we shall not part without our knowing something about those laws and the manner in which they act. You recollect, upon the last occasion, I explained that all bodies attracted each other, and that this power we call *gravitation*. I told you that when we brought these two bodies [two equal-sized ivory balls suspended by threads] near together, they attracted each other, and that we might suppose that the whole power of this attraction was exerted between their respective centers of gravity; and, furthermore, you learned from me that if, instead of a small ball, I took a larger one like *that* [changing one of the balls for a much larger one], there was much more of this attraction exerted; or, if I made this ball larger and larger, until, if it were possible, it became as large as the earth itself—or I might take the earth itself as the large ball—that *then* the attraction would become so powerful as to cause them to rush together in this manner [dropping the ivory ball]. You sit *there* upright, and I stand upright *here*, because we keep our centers of gravity properly balanced with respect to the earth; and I need not tell you that on the other side of this world the people are standing and moving about with their feet toward our feet, in a reversed position as compared with us, and all by means of this power of gravitation to the center of the earth.

I must not, however, leave the subject of gravitation without telling you something about its laws and regularity; and, first, as regards its power with respect to the distance that bodies are apart. If I take one of these balls and place it within an inch of the other, they attract each other with a certain power. If I hold it at a greater distance off, they attract with less power; and if I hold it at a greater distance still, their attraction is still less. Now this fact is of the greatest consequence, for, knowing this law, philosophers have discovered most wonderful things. You know that there is a planet, Uranus, revolving round the sun with us, but eighteen hundred millions of miles off; and because there is another planet as far off as three thousand millions of miles, this law of attraction, or gravitation, still holds good, and philosophers actually discovered this latter planet, Neptune, by reason of the effects of its attraction at this overwhelming distance. Now, I want you clearly to understand what this law is. They say (and they are right) that two bodies attract each other inversely as the square of the distance—a sad jumble of words until you understand them; but I think we shall soon comprehend what this law is, and what is the meaning of the "inverse square of the distance."

I have here (Fig. 11) a lamp, A, shining most intensely upon this disk, B C D; and this light acts as a sun, by which I can get a shadow from this little screen, B F (merely a square piece of card), which, as you know, when I place it close to the large screen, just shadows as much of it as is exactly equal to its own size; but now let me take this card, E, which is equal to the other one in size, and place it midway between the lamp and the screen; now look at the size of the shadow, B D—it is four times the original size. Here, then, comes the "inverse square of the distance." This distance, A E, is *one*, and that distance, A B, is *two*; but that size, E, being *one*, this size, B D, of shadow is *four* instead of *two*, which is the *square* of the distance; and, if I put the screen at one-third of the distance from the lamp, the shadow on the large screen would be *nine* times the size. Again: if I hold this screen *here*, at B F, a certain amount of light falls on it; and if I hold it nearer the lamp at E, *more* light shines upon it. And you see at once how much—exactly the quantity which I have shut off from the part of this screen, B D, now in shadow; moreover, you see that if I put a single screen here, at G, by the side of the shadow, it can only receive one-fourth of the proportion of light which is obstructed. That, then, is what is meant by the *inverse* of the square of the distance. This screen, E, is the brightest, because it is the nearest; and there is the whole secret of this curious expression—"inversely as the square of the distance." Now, if you cannot perfectly recollect this when you go home, get a candle and throw a shadow of something—your profile, if you like—on the wall, and then recede or advance, and you will find that your shadow is exactly in proportion to the square of the distance you are off the wall; and then, if you consider how much light shines on you at one distance, and how much at another, you get the inverse accordingly. So it is as regards the attraction of these two balls; they attract according to the square of the distance, inversely. I want you to try and remember these words, and then you will be able to go into all the calculations of astronomers as to the planets and other bodies, and tell why they move so fast, and why they go round the sun without falling into it, and be prepared to enter upon many other interesting inquiries of the like nature.

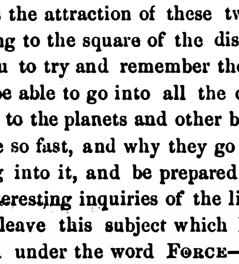
Fig. 11



Let us now leave this subject which I have written upon the board under the word FORCE—GRAVITATION—and go a step farther. All bodies attract each other at sensible distances. I showed you the electric attraction on the last occasion (though I did not call it so); that attracts at a distance; and, in order to make our progress a little more gradual, suppose I take a few iron particles [dropping some small fragments of iron on the table]. There! I have already told you that, in all cases where bodies fall, it is the particles that are attracted. You may consider these, then, as separate particles magnified, so as to be evident to your sight; they are loose from each other—they all gravitate—they all fall to the earth—for the force of gravitation *never* fails. Now, I have here a center of power which I will not name at present, and when these particles are placed upon it, see what an attraction they have for each other.

Here I have an arch of iron filings (Fig. 12) regularly built up like an iron bridge, because I have put them within a sphere of action which will cause them to attract each other. See! I could let a mouse run through it; and yet, if I try to do the same thing with them *here* [on the table], they do not attract each other at all. It is *that* [the magnet] which makes them hold together. Now, just as these iron particles hold together in the form of an elliptical bridge, so do the different particles of iron which constitute this nail hold together and make it one. And here is a bar of iron; why, it is only because the different parts of *this* iron are so wrought as to keep close together by the attraction between the particles that it is held together in one mass. It is kept together, in fact, merely by the attraction of one particle to another, and that is the point I want now to illustrate. If I take a piece of flint, and strike it with a hammer, and break it thus [breaking off a piece of the flint]. I have done nothing more than separate the particles which compose these two pieces so far apart that their attraction is too weak to cause them to hold together, and it is only for that reason that there are now two pieces in the place of one. I will show you an experiment to prove that this attraction does still exist in those particles; for here is a piece of glass (for what was true of the flint and of the bar of iron is true of the piece of glass, and is true of every other solid—they are all held together in the lump by the attraction between their parts), and I can show you the attraction between its separate particles; for if I take these portions of glass which I have reduced to very fine powder, you see that I can actually build them up into a solid wall by pressure between two flat surfaces. The power which I thus have of building up this wall is due to the attraction of the particles, forming, as it were, the cement which holds them together; and so, in this case, where I have taken no very great pains to bring the particles together, you see perhaps a couple of ounces of finely-pounded glass standing as an upright wall; is not this attraction most wonderful? *That* bar of iron, one inch square, has such power of attraction in its particles—giving to it such strength—that it will hold up twenty tuns weight before the little set of particles in the small space equal to one division across which it can be pulled apart will separate. In this manner, suspension bridges and chains are held together by the attraction of their particles; and I am going to make an experiment which will show how strong is this attraction of the particles. [The lecturer here placed his foot on a loop of wire fastened to a support above, and swung with his whole weight resting upon it for some moments.] You see, while hanging here, all my weight is supported by these little particles of the wire, just as in pantomimes they sometimes suspend gentlemen and damsels.

Fig. 12



How can we make this attraction of the particles a little more simple? There are many things which, if brought together properly, will show this attraction. Here is a boy's experiment, and I like a boy's experiment. Get a tobacco pipe, fill it with lead, melt it, and then pour it out upon a stone, and thus get a clean piece of lead (this is a better plan than scraping it; scraping alters the condition of the surface of the lead). I have here some pieces of lead which I melted this morning for the sake of making them clean. Now, these pieces of lead hang together by the attraction of their particles, and as I press these two separate pieces close together, so as to bring their particles within the sphere of attraction, you will see how soon they become one. I have merely to give them a good squeeze, and draw the upper piece slightly round at the same time, and here they are as one, and all the bending and twisting I can give them will not separate them again; I have joined the lead together, not with solder, but simply by means of the attraction of the particles.

This, however, is not the best way of bringing those particles together; we have many better plans than that; and I will show you one that will do very well for juvenile experiments. There is some alum crystallized very beautifully by nature (for all things are far more beautiful in their natural than their artificial form), and here I have some of the same alum broken into fine powder. In it I have destroyed that force of which I have placed the name on this board—COHESION, or the attraction exerted between the particles of bodies to hold them together. Now, I am going to show you that if we take this powdered alum and some hot water, and mix them together, I shall dissolve the alum; all the particles will be separated by the water far more completely than they are here in the powder; but then, being in the water, they will have the opportunity, as it cools (for that is the condition which favors their coalescence), of uniting together again and forming one mass.

Now, having brought the alum into solution, I will pour it into this glass basin, and you will, to-morrow, find that those particles of alum which I have put into the water, and so separated that they are no longer solid, will, as the water cools, come together and cohere, and by to-morrow morning we shall have a great deal of the alum crystallized out; that is to say, come back to the solid form. [The lecturer here poured a little of the hot solution of alum into the glass dish, and when the latter had thus been made warm, the remainder of the solution was added.] I am now doing that which I advise you to do if you use a glass vessel, namely, warming it slowly and gradually; and, in repeating this experiment, do as I do—pour the liquid out gently, leaving all the dirt behind in the basin; and remember that the more carefully and quietly you make this experiment at home, the better the crystals. To-morrow you will see the particles of alum drawn together;

and if I put two pieces of coke in some part of the solution (the coke ought first to be washed very clean and dried), you will find to-morrow that we shall have a beautiful crystallization over the coke, making it exactly resemble a natural mineral.

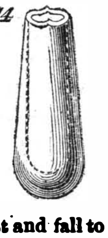
Now how curiously our ideas expand by watching these conditions of the attraction of cohesion!—how many new phenomena it gives us beyond those of the attraction of gravitation! See how it gives us great strength. The things we deal with in building up the structures on the earth are of strength—we use iron, stone, and other things of great strength; and only think that all those structures you have about you—think of the *Great Eastern*, if you please, which is of such size and power as to be almost more than man can manage—are the result of this power of cohesion and attraction.

I have here a body in which I believe you will see a change taking place in its condition of cohesion at the moment it is made. It is at first yellow; it then becomes a fine crimson red. Just watch when I pour these two liquids together—both colorless as water. [The lecturer here mixed together solutions of perchloride of mercury and iodide of potassium, when a yellow precipitate of biniodide of mercury fell down, which almost immediately became crimson red.] Now, there is a substance which is very beautiful; but see how it is changing color. It was reddish-yellow at first, but it has now become red. I have previously prepared a little of this red substance, which you see formed in the liquid, and have put some of it upon paper [exhibiting several sheets of paper coated with scarlet biniodide of mercury]. There it is—the same substance spread upon paper; and there, too, is the same substance; and here is some more of it [exhibiting a piece of paper as large as the other sheets, but having only very little red color on it, the greater part being yellow]—a *little* more of it, you will say. Do not be mistaken; there is as much upon the surface of one of these pieces of paper as upon the other. What you see yellow is the same thing as the red body, only the attraction of cohesion is in a certain degree changed; for I will take this red body and apply heat to it (you may perhaps see a little smoke arise, but that is of no consequence), and if you look at it, it will, first of all, darken; but see how it is becoming yellow. I have now made it all yellow, and, what is more, it will remain so; but if I take any hard substance, and rub the yellow part with it, it will immediately go back again to the red condition [exhibiting the experiment]. There it is. You see the red is not *put back*, but *brought back* by the change in the substance. Now [warming it over the spirit lamp] here it is becoming yellow again, and that is all because its attraction of cohesion is changed. And what will you say to me when I tell you that this piece of common charcoal is just the same thing, only differently coalesced, as the diamonds which you wear? (I have put a specimen outside of a piece of straw which was charred in a particular way; it is just like black lead.) Now this charred straw, this charcoal and these diamonds are all of them the same substance, changed but in their properties as respects the force of cohesion.

Here is a piece of glass [producing a piece of plate glass, about two inches square] (I shall want this afterward to look to and examine its internal condition), and here is some of the same sort of glass, differing only in its power of cohesion, because, while yet melted, it has been dropped into cold water [exhibiting a "Prince Rupert's drop" (Fig. 13)], and if I take one of these little tear-like pieces, and break off ever so little from

Fig. 13

Fig. 14



the point, the whole will at once burst and fall to pieces. I will now break off a piece of this. [The lecturer nipped off a small piece from the end of one of "Rupert's drops," whereupon the whole immediately fell to pieces.] There! you see the solid glass has suddenly become powder; and, more than that, it has knocked a hole in the glass vessel in which it was held. I can show the effect better in this bottle of water, and it is very likely the whole bottle will go. [A six-ounce vial was filled with water, and a "Rupert's drop" placed in it, with the point of the tail just projecting out; upon breaking the tip off, the drop burst, and the shock, being transmitted through the water to the sides of the bottle, shattered the latter to pieces.]

Here is another form of the same kind of experiment. I have here some more glass which has not been annealed [showing some thick glass vessels (Fig. 14)], and if I take one of these glass vessels and drop a piece of pounded glass into it (or I will take some of these small pieces of rock crystal; they have the advantage of being harder than glass), and so make the least scratch upon the inside, the whole bottle will break to pieces—it cannot hold together. [The lecturer here dropped a small fragment of rock crystal into one of these glass vessels, when the bottom immediately came out and fell upon the plate.] There! it goes through, just as it would through a sieve.

Now I have shown you these things for the purpose of bringing your minds to see that bodies are not merely held together by this power of cohesion, but that they are held together in very curious ways. And suppose I take some things that are held together by this force, and examine them more minutely. I will first take a bit of glass, and if I give it a blow with a hammer, I shall just break it to pieces. You saw how it was in the case of the flint when I broke the piece off; a piece of a similar kind would come off, just as you would expect; and if I were to break it up still more, it would be, as you have seen, simply a collection of small particles of no definite shape or form. But supposing I take some other thing—this stone, for instance (Fig. 15) [taking a piece of mica]—and if I hammer this stone

Fig. 15

Fig. 16

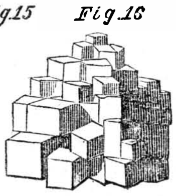
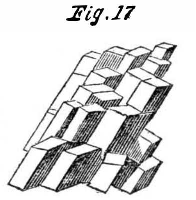


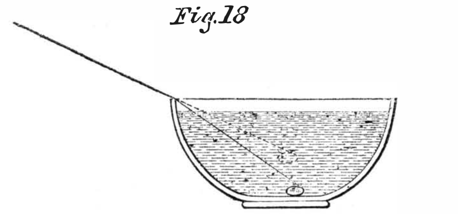
Fig. 17



I may batter it a great deal before I can break it up. I may even bend it without breaking it—that is to say, I may bend it in *one particular direction* without breaking it much, although I feel in my hands that I am doing it some injury. But now, if I take it by the edges, I find that it breaks up into leaf after leaf, in the most extraordinary manner. Why should it break up like that? Not because all stones do, or all crystals; for there is some salt (Fig. 16)—you know what common salt is; here is a piece of this salt, which, by natural circumstances has had its particles so brought together that they have been allowed free opportunity of combining or coalescing, and you shall see what happens if I take this piece of salt and break it. It does not break as flint did or as the mica did, but with a clean, sharp angle and exact surfaces, beautiful and glittering as diamonds [breaking it by gentle blows with a hammer]; there is a square prism which I may break up into a square cube. You see these fragments are all square; one side may be longer than the other, but they will only split up so as to form square or oblong pieces with cubical sides. Now I go a little farther, and I find another stone (Fig. 17) [Iceland or calc-spar], which I may break in a similar way, but *not* with the same result. Here is a piece which I have broken off; and you see there are plain surfaces, perfectly regular with respect to each other, but it is not cubical—it is what we call a rhomboid. It still breaks in three directions most beautifully and regularly with polished surfaces, but with *sloping* sides—not like the salt. Why not? It is very manifest that this is owing to the attraction of the particles one for the other being less in the direction in which they give way than in other directions. I have, on the table before me, a number of little bits of calcareous spar, and I recommend each of you to take a piece home, and then you can take a knife and try to divide it in the direction of any of the surfaces already existing. You will be able to do it at once; but if you try to cut it *across* the crystals, you cannot; by hammering, you may bruise and break it up, but you can only divide it into these beautiful little rhomboids.

Now I want you to understand a little more how this is; and for this purpose I am going to use the electric light again. You see we cannot look into the *middle* of a body like this piece of glass. We perceive the outside form and the inside form, and we look *through* it, but we cannot well find out how these forms become so, and I want you, therefore, to take a lesson in the way in which we use a ray of light for the purpose of seeing what is in the interior of bodies. Light is a thing which is, so to say, attracted by every substance that gravitates (and we do not know anything that does not). All matter affects light more or less by what we may consider as a kind of attraction, and I have arranged (Fig. 18) a very simple experiment upon the

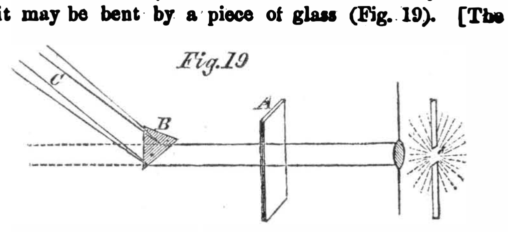
Fig. 18



floor of the room for the purpose of illustrating this. I have put into that basin a few things which those who are in the body of the theater will not be able to see, and I am going to make use of this power which matter possesses of attracting a ray of light. If Mr. Anderson pours some water, gently and steadily, into the basin, the water will attract the rays of light downward, and the piece of silver and the sealing-wax will appear to rise up into the sight of those who were before not high enough to see over the side of the basin to its bottom. [Mr. Anderson here poured water into the basin; and upon the lecturer asking whether anybody could see the silver and sealing-wax, he was answered by a general affirmative.] Now, I suppose that everybody can see that they are not at all disturbed, while, from the way they appear to have risen up, you would imagine the bottom of the basin and the articles in it were two inches thick, although they are only one of our small silver dishes and a piece of sealing-wax which I have put there. The light which now goes to you from that piece of silver was obstructed by the edge of the basin when there was no water there, and you were unable to see anything of it; but when we poured in water, the rays were attracted down by it over the edge of the basin, and you were thus enabled to see the articles at the bottom.

I have shown you this experiment first, so that you might understand how glass attracts light, and might then see how other substances, like rock salt and calcareous spar, mica and other stones would affect the light; and if Dr. Tyndall will be good enough to let us use his light again, we will first of all show you how it may be bent by a piece of glass (Fig. 19). [The

Fig. 19



electric lamp was again lit, and the beam of parallel rays of light which it emitted was bent about and decomposed by means of the prism.] Now, here you see, if I send the light through this piece of plain glass, A, it goes straight through without being bent (unless the glass be held obliquely, and then the phenomenon becomes more complicated); but if I take this piece of glass, B [a prism], you see it will show a very different effect. It no longer goes to that wall, but it is bent to this screen, C; and how much more beautiful it is now [throwing the prismatic spectrum on the screen]. This ray of light is bent out of its course by the attraction of the glass upon it; and you see I can turn and twist the rays to-and-fro in different parts of the room, just as I please. Now it goes there—now here. [The lecturer projected the prismatic spectrum about the theater.] Here I have the rays once more bent on to the screen, and you see how wonderfully and beautifully that piece of glass not only bends the light by virtue of its attraction, but actually splits it up into different colors. Now I want you to understand that this piece of glass [the prism], being perfectly uniform in its internal structure, tells us about the action of these other bodies which are not uniform—which do not merely *cohere*, but also have within them, in different parts, different *degrees of cohesion*, and thus attract and bend the light with varying powers. We will now let the light pass through one or two of these things which I just now showed you broke so curiously; and, first of all, I will take a piece of mica. Here, you see, is our ray of light; we have first to make it what we call *polarized*; but about that you need not trouble yourselves; it is only to make our illustration more clear. Here, then, we have our polarized ray of light, and I can so adjust it as to make the screen upon which it is shining either light or dark, although I have nothing in the course of this ray of light but what is perfectly transparent [turning the *analyzer* round]. I will now make it so that it is quite dark, and we will, in the first instance, put a piece of common glass into the polarized ray so as to show you that it does not enable the light to get through. You see the screen remains dark. The glass, then, internally, has no effect upon the light. [The glass was removed, and a piece of mica introduced.] Now there is the mica which we split up so curiously into leaf after leaf, and see how that enables the light to pass through to the screen, and how, as Dr. Tyndall turns it round in his hand, you have those different colors, pink and purple and green, coming and going most beautifully; not that the mica is more transparent than the glass, but because of the different manner in which its particles are arranged by the force of cohesion.

