

# A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

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# NEW YORK, DECEMBER 17, 1864.

S3 PER ANNUM (IN ADVANCE.)

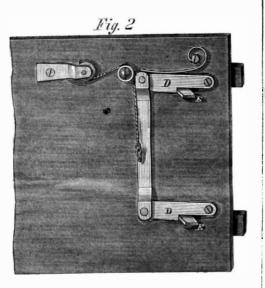
#### Improved Canal Boat.

It is claimed by the inventor of the machinery used on this canal boat, that it is an improvement upon those now in use, that it is readily controlled and, when properly cared for, at all times efficient. The canal boat is of that desirable class which is built in sections and connected by bolts or their equivalent. The invertor claims as novel the extension of the deck rai's, A, so that they bear on the deck of the stern section, and attaching a piece of timber, B, just inside the other rails so that it bears on the deck of square, and which it is desirable, for the sake of en- Barbara and Sau Buenaventura, are sixty years old

the forward section: these parts, together with the windlass. forming a secure and rigid connection for all practical purposes in smooth water, when the bow and stern are trimmed a trifle dceper than the midship ends.

The two parts are disconnected by the lever, C. When this is shipped in one direction the arms, D (see Fig. 2), below the deck, are drawn away from the hooks, E, thus allowing them to move forward in the slot, seen in Fig. 1, and ease off the line or chain, F, so that it can be cast off. The windlasses are to take up the slack and heave the two sections together

when they are loaded. It is intended to steer the boat from the wheel, G, so the wheelman can be at hand to disconnect the sections when necessary. The midship rudder, seen in dotted lines, is protected by an extension rail built around the margin of the end section, thus forming a compartment in which



the rudder remains when the two sections are attached.

This invention was patented through the Scientific American Patent Agency on the 21st of Nov., 1864, by E. Heath of Rochester, N. Y., whom address for further information,

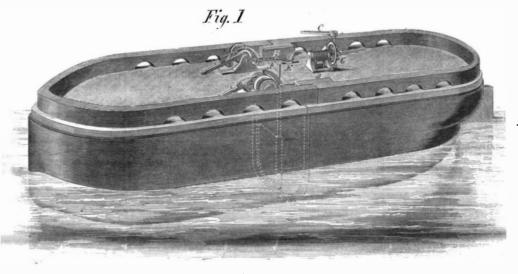
MANSFIED mountain, in Vermont, has been lately re-measured, and the "chin" found to be four thousand three hundred and eighty-nine feet above tide-water.

Another New English Steam Engine. At the Dacca Mills, in this city, there has been exhibited this week a model, consisting of two small steam engines working in one frame-work, and coupled into one crank-shaft-an arrangement which is certainly ingenious and novel. Whether it will prove practicable and profitable remains to be determined when the inventors shall have been able to embody their ideas in a 20 horse-power double engine, which will occupy a space of about six feet

tion and fair consideration, to ascertain if still further progress may be made in engineering science.-Manchester Guardian.

## California Fruits.

Figs and olives were introduced into California at the Missions over sixty years ago, and have taken to the soil admirably, very seldom failing to give abundant crops whenever they were planted in proper climates and soils. Some of the olive trees near Santa



### and are still thrifty. The fig, however, has to be more carefully attended to. Dried figs of an excellent quality, from the black variety, are dried