Now we will see how calcareous spar acts upon this light—that stone which split up into rhombs, and of which you are each of you going to take a little piece home. [The mica was removed, and a piece of calcspar introduced at A.] See how that turns the light round and round, and produces these rings and that black cross (Fig. 20). Look at those colors; are they not most beautiful for you and for me (for I enjoy these

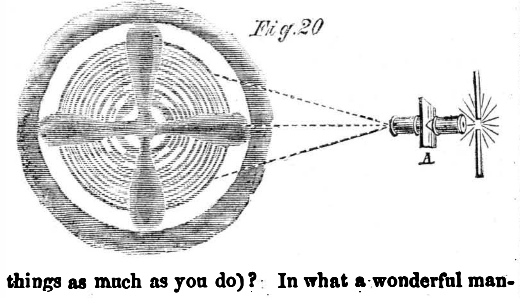


Fig. 20

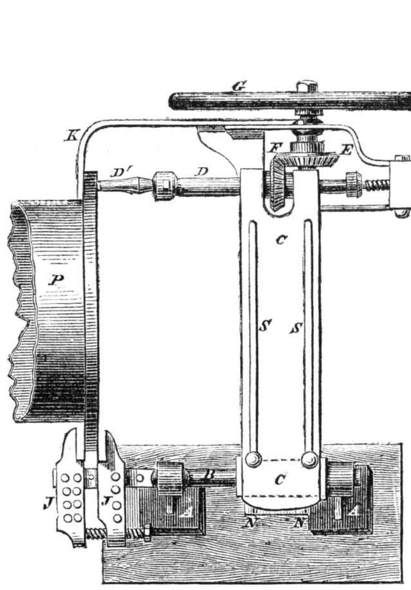
things as much as you do)? In what a wonderful manner they open out to us the internal arrangement of the particles of this calcareous spar by the force of cohesion.

And now I will show you another experiment. Here is that piece of glass which before had no action upon the light. You shall see what it will do when we apply pressure to it. Here, then, we have our ray of polarized light, and I will first of all show you that the glass has no effect upon it in its ordinary state; when I place it in the course of the light, the screen still remains dark. Now Dr. Tyndall will press that bit of glass between three little points—one point against two—so as to bring a strain upon the parts, and you will see what a curious effect that has. [Upon the screen two white dots gradually appeared.] Ah! these points show the position of the strain; in these parts the force of cohesion is being exerted in a different degree to what it is in the other parts, and hence it allows the light to pass through. How beautiful that is! how it makes the light come through some parts and leaves it dark in others; and all because we weaken the force of cohesion between particle and particle. Whether you have this mechanical power of straining, or whether we take other means, we get the same result; and, indeed, I will show you by another experiment that if we heat the glass in one part, it will alter its internal structure and produce a similar effect. Here is a piece of common glass, and if I insert this in the path of the polarized ray, I believe it will do nothing. There is the common glass [introducing it]. No light passes through; the screen remains quite dark; but I am going to warm this glass in the lamp, and you know yourselves that when you pour warm water upon glass you put a strain upon it sufficient to break it sometimes—something like there was in the case of the "Prince Rupert's drops." [The glass was warmed in the spirit lamp, and again placed across the ray of light.] Now you see how beautifully the light goes through those parts which are hot, making dark and light lines just as the crystal did, and all because of the alteration I have effected in its internal condition; for these dark and light parts are a proof of the presence of forces acting and dragging in different directions within the solid mass.

M. A. SOUL & CO.'S PORTABLE ADJUSTABLE DRILLING MACHINE FOR STEAMSHIP AND OTHER PURPOSES.

We transfer the following description of an improved drilling machine from *Mitchell's Steamshipping Journal*:

The purpose of utility to which the shape or configuration of this design has reference, is to economise time and labor in the drilling of holes in the flanches of



pipes, or in such other objects as they may be required, for which purposes ratchet drilling braces are at present generally used, but are objectionable from the time consumed in drilling.

The cut represents a plan of this drilling machine. Two standards support a round bar, B, which carries the frame, C C, at the end of which is the drill spindle, D, and drill, D′, to which motion is imparted through the bench wheels, E F, by the fly-wheel, G. The flanch of the pipe, P, to be drilled, is firmly gripped and held in position by means of the clamps, J J, and steadying piece, K. The frame, C C, has in it slotted guides, S S, so that it may be moved backward and forward, as well as upward and downward, and it can be fixed so as to drill in any position desired, by means of the bolts and nuts, N N, as shown in the drawing. The machine may be driven at different speeds, as may be required, by altering the position of the driving handle in the fly-wheel, G, for which purpose one of its arms is provided with a slot, in which the handle can slide, and be secured at any required distance by means of a screw and nut. This machine was designed for the purpose of drilling the flanches of pipes on board steamships, but is applicable for almost any purpose where the use of a small drilling machine is required. From its compactness of size, its portability, and its facility of easy adjustment, it will be found a most useful and serviceable tool in the engine-rooms of steamers. In small factories where manufactures in metal are carried on, it will be found particularly valuable as a labor-saving tool. It can be arranged for such situations so as to be driven by steam or other power.

The Boy who is to be Commodore.—The brightest boy of the class just examined for admission to the Annapolis naval academy was a little fellow from Texas, about 15 years of age, who had been three years setting type in a newspaper office, and had studied mathematics and arithmetic with a dip candle in the garret of a log cabin at night. He was poorly clad when he reached Annapolis, and on being asked how he obtained the means to reach Annapolis, replied that he worked for it, and that his money falling short on the route, he had got some small jobs at type-setting in New Orleans, and other points of his journey. If he should not be admitted, he expected to work his way home again. He is now to be seen on board the *Constitution* in his naval uniform, with his gilt buttons and anchors, looking as bright and hopeful as if he anticipated becoming a commodore.

THE NORTHERN COTTON PLANT.

Messrs. Editors:—On page 213 of the present volume of the Scientific American, your correspondent—Albany Peckham, D.D.S.—asks for information and propounds a question. The information I cannot give him, but I will suggest a few hints on his concluding remarks and question. He says:—"I intend, next Spring, to plant western silk-weed seed with cotton seed, and anticipate getting a hybrid seed from them;" then adds, "What say your horticultural readers? Shall I succeed or not?"

Well, a reflecting mind is slow to say what may or may not succeed in these latter days of wonders; and yet, having paid some attention to this subject, I venture to say that he will not succeed; but let him try it. Plants of the same generic character do hybridize under favorable circumstances, as has been proved. The practice is extensively adopted by most of our florists and horticulturists of the present time.

Yet, Mr. Knight could not succeed in effecting a cross between the common and Morello cherries; and Dr. Lindly mentions his own vain endeavors to cross the gooseberry and the currant, though both of the *genus ribes* (as the *grossularia* of Tourneford are but a section of the currants). In short, there is not a single well authenticated account of plants from two different *genera* having any mutual affinity; but on the contrary, there appears to exist some natural obstacle, which art has been unable to surmount, to produce a mutual fertilization between them. The cotton being a malvaceous plant, is very far removed from the order *asclepiads*, there being no affinity between them; hence, should he succeed, it would be truly a wonderful thing in this wonderful world of ours. J. Stauffer.

Lancaster, Pa., October 11, 1860.

STAINS ON BRICK WALLS.

Messrs. Editors:—As you appear to be very good-natured in the way of answering questions, I take the liberty of asking one in which a good many persons in this place are interested. It is this:—What will remove the stains from pressed bricks, occasioned by the washing from cut stone used in the building, and from other causes? The unsightly stains thus made, and the difficulty of removing them and restoring the fresh color of the brick, have been the source of considerable speculation and annoyance here. Your solution would oblige many. J. F.

Harrisburg, Pa., October 8, 1860.

[The stains of which our correspondent speaks are probably washings from the accumulation of dirt on the sill stones, and being of a heterogeneous composition, could not be dissolved by any one liquid. We would suggest rubbing off the surface of the brick with a brick of the same color. But as prevention is better than cure, why not dust off or wash the sills before every shower?

MILLSTONE SPINDLES AGAIN.

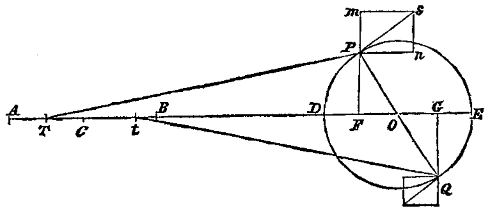
Messrs. Editors:—In reply to J. F. Dance & Bros., of Columbia, Texas, I would recommend them to run their bands as loose as possible on the pulleys, and there will be less friction on the spindles. I have run stones weighing from 400 to 2,000 pounds, and never used a spindle point over 1¼ inch in diameter. The weight of the stone has very little to do with the heating of the spindle. In grinding provender, I have often taken the whole weight of the stone to do the grinding, thus relieving the spindle from any weight but its own. If the band draws tight on the pulley, it is liable to heat in the step. M. B. Felshaw.

Hunter, N. Y., Sept. 25, 1860.

Canadian Machinery.—The *American Railway Times* has a few notes taken at the late Provincial Fair, at Hamilton, C. W., by a correspondent. The Great Western Railway Company exhibited a full-sized, semi-steel, locomotive boiler; locomotive driving and truck wheels made entirely of wrought iron, and forged at the company's works; also the entire valve gear for a new freight engine of the most excellent design and finish. The train machinery and equipage used in the service of the Prince of Wales, in his late trip through the province, are also spoken of as highly creditable to the state of mechanic arts in the province.

CRANK MOTION.

MESSRS. EDITORS:—Permit me to say a few words more on the crank motion. Although my last communication was misunderstood, I would have allowed the matter to pass unnoticed but for a communication from Q. E. D., that appeared in your journal of Sept. 29. Let A B be the range of the slides, and C a point in the center between A and B; I contend that I answered the question of "A Mechanic" when I proved that the triangle, T P O, was isosceles, only when the cross-



head, T, was at C; and hence, in this position, the angle, P O D, could not be a right angle. "A Mechanic" admitted and had observed the fact, that when T was at C, P had not moved over half the semi-circle, D P E, but did not know the reason why. When an engine is doing its maximum work, the motion of the crank, O P, is nearly uniform; and I will presently demonstrate that the velocity of the point, P, multiplied by the natural sine of the angle, P O D, gives the velocity of the point, T. I do not remember this fact to be stated by any writer on mechanics. For example: let O P=14 inches, P T=55, the angle, P O D=52°, and the velocity of point, P, 30 inches per second.

Natural sine of 52°=.788, nearly;

.788×30=23.640.

Hence, the velocity of the point, T, in this position is nearly equal 23 2-3 inches per second when the velocity of the point, P, is 36 inches per second; while the distance of the point, T, from the point, A, is 6.51 inches, and the distance, D F=5.38 inches; yet when T was at A, P was at D. When T is 15.812 inches from A, in the example before us, it is moving with its maximum velocity; T has not attained its maximum velocity when it arrives at the center, C. Hence, when the rule above given is understood, the velocity and position of T is readily found when the position and velocity of P is given. The problem may present itself in another form, namely: given the position of the point, T, and the velocity of P, to find the velocity of T.

Let A T=9, and the velocity of P (50 feet) a second; required the velocity of T. At this point, T O=60, O P=14, and T P=55; the three sides of the triangle, T P O, being given, the angle, T O P, is readily found to be 62° 41′. Natural sine of 62° 41′=.888, nearly; hence, .888 × 50=44.400 feet, the velocity of T when 9 inches from A. The rule here applied may be demonstrated thus: Let P *m s n* be a mathematical point at the point, P, and P *s* a tangent to the circle representing *dv*, the differential of the velocity of P in the direction of the tangent, and P *n*=*sy*, the velocity of the point, P, in the direction of the slides. In fact, although the parallelogram of velocities P *m s n* is without magnitude, it has a different form at every point on the circumference of the circle (see "Byrne's Calculus of Form"); yet, in every position, the triangles, P *n s* and P F O, are similar:—

∴ Velocity of P : velocity of T : : *d v* : *d y*,
: : O P : P F;
But O P : P F : : radius : sine P O F.
∴ Velocity of P : velocity of T : : 1 : sine P O F.
∴ Velocity of P×sine P O F=velocity of T.

The same reasoning is applicable to the motion of the crank at any other point, Q. What I state, I demonstrate mathematically, subject to no abatement. The mere words of Q. E. D., and the use of his terms "sum" and "difference," are well calculated to lead people astray; such arguments can never lead to a conclusion by which the comparative velocities of the two points, P and T, may be calculated.

Let *t* B=A T=9 inches; then *t* O=64 inches; *t* Q=55, and O Q=14. In this case, the angle G O Q=76° 24′—the natural sine of which is .972, nearly; therefore the velocity of the crosshead, when at *t*=.972×50=48.6 feet per second; while at T, in the example I have taken, the velocity is only 44.4 feet per second; and yet A T=B *t*=9 inches. The principles demonstrated and applied in this particular example are easily rendered general and made to suit any case, and the ratio of the velocities of P to T is not found by a sum or difference, but by a multiplication, and the multiplier is the sine of the angle D O P. When the velocity of T is given, the velocity of P is found by dividing the velocity of T by the sine of the angle D O P.

OLIVER BYRNE.

Jersey City, N. J., Oct. 15, 1860.

AMERICAN ENGINEERS' ASSOCIATION.

On Wednesday evening, Oct. 3d, the usual monthly meeting of this association was held at its room, No. 24 Cooper Institute, this city—Henry E. Rhoeden, chairman *pro tem;* John C. Merriam, secretary.

After the disposition of their usual miscellaneous business, the following gentlemen were proposed for election as members of the society:—Wm. Russel, Edward Storrer, Wm. Gee, George Gee, Chas. Nelson, Theo. Allen, Alfred Sims, Wm. Sparks, J. F. Holmes, A. M. Cummings, Horatio Allen, William E. Everitt, W. Lee, S. D. Larned, George Monell, John Ozza and John Powers.

The election of those proposed at the meeting of the 5th of September was not proceeded with, owing to the absence of every member of the Committee on Elections. To us, this would seem to be a very important committee, and their absence, beside retarding the healthy progress of the association, might engender an unfriendly feeling toward the body in the mind of some sensitive person thus neglected.

The association then proceeded to consider the subjoined

NEW INVENTION.

Improved Car Brake.—The Secretary exhibited an improved automatic car brake, invented by a Mr. Perkins. The essential novelties of this essay are, that the brakes, when applied to a train, are thrown into action automatically, by the engineer's simply checking the speed of the locomotive, whereby he exercises complete and instantaneous control over the train; and yet the brakes are liberated and set for proper action by simply putting the train in motion, either to go forward or backward.

This invention was duly referred to the Committee on Science and New Inventions.

It was resolved by the members that, after this date, they would give up room No. 25, held by them for the purpose of weekly re-unions, and in future hold, upon Wednesday evening of each week, an informal meeting in their large room, No. 24. This action was necessitated, from the fact that it would enable them to proceed at a much less expense than hitherto.

The association was notified by Mr. Merriam that, at the next regular monthly meeting, he would offer an amendment to the constitution, to the effect that, at their weekly re-unions, proposals for membership be declared in order, action of election as heretofore.

An invitation was extended to the society to visit the gas works of Messrs. Richard Smith & Co., this city.—Accepted.

At this juncture, Mr. Lewis Koch, engineer, read a paper on the "Expansion of Steam."

THE FASTEST STEAMBOAT RUNNING ON RECORD.

On the 13th inst., the steamboat *Daniel Drew* made the trip between New York and Albany in six hours and fifty minutes, with five landings and against a head wind. The distance on the Hudson river route between the two places is considered to be 150 miles; and if we allow ten minutes for each of the landings—they having to be made on both sides of the river—the actual running time will be six hours, and the average speed 25 miles per hour. This is equal to locomotive running, and the fastest ocean steamers, in the calmest weather, do not come within eight miles per hour of this figure. See details of this steamboat on page 374, Vol. II. (present series) of the SCIENTIFIC AMERICAN.

THE ART OF AGRICULTURE.—A great deal has been written and said about the science and art of agriculture, but for practical guidance the whole thing is in a nut shell. It consists in these two rules—make the land rich, and keep the weeds down. If any person who tries to raise any plant will follow these two rules he will succeed, and if he does not follow them he will not succeed.

PHOTOGRAPH O BOSTON FROM A BALLOON.

The experiment of photographing the city and its environs, undertaken on Saturday by Mr. Black, of the firm of Black & Batchelder, assisted by Mr. King, the aeronaut, was attended with the most satisfactory results. The idea that it was possible to get photographic pictures of the earth first occured to Dr. W. H. Helme, of Providence, who, having interested Mr. Black on the subject, the two made an ascension from Providence a few weeks since, to make a trial in the "high art." Then, as on Saturdey, the balloon *Queen of the Air* furnished by Messrs. King & Allen, was confined by a cable at an elevation of 1,200 feet. Several views were taken, but these preliminary experiments proved sunlight indispensable to complete success. Of the two trial pictures obtained over Providence, the buildings in one were sharply defined while the other was blurred by motion. The plate of the first "negative" having been spoiled in the process of finishing, the photographs are of but little value save as curiosities of the art.

The last experiment, however, made on Saturday, furnishes the most conclusive evidence that photography can be applied under favorable circumstonces to the production of birds'-eye views of towns and cities, harbors, lakes and water-courses. Six plates were used, only two of which, however, received satisfactory impressions. The area brought within the field of the camera in two pictures, is bounded by Brattle-street on the north, the harbor on the east, Summer-street on the south, and Park-street on the west, forming a view at once novel and picturesque, of the entire business portion of the city. The impression which is received in looking at the pictures is similar to that experienced by the aeronauts themselves. The wider streets of the city—in their tortuous windings—seem like mere alleys, dark and narrow, while the alleys themselves are scarcely distinguishable in the midst of the high walls. The public buildings, churches, and long blocks of storehouses look like the toy village of a child, while the shipping at the wharves and sailing craft in the harbor look no bigger than the miniature vessels on the Frog Pond. And yet the buildings are sharply defined, especially where the sun fell upon them in full force.

The City Hall and Court-house, Faneuil Hall, Quincy market, and the intermediate buildings seen in the center of one picture are finely marked, while on the periphery of the photograph, Park-street church, the *Journal* office, Old South church, Custom House, Scollay's Building, and the wharves are thrown into a dark shade. The white sails of a vessel lying in dock, and one of the East Boston ferry boats on her passage, loom up out of the darkness. In the picture of the city above Water-street the Old South is more strongly defined, a sign, "clothing-house," on a store in Milk-street, being clearly marked, while the splendid granite warehouses in Franklin, Pearl, and other streets are truthfully depicted. Trinity church, the Music-hall, one of the Portland steamboats and a vessel under sail in the harbor, are seen in partial obscurity on the outer circle of the photograph. Seen through a magnifying glass, the corners and projecting points of the picture are tinged with the colors of the rainbow, producing a very beautiful impression. The photographs will probably be reduced to a size adapted to the stereoscope.—*Boston Journal.*

THE MAUVE DYE.

The beautiful red and purple silks which are now so fashionable throughout the civilized world, are colored with a substance which is extracted from coal tar. On page 98 of our last volume, we published a translation from a French periodical, giving a full account of the mode of obtaining this coloring matter from the waste tar. In that article, the price in Paris of pure aniline violet, in powder, was stated to be from $245 to $326 per pound. The enormous value of this substance is owing to the fact that it not only produces a great variety of red and purple shades of exceeding delicacy and brilliancy, but these colors are also remarkably permanent. By the advertisement of Charles A. Seely, in another column, it will be seen that the manufacture of this coloring matter is now carried on in this city; and as Mr. Seely is one of our most thorough theoretical and practical chemists, he is one of the few men in the community competent to conduct the delicate manipulations required in the manufacture of this beautiful dye.

THE POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

The usual weekly meeting of this association was held at the Institute rooms, on Thursday evening, 11th inst; Professor C. Mason presiding.

MISCELLANEOUS BUSINESS.

Social Progress. — On taking the chair, Professor Mason said: Our reception, this day, of the Prince of Wales—the symbol of British nationality—is in strange contrast with the dismission my grandfather helped to give his great-grandfather, when they broke down the statue of George III, at the Bowling Green, and reviewed his last troops on Evacuation day. It is quite in contrast with a more recent state of things, which led my youthful company, in Rensselaer county, to offer themselves to Governor Tompkins, for the defense of the harbor, in 1815. But that year closed the long period of the war. The attempts to mend the world by fighting ceased from sheer exhaustion, and left the poor nations of the earth to the ameliorating experiments of applied science.

In 1819, Neilson invented the hot-blast furnace, which reduced the coal required to make a tun of iron from seven tuns to less than two, and brought into use the neglected black band ore. Two years later, the rolling mill appeared and produced a greater economy in the working of iron than the hot blast had made in its production.

But the great cost of conveying persons and property, except on navigable waters, was the stumbling block of social progress. This difficulty led the contrivers to explore the coal mines, where ingenuity had converted a steam pump into a nondescript machine for the carrying of coals on wooden trams, through long levels, to the mouth of the pit. World-building had operated at first from beneath, in throwing up hills. The underground contrivances sent up the locomotive to rebuild the world by a cheap and rapid conveyance of persons and property through the valleys which run among the hills, or, if need be, under the hills, so that all lands might be inhabited, and all people enjoy all the products of the earth, by means of moderate, educated labor.

The whole work is done and has been done since I was the captain of a uniformed company; and the Prince of Wales has made the tour of North America in less time and with less discomfort than it would have cost George III. to explore the counties of Ireland.

"Look now at the social results. The men of science have had the field about as long as the fighting men had occupied it—say forty years. The results may be justly measured by the population and its condition.

"Greatness may be attained by a nation of small numbers; Greece was an example. But greatness ranks far below welfare, and welfare is measured by happy numbers.

The men of science have multiplied the happy numbers of men, with a softened and diminished labor. They have more than doubled the entire population of Europe, and these large numbers are better taught, better fed, better clad, and better housed than the small population of 1815.

"In this country, since Evacuation Day, applied science has multiplied our whole population by eight. And if this welfare does not amount to greatness, it is sufficiently like it for all useful purposes.

"The wild beasts rejoiced in the acquisition of this island, and left it with reluctance. When the Indians arrived here, they rejoiced in the leisure and safety derived from its vast resources as a fishing ground, and they preferred death at the hands of the Dutch than life elsewhere. The Dutch gloried in resources of which the Indians never dreamed, and extended their outlying settlements beyond Spuytenduyvil. And when they yielded to the English, they secured the right to remain. When the English yielded to the Yankees, and retired, we were surprised to find that our people acted and talked and legislated and worshipped and taught and traded like Englishmen in everything but royalty and lordship. And this day proves that we like an occasional glimpse of these.

At this moment I recall what my paternal grandfather, who was a stannch tory, used to say when I was a boy: "Remember that we were a race of Englishmen long before we were Yankees, and we shall be a race of Englishmen long after democracy has passed away."

The Re-organization.—The Committee on re-organization made their final report and were discharged with thanks for the faithful discharge of their laborious duties. A beginning of the new order of things was made by the members subscribing to the rules of the club.

Domestication of the Ostrich.— Lieutenant Bartlett gave a very interesting account of recent successful attempts, in France, of domesticating the ostrich. Late observations show that many of the popular notions regarding the ostrich are erroneous. It is commonly believed that the ostrich lays its eggs in the sand, and abandons them to be destroyed or to be hatched by the heat of the sun. The fact is, however, that the ostrich is peculiarly careful of its eggs, and is more faithful to them than the hen. The labor of sitting is divided between the male and female birds, each taking its turn. The male sits nineteen hours and the female five hours each day. The hens in good condition lay an egg every other day, and it is supposed that ostriches, if well taken care of, would be as prolific as ordinary fowl. Ostrich feathers always find a ready market, and it is said that the meat is delicious.

The President here called up the regular subject: "Cut-off Experiments."

DISCUSSION.

Professor Hedrick, assisted by Mr. Rowell, described an apparatus used in the series of experiments on the expansion of steam, at Waterman's factory in Cherry-street. The apparatus mainly consists of two chambers or vessels, each of 1 cubic foot capacity, and connected to each other by a 2 inch pipe provided with a cock of large port. By charging one of the vessels with steam at high pressure, and then exhausting it into the other, is was supposed that the practical deviation, if any, from Mariotte's law would be shown. One of the vessels it connected directly with the boiler, while the other is furnished with a blow-off cock. In order to keep the vessels at any desired temperature, they are entirely immersed, including the connection pipe, in an oil bath. The two vessels, when in the bath, are separated by a partition, so that the temperature of either may be varied independently of the other. Finally, the vessels are provided with pressure gages. The manner of making an experiment is as follows: the oil bath is heated to the temperature of the steam of the boiler; the blow-off cock being opened, steam is passed through the vessels till the air has been replaced by steam. The cock of the connecting pipe is then closed, and the pressure of steam in the second vessel falls to the atmospheric pressure, when the blow-off cock is closed. The connection with the boiler is now cut off from the first vessel, and the cock of the connecting pipe is opened. The steam of the first vessel now expands into the second, the pressure is equalized, and the gages show what variation, if any, there is from theoretical calculations. Mr. Rowell remarked that the conclusion from the many experiments made was that the actual expansion of steam varies about 10 per cent from the law of Mariotte. If theory is correct, 60 lbs. pressure in the first vessel should become 30 lbs. on expansion. But it becomes less than 28.

Mr. Koch—The figures by theory, are 28.6. I have made a careful examination of this subject, and am prepared to demonstrate that 60-lb. steam on doubling its volume has a pressure of precisely 28.6.

Mr. Garvey—This apparatus is open to many objections. It cannot be relied on. The temperature cannot be uniformly maintained. Even the gages will convey away heat enough to vitiate a conclusion. The construction is grossly inaccurate.

Mr. Rowell—The gentleman's language is too severe. I should not object to his telling us, if he thinks so, that the apparatus might lead us to entertain erroneous conclusions, but "*grossly* inaccurate" is offensive.

Mr. Garvey—I do not mean any less than I say.

Mr. Dibben—I was present at some of the experiments with the apparatus and was afforded every facility of examination. The results given by it are not anomalies when reasonably considered, and do not in the least weaken my confidence in the utility of the steam expansively. At the time the experiments were made, I took notes of what was done, but inadvertently I have not brought them with me. I will, however, give the figures approximately from memory, and be able to show how this apparatus operated in practice.

1*st. Experiment.*—Boiler pressure, 45 lbs.; 1st vessel, 300°; 2d vessel, 175°; pressure after expansion, 5 lbs. Here it is evident that the steam was almost instantly condensed in the 2d vessel.

2d. Boiler pressure, 45 lbs.; 1st vessel, 300°; 2d vessel, 300°; final pressure, 6½ lbs.

3d. Boiler pressure, 45 lbs.; 1st vessel, 300°; 2d vessel, 210°; final pressure, 7 lbs.

4th. Boiler pressure, 45 lbs.; 1st vessel, 330°; 2d vessel, 300°; final pressure, 22 lbs. In this experiment the steam was superheated before expansion. The vessels were now taken out of the oil baths, and the experiments were continued, no particular care being taken to regulate their temperature—

Experiment.	Boiler pressure.	Pressure after expansion
1.................	80 lbs.	31 lbs.
2.................	80 "	35 "
3.................	75 "	32 "
4............... ..	22 "	nearly 11 "

The experiments in the air are nearer the ordinary conditions of practically-working steam, and clearly show the gain by expansion. Mr. Dibben continued with comments on the experiments and pointed out how the conducting power of the oil accounted for the apparent anomalies of the first set.

Mr. Seely—Mariotte's law, until recently, has been accepted as mathematically true. It has been shown, however, that no gas whatever conforms to it, some varying one way, some the other. The condensible gases and steam vary much more than the permanent gases, and with these the variation is always greater near the point of condensation to the fluid state. These facts have been demonstrated by the ablest experimentors of modern times, and the particulars as to steam and the most common gases may be found in almost any of our large treatises on chemistry. The variations from Mariotte's law are however so small that in ordinary discussion of steam and air we very properly neglect them; they would only complicate the subject unnecessarily. Now, if this apparatus is designed to show the fallacy of the Mariotte theory, it is clumsy and unreliable.

Professor Hedrick—The apparatus is designed to illustrate the practical working of steam, and for that purpose it is admirable.

Mr. Seely—I agree with Professor Hedrick as to the utility of Mr. Isherwood's experiments. I object to the apparatus only when it is proposed to determine by it a philosophical principle.

Professor Hedrick—I understand that these experiments are carried on only in view of useful results. No one denies that steam under pressure will expand with power. The practical question is how much of this power can be realized, and the experiments will probably show that the advantage of expansion is commonly overstated.

Mr. Rowell—Mr. Stevens, of Hoboken, says he has used all kinds of engines and applied many tests, and the result of all his observations is that there is no advantage in cutting off at less than one half.

It was ultimately agreed to defer the conclusion of the discussion for a future meeting, when the final report of the committee should be ready.

Subject for next week: "Recent Practical Applications of Magnetism.

HOW NEW YORK SELLS DRY GOODS.

The New York correspondent of the Boston *Post* furnishes the following statements in regard to the leading traders of this city:—

Claflin, Mellen & Co. are the heaviest dealers in merchandise in New York—their yearly business exceeding that of Stewart by some three million dollars. Their aggregate sales swell up to the enormous figures of eleven millions annually. The per centage of net profits on this amount is, however, quite small; but even at eight per cent, the sum of eight hundred and eighty thousand dollars must find its way into the private bank accounts of the several partners. Next, in amount of sales, comes the establishment of A. T. Stewart & Co. They sell eight millions a year, of which two and a half millions are disposed of at retail, and the remainder at wholesale; $300,000 worth of gloves alone are handled by this house. No paltry per centage is assessed upon the buyers at the Broadway marble palace. The class of goods sold is such as always bears a high price and a large profit. I happen to know of one instance where a twentieth share netted one of the partners $60,000 in a single year, which proves the profits of that year to have been $1,200,000. One million dollars a year will be about the margin of excess over all expenditure. Next in the same line come the houses of Lord & Taylor, and Arnold, Constable & Co., the former of which does a business, in several stores, of $6,000,000 annually, at a profit of some $800,000; while the latter firm enjoys a regular unchanging trade of about four and a half or five millions, which pays a yearly profit of not far from six hundred thousand dollars. Of houses in the dry goods trade, whose yearly trade ranges from five to seven millions, there are several, as for instance, C. W. & J. T. Moore & Co., Phelps, Bliss & Co., and S. B. Crittenden & Co. Their profits foot up variously from two to four hundred thousand dollars. J. R. Jaffray & Sons, our leading lace house, sell enough of that strictly female fabric to net them six hundred thousand dollars a year profit. Some of the Boston branches located here, exceed in their sales five millions yearly. Such are A. & A. Lawrence & Co., J. W. Paige & Co., and A. F. Skinner & Co. The first-named firm, as every one knows, place some ten million dollars worth of domestic fabrics per year. The profits of all these commission houses are only from one to two per cent upon the sales. Garner & Co., a commission firm, sell between eight and nine millions per year at paying rates; while of those doing a dry goods commission business of from three to five millions may be named Hoyt, Spragues & Co., Low, Harriman & Co., and Hunt, Tillinghast & Co. Their profits overleap a hundred thousand dollars a year. There are several French and English importing houses whose sales overrun into the millions, and whose profits are a fortune every year.

THE WAY JOULE'S EQUIVALENT WAS ASCERTAINED.

First, By observing the calorific effects of magneto-electricity. He caused to revolve a small compound electro-magnet immersed in a glass vessel containing water between the poles of a powerful magnet; heat was proved to be excited by the machine by the change of temperature in the water surrounding it, and its mechanical effect was measured by the motion of such weights as by their descent were sufficient to keep the machine in motion at any assigned velocity. Second, By observing the changes of temperature produced by the rarefaction and condensation of air. In this case, the mechanical force producing compression being known, the heat excited was measured by observing the changes of temperature of the water in which the condensing apparatus was immersed. Third, By observing the heat evolved by the friction of fluids. A brass paddle-wheel, in a copper can containing the fluid, was made to revolve by descending weights. Sperm oil and water yielded the same results. Mr. Joule considered the third method the most likely to afford accurate results; and he arrived at the conclusion that one unit of heat was capable of raising 772 pounds 1 foot in hight; or that the mechanical equivalent of heat was expressible by 772 foot-pounds for one unit of heat—known as "Joule's equivalent."

The following are the values of Joule's equivalent for different thermometric scales, and in English and French units:—

1 English thermal unit, or 1° Fah. in 1 lb. of water,	772 foot-lbs.
1 centigrade degree in 1 lb. of water...................	1389·6 "
1 French thermal unit, or 1 centigrade degree in a kilogramme of water..............................	423·55 kil'trs.

ROOM PLANTS.

During the cold days of winter, when fields and gardens are stript of their foliage and coloring, it is pleasant to witness the care and the taste which some ladies bestow in the culture of flowers in their houses. The last number of the *Horticulturist* contains an interesting article on this topic, from which we select a few extracts for our lady readers:—

We should be glad to do or say something to increase the number of those who grow room plants. It is true that plants cannot be as well grown in rooms as in a well-constructed greenhouse; but, notwithstanding, there are some kinds that may be grown and flowered in a manner quite satisfactory, and with results highly gratifying. Certain conditions are necessary for the best success, and these it is our object to point out. The greatest obstacle to success is the dryness of the air: this may in a measure be overcome by a table suitably constructed, and the selection of plants best adapted to a dry atmosphere. The table should be the length of the window, and two or three feet wide, the boards being tongued and grooved. Around the edge nail a strip three inches wide, making the corners fit tight. The table is then to be filled with two inches of clean white sand. With a table of this kind, the foliage of the plants can be frequently syringed or sprinkled with water, which keeps them clean and promotes their health; the drippings and surplus water are caught and absorbed by the sand, and the floor of the room is thus kept clean; the sand, indeed, ought to be kept constantly wet, and even watered for this purpose, if necessary. The evaporation from the sand will diffuse itself among the plants and through the room, and thus overcome, in a small degree, one of the chief obstacles to the successful culture of plants in rooms. The table should be fitted with rollers, to facilitate the operation of watering and cleaning the plants, and also for the purpose of moving it back from the window during very cold nights. The flower-stands in common use are altogether unfit for a room; the surplus water, dead leaves, &c., fall to the floor, injuring the carpet, and giving the room an untidy appearance. The table above described is free from these objections, besides having positive advantages for the successful growth of plants which no ordinary flower-stand can possess.

All rooms do not possess equal advantages for growing plants. A room with large, high windows, looking to the south, is the best; the next best is one with a southeast or southwest exposure; next, east; next, west; and the least desirable of all, one looking to any point north. A large bay window with a southern exposure possesses many advantages for growing plants, quite equal in many cases, and superior in some, to these structures absurdly called "plant cabinets," unless the latter be intended for the preservation of dried specimens, the only purpose for which most of them are fit. A basement window with a southern exposure will sometimes answer tolerably well, but a room in the upper part of the house is always to be preferred.

Plants cannot be well grown anywhere, or under any circumstances, when crowded together; it is always more satisfactory to grow a few well than to grow many indifferently. During very cold nights the table may be moved to the middle of the room; and if the plants should unfortunately get frozen, darken the room and throw cold water over them repeatedly till the frost is drawn out, and then expose them gradually to the light. In this way we have saved plants when the ball of earth has been frozen as hard as a brick. Room plants should not be brought into the house till the nights get frosty, and while out of doors they should have a sunny exposure. Insects should be looked after, and destroyed on their first appearance; a little attention in this way will keep them free from such pests.

Ornamenting Room Windows.—The following very simple method of decorating windows, when it is desirable to shut off a portion of light, and subdue its character, is described in the London *Photographic News*:—The glass must be thoroughly cleaned and freed from every sign of grease. Then mix on a slab of ground-glass, palette, or what not, a little of the tube oil color, sold for the purposes of the artist, diluted slightly with a little pale drying oil. Lay this thinly over the glass with a large, soft brush, and then taking a large hog-hair tool, the hairs of which are of a perfectly uniform length, hold it perpendicularly to the glass, and commence dabing the ends of the hairs, gently, and with an equal amount of pressure over the whole surface, until a uniform degree of opacity is secured, and the glass has all the appearance of being ground. Now, if you desire to give this a very decorative character, closely resembling that of what is termed embossed glass, you may do so with much ease. Draw out, first, on a piece of paper the required size, some pattern of an elegant character, a design for which may easily be discovered in any work on ornamental art, making the lines sufficiently strong to be seen through the semi-opaque glass; and then, with wooden points of various degrees of thickness, some finely pointed, and others wider and flat (like the edge of a chisel) trace out on the painted surface of the glass the drawing laid under it. The points will remove the wet paint. A piece of wash-leather is sometimes fastened to the ends of the sticks for the better clearing off of the paint, but in this case you must carefully prevent the leather becoming charged with paint, by repeatedly cleansing or changing it. This pattern being clearly defined and perfectly transparent, the glass is then put aside to dry, and fixed in its place the painted side inwards. To clean it use simply a little pure warm water *without soap*.

It is stated, in a late foreign paper, that bathing has been found to be a certain cure for pleuro-pneumonia; that a gentleman in Ireland, who tried the experiment on eight cattle who were infected, saved seven of them by driving them into a bath.

A COLUMN OF VARIETIES.

The Spaniards of South America use twisted raw hide for ropes and as substitutes for log chains in working their cattle. Raw hide is very strong and lasts quite a number of years, even when considerably exposed.

Shingled roofs, whitewashed with lime, last nearly twice as long as roofs which receive no treatment to render them durable.

The total amount of wheat received at Chicago, since the 1st of January last, is 26,860,973 bushels, against 12,428,478 bushels received in the corresponding period last year.

The Pacific Mill at Lawrence, Mass., is the largest factory, in a single building, in the world. It is 800 feet long and 80 wide, and contains 108,000 spindles, with all the attendant machinery to manufacture delaine and muslin goods, from the raw material up to the finishing touch ready for market.

The Magnetic Telegraph Company in England, which has lines extending through the whole United Kingdom, issues stamps for franking messages. This is similar to the postage stamp system, and is found very convenient to merchants and others.

The last number of the *North British Review* contains an article on meteorology, in which severe winters are stated to be connected with the appearance of spots on the sun. If the writer's theory be correct, the next winter should be a very cold one.

It is stated by Mr. Nicholas Longworth, of Cincinnati, the great vine cultivator, that wine made from the best native American grapes surpasses in quality the best wines of Europe.

The tobacco crop inspected at Richmond, Va., for the year ending October 1, 1860, amounted to 46,633 hhds., which is an increase of 4,835 hhds. over last year's crop.

On the 16th of August last, a flash of lightning struck a windmill at Lappion, in France, in which there was a female who was killed by the electric fluid, and on whose body there was left the picture of a neighboring tree, with all its branches and leaves complete. This singular tatooing by the lightning was seen and attested by medical examiners and the municipal authorities of the place.

The Philadelphia *Engineer* advocates the employment of single cylinder locomotives, as their adoption would mark a revolution in locomotive construction, and result in great economy. A number of locomotives with single cylinders are stated to have been made by Neilson & Co., of Glasgow.

Mr. Holley, in a communication to the *New York Times*, states that "the cost of hauling a passenger or a ton of goods a mile on an English railroad is about one-half only of what it is in America." The reason of this is that English roads are better constructed and require less power to do the work.

Two years ago, a Canadian, near Acton, C. E., while engaged in digging potatoes, found some fragments of copper ore. On the 15th of September, 1859, Mr. Lewis Sleeper, a school teacher at Montreal, having obtained a lease of the grounds, commenced the development of a mine with great success, having, since March last, taken out $260,000 worth of ore, some of the blocks weighing 15 tuns. A few days ago this mine was sold for $500,000, of which Mr. Sleeper received $200,000.

From the census of Australia, taken on the 1st of April last, it appears that the total population was 117,727. Of this total of 117,727, no less than 43,349 were born in the colony, 49,788 in England and Wales, 7,172 in Scotland, 12,128 in Ireland, 2,201 in other British possessions, 7,864 in Germany, 1,093 in foreign countries, leaving 122 not specified.

The numerous cases of poisoning resulting from the employment of the pigment known as Brunswick green, or arsenite of copper, has induced the French sanitary board to take measures to suppress its use in various arts, as those of the dyer, calico printer, paper stainer, &c. Many articles of ladies' clothing dyed with this pigment, artificial flowers, &c., have caused dangerous illness to their wearers. In light materials, as gauze, tarlatan, &c., this pigment is shaken out in considerable quantities during dancing, or rapid motion accompanied by friction, and finds its way into the faces and nostrils of the wearers, producing the most alarming symptoms.

A FRENCH APPARATUS FOR LIGHTING CITIES WITH HOT WIRE.

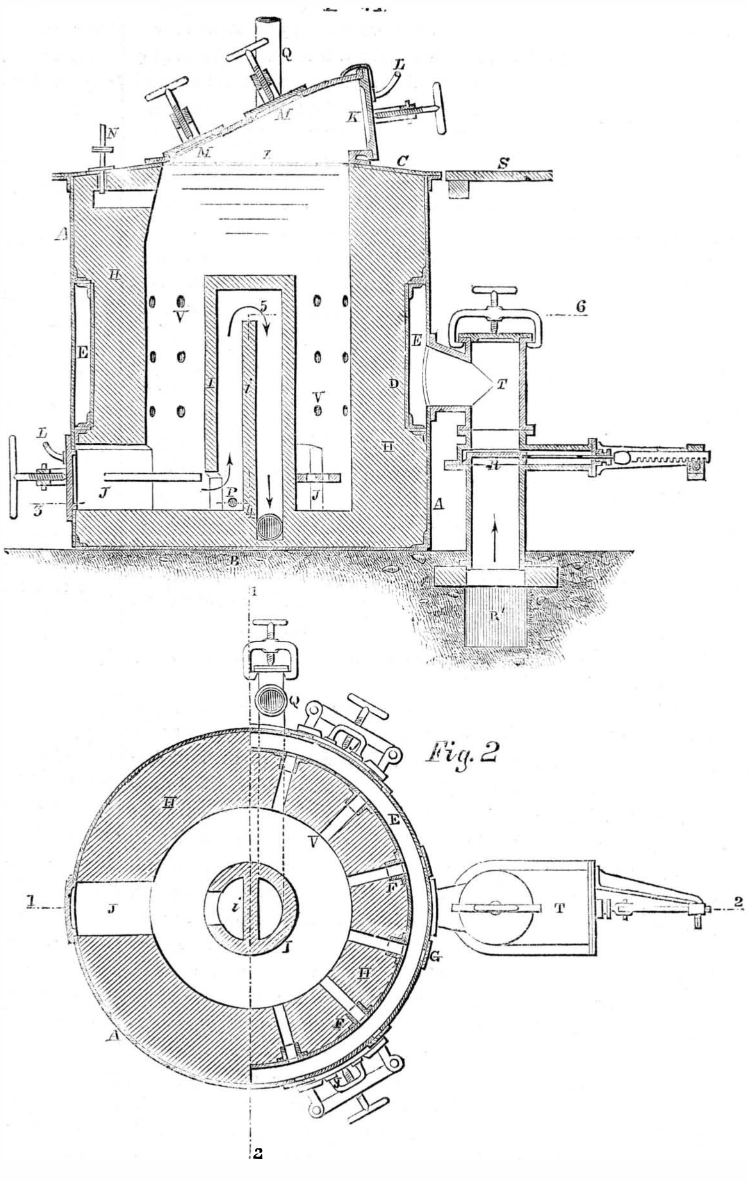
It is known that the city of Narbonne in France, has been lighted for the last three years by means of platinum wire, made intensely hot in the flame of burning hydrogen. The metal, platinum, like all other substances, when at a high temperature, emits a brilliant light, but unlike most other substances when highly heated it does not combine with oxygen, and it may, therefore, be kept hot for a long time without being consumed. This property has been taken advantage of to produce a light, and for several years the platinum light has been one of the scientific toys of the laboratory. Hydrogen has been adopted as the best fuel for heating the metal, as it generates, in burning, more heat than any other substance, and burns with a perfectly clear flame, the only product of its combustion being pure water. A little basket is made of platinum gauze and placed over the jet of gas, which as it burns, heats the wire gauze to a white heat causing it to shine with a brilliant light.

We believe that the first attempt to use this light on a large scale is the one spoken of at the city of Narbonne. The carrying out of this enterprise has called for the production of hydrogen gas in larger quantities than have ever before been required, and the experience obtained in its manufacture on so large a scale has led to some notable improvements in the process. We find in *Le Génie Industriel* an illustrated description of extensive gas works on an improved plan for the manufacture of hydrogen gas, which have recently been erected at Narbonne, and as there is an almost universal interest in new methods of producing light, we have had these illustrations engraved for our columns. If pure hydrogen gas answers as well as carburetted hydrogen for lighting purposes, it will be extensively introduced, as it is so manifestly superior for cooking and all other heating operations, from the great heat and perfect clearness of its flame. As it is much lighter too than illuminating gas, it is superior to that for filling balloons, requiring a smaller balloon for the same buoyant power, and if it can be made for some 30 or 40 cents per thousand cubic feet, it may be economical for our aeronauts to construct a hydrogen gas apparatus, rather than pay the gas companies seve al hundred dollars for each inflation of their monster balloons.

Of the annexed cuts, Fig. 1 is a vertical section in the middle of Fig. 2, and Fig. 2, follows the line, 1 2 3 4 5 and 6 of Fig. 1. A cylinder of thin boiler plate, A, is lined with fire brick, H, and has a small cylinder, I, of fire brick in its middle, divided by the partition, *i*. The main cylinder is filled to the level of L, with coke which is set on fire and allowed to become red hot, when steam under a pressure of two atmospheres is introduced among the burning mass through the pipe, N. This steam is decomposed by the coke, its hydrogen set free, and its oxygen uniting with the carbon of the coke, forms carbonic oxyd, (CO), and carbonic acid (CO2). All of these gasses then flow into the bottom of the cylinder, I, and rising over the top of the partition, *i*, pass out hrough the pipe, Q, to the purifiers, and thence to the gasometer.

In the passage through the cylinder, I, the carbonic oxyd is met by a fresh supply of steam coming through the pipe, P, which it decomposes, taking on another equivalent of oxygen from the steam and becoming carbonic acid, while the hydrogen from the steam is set free, and thus increases the quantity of hydrogen produced by the apparatus. As this decomposition of the steam cools the coke rapidly, after the process has continued about 20 minutes, it is necessary to suspend it and heat the coke anew. This is effected by forcing a blast of air through the pipes, R′, R and T, into the annular space, E, surrounding the main cylinder, whence it passes through the lining, H, by the pipes, F F, terminating in the 36 mouths, V V, by which the air is distributed among the coke. The blast is continued about 2 minutes, but the opening and closing of the passage-way extends the whole time occupied by each reheating to 4 or 5 minutes. The blast of air is produced by a two horse power engine, driven by steam from the same boiler that furnishes the steam to be decomposed.

Three doors, I, are made in the bottom of the apparatus, and two, M M, in the top for cleaning it. The coke is supplied through the door, K, and a charge is placed on the plank, S, before opening the door, in order that the filling may be quickly done.



APPARATUS FOR LIGHTING CITIES WITH HOT WIRE.

HOBBS, THE LOCKSMITH, RETURNING.

In 1851, during the Exhibition of Industry of all Nations in London, our countryman, Hobbs, astonished the cockneys by picking Bramah's and all the most famous English locks which had been represented as burglar proof; while, at the same time, not one of their locksmiths were able to pick Newall's American lock. These incidents were the means of making Mr. Hobbs and the locks which he took to London quite popular, so that a very promising field was presented for their manufacture in England, and he, in company with an English capitalist, entered upon its occupancy. A large factory was soon erected in the vicinity of London, and Mr. Hobbs had several ingenious machines constructed to fabricate several parts of locks which had previously been executed solely by hand-labor in England. His lock factory became the first in that country; he beat all opponents, and success attended his efforts. After a residence of nine years in England, we learn from the London *Mechanics' Magazine* that he has retired from business, and is about to return permanently to America with his family. During his residence in London he has won respect, and his workpeople seem to have been greatly attached to him. They have presented him with a handsome parting testimonial, and an address couched in very affectionate language.

AMERICAN INVENTIONS.

Charles Reade, in his last book, writes as follows about American inventors:—"American genius is at this moment ahead of all nations for mechanical invention. I learn from Coryton, the last English writer on patents, that she took out her first patent in 1790; in 1800, took out 39 patents; in 1810, 222; in 1830, 551; in 1840, 452; in 1849, 1,075. At this last date, she headed Great Britain, and has maintained the lead ever since. Europe teems with the products of her mechanical genius. Her inventors draw large percentages from England, and no Englishman grudges them, for they leave us still their debtor. The preeminence this nation has attained in mechanical invention rests on the rock of statistics, and my little paltry experience can neither contradict nor confirm statistics; still, I cannot help remarking that I am sitting in London at this moment in a shirt which I happen to know was sewed by Mr. Singer's patent, and that there are three English newspapers on the table, two of which—the *Times* and *Lloyds*—were printed by Mr. Hoe's patent; the other was worked off either by the Adam's press (invented, I think, at Boston, Mass.) or else by the Columbian press, which is still in vogue here, though long ago exploded in the leading nation. The constructive genius of this people, stimulated by sound legislation, teaches us lessons at every turn. Look at their hotels, the wonder of the world; ours are only the terror. Look at their cities, reticulated with telegraphic wires, so that at the first alarm of fire an engine is rung for; here it is run for, and that is why it often finds the house on the ground floor, and drenches the smoking ruins, which hiss it for not managing better. I go through the Liverpool docks, and point out the biggest and smartest ships, and ask a sailor from what ports they came. It is always, 'Yankee, sir; Yankee!' We had been sailing yachts many years more than they had when they sent over the *America* and beat our fleet; and, observe, the victory was achieved by mechanical onstruction, and not by an extra cloud of canvas." The wonderful progress of American inventions would appear more striking still by comparing the number of patents issued here in 1859, with those of Great Britain in the same year.

The "Great Eastern."—By the latest news from England, we learn that the captain and chief engineer of the *Great Eastern* have been discharged, and it is said that she is to be laid up all winter. Her bottom was examined at Milford Haven, and found to be tolerably clean, but a little rusty. It had been stated that her bottom had become so foul as to detract about two miles per hour from her speed in the voyage across the Atlantic. This turns out to have been fiction. It was expected that she would make a voyage with a cargo to New York this winter. This would be a true test of her qualities as a merchant steamer.

Longevity of a Horse.—Mr. Dampler, a farmer residing near Tanlon, England, is said to have a horse in his possession, aged 56 years, which he rides daily about his farm, and occasionally goes out hunting with. The animal is still fresh on his legs, and free from blemish.

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NEW YORK, SATURDAY, OCTOBER 27, 1860.

UNSAFE STEAMERS.

It is a common custom with British writers, in alluding to accidents in America, to denounce our steamers as so many floating volcanoes, constructed in the most flimsy manner, and managed with the most desperate recklessness to life—all for the love of the "almighty dollar." Safety, they consider, is the exception, and dangerous accidents the rule in American traveling; and they look upon their own vessels as the very models of perfect construction, security and good management. Such sentiments are altogether erroneous, and we think they have been the main cause (by engendering a feeling of safety) of several very sad disasters. The most terrific calamity which can befall a vessel at sea is to take fire, without the power of extinguishing it. A crowd of beings in a ship on fire, with the lurid flames beneath and around them, and no way of escape presented, is a dreadful spectacle; and this has been the case with two British built steamships on the Atlantic ocean, within the past two years. The first was the *Austria*, an account of which we gave on page 37, Vol. XIV. (old series), of the SCIENTIFIC AMERICAN; the last was the *Connaught*, which was consumed on the 7th inst., when about one hundred and fifty miles east of Boston. By the first accident no less than five hundred persons lost their lives; and had it not been for the timely arrival of the American brig, *Minnie Schiffer*, as many would have perished in the latter case, as there were five hundred and fifteen passengers on board. Both of these steamers were said to be built in the most substantial manner, with iron plated hulls, divided into several water-tight compartments. They were given out to be proof against fire, owing to the materials of which they were constructed; yet they were destroyed by fire, and in the case of the *Austria*, with a loss of life unsurpassed on any wooden vessel. The idea of safety from fire in the case of these iron steamers was a delusion—a falsehood palmed off upon the public; and perhaps most of the British iron steamers now running on the ocean are not more safe than these two which have been destroyed. That iron steamers can be built fireproof is a question which admits of no dispute, but that these steamers were not so constructed is an established fact which should lead the whole world to execrate either their builders or owners.

As the ocean is the highway of nations, all persons are interested in the safety of those who go out upon the "mighty waters;" and we are especially so in those who voyage upon the Atlantic. Every nation is responsible for the character of the vessels built within its borders, and Great Britain has been degraded by the miserable iron steamers which have been built by her marine engineers during the past few years. The materials of which they have been constructed were either of the most inferior quality, or else they were put together in a manner which would disgrace the youngest apprentices in any American establishment. We make these strong assertions, not for the purpose of giving pungency to a paragraph, but because painful facts call them forth. Our wooden steamers seem to be, infinitely stronger and safer than the British iron steamers which have recently become their competitors on the ocean. The iron steamer, *Royal Charter*, went down like a stone when she struck the rocks last year on the English coast, and a like fate was experienced last summer by the *Hungarian* on the American coast. The most disgraceful case of all, however, was that of the *Connaught*. She was represented to be a most safe and perfect iron steamer; yet she first sprung a leak and was gradually sinking, when, to add to the horrors of the scene, she was also soon wrapped in flames. This was proof of construction and arrangement so defective, that we search in vain for a parallel in the history of steam navigation.

Neither England nor the United States has a proper system of steamship inspection. We hope that the many disasters which have occurred with steamships during the past few years—and which, in most cases, might have been prevented with common foresight—will lead to the adoption of some system whereby no steamer will be permitted to go to sea without first being thoroughly inspected in all that relates to her construction and equipment, so as to insure greater safety to passengers.

BELLS AND THEIR MANUFACTURE.

The various purposes for which bells are employed connect their sounds with the most touching and diversified associations. In the early days of youth, they recalled our busy feet from the playground to the schoolroom; on Sabbath morning, they invited us with sweet and solemn cadence to the house of God; and on "Independence Day," their stirring notes made the heart vibrate with the wildest emotions. Although most persons know considerable about the form and sound of bells, the number is small, we believe, who are acquainted with the mode of their manufacture; some facts in connection with this art will, therefore, be of general interest.

The most famous bell foundry on our continent, so far as we know, is that of A. Meneely's Sons, situated at West Troy, on the banks of the Hudson river. While on a recent visit to that section of the country, we took the opportunity and had the pleasure of inspecting this establishment, where all the operations were freely explained to us by one of the brothers.

Bells are formed by casting an alloy of copper and tin in molds prepared for the purpose. The method of molding conducted in this foundry is a very great improvement upon the old system. A mold consists of a hollow space, the exact form and dimensions of the bell to be cast. Two separate hollow iron cases, shaped like a bell, and of a size to correspond with the casting to be obtained, are employed to form a mold. Their sides are full of small perforations or vent holes; one case is made smaller than the other and forms the *core* for the inside—the larger one, called the *cope*, forms the outside shell of the mold. The inner case is first swathed with straw rope, and a coat of loam is placed on the outside of this; when perfectly dry, it forms the core. The outer case is lined on the inside with loam, and carefully swept, to obtain the proper thickness and surface for the casting. When the cores for a number of bells are ready, they are placed on the even floor of the foundry, and their copes are lowered over them by machinery, and guided to their exact positions by gages. The spaces between these cases then form the molds for the bell castings, and different sizes are employed for bells, according to their desired weight. Large reverberatory furnaces are used for fusing the bell metal, and when it has reached a proper state of fluidity, it is poured into the prepared molds in the usual way. The casting operation is an interesting sight at night, as the intense heat of the metal causes numberless jets of bluish-green flame to issue from the vent holes of the mold covers, which appear like domes of fire, and rival a gorgeous display of colored fire-works. The straw ropes on the cores take fire and burn very slowly, as the casting cools, and the shrinkage of the metal thus goes on gradually and prevents sudden undue straining. Great care and practical experience are necessary to conduct these operations, although apparently simple; the metal must be perfectly fluid and of the same temperature at every part of the mold, to produce a homogeneous casting. The castings which we examined were beautiful and uniform in their texture. Formerly, when entire loam molds were employed for bells, these were packed in pits beneath the surface of the foundry floor, to enable them to resist the great pressure of the fluid metal. Serious explosions frequently occurred then, by the confined air within these packed molds becoming highly heated; and inferior, porous castings were also very common. These evils are now avoided with the iron vent casting.

After the bells are cast, they are scoured bright in rotating frames, in which a sand cushion is brought to bear upon the inside and outside surfaces of the metal. Each bell is tested as to its tone and quality, and if the least imperfection is detected, it is condemned; no inferior article is allowed to pass outside the foundry gate. After this, the bells are fitted with clappers and yokes, and mounted on frames. The thickness of a bell, from its crown to the *sound-bow*, varies with its diameter—about one-fourteenth of the total diameter being the proportion.

Mr. Andrew Meneely, the father of the present proprietors, commenced the manufacture of bells at West Troy, in 1826, and from that period up to the present date, no less than 14,000 bells, averaging 500 pounds weight, have been manufactured. These have had a wide circulation. Every State and Territory in the Union has been furnished with a number; some have gone to Mexico, Brazil, Europe, Asia, and Africa. During the past ten years, the number cast annually has averaged 600, of 500 pounds weight each, and, in the week of our visit, 20 were sent out, averaging 700 pounds; while no less than five chimes have been completed for as many different places, during the past six months.

Some large bells have rung out their cheerful notes for centuries, while others have been cracked after a few years' service, by the clapper continually striking in the same place. In order to change the surface of the bell to the blows of the clapper, all those ranging from 400 pounds and upwards, are fitted with Meneely's patent adjustable yoke, which was illustrated on page 22, Vol. I. (new series), of the SCIENTIFIC AMERICAN. The bells thus hung can be easily adjusted to present a new surface to the action of the clapper.

On bells of 100 pounds and upwards, a cushioned steel spring hangs down like an arm on each side of the tongue, so that when the latter strikes, it is caught and moved back to prevent it from clattering on the sides of the bell and injuring the vibration. Bells of 400 pounds and upwards are also provided with a tolling hammer, set on the frame, so that they can be employed for alarms as well as for ringing. The yoke of a bell is furnished with a gudgeon at each side, and is hung in a frame connected with a wheel to which a rope is attached for ringing. A counterpoise weight is bolted on the rim of the wheel, at the top, to diminish the labor of swinging, and a stop clutch is provided at the top and bottom of the frame of very large bells, to prevent them from being thrown over in ringing. Bells varying in size from 10 pounds up to giants of 25,000 pounds weight are manufactured in this foundry and sent everywhere.

The quality of a bell depends upon the character of its metal, the uniformity of the casting in density, and in its form, although the last is really not such a fixed question with bell founders as many suppose. The great bell of Pekin, which weighs 55,000 pounds, is of a cylindrical form, and devoid of the *sound-bow*, or flaring mouth which is common to our bells. "Big Ben" of Westminster, about which so much was said in the London papers a few years ago, became cracked a few days after it was hung up; and upon being re-cast, the same fate attended "Big Ben" the second. Its alloy was composed of 3 parts copper and 1 of tin; it was too weak for such service. Common bell metal consists of 4 parts copper to 1 of tin, and is twice as strong as the former alloy. A bell should be so constructed as to give out the same note at whatever part it may be struck, but there are few (if any) bells which are so perfect in tone. In order to give out the greatest volume of sound, a bell must be swung instead of being struck, but this, of course, is difficult with large signal bells of from eight to ten tons in weight. The tower or steeple where a bell is hung should be as open as possible at the sides, and sealed close at the top. We have seen some church steeples constructed with slatted blinds around their sides, as if they had been designed for the very purpose of strangling the sounds of the

——Swinging bell
Which afar doth swell
O'er moor and fell.

RECENT AMERICAN INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions, the reader is referred to the official list on another page:—

DESICCATOR.

This invention consists principally in the use of a fused metal or alloy, in connection with a suitable chamber for the reception of the substance or substances to be desiccated, in such manner that such substance or substances may have their moisture evaporated by the heat distributed throughout the chamber from the fused metal or alloy, by which means the temperature at which the desiccation is carried on may be regulated and kept uniform. It also consists in certain means applied in combination with the desiccating chamber to facilitate the process of desiccation. J. Eugene Tourné, of New Orleans, La., is the patentee of this invention. He has also secured his invention in foreign countries through this office.

MACHINE FOR FILING GIN SAWS.

This invention consists in the employment or use of a circular rotating file, placed within a swinging or movable frame, and arranged with a slide or carriage containing the saw-shaft and saws, in such a way that the device, by means of a single operator, may be made to perform the desired work in a rapid and perfect manner. The filing of gin saws and the keeping of them in proper order has hitherto been attended with considerable trouble and expense, and great care is requisite in order to preserve the proper form of the teeth. It usually requires about six days to put a set of gin saws in perfect working order by the manual process, while, with this invention, the work can be performed in one day. The credit of this contrivance is due to Samuel Yeatman, of Providence, Ala.

SLIVERING MACHINE.

This invention is an improvement in machinery for slivering blocks of wood for upholsterers' purposes. It consists in setting the beveled cutting point of each slitting cutter at an obtuse angle—more or less—with its shank, whereby, instead of their cutting perpendicularly into the wood, they will make a slanting cut, so that, when two sets of such slivers are used with their points inclined in opposite directions, they will produce, with the horizontal plane irons, prismatic shreds or slivers. It further consists in securing the slivering cutters in stocks which are allowed to have a lateral play, so that the points of these slivers will follow the grain of the wood where it is not perfectly straight. This invention was designed by Henry L. Nichols, of this city.

ROTARY ENGINES.

This invention relates to that description of rotary engine having sliding pistons rotating with an inner cylinder or drum arranged eccentrically within a larger stationary cylinder; and it consists principally in a certain construction of the sliding piston and mode of applying the same, in connection with arc-formed revolving guide plates arranged between the heads of the inner drum and outer cylinder, whereby the pistons are caused to present themselves, with their outer faces concentric with the inner periphery of the outer cylinder, and in proper contact with said periphery throughout the whole of their revolution; and the escape of steam, water or fluid between the pistons and the outer cylinder, and between the said cylinder and the rotating drum, is very effectually prevented without any necessity for stuffing-boxes around the shaft. It also consists in a certain construction of the ports in the outer cylinder, whereby, after the pistons, in their revolution, have passed that portion of the inner periphery of the outer cylinder with which the rotating drum comes in contact, the steam, water or other fluid is received into the cylinder, both in front of and behind them, until they arrive at a position where the steam or other fluid, in the case of an engine used as a motor, may act upon them, or the water, in the case of a pump, may be acted upon by them with good effect, and a free eduction is provided for. It further consists in a certain construction of an adjustable packing piece which is fitted to the inner periphery of the outer cylinder, to constitute a bearing for the outer periphery of the rotating drum, whereby provision is made for adjusting the said piece toward the axis of the rotating drum without any danger of the pistons catching against the said piece in their revolution, and so injuring or being injured by it. The inventors of this device are K. and T. Cox, of this city. Foreign patents have been secured through our agency.

STEAM PIPES FOR EVAPORATORS.

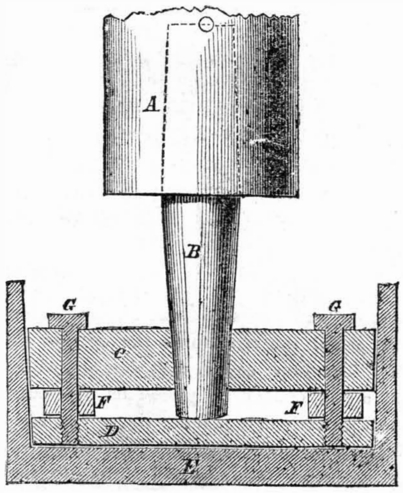
This invention relates to a system of parallel pipes, connected at their ends with two transverse boxes, one of which is by a transverse partition made to serve partly as the induction or steam chamber, and partly as an eduction or water chamber, and is also made to turn on its axis to permit the cleaning of the evaporating vessel. The improvement consists in so arranging the aforesaid partition in the main box with respect to the pipes, that the water of condensation is conveyed from the pipes and boxes through a single pipe, or through a small number of the pipes only, so that nearly the whole or the greater number of the pipes are made fully effective for evaporation, instead of one-half only, as in other arrangements of the partition in the main box. The patentee of this improvement is H. O. Ames, of New Orleans, La.

GAS REGULATOR.

This invention relates to that kind of regulator composed of a valve attached to an inverted cup, floating in a basin of quicksilver or other fluid substance. It consists in the arrangement of the weight by which the buoyancy of the cup is, to a sufficient degree, counteracted, below the cup and between the cup and the valve. It also consists in the employment as a weight to counteract and adjust the buoyancy of the cup, of a tubular valve stem containing shot or other weight movable in small quantities. And it further consists in the attachment of the guides, by which the cup is kept upright, outside of or beyond the circumference of the cup. The inventor of this ingenious device is Joseph Foster, of Richmond, Va.

A GOOD STEP FOR MILLSTONES.

Messrs. Editors:—I herewith send you a description of the step which I use in my mill. I think it will answer the purpose for J. F. Dance & Bros., of Columbia, Texas. A is the spindle; B the steel point passing



through the steel plate, C, and resting on the bottom steel plate, O, all placed in the cast iron step, E. The plates, C and D, should be bolted together with bolts, G G, and held apart by thick washers, F F. The bearing surfaces of the steel plates should be hardened and polished; and when put in motion, the step should be filled nearly full of good oil. If this step does not furnish a remedy for the evil of which he speaks, I know of none that will. Henry H. Guild.

Milton, Conn., October 12, 1860.

New American Atlantic Line of Steamers.—Commodore Vanderbilt, it is reported, is about to build two new fast steamers for his transatlantic line. The length of each is to be 400 feet; breadth of beam, 55; depth, 18. They are to be of wood, and built in the most substantial manner, so as to secure light draught, combined with great strength. Their model will be after that of our fastest river boats; the engines are to be "overhead beam," with 100 inch cylinders and 16 feet stroke. The paddle wheels will be 50 feet in diameter. The Commodore is determined to wrest from the English steamers those advantages which they have lately gained in the carrying trade of the Atlantic. We have no fears of the result. Those steamers, when built, will be the swiftest in the world.

CELLAR WALLS AND FLOORS.

Most cellars are built without adequate provision being made for keeping moisture from passing through the walls from the outside, and up through the earthen floors inside during rainy weather. The cellar of a house should be dry so as to render it comfortable and healthy, as moisture in the lower part of a dwelling generally makes the upper stories damp and chilly, and causes mildew in clothes, books, and all household articles made of cloth and leather. Cellars can be easily built so as to have dry walls, and hard dry floors; and the latter are invaluable to prevent rats from burrowing, as well as dampness from coming up from the soil beneath. To render the cellar walls dry, they should be coated on the outside with hydraulic cement, mixed with sand. Houses in our cities have their cellar walls thus treated in many instances, but their floors are neglected. To make a cement floor, the surface should first be rammed down and levelled; then hydraulic cement, mixed with sand, of about the consistency of thick mortar, should be laid on to about one inch in thickness, and its surface levelled with a scraper made of a thick plank. In laying down such a floor, sections of about eight feet square should be marked off, and finished one after another. A coat of clean sand or gravel, one inch thick, should be laid on the top of the cement; and after it has stood about half an hour, the whole should be rammed down smooth with a pounder, when the work is complete, after the surplus sand has been swept off. In a few days, such a floor becomes hard as a stone, and quite impervious to water.

MEETING OF STEAMBOAT INSPECTORS.

A meeting of the steamboat inspectors from the various districts throughout the Union is now being held at the Metropolitan Hotel, this city. At the time of going to press, no important business had been decided, but in our next issue we may be able to give a condensed report of the whole proceedings. The present law relating to steamboat inspection is defective in several vital features. Neither steamships nor steam ferry boats come under its control. It is desirable that its provisions should extend to these classes of vessels as well as river boats which carry passengers. The inspectors have repeatedly taken measures to bring these reforms before Congress, and their bill of amendments got the length of passing the lower House last session. We trust it will go through the Senate next winter, and become a law. The important subject of marine signals, we understand, is engaging the attention of the inspectors. Collisions are becoming so frequent, for want of proper lights, that far more lives are now lost by such accidents than by explosions.

A Boiler Blown from Under a Man Without Hurting Him.—We learn by the Fort Wayne (Ind.) *Sentinel* that, on the 27th ult., while Mr. Hattersley was standing astride of the steam boiler at Smith's factory, at that place, the west end of the boiler blew out, and the boiler jumped endways from beneath Mr. H., dropping him into the furnace. He was slightly burned by the fire, but not injured at all by the boiler. The cause of the explosion was low water in the boiler, as usual.

Preserving Sweet Potatoes.—The Ohio *Cultivator* gives the following method of preserving these precious roots during severe winter weather:—Take dust from the highway and dry it thoroughly; then pack the potatoes in layers in it, using either barrels or boxes for this purpose. They should be kept in a warm place, such as in the vicinity of a stove, or some situation where they cannot be affected with frost during very cold nights. This appears to be as good as any other method yet published.

European National Debt.—The debts of the several States of Europe, at the close of June, 1860, were as follows:—Great Britain, $5,365,000,000: France, $2,880,000,000; Russia, $1,745,000,000; Austria, $1,600,000,000; Spain, $1,050,000,000; Prussia, $284,000,000; Portugal, $190,000,000; Turkey, $135,000,000; Belgium, $100,000,000.

At Boulogne (France), the female porters have been formed into a regular corps, in uniform, with the exclusive right to carry passengers' luggage ashore.

NEW METHOD OF MAKING GRAPE WINE.

The following is a short and quick method of making wine from grapes, given by Professor Wm. Hume, of Charleston, S. C., and taken by us from the *Rural Register*:—The grapes are collected, bruised and pressed. The obtained juice is strained, and allowed to flow into a cask or other convenient receptacle. To every gallon of this must one pint of deodorized alcohol of 80° be added. The cask is shaken or stirred to effect a mixture, and the bung is put in. The effect of this mixture is to congulate, and to precipitate all the fecula contained in the must, so that, at the end of twenty-four or forty-eight hours, a thick sediment is formed at the bottom of the cask, and the juice brightens in color. At this period, I thought it prudent to filter the whole by piercing above the sediment, and allowing the clear portion to run first, and then the sediment. An upward cloth filter or a downward sand filter is necessary, as the fecula soon covers the cloth and renders it impervious. This filtration is practiced to prevent the putrefactive fermentation from proceeding in the fecula and imparting a bad flavor. Its presenne is of no possible advantage to the wine, and its absence secures us against the possibility of future fermentation. Whatever ferment there may have been in the must is now removed. All the sugar has been retained to secure sufficient swneetness, and the added deodorized alcohol has communicated no flavor or odor, and supplies the place of that which would have been formed had two pounds of sugar been added to the must. The original flavor of the grape is preserved, and with such accuracy as to enable any one to detect the kind of grape that was used to prepare the must. This quantity of alcohol, which is ten per cent, is sufficient to preserve the must from any future change, and ranks it in strength to the weaker wines of France and Germany. The plan is so natural and simple that the wonder is that it has not long been put in practice. The nearest approach to the method is the practice common in Spain, Portugal and Madeira, of adding brandy to their wines, in order to strengthen them to suit the taste of the English and American market. A question of economy frequently arises on the introduction of a new manufacture. I am only anxious to point out those processes to which the grapes may be subjected, to produce a wholesome, agreeable and harmless beverage, which all may enjoy, at prices far below what is now paid for dangerous compounds, which may have been made in Europe, but are also largely made in these United States.

A CAST IRON STREET RAILROAD.

On Monday, the 15th inst., a new railroad was opened to the public, running through Grand-street, in Williamsburgh, L. I., under a charter granted to Mr. Ira Buckman, and is, we believe, the only complete line of the kind ever laid. The rails are of cast iron, and laid directly on the ground, without sills or sleepers under them. There is a broad flange on the bottom of each rail, and the web between it and the top is deep and stiff. The top is not formed with a groove, like street rails of wrought iron, but with two flat faces—the one a little above the other, and a short shoulder between. Lugs are cast on the sides of the joints, and these are fished together by broad, thin wedges driven in horizontally. This mode of uniting the rails forms each side into one continuous rail from end to end. The track is very solid and smooth, and we see no reason why it should not be far more durable than those that are laid on wooden sleepers, which become completely rotten in about four years.

OXYDES OF IRON.

Red oxyd is usually set down by chemists as peroxyd, while black oxyd alone is considered to be true magnetic oxyd, but which will be found far from being invariably the case. Some of the most energetic magnetic oxyd is as red as peroxyd, and is obtained from corroded cast iron. Protoxyd consists of one atom of oxygen to one of iron (Fe. 0), though it has never been found isolated. Magnetic oxyd, as ordinarily found, consists of three atoms of iron to four of oxygen (Fe. 3.04). Peroxyd consists of two atoms of iron to three of oxygen (Fe. 2.03). The surface of cast iron laid in moist earth soon acquires a coating of oxyd, though not with nearly so much rapidity as wrought iron placed in the same circumstances. The oxyd of cast iron soon becomes magnetic, while that of wrought iron usually remains in the state of inert peroxyd (ordinary rust). In the one case, we have an energetic body which neutralizes organic odors and rapidly absorbs sulphur; in the other, a comparatively inert one, which exercises but little (if any) influence on the same substances. Both oxydes are red in color. Magnetic oxyd of iron is a great absorbent of sulphur and a powerful disinfectant. This oxyd will absorb about from 40 to 50 per cent its weight of sulphur, and becomes quadrupled in bulk in so doing.

PERILS OF A BALLOONIST.

The veteran and daring aeronaut, Professor John Wise, who frequently contributes scientific information to our columns, came very near losing his life in an ascent which he made at Petersburgh, Va., on the 11th inst. When about one thousand feet above the earth, while in the act of descending, the gas rushed out of his balloon through a huge rent, and his descent became fearfully rapid. The Professor, seeing his danger, leaped up amidst the rigging, designing to escape the shock which threatened the car on reaching the ground. The precaution was good, but did not avert the whole danger. The car struck the ground with terrible force; the balloon, completely collapsed, fell, and the Professor was thrown violently backwards over the car, his back striking the rim and nearly knocking him senseless. A large number of persons who were following him, and saw him fall, were unable to find him until after a long search, the descent being made in a sort of glen, rankly overgrown with weeds, where he lay, hardly able to move. Such was the violence of the shock that his watch bounded out of his pocket and was thrown several yards distant.

We are glad to learn from the Petersburgh *Express* that, though Mr. Wise was severely, he was not permanently injured.

DEATH OF AN INVENTOR.

By a recent Bridgeport paper, we notice the death of Smith Beers, of Naugatuck, Conn. Mr. Beers was possessed of a remarkable inventive genius, and had perfected and patented several useful inventions. Among them was an ingenious machine for turning spokes, an odometer, for registering the number of miles run by a carriage, and a machine for pulling cotton stalks, &c. At the time of his last illness, his mind was actively employed in endeavoring to perfect a steam carriage, to be used upon highways. Like most true inventors, he was a quiet, unobtrusive, honest man and a useful citizen.

Sir Humphrey Davy at Fault.—When it was first proposed to light London with gas, Sir Humphrey Davy gave his opinion against its practicability, solely on the ground of the impossibility of keeping the joints of the pipes from leaking. This great chemist was very deficient in mechanical talent, and was seldom able to make a tight joint for his pneumatic experiments; hence the cause of his opinion. Faraday, who became his assistant, being an excellent mechanic, soon showed him how easy it was to make tight joints for gas pipes.

A Fast Ship.—The clipper ship *Lightning*, built by Donald McKay of Boston, for the Baine's line, running between Liverpool and Australia, has very fleet heels, and she has led every ship on that route. In 14 voyages out and back, their average time was but 77 days—the shortest 63½, and the longest 88 days. The American-built ship *Red Jacket*, on the same route, is also a very fast sailor. In 17 voyages, their average time was but 80 days.

Death of a Hermit.—A hermit named Daniel West died lately at McMinnville, Tenn., at the age of 78 years. He was, in many respects, a peculiar character. He had lived on a mountain for several years, in the inside of a large hollow poplar, in which he slept and cooked his meals. Near this tree he had a shed, which served as his workshop for manufacturing chairs, boxes and other articles of wood. He had been a soldier in his youth, and fought in the war of 1812.

THE CASHMERE GOAT.

We find the following communication in the Galveston (Texas) *News*:—

Messrs. Editors:—About twenty months ago, a few Cashmere goats were introduced into our State, mostly by the Sumner Cashmere Company, varying from one-half breeds to full bloods; and during the last Fall and winter, we had an additional number brought into the State, chiefly by the above company, and from Mr. Richard's flock at Atlanta, Ga. In all, I suppose, there has been introduced into our State something like two hundred head, principally bucks.

None of these have died from disease, so far as I have heard. Some have been lost from the want of proper care and attention.

I received from the Sumner Cashmere Company, at Hempstead, on the 4th of last December, twenty-eight head, and notwithstanding the severe winter, none have died from disease or from any other cause, so far as I can learn. They improved, while the common goat, sharing in the same kind of treatment, died in considerable numbers.

The Cashmere goat seems to be peculiarly adapted to our climate, and must soon become a valuable animal to raise in our State.

I wrote to a well-known gentleman in Athens, Ga., last June, a year ago, to give me his opinion about their value, &c., to which he replied as follows: "I am much pleased with my Cashmere goats. They rarely stray off; are not liable to be killed by dogs; are very healthy, and I consider one pound of their fine hair worth twelve pounds of wool, and one goat worth twelve sheep."

This gentleman had tried them for several years, and was competent to speak on the subject.

In the "American Cyclopedia," page 514, published by D. Appleton & Co., 1858, it is stated: "We learn that in Lyons, France, there are 4,000 looms at work, employing 12,000 persons in the manufacture of Cashmere goods."

I have been informed that an agent of a Paris house is offering from $4 to $8 per pound for half breed up to full blood hair of the Cashmere goats, raised on those grades here and in the rest of the United States.

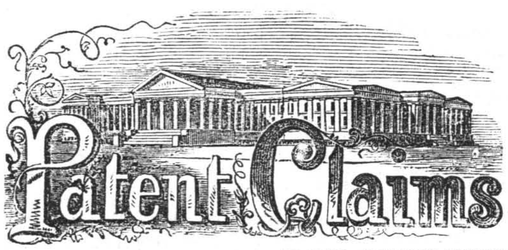
The time is not far distant, in all probability, when this hair will be manufactured in our own country. By next season, I hope to be able to supply a number of grade bucks. A few may be obtained this Fall, by application to me at Austin, by mail or otherwise, by those who apply early.

John R. McCall.

Austin City, Texas, August 22, 1860.

Bite of a Rattlesnake Cured.—The Petersburgh (Va.) *Express* publishes the following from a reliable correspondent:—"A carpenter, while engaged a few days ago, in pulling down an old house, and in removing some of the rotten timbers near the ground, was bitten by a rattlesnake. In a few moments his finger was swollen to four times its natural size, and red streaks commenced running up his hand and wrist. A deadly languor came over him and his vision grew dim, clearly indicating that the subtle poison that was coursing through his veins was rapidly approaching the citadel of life. But a remedy was tried which, to the surprise of all present, acted like a charm, the component parts of which were onion, tobacco and salt, of equal parts, made into a poultice and applied to the wound, and at the same time a cord was bound tightly around his wrist. In two hours afterwards, he had so far recovered as to be able to resume his work. I know an old negro who cured a boy that had been bitten by a mad dog by the same application.

Explosion of a Diamond Machine.—"It is generally known," says the Sacramento (Cal.) *Union*, "that a party of gentlemen have been experimenting for some months past in diamond-making, and for said purpose have caused to be put together some sort of machinery of some kind peculiar to the vocation, we know not what. At any rate, it is of iron, and is bolted and riveted together about as strong as mechanics can make such things. On Wednesday, about noon, as I. W. Underwood was experimenting with his pet, which is to make diamonds as cheap as pebbles, the thing blew up, and the experimenter barely escaped with his life."



ISSUED FROM THE UNITED STATES PATENT OFFICE FOR THE WEEK ENDING OCTOBER 16, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

. Pamphlets giving full particulars of the mode of applying for patents, 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.

30,381.—J. E. Ambrose, of Batavia, Ill., for an Improvement in Lamps:

I claim, first, The arrangement of the heaters, G H, with a space between them communicating directly with the external air, in connection with the collar, p, and plates, q q, fitted on the top of the wick tube, E, and the perforated cap, C, substantially as and for the purpose set forth.

Second, In combination with the parts aforesaid, the vapor tube, F, placed within the cap, C, and adjoining or contiguous to the wick tube, as and for the purpose specified.

Third, The shaft, e, provided with the rod, f, and spurs, g, which are within the chamber, d, of the wick tube, in connection with the plates, h j k, and spring, i, on said shaft, all being arranged to operate as and for the purpose set forth.

[The object of this invention is to obtain a lamp which will burn without a chimney, and without danger of explosion, those hydro-carbons which are volatile, and contain an excess of carbon.]

30,382.—James Bain and S. C. Brown, of Richmond, Ind., for an Improvement in Dovetailing Machines:

We claim, first, The arrangement of the guides, v, and bearings, a', of the cutter arbors J, substantially as shown, to admit of the adjustment of the cutters, for the purpose specified.

Second, The combination of the tilting or adjustable bed, E, with the adjustable arbors, J J, arranged for joint operation, as and for the purpose set forth.

[This invention consists in the employment or use of an adjustable bed and cutters, so arranged, that both the stuff to be operated upon and the cutters may be placed relatively with each other, that the desired work may be done expeditiously and in a perfect manner.]

30,383.—James Boyd and James Belford, of Philadelphia, Pa., for an Improved Door Spring:

We claim, first, The combination of the two springs, F F, with the door, B, when the said springs are arranged as set forth, and when they are adjustable on the door by the devices described, or their equivalents, for the purpose specified.

Second, We claim the plate, G, with its hinged bar, H, and bolt, I, when constructed and applied for the retention and release of the spring, as set forth.

30,384.—J. A. Burnap, of Albany, N. Y., for an Improved Regulator for Steam and Other Engines:

I claim the movable pendulous lever or ratchet arm, C, working on a fixed rack, B, said lever being constructed and operating substantially as and for the purpose specified.

Second, I claim the friction jointed arm, P, for adjusting the relative position of the guard, O, substantially as set forth.

30,385.—George Butterfield and Daniel Bowker, of Boston, Mass., for an Improved Window Curtain:

We claim the application to a window curtain of the elastic bands or cords, E E, substantially in manner and to operate as above described.

30,386.—Charles Carlisle, of Woodstock, Vt., for an Improved Nail Hammer:

I claim combining an angular lever with a nail hammer or hatchet substantially in the manner and for the purpose set forth.

30,387.—A. P. Cassel, of Wataga, Ill., for an Improvement in Shrinking Tires:

I claim the arrangement of the adjustable bars, F G, and dogs, H H, with the curved bar, A, jointed bars, B B', slide, D, spring, E, and eccentric, C, as and for the purposes shown and described.

[The object of this invention is to obtain a simple and portable device for upsetting or shrinking wheel tires, so that the latter may be made to fit the wheels without cutting and re-welding after being once formed.]

30,388.—Rowland Chapman, of Darlington District, S. C., for an Improvement in Sowing Machines:

I claim the arrangement of the frame, A, the furrow opener, B, the furrow smoother, C, the uprights, D D, the wheel, E, and the spokes, e e e e, operating in conjunction with the spokes, i i i i, the spur, L, cup, G, and ring, I, the whole being constructed for operation conjointly, in the manner and for the purpose set forth.

30,389.—Kenyon Cox and Theodore Cox, of New York City, for an Improvement in Rotary Engines:

We claim, first, The jointed pistons, G H G H, and arc-formed guide plates, F F, constructed, combined and applied in connection with the stationary cylinder, A, and rotating drum, D, substantially as and for the purpose described.

Second, The ports, a a, elongated in the manner and for the purpose described.

Third, The construction of the packing-piece, C, with beveled projections fitted in the cylinder, substantially as and for the purpose specified.

30,390.—Roswell Crane and Wm. Baldwin, of Anamosa, Iowa, for an Improvement in Tanning:

We claim the process of tanning leather shown and described, consisting in the use of a compound of terra-japonica and lye in the proportions and manner specified.

[This invention consists in treating the hides with a simple composition of lye and terra-japonica in the proportion specified, increasing the terra-japonica and diminishing the lye at subsequent stages of the process until the tanning of the leather is complete.]

30,391.—S. F. Dexter, of Paris, N. Y., for an Improvement in Boots and Shoes:

I claim the formation of an air-chamber in or on the sole of a boot or shoe, substantially as set forth.

30,392.—Andrew Dietz, of New York City, for an Improvement in Tanning:

I claim tanning leather by the use of saline solutions, as set forth, when used in combination with tannic liquors of different and increasing strengths, for the purposes as set forth.

30,393.—Andrew Dietz, of New York City, for an Improvement in the Manufacture of Tanned Leather:

I claim the use and application of honey, in the tanning or treatment of leather, during the last stages of the process of tanning, or in the finishing of leather, or after the leather is tanned and finished, as set forth.

30,394.—Solon Dike, of Columbus, S. C., for an Improved Cotton Press:

I claim, first, The employment of the guide rod, H, operated and secured in the manner represented, for the purpose of directing the press block, R, and for keeping the levers, F and D, in proper position, substantially as specified.

Second, The trucks, E E, secured between the bars, L L, and operating in connection with the levers, F F and D D, frames, G and C, guide rod, H, and cords, K and J, substantially as and for the purpose specified.

Third, In combination with the subject of the second claim, I claim the arrangement of the capstan, M, operating substantially as specified.

30,395.—N. T. Edson, of New Orleans, La., for an Improvement in Metallic Hubs for Carriage Wheels:

I claim so constructing the two metallic flanches, C and B, which are provided with grooves, A A A, and projections, as represented that they will clamp and hold the spokes separate and distinct from each other on their edges, while they are allowed to bear and press against each other on their faces, forming a wheel of dodged spokes, substantially as and for the purpose specified.

30,396.—E. W. Ferris, of Macon, Miss., for an Improvement in Astringent Medicines:

I claim the combination of recipes No. 1 and No. 2, substantially as stated.

30,397.—A. T. Finch, of Meriden, Conn., for an Improvement in Window Blind Fasteners:

I claim forming a blind fastener by casting the hooks solid with their axis pins and combining them together by clamping plates, as set forth.

30,398.—J. R. Floyd, of New York City, for an Improvement in Making Burglar Proof Safes:

I claim the employment of the described franklinite, or other similarly constructed metal, in forming cast metal safes, substantially as and for the purposes set forth.

30,399.—Joseph Foster, of Richmond, Va., for an Improvement in Gas Regulators:

I claim, first, The arrangement of the load or weight on the inverted cup below the said cup and between the said cup and the valve, substantially as described.

Second, The arrangement of the guides of the inverted cup outside of or beyond the circumference of the said cup, substantially as and for the purpose set forth.

30,400.—E. P. Gleason, of Providence, R. I., for an Improvement in Socket Coupling:

I claim a socket coupling having a hollow cylindrical cushion of caoutchouc, or other similar elastic gum, adhering to the inner walls of the socket shell, and having the surface of the opening through the same molded in a proper form by compression, and made elastic by the action of heat applied thereto, in the manner and for the purpose substantially as specified.

I also claim, in combination with such a cushion, a socket piece or nipple having a bulb or swelling ridge upon the end which passes through the opening in said cushion, by the contraction of which opening the nipple is held securely within the socket, as set forth.

30,401.—Richard Wright, of London, England, for an Improvement in Evaporating Cane Juice. Patented in England Sept. 6, 1860:

I claim the combination of rotating disks with a vessel, a, and vessel, b, so arranged that the water in the vessel, b, cannot rise up to the vessel, a, or the water in the vessel, b, be raised to a higher heat than boiling water (212° Fah.), substantially as described.

30,402.—Ezekiel Guile, of Waverly, Mo., for an Improvement in Hemp Brakes:

I claim the combination and relative arrangement of the feed and crushing rollers, B B', the upper roller, B', being transversely fluted, and brake bar, D, with the beating cylinder, E, and cleaning and beating drums, G H J, all arranged and operating in the manner and for the purposes described and represented.

[This invention consists in a novel arrangement of breaking swords upon cylinders, and in a novel arrangement of four cylinders themselves with feed rollers, one of which has its surface made up of grooves running around the roller, and the other is smooth on its periphery; said cylinders and feed rollers are arranged in such a relation to one another that the shoves or ligneous matter will be nicely separated from the fibers, while at the same time the stalks are kept in a straight state in passing from one cylinder to another, and submitted to the action of each cylinder of swords or slats; in combination with an adjustable bar, placed parallel with and between the lower feed roller and uppermost breaking cylinder, whereby the flax or hemp will be brought up close to the swords or slats in said cylinder, so that the slats may have a more perfect action upon the flax or hemp.]

30,403.—G. W. Hathaway, of Tioga, Pa., for an Improvement in Corn Shellers:

I claim the arrangement of two endless revolving screws, A A, in combination with the rotary toothed disk, K, constructed and operating substantially as and for the purpose specified.

[This invention consists in the arrangement of two endless revolving screws, in combination with a rotary disk having teeth on its under surface and attached to a vertical axle which rises and falls freely, in such a manner that, by the action of the endless screws, the ears are fed under and exposed to the action of the rotary disk, which accommodates itself to the varying diameters of the ears, thereby shelling the same from end to end.]

30,404.—D. B. Hedden, of Newark, N. J., for an Improvement in Wood-bending Machines:

I claim my mode of applying the end pressure, by means of an adjustable weight, as superior to all other modes, being a self-acting, perfectly graduating and equalized pressure.

30,405.—R. Humphrey, of Unionville, Conn., for an Improvement in Punches:

I claim constructing the punch and die plate in the manner substantially as shown, to wit: the punch, A, having an interior cavity with rounded edges to form a cutting edge, and a solid punch, B, projecting from the upper part of the cavity, and the die plate, D, having a central hollow mandrel, G, rising through its center, so that, when the sheet metal is placed between the die plate and punch, A, the latter, on descending, will first cut out the blank, then bend the same into the form of a ferule and then punch an opening in the upper end thereof, thus completing the ferule all at one operation or motion of the punch, A, as set forth.

[This invention is an improved punch for cutting out and forming a metal ferule or thimble, having a hole through their crown. The invention consists in constructing a die and counter die or punch, in such a manner that, by one downward movement of the punch, the ferule will be completely cut out and formed into the desired shape from a flat strip of suitable sheet metal.]

30,406.—J. J. Hutchison and J. D. Brandbery, of Cape Gerardeau, Mo., for an Improvement in Brick-molding Machines:

We claim the combination of the wheels, K and R, the clay box, B, the press box, H, and the plunger, F, when these several parts are constructed, arranged and operated substantially in the manner described.

30,407.—E. J. Hyde, of Philadelphia, Pa., for an Improvement in Grinding Mills:

I claim the arrangement of the eccentric ridges, f f, concentric ridges, e, and notched flanges, h, with the disks, B F, and concave, C, as and for the purposes shown and described.

[This invention consists in arranging on the grinding disks, and near to the cone of a grinding mill, a concentric ridge, which confines the substance to be ground on the cone and near to the center of rotation until it is reduced to a certain degree of fineness. It also consists in arranging the eccentric ridges with a series of diamond-shaped notches, each cut into their grinding side and extending to about two-thirds through the entire width of these ridges, so that the grinding surface is increased and the eccentric ridges produce both a cutting and crushing surface.]

30,408.—E. M. Judd, of New Britain, Conn., for an Improved Window Fastener:

I claim the combination, with a bolt pivoted intermediately of its length or depth, and mortise box or case for carrying the same and for imbedding it, as specified, of a spring or spring back plate to the box, arranged to act upon the rear of the pivoted bow or bolt by a jog or jogs, or their equivalents, to hold or lock the bolt both in its open and closed conditions, and so as to cause the spring to adjust the bolt to lie, when closed, flush or thereabouts, at its front or opposite finger surfaces, with the mouth of the mortise or face plate of the box, essentially as specified.

30,409.—J. W. Kellberg, of Pittsburgh, Pa., for an Improvement in Churns:

I claim the dasher and disk, made and operating substantially as described.

30,410.—Gustavus Kleinwort, of Albion, Ill., for an Improvement in Uterine Supporters:

I claim the ring, or its equivalent, to support the uterus, in combination with the flaps, connected with each other by a hinged joint and with the ring by hinged braces, so that the instrument may be folded up for insertion and then spread out, that the instrument may be retained in place without external supporters.

30,411.—S. T. Lamb, of New Washington, Ind., for an Improvement in Fastening Blades of Churn Dashers:

I claim interlocking or overlapping of the shanks of the blades, J, so that they shall serve to hold each other firmly in the staff, as described and represented.

30,412.—S. T. Lamb, of New Washington, Ind., for an Improvement in Washing Machines:

I claim hanging the roller, F, in the weighted levers, C, for the purpose and in the manner set forth.

30,413.—George Landers and Henry Lampman, of Afton, N. Y., for an Improvement in Grain Separators:

We claim the arrangement of the spout, F, with the shoe, E, screen, f, trunk, A, and divided spout, D, as and for the purposes shown and described.

We also claim the arrangement of the curved partition plate, c, and shelves, e e, with the spout, D, trunk, A, spout, g, screen, f, and hopper, F, as and for the purposes shown and described.

We also claim the construction of the interior surface of the spout, D, with convex sides, i i, the convex portions made to approach each other, and with enlarged concave ends, j j, as and for the purposes shown and described.

[This invention relates to a new and improved grain separating device, to be used simultaneously with the grinding mechanism, and interposed between the grain hopper and the eye of the stone.]

30,414.—J. H. Lilly, of Bardstown, Ky., for an Improvement in Straw Cutters:

I claim the arrangement of the three sickle-edged knives, a b and c, with the steel bars, d and e, all the parts being constructed and operating in the manner set forth.

[This invention consists in the arrangement of three sickle-edged knives in straw cutters (one of them being V-shaped and the other two triangular), with rests or supporters for the projecting straw while the said knives are cutting it off. The cutting edge of the knives is so arranged as to have a shearing stroke. The triangular-shaped knives cut—one from the center of the mouth of the box to one side and the other one from the center to the other side, and the V-shaped one cuts both ways from the center, but only about half as far as the other two.]

30,415.—J. G. Liffingwell, of Newark, N. J. (formerly of St. Louis, Mo.), for an Improvement in Gas Regulators:

I claim, first, Interposing between the flanges of the cups or sections of the regulator and the elastic diaphragm the non-corrosive metal for protecting the flanges and the diaphragm.

Second, I claim clamping the diaphragm between the edges of the metal plates, constructed and operated substantially as described.

Third, I claim connecting the extended part of the regulator to which the exit or eduction pipe is attached to the induction pipe by a syphon, constructed and arranged and operating as set forth.

Fourth, I claim the independent valve seat made of non-corrosive metal, and fitted to the regulator by a grooved joint, in combination with a non-corrosive metal valve, as described.

Fifth, I claim the lever valve, r, in combination with the tube or opening, g, of the upper section of the regulator for the purpose of regulating the condition of the atmospheric pressure upon the upper side of the diaphragm, as set forth.

30,416.—Joseph Marks, of Boston, Mass., for an Improved Method of Lubricating Engines, &c.:

I claim the mode or process described of saturating, mixing or impregnating steam air, gas, &c., with lubricating material for the lubrication of the various working parts of engines and machines operated by steam, air, gas or vapor, by means of any impregnating, mixing or saturating apparatus, containing any proper lubricating material through which the steam, &c., is made to pass, and arranged and operating substantially as described.

30,417.—T. J. Mayall, of Roxbury, Mass., for an Improvement in the Manufacture of Tiles for Flooring:

I claim the new manufacture of tiles or slabs for flooring, the same consisting of an india-rubber or gutta-percha composition, which, when combined with various coloring ingredients, made into sheets of suitable thickness, cut or molded into desired patterns and vulcanized, produce tiles of the peculiar softness and nature described.

30,418.—H. L. Nichols, of New York City, for an Improvement in Slivering Machines:

I claim the slanting pointed cutters, c c', when they are arranged in the relation to the two plane irons, d d', and operate in the manner described.

I also claim allowing a lateral yielding motion to slitting cutters, c c', for the purpose and substantially set forth.

30,419.—Henry Port and Eugene Surgi, of New Orleans, La., for an Improvement in Boots and Shoes:

We claim the metallic skeleton plate or frame, C, when used in combination with the sole and upper leather, in the manner and for the purpose specified.

30,420.—Lemuel Postlewait, of Russellville, Ohio, for an Improvement in Lathes:

I claim the combination of the movable or pulley, C, with the stationary spindle or shaft, D, when the same are used in the manner and for the purpose specified.

30,421.—D. R. Pratt, of Worcester, Mass., for an Improvement in Trucks for Locomotives:

I claim, first, Attaching the locomotive to the truck by means of the king bolt and swinging bed, C, said bed being hung upon the shafts, c c, by means of the connecting rods or bars, d d, substantially as and for the purpose specified.

Second, The employment of the springs and levers used in connection with the truck, as represented, whereby the forward and rear ends of the truck are guided at the same time by the movement of the locomotive, substantially as specified.

30,422.—S. R. Pressey and Daniel Sheets, of Suisun City, Cal., for an Improved Carriage Spring:

We claim a compound spring, composed of two elliptical portions, A A, two scroll portions, B and a C, shaped portion, c, the whole arranged in the manner and for the purposes set forth.

30,423.—A. J. Preston, of East Guilford, N. Y., for an Improvement in Machines for Raking and Pitching Hay:

I claim, first, The combination of the vibrating pitcher with a rotary rake having an intermittent motion, the whole arranged and operating substantially as described for the purposes set forth.

Second, I claim the arms, J, and shipper fingers, j, on the pitcher, in combination with the retaining levers, K, and springing vibrating arm, H, the whole constructed and arranged substantially as described, for the purpose of causing the rake to rotate automatically, for the purpose set forth.

Third, I claim, in combination with the vibrating pitcher and automatically rotating rake, the sliding gears, or their equivalents, for changing the speed of the pitcher, substantially as and for the purpose specified.

Fourth, I claim the hinged guides, i, in combination with the intermittently rotating rake teeth, g, arranged as and for the purpose specified.

Fifth, I claim, in combination with the rotating self-shipping shaft, a, the mechanism specifically as set forth, for imparting to the pitcher the vibrating self-reverse motion, as and for the purpose described.

30,424.—W. W. Reid, of Rochester, N. Y., for an Improved Churn:

I claim the annular perforated tube, n, in combination with the bars, I I, and dasher, o, for the purposes specified.

30,425.—Sheridan Roberts, of Cleveland, Ohio, for an Improved Method of Making Barrels:

I claim making the cylinder part or body of barrels from hollow cylinders turned off or rounded from solid cylinders, and then slitted, and a piece taken from or added to, as may be required, to bring the body to the proper dimensions and completed, as set forth.

30,426.—J. A. Roebling, of Trenton, N. J., for an Improvement in Metallic Railroad Cars:

I claim the combination of the longitudinal pieces, ribs or uprights, straps and plates which constitute the framework of the sides and roof of a metallic railroad car, with curved and flat panels, in such manner as to leave a partial space between the panels, and thus forming a non-conducting wall and affording a receptacle for window sashes when required, while the curved and flat panels may be united with any part of the framing with which they come in contact by one single rivet.

30,427.—L. C. Rogers, of Danvers, Mass., for an Improvement in Tools for Trimming Boots:

I claim the arrangement of the knife, g, or cutter, and the socket, c, so as to allow the knife to travel on the arc of a circle and to admit of its being adjusted or moved toward the guard as fast as it becomes worn, substantially as described.

30,428.—C. H. Sayre, of Utica, N. Y., for an Improvement in Straps for Handles of Shovels:

I claim malleable cast iron straps, with pins formed on their inner sides to serve as rivets, and countersunk holes on their outer sides, in the manner and for the purposes described.

30,429.—H. B. Smith, of Lowell, Mass., for an Improved Blind Slat Machine:

I claim the combination of the apparatus for boring the stiles with the apparatus for driving and setting the staples in the rods, in manner substantially as described and for the purpose of producing the effect set forth in the specifications.

Second, I claim a sliding rack, having adjustable teeth, when used for the purpose of giving the spaces between the holes in the stiles or the staples in the rods for rolling slat window blinds, substantially as specified.

Third, I claim the hopper or feeder, having a space inside fitted to the staples, and made so as to open substantially as specified.

30,430.—D. Squeir, Jr., and E. A. Preston, of Battle Creek, Mich., for an Improvement in Grain-weighing Machines:

We claim the arrangement of the adjustable head blocks, G G, slotted levers, D′, and valve, C, with the rods, i i, arms, J J, valves, H H, boxes, E E, plate, L, wheel, P, and index plate, N, and as for the purposes shown and described.

[This invention provides for weighing different quantities of grain by a very simple adjustment, and for stopping the flow of grain from the hopper at the very instant the quantity to be weighed is attained.]

30,431.—G. C. Taft, of Worcester, Mass., for an Improved Screw Wrench:

I claim the combination of nut, I, with its reverse screws, c and d, with screw, a, on the shank part, C, and screw, b, on the rear part of the sliding jaw, H, substantially as and for the purposes set forth.

30,432.—Wm. H. Tambling, of Berlin, Wis., for an Improved Bed Bottom:

I claim the employment of the slats, a a′, and screws, c c, in connection with the canvas, B, and the side and end rails of the bed, arranged and constructed substantially as and for the purpose specified.

30,433.—D. C. Teller, of Beaver Dam, Wis., for an Improvement in Sowing Machines:

I claim the arrangement of the vertically-sliding plates, I, and turning beams, H, from which the shares are suspended, in combination with the hopper, D, and discharge tube, F, constructed and operating substantially as and for the purpose set forth.

[This invention relates to certain improvements in machines for sowing broadcast, and it consists in the arrangement of vertically-adjustable, slides which form the bearings for a double series of swinging shares, in combination with the seed-discharging device, in such a manner that said shares can be made to cut deeper and shallower, according to the quantity and quality of the seed discharged from the hopper, and that they can be made to cut at a greater or smaller inclination, according to the soil through which they have to pass. It also consists in arranging, in the interior of a seed-discharging tube, a series of rods or pegs, forming a number of zigzag passages for the purpose of scattering the seed.]

30,434.—C. H. Thomas, of New Orleans, La., for an Improvement in Prophylatic Remedies:

I claim the above composition of matter or compound of medicines, as a preventive of yellow fever.

30,435.—J. W. Thorne, of Courtland, Ala., for an Improvement in Cotton Cleaners:

I claim, first, Constructing the beater chamber, S, as described, of the close box, G, and the grid, C, springing from a common point at or near the feed rollers, and diverging from each other as and for the purposes set forth.

Second, I claim the combination of the beater chamber, S, containing a series of beaters, with the trap door, H, and the devices for opening and closing the same and for putting the feed rollers in and out of action, substantially as and for the purposes described.

[With this invention, the seed cotton is opened and subjected to the combined action of a strong blast of air and a series of rotating arms, which separates all extraneous matters, such as leaves, dirt, &c., from it, and prepares it in a fit state for the ginning operation.]

30,436.—J. E. Tourné, of New Orleans, La., for an Improvement in Drying Chambers;

I claim, first, A desiccating apparatus, composed of a chamber for the reception of the substance to be desiccated, a feeding apparatus for conveying the substance to and from and through said chamber, and a vessel containing metal or alloy, fusible at a low temperature, to serve as a heating medium; the whole combined to operate substantially as described.

Second, Furnishing the interior of the desiccating chamber with inclined plates, i i, applied in combination with gutters, k k and l l, substantially as and for the purpose described.

Third, Making the feeding apparatus vertically-adjustable along with the removable heads, H H, of the chamber, and in relation to the box of fusible metal, substantially as and for the purpose specified.

30,437.—N. S. Warner and H. S. Benedict, of Bridgeport, Conn., for an Improved Ladle, with Fork Attached:

We claim the movable framework, C C, attached to the fork, which, in combination with said fork, composes a skimmer, as set forth.

30,438.—J. J. Watson, of Buffalo, N. Y., for an Improved Churn Dasher:

I claim the arrangement of the main dashers, D D, with the auxillary dashers, a a, and the spiral flange, E, when the same are used as and for the purpose specified.

30,439.—Samuel Wetherill, of Bethlehem, Pa., for an Improvement in the Manufacture of Glass:

I claim the use of the oxyd of nickel in the manufacture of glass, substantially in the proportions and manner and for the purpose set forth.

30,440.—H. Y. Wildey, of Philadelphia, Pa., for an Improvement in Apparatuses for Sealing Cans:

I claim the arrangement of the socket, C, and screw plunger, D, with the nipple, b, and air pump, A, as shown and described, so that when the air has been exhausted from the can by the pump, the plunger, D, may be screwed down and cause the wax plug to seal the aperture, a, all as set forth and described.

[The object of this invention is to enable the sealing of the nipple or small aperture, provided in a preserve or other vessel for its exhaustion by an air pump, to be effected while the pump remains attached—after the exhaustion, and before the vacuum is impaired—and, to this end, the invention consists in the attachment to the suction-pipe of the pump, of a socket, so constructed as to be capable of being attached or fitted air-tight to the nipple or aperture of the vessel, and so fitted with a plunger that the latter need not interfere with the exhausting process, but that it may be capable of depositing within or upon the aperture a sufficient quantity of wax or other suitable material to make a perfect seal.]

30,441.—E. H. Graham, of Manchester, N. H., for an Improvement in Picker-staff Motion:

I claim the arrangement of the rocker, a a, and guiding shaft or bar, g g, traveling in suitable journals or bearings, h h, and operating together substantially as described.

30,442.—Samual Yeatman, of Providence, Ala., for an Improvement in Filing Gin Saws!

I claim the arrangement of the saw shaft, G, saws, H, and carriage, E, with the saw, D, saw shaft, C, swinging frame, B, and spring stop bar, I, as and for the purpose shown and described.

30,443.—H. O. Ames (assignor to himself and F. W. Ames), of New Orleans, La., for an Improvement in Evaporating Pans:

I claim the arrangement of the partition, a, in the main box, B, substantially as described, in relation to the evaporating pipes, D D D′, the induction and eduction pipes, E F, and box, C, whereby only one or a limited number of the said pipes, D D D′, are brought into communication with the exhaust chamber, c.

30,444.—H. W. Dopp (assignor to J. B. White), of Buffalo, N. Y., for an Improvement in Lamps:

I claim, first, The employment of a bellows or elastic diaphragm, operated by a spring or equivalent, for the purpose of driving or forcing the fluid from the body of the lamp toward or in the direction of the burner, substantially as specified.

Second, I claim operating the valve, S, and needle point, x, for graduating and cleaning purposes, by means of a cam groove or its equivalent, in the stop-cock, F, in combination with the nozzle, n, whereby I avoid the necessity of packing, substantially as specified.

Third, I claim the rod, a, or its equivalent, when used as described, by means of which I am enabled to place the cam stop-cock, or its equivalent beyond the reach of the surplus heat, substantially as set forth.

Fourth, I claim the valve, S, in combinatien with the rod, a, spring, d, and cam stop-cock, F, for the purpose of graduating the size of the flame, substantially as specified.

30,445.—J. W. Harbin (assignor to himself and R. S. Willis), of Delaware Station, Ind., for an Improvement in Corn Planters:

I claim the arrangement of the spring lever, b, supported by the standard, F, and operated by the projecting pins, a a, upon the traction wheel, D, in connection with the rod, d, operating the spring slide, k, and the rod, e, operating the agitator, g, in the manner and for the purposes set forth.

30,446.—B. T. Henry (assignor to O. F. Winchester), of New Haven, Conn., for an Improvement in Magazine Fire-arms:

I claim, first, In combination with the hollow breech pin, N, and the piston, I, working through and with it, the giving of said piston additional end motion for the purpose of exploding the fulminate, substantially as described.

Second, I also claim, in combination with the hollow breech pin and the piston working through it, the spring catch and rest on the breech pin and the fillets on the piston, substantially as and for the purpose set forth.

Third, I also claim, in combination with the carrier block, c, and the spring, s, placed on top of the breech pin, J, the so forming of the top of said carrier block near the rear end (as shown at z z) as to strike the cartridge forward of the center, and thus raising the forward end of the cartridge while the rear end is held down by the spring catch tripping it over and freeing it from the spring and ejecting it from the gun, substantially as described.

30,447.—William May (assignor to himself and Jerome de Bruin), of Winchester, Ohio, for an Improvement in Cultivators:

I claim the curved bar, P, carrying weight, Q, pressing on the roller, o, in connection with the curved bars, T and O, substantially as and for the purposes shown and described.

30,448.—John McCarty, of Philadelphia, Pa., assignor to Leyfert, McManus & Co., of Reading, Pa., for an Improved Horse Shoe Machine:

I claim, first, The upper die, N, with its projection, n, of the form of the inside edge of the shoe, in combination with the lower die, M, with its recess of the form of the outer edge of the shoe, the dies being so constructed and arranged that when the said projection penetrates the said recess a space of the desired form of the shoe shall be inclosed by the two dies.

Second, I claim the weighted lever, L, its rods, K K, the latter passing through the guides, e e, of the frame and being connected to the ram as specified, and the whole being arranged and combined with the revolving cam, F, substantially as and for the purpose set forth.

Third, The block, P, with its rods, q q, passing through the lower die, M, and into the recess of the same, in combination with the arm, Q, lever, S, and revolving cam, G—the whole being arranged and operating substantially as described for the purpose specified.

RE-ISSUES.

H. R. Burger, of Richmond, Va., for an Improved Machine for Grinding Saws. Patented Sept. 11, 1860:

I claim, first, So arranging the saw-supporting disk shaft, I, the feed carriage and the gearing, that said shaft is moved laterally independently of the carriage, and simultaneously therewith the shaft and carriage moved together longitudinally, substantially as and for the purposes set forth.

Second, The combination of the gage stop, R, and its adjusting screws with the sliding shaft, I, and the mechanism by which it is controlled and actuated, substantially as and for the purposes set forth.

Third, The combination of a sliding bearing of the disk shaft with a double eccentric upon the disk shaft and a friction roller upon an independent shaft, substantially as and for the purposes set forth.

Fourth, Holding the saw to the disk by means of two center pins and an adjustable friction roller, substantially as and for the purposes set forth.

Fifth, The arrangement and combination of the set screw, U, bearing, P, and shaft, I, of the saw-supporting disk, so that the face of said disk may be adjusted parallel to or oblique to the circumference of the grindstone, substantially as and for the purposes set forth.

[This invention allows of the shaft which carries the saw blade supporting disk being moved laterally while the carriage on which it is supported moves longitudinally. It also provides for grinding saw blades which are thicker at one place than at another. By having the sawdisk shaft thus arranged, the necessity of reciprocating the grindstone is obviated, and at the same time one carriage answers for supporting and bringing the circular saw blade, from circumference to center, in contact with the grindstone. This machine operates well and is very simple and compact.]

E. P. Monroe (assignee of J. F. Monroe and E. P. Monroe), of New York City, for an Improved Egg Beater. Patented April 10, 1859:

We claim, first, In combination with a rotary egg beater, an arm, a, having at one end bearings for the journals to rotate in, and at the other a clamping device for the purpose of securing the beater to the table, with its shaft or bearings in a vertical line, as set forth.

Second, We claim the beaters, I and J, revolved in opposite directions by suitable mechanism, substantially as set forth.

T. L. Pye, of New York City, for an Improvement in Locks. Patented Sept. 28, 1858:

I claim, first, A series of tumblers provided with openings or notches into which the shackle or stud of the bolt passes, in combination with a key having bits on the opposite sides, by the turning of which said tumblers are moved in reverse directions to bring the the notches or openings into line for receiving or liberating the shackle or stud of the bolt, as set forth.

Second, I claim a V-shaped sliding bar and spring combined with said reverse-moving tumblers, to restore them to a normal position when the key is not in action, as set forth.

C. D. Wheeler, of Bridgeport, Conn., for an Improved Needle Case and Index. Patented May 17, 1859:

I claim a cylindrical case constructed with cells substantially such as described, for containing the needles, and combining therewith an index of letters or figures for designating the size of the needles, substantially as and for the purposes set forth and specified.

I also claim arranging the cover or some convenient part of said case with an index which shall designate the appropriate sizes of thread and needles to properly work together, as set forth.

Louis Lefebvre, of New Orleans, La., for an Improvement in Steam Boilers. Patented May 3, 1859:

I claim the longitudinally-fluted boiler braced as described.

I also claim, in combination with this construction of boiler, the conformable under surface of the exterior flue, B′, operating as described.

I further claim the longitudinally-fluted flue as described.

J. W. Bliss, of Hartford, Conn., for an Improvement in Door Plates. Patented July 13, 1858:

I claim, first, A frame or perforated plate attached to a door, in combination with a hinged plate upon which the name of the occupant of the house is depicted, and with a slot or aperture through the door to which the name plate serves as a cover, the combination being substantially such as is specified; and this combination I also claim when the hinged name plate is combined with an alarm bell which is struck when the plate is lifted.

Second, I claim a hinged door plate and a bell pull on the outside of a door, in combination with a single bell and a single striking mechanism attached to the inside of the same door, when the whole are arranged and combined substantially in the manner specified.

NEW BOOKS AND PERIODICALS RECEIVED.

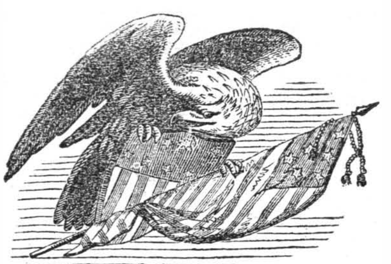
Bryant, Stratton & Packard's Bookkeeping; 216 pages. New York: Ivison & Phinney.

We notice this book chiefly to suggest to the inventors that if they would pay a little more attention to the art of keeping accounts, they might be more thrifty. Inventors have the reputation of being more generous to others than to themselves—a very pardonable fault. But charity should begin at home. Bookkeeping is almost equivalent to money-keeping, and is essential to money-getting. Having examined this book with a good deal of interest, we find in it everything desirable in a text book. There is little doubt that it will become the standard treatise on bookkeeping, and take the position which the droll Preston occupied in our school days.

A Practical Treatise on Coal Oil and Petroleum; by Abraham Gesner, M. D., Consulting Chemist.

This work is in press, and to be issued immediately by Bailliere Brothers, publishers, New York, and H. Bailliere, Regent-street, London. Dr. Gesner is the author of several historical and scientific publications.

THE RISE AND PROGRESS OF INVENTIONS



During the period of Fourteen Years which has elapsed since the business of procuring patents for inventors was commenced by MUNN & Co., in connection with the publication of this paper, the number of applications for patents in this country and abroad has yearly increased until the number of patents issued at the United States Patent Office last year (1859) amounted to 4,538; while the number granted in the year 1845—fourteen years ago—numbered 502—only about one-third as many as were granted to our own clients last year; there being patented, through the Scientific American Patent Agency, 1,440 during the year 1859. The increasing activity among inventors has largely augmented the number of agencies for transacting such business.

In this profession, the publishers of this paper have become identified with the universal brotherhood of Inventors and Patentees at home and abroad, at the North and the South; and with the increased activity of these men of genius we have kept apace up to this time, when we find ourselves transacting a larger business in this profession than any other firm in the world.

We may safely assert that no concern has the combined talent and facilities that we possess for preparing carefully and correctly applications for patents, and attending to all business pertaining thereto.

FREE 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 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 our long experience, and 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.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared on reasonable terms, by sending a sketch and description of the invention. The government fee for a caveat is $20. 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 charges 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 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, enclosing 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 the 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.

CAUTION TO INVENTORS.

Messrs. MUNN & CO. wish it to be distinctly understood that they neither buy nor sell patents. They regard it as inconsistent with a proper management of the interests and claims of inventors, to participate in the least apparent speculation in the rights of patentees They would also advise patentees to be extremely cautious into whose hands they entrust the power to dispose of their inventions. Nearly fifteen years' observation has convinced us that the selling of patents cannot be conducted by the same parties who solicit them for others, without causing distrust.

BUSINESS CONDUCTED CONFIDENTIALLY.

We would inform inventors that their communications are treated with the utmost confidence, and that the secrets of inventors confided to us are never divulged, without an order from the inventor or his acknowledged representative.

TESTIMONIALS.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

Messrs. MUNN & Co.:—Gentlemen: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

Notes & Queries

CORRESPONDENTS sending communications for publication in our columns are requested to avoid writing on both sides of a sheet of paper. This fault, though common to persons unaccustomed to writing for the press, gives great trouble to the printer (especially in long articles), and, when combined with illegibility of handwriting, often causes interesting contributions to be regretfully consigned to our waste-paper basket.

G. B., of Ga.—We think Tusch's soaping brush is a good household article. It can be used anywhere. It was patented May 22, 1860.

H. G., of N. Y.—Letters Patent are granted for 14 years. Minors can take patents, but the benefits of it must revert to the parents. In making assignment of a patent granted to a minor, it is necessary that the father should also sign the document.

D. R., of Ill.—The product made on a patented machine is not protected by the Letters Patent. If you buy a patented machine for making brick, you are confined to the manufacture in your own territory, but you can sell the brick where you please.

L. C. S. & Co. and A. R. B., of Conn.—We have inquired for tungsten steel but cannot find that any has yet been imported to this city.

J. G. W. L., of La.—We cannot tell how long the oil wells of Pennsylvania will continue to yield, but recent reports from the principal oily districts represent the supply as gradually diminishing in all the wells, thus involving the necessity of sinking new ones to keep up the supply. We are informed that there is a tract of country in Pennsylvania, about 200 miles long by 30 wide, in which oil can be obtained anywhere by sinking wells.

E. W. E., of Ala.—You can stain black walnut or pine in imitation of rosewood, by mixing some carmine with lac varnish, for the red streaks, and using a little copperas and logwood in solution, to make the black streaks. You can make a cheap red stain for wood with a strong solution of red Brazil wood mixed with lac varnish.

A. W. & S., of Tenn.—We know of no way to prevent your millstones from heating but to reduce the speed. In some of the back numbers of our paper you will find many valuable suggestions on the subject by practical millers.

S. C., of N. Y.—A head of water 60 feet high would drive an engine similar to a steam engine. It is by this plan that the water is raised at the Washington Water Works.

R. O. D., of D. C.—Ericsson's air engine is altogether too heavy in proportion to its power to drive a flying machine; a yoke of oxen would be about as suitable.

K. N., of Wis.—No soap possesses the astonishing properties of removing oil, paint, pitch and tar directly from cloth. Any good soap, however, will remove oil, but when tar and pitch get upon cloth these substances must first be softened with a little warm butter, after which the soap should be applied for their removal. Benzole and refined turpentine, mixed with alcohol, are the best substances which can be employed for removing paint from cloth. Considerable railroad iron is still imported from England, but it is not equal to the best American. In a few years hence, we think American iron will be manufactured as cheaply as the English.

C. L. R., of N. Y.—There is a difference of opinion among engineers about the expediency of putting tallow into the boiler of a steam engine before blowing it off for the last time when laying it by for the winter. We think it is better to dry it thoroughly and then close it perfectly air-tight.

C. H., of La.—You have doubtless seen before this time the same idea as yours, in regard to the crank motion, in our paper.

W. N., of Mass.—The colored rings which you saw in the mirror, when standing between it and the light, were produced by refraction. The light from the lamp passed twice through the glass, once on its way from the lamp to the metal back of the mirror, and again on its return towards the eye; in this passage it was decomposed by the rays of different colors being bent or refracted, some more than the others. Light is never increased, but always diminished, by passing through glass or anything else.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Oct. 20, 1860:—

J. P. M., of R.I., $250; L. P., of Mass., $25; W. & F., of N. Y., $100; J. H. P., of Mo., $25; J. A. M., of La., $130; A. S., of Ala., $30; B. E. S., of Mass., $30; C. M. D., of Conn., $25; S. R. S., of Ind., $25; H. G., of Ill., $25; B. T., of Ill., $25; L. J., of N. H., $25; C. W., of Ga., $25; G. S. K., of Wis., $12; F. Van H., of N. Y., $55; A. S. E., of Texas, $55; C. H. B., of Conn., $25; J. A. H., of N. Y., $55; J. M., of N. Y., $250; R. F. H. H., of N. J., $435; S. N. D., of Mich., $25; J. T., of Cal., $30; W. H. B., of Mass., $10; C. L., of Cal., $10; W. H. B., of Ill., $116; C. F. A., of N. H. $25; R. & E., of N. Y., $100; A. A., of Conn., $25; J. B. Mc M., of N. Y., $20; G. S. R., of Miss., $23; J. P. W., of Ky., $30; P. M. of Conn., $110; G. H. F., of N. Y., $15; W. H. W., of N. Y., $25 J. W., of Conn., $25; S. & S., of Ga., $30; J. A. H., of Cal., $25; S. F. H., of Mich., $60; D. S., of Cal., $150; G. A. C., of N. Y., $25; S. & B., of Cal., $30; R. G., Jr., of Fla., $25; S. & J. H. B., of Mo., $40; Z. F. of Mo., $25; C. G. S., of Mass., $30; H. & G., of Iowa, $15; S. I., of N. Y., $30; W. C. W., of N. Y., $30; E. H. B., of N. Y., $15; E. R. P., of N. Y., $15; G. M., of N. Y., $25.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Oct. 20, 1860:—

P. D. Van D., of N. Y.; C. R. O., of N. Y.; J. S. & Mc C., of Ohio; C. M. D., of Conn.; J. H. P., of Mo; S. N. D., of Mich.; H. & G., of Iowa; C. E. A., of N. H.; G. S. R., of Miss.; W. H. H. M., of N. H.; Z. F., of Mo.; P. M., of Conn. (2 cases); E. R. P., of N. Y.; L. P., of Mass. R. G., Jr., of Fla.; S. P. P., of N. Y.; J. A. H., of Cal.; I. K., of Ill.; S. I., of N. Y.; H. N. H., of Vt.; C. H. C., of N. Y.; W. & F., of N. Y. (2 cases); C. H. B., of Conn.; J. W., of Conn.; S B. S., of Ind.; H. P., of N. Y.; J. S. B., of N. Y.; J. B. Mc M., of N. Y.; G. M., of N. Y.; C. W., of N. Y.; A. A., of Conn.; B. T., of Ill.; J. A. H., of N. Y.

USEFUL HINT TO OUR READERS.

BOUND VOLUMES.—Persons desiring the first volume of the New Series of the SCIENTIFIC AMERICAN can be supplied at the office of publication, and by all the periodical dealers; price, $1.50; by mail, $2, which includes postage. The volume, in sheets, complete, can be furnished by mail; price $1. Vol. II. is now bound and ready for delivery. The price for this volume is the same as that charged for Vol. I.

SUBSCRIBERS TO THE SCIENTIFIC AMERICAN who fail to get their papers regularly will oblige the publishers by stating their complaints in writing. Those who may have missed certain numbers can have them supplied by addressing a note to the office of publication.

GIVE INTELLIGIBLE DIRECTIONS.—We often receive letters with money inclosed, requesting the paper sent for the amount of the enclosure, but no name of State given, and often with the name of the Post-office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the Post-office at which they wish to receive their paper, and the State in which the Post-office is located.

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.

CANVASSERS WANTED IN ALL PARTS OF the United States—Profitable employment. Please to read this!—Agents wanted!—Extra inducements for 1861! All persons in waut of EMPLOYMENT will at once receive our catalogue of Books (pre-paid) by forwarding us their address. Particular attention is requested to the liberal offers we make to all persons engaging in the sale of our large type quarto PICTORIAL FAMILY BIBLE, with about One Thousand Engravings. On receipt of the established price ($6), the Pictorial Family Bible, with a well-bound Subscription Book, will be carefully boxed and forwarded by express, at our risk and expense, to any central town or village in the United States, excepting those of California, Oregon and Texas. Our books are sold by canvassers, and are well-known to be the most saleable. Address, post-paid, ROBERT SEARS, Publisher, No. 181 William-street, New York. 1

A CHANCE FOR A GOOD BUSINESS MAN.—The advertiser has just purchased the business, good-will, &c., &c., of a large Commission and Machinery Business, well located in the State of New York, enjoying the patronage of several large railroad companies He wishes a partner, with not less than $5,000 cash capital, who must be acquainted with the business, oftnoroughly correct habits, and able to influence orders and consignments. None others will be treated with. Address, with name and reference, which will be confidential, T. I. F., Post Office Box No. 1,511, Baltimore, Md. 18 2*

HOWARD ASSOCIATION, PHILADELPHIA, Pa.—A benevolent Institution, established by special endowment for the relief of the Sick and Distressed, afflicted with Virulent and Epidemic Diseases; open to patients in all parts of the United States. Valuable reports on diseases of a virulent character, and on the new remedies employed in the Dispensary, sent to the afflicted, by mail, free of charge. Address Dr. J. SKILLIN HOUGHTON, Acting Surgeon Howard Association, No. 2 South Ninth-street, Philadelphia, Pa. 18 2*

A GOOD CHANCE FOR MANUFACTURING.—The subscribers have for sale a very valuable property, comprising about 13 acres, suitable for Cotton, Paper or any other manufacturing purposes. There are several large springs of pure Water on the premises. The Building is four stories high, 50x100 feet; the basement walls are 2½ feet thick; the whole building is put up in the most substantial manner. In addition thereto, is an octagon Wheel-house, two stories high, 34x36 feet, containing a large iron overshot Water Wheel, built by Barton, of Troy. Attached to the property are 11 good Dwellings and a Store. The situation of this property is unsurpassed for any manufacturing purposes in the State, and is within fifteen minutes' ride of the Hudson river and one mile of the New York and Erie Branch Railroad. If not sold by the first of January, it will be to rent. This property is now in complete order, and ready for operation. For further particulars, inquire of the subscribers, at Cornwall, Orange county, N. Y.
18 5*eow ORR & CO.

$100 PER MONTH MADE BY ANY ACtive person, with the cheapest and best Stencil Tools in the market. Before purchasing elsewhere, be sure to send for my latest circular and samples, which are free. Address D. L. MILLIKEN, Brandon, Vt. 18 2*

LABORATORY OF CHEMISTRY.—CONSULTAtions and advices on chemistry applied to arts and manufactures, agriculture, metallurgy, mining surveys. Information on chemical fabrications, with drawings, such as colors, varnishes, coal oils, paper, gas, candles, soaps, dyeing, animal black, manures, acids, alkalies, salts, india-rubber, gutta-percha, &c. Address Professor H. DUSSAUCE, chemist (from the Conservatoire Imperial of Arts and Manufactures, Paris), New Lebanon, N. Y. 1*

PHOTOGRAPHIC PAPER FOR TAKING A true likeness of articles, such as Laces, Embroideries, Ambrotypes, Flowers, Leaves, &c., in a moment's time. Only 25 cents for one package of six sheets. Address S. E. FORD, Post Office Box No. 183, Collinsville, Conn. 1*

SOMETHING NEW.—JUST OUT, GENTLEmens' Water-proof Cloth Coats, Sporting Coats and Leggings, and a variety of new styles of Water-proof Clothing, from the new factory of the N. Hayward Company. For sale by the New York agent, at No. 181 Broadway. [18tf] SAM. C. BISHOP.

ANILINE AND ANILINE DYES—ASSORTED samples, with directions for use, sent to any part of the country on receipt of $1. CHARLES A. SEELY, Chemist,
1* No. 424 Broadway, New York.

GET THE BEST.—LAPHAM'S STEAM TRAP keeps up the pressure full heat and saves fuel; works under all degrees of pressure. Will be sent to responsible parties on trial. For circular or Traps, address C. A. DURGIN, No. 335 Broadway, New York. 18 2*

A MACHINIST AND DRAUGHTSMAN, ACcustomed to the management of a Machine Shop, wants a situation. Address A., care of T. D. Stetson, No. 5 Tryon-row, New York. 18 2*

HOUSEHOLD ARTICLE FOR EVERYDAY use—Patent for sale.—A self-soaping Scrubbing Bath or Nail Brush. Can be got up cheap; an excellent opportunity to make money. Patent granted May 22, 1860. Address WM. TUSCH, Box No. 773 New York Post Office. 18

NEW AND PERFECT BARREL MACHINERY, consisting of a Head-turner, Stave-dresser, Jointer and Crozer, and especially adapted to rice tierces, sugar and molasses hogsheads, and to tight or slack work of every description. They are at once the simplest, cheapest and most efficient Machines made. Liberal terms offered to agents and others to sell Machines and Rights. For full descriptive circulars, address C. B. HUTCHINSON, Auburn, N. Y. 18 4c

THE ACAMINE LAMP.—THIS LAMP (BURNing coal oil, &c., without a glass chimney) having met with so high a degree of commendation and favor, the patentee is about to provide more suitable facilities for its exhibition than it has hitherto enjoyed. Parties, however (in the meantime), who are desirous of examining the invention in New York, where it will be exhibited, or of negotiating for an interest or patent rights for the same, will please address W. H. RACEY (care of T. W. Geissenhainer), No. 298 Broadway, New York. 1*

CHARLES A. SEELY, CHEMIST, NO. 424 Broadway, New York.—Analyses of ores, minerals, articles of commerce, &c. Advice and instruction in chemical processes generally; advice on chemical patents. 1*

FOR SALE—JOHNSON'S PATENT FOR AN improved steam generator and superheater, warranted not to consume more than one pound of coal per horse-power per hour. Address JOHN JOHNSON, Box 313, Biddeford, Maine. 17 5*

THE TINMANS' MANUAL AND BUILDERS' AND MECHANICS' HANDBOOK.—This work contains 204 pages, 50 diagrams and patterns, and several hundred rules, tables, and receipts for tinmen, builders and mechanics. Just published. Price $1. Single copies sent by mail, postage paid, on receipt of price. Sold by agents. Address I. R. BUTTS & CO., Boston, Mass.
17 3*

PORTER'S IMPROVED GOVERNOR.
The reputation of these governors is well established. Parties troubled with unsteady power may send for them on entire confidence. They never fail.
The numerous valves in use are all equally good, if well made; the form of the opening is immaterial. The governors are warranted to work perfectly with any and all valves, which move freely and close tolerably tight.
A style is made expressly adapted to waterwheels, to which they will give a perfectly uniform motion, under any variation of resistance.
I have long done with troubling my customers for certificates; but am able to refer to a large number of parties now using this governor in a majority of the States of the Union.
I will send a governor to any responsible party for trial. If it does not operate perfectly it may be returned.
A liberal discount to the trade, whose orders will always be promptly filled.
CHARLES T. PORTER,
No. 235 West Thirteenth-street, corner of Ninth-avenue,
14 tf New York City.

THE GRAEFENBERG THEORY AND PRACTICE OF MEDICINE.—On the 1st day of May, 1860, the Graefenberg Company's Sales-rooms, 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 medicines, 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.,
No. 2 Bond-street, New York.
One of the leading journals says of the Graefenberg Manual of Health:—"This is the only medical book for family and general use ever published. It is written in plain language, free from scientific terms, and condenses more practical medical information than can be obtained anywhere else, unless a regular medical course of education is undergone. The popularity of this admirable and compendious work is well shown by this being the twenty-fourth edition. It contains a number of colored anatomical plates, and is a complete family physician. It is at once simple, popular, plain and explicit; and the mother, with such an adviser, is prepared at once to apply the proper remedies in case of sudden sickness in the family. In the country, a copy of the 'Manual of Health' is indispensable, and every family should possess one. It will save a hundred times its cost in doctors' bills, and, what is far better, will be the means of preserving many valuable lives to their families and relatives."
1eowtf

INVENTORS' MODELS MADE BY P. L. SLAYTON, corner of White and Center-streets, New York. 18 3*

STEVENSON'S JONVAL TURBINE WATER WHEELS, which gave a useful effect of .9077 per cent of the power employed at the late trial of water wheels at the Fairmount Works, Philadelphia, March 9, 1860, are manufactured solely by J. E. STEVENSON, Novelty Iron-works, New York. 16 4*

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JONVAL TURBINES—THE SAME IN EVERY respect as the one illustrated on page 164 of the present volume of the SCIENTIFIC AMERICAN, and described by J. E. Stevenson, are made by the undersigned at their manufactory in Paterson, N. J. We have made and put in over 40 of these wheels, and they have given general satisfaction. We can furnish the best of references. Address W. G. & J. WATSON, Paterson, N. J. 14 5*

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A MESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence.
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BLOCHER'S IMPROVEMENT IN WATER WHEELS.

It is probable that the water wheel here illustrated has presented itself to more inventors than any other device known in mechanism, and it would doubtless, in many circumstances, be the best form of wheel known, were it not for some difficulties in the details of its construction. The principal one of these is the friction in the joints of the buckets.

Fig. 1

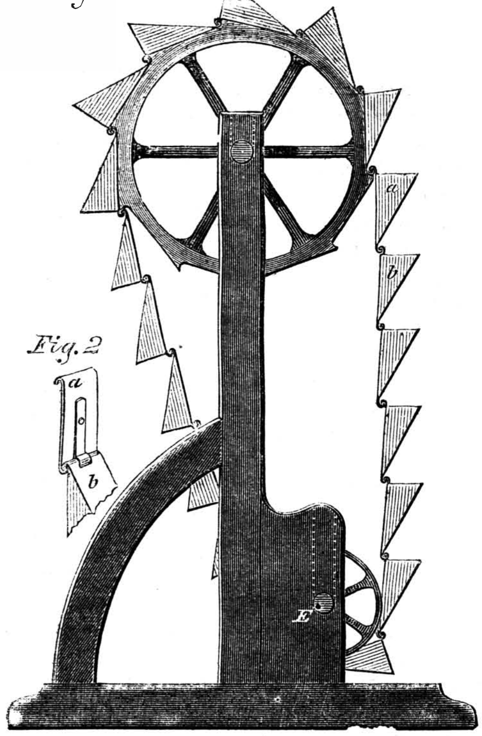


Fig. 2

A glance at the engraving shows that it is an endless chain of buckets to be filled by the water at the top, on one side, passing up empty on the opposite side. When the buckets are connected by hinges formed of rods, there is found to be too much friction and wear in the joints, and the principal feature in this invention is the mode of forming these joints so as to reduce the friction to the very lowest point. The back plate of bucket, *a*, Fig. 1, is turned up at the bottom, and the back plate of bucket, *b*, is rolled down at the top, so that its end (reduced to a knife edge) may rest in the bottom of the groove of the bucket, *a*. To prevent this joint from becoming unhooked, a slot is cut in the back plate of *b* (see Fig. 2), the slot not extending to the edge, but being simply a square hole through the plate, and a plate, *c*, is fastened to bucket, *a*, with a groove in its lower end resting just over that portion of bucket, *b*, which extends between the slot and the edge.

The shaft, E, rests in a long slot so that it may rise and fall without difficulty, and the wheel may be readily adjusted to the rise and fall of the water by taking out some of the buckets or putting in additional ones.

The patent for this simple and valuable invention was procured through the Scientific American Patent Agency, on August 7, 1860, and further information in relation to it may be obtained by addressing the inventor, John Blocher, at Williamsville, N. Y.

LARGE MARBLE COLUMNS.

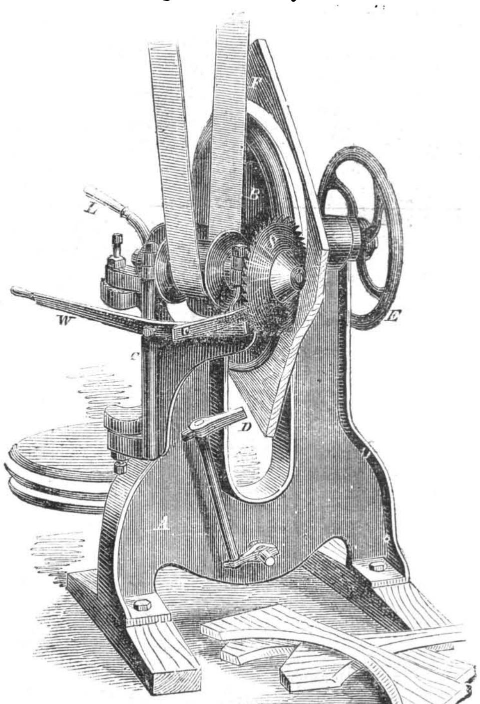
The columns for the Capitol extension, at Washington, are each 25 feet 4 inches long, 3 feet 8 inches diameter at the base, and 3 feet at the top. The weight of one is about 23 tuns; they are obtained at Beaver Dam, Baltimore county, Md., and are said to be the largest monoliths ever quarried in the United States. The marble is very white and hard; no powder is employed for blasting, lest the shaft should be fractured. They are obtained from the solid rock by drill, wedge, hammer and pick, at an immense labor. A block is first marked out of the proper length and breadth, then a series of holes are drilled about four feet deep along the sides, and the intermediate spaces between these are cut out with chisels. At the bottom of the block thus marked out, holes like those at the sides are likewise made; and the mass is split off by the insertion of wooden wedges in the drills. The columns in the rough condition are transported to Washington, where they are finished.

NEW STAVES AND BARREL MACHINERY.

The manufacture of barrels has become a very important interest. The number of hogsheads, tierces and barrels annually used in shipping our immense productions of sugar, molasses, flour, meats, salt, liquors, &c., is counted by millions; and, besides, large exportations of manufactured staves are annually made to foreign ports.

Various machines have, from time to time, been devised, by which the cost of barrel-making has been cheapened and better work produced. Amongst the earlier and more successful of the inventors of such machines, is Mr. C. B. Hutchinson, of Auburn, N. Y. Our readers have heretofore been made familiar with his machinery for making dry barrels; and he has now just completed a new set for the manufacture of tight work from the rough rived or sawed staves. That machinery consists of a head turner, of which we append an illustration and description; a stave dresser and jointer combined in one machine, and a stave crozer. These machines are of various sizes, and are adapted to the largest hogsheads, and to barrels and half barrels. They are said to be nicely adapted to each other, to make perfectly tight work, and to be at once simple, cheap and durable. The inventor has had large experience in this special field, and is well informed as to its existing wants. Judging from the evident merit of the head turner, the claim would appear to be well founded. At any rate, such machinery would be of incalculable benefit to the country; and will therefore, doubtless, attract the attention of those interested in barrel-making, or in manufacturing staves for export.

The annexed engraving represents the head turner, the operation of which is so simple as to require but a brief description. The operator places the pieces of board or heading stuff between the clamp disks; one of which is shown at B, and which rests on the dogs, D. The disks are then pressed firmly upon it by a screw, operated by the hand wheel, E. The revolving dish-saw, S, mounted upon the swing crane or pier, C, and which is movable to the right and left by the lever or locking



bar, W, is then thrown into the work, and cuts through the stuff at such an angle as to give to the head the proper bevel; the counter bevel being formed by small cutters acting at the same time on the opposite side. The operator then turns the stuff once around, by which the projecting parts are sawed off, and a perfectly round head formed, neatly beveled to fit the crozed staves. By changing the center-points on which the crane or pier swings into other indentations made for the purpose, each of the three sizes of this machine can, at pleasure, be suited to heads varying in their diameters from two to three inches.

This machine was patented Sept. 11, 1860, and any further information concerning it can be obtained by addressing the inventor, C. B. Hutchinson, Auburn, N. Y.

A FLYING PATENT.

A patent has just been taken out by J. K. Smythes, of London (England), for a flying machine consisting of a very light steam engine and boiler, which are to operate a huge pair of wings. Instead of using coal for fuel, he proposes to employ a liquid hydro-carbon, such as oil, in order to obtain great heat with a very limited weight. Two very small and neat steam engines were built in this city for driving Robjohn's celebrated balloon, about which so much noise was made fourteen years ago, but it never went up, although its author brought a great amount of original genius into service in making it.

New Agricultural Mine.—In the center of Long Island, about forty miles from New York, there is a large tract of unoccupied land (commonly called Hempstead Plains), which has hitherto been considered so devoid of fertile qualities as to be unfit for cultivation. This seems to have been a queer delusion, as some of the members of the Farmers' Club have lately examined the soil and find it capable of yielding good crops under a proper system of cultivation. This is a valuable discovery, and it will lead to several square miles of land being soon converted into productive farms and cabbage gardens for the supply of the New York markets.

Charcoal for Pigs.—As this is the season of the year principally devoted to the fattening of porkers, it should not be forgotten that a box containing some charcoal should be placed in every hog pen. Experience has proven that its use in this manner tends to maintain these animals in a healthy condition, and conduces to more rapid fattening.

A new style of street car has been introduced into Pittsburgh, which is to be propelled by compressed air, and can run with more than ordinary speed, with 600 pounds of air.

Honor to Whom Honor is Due.—We are informed by Robert Creuzbaur that Abraham Andrews is the sole inventor of the Kalbach Turbine Water Wheel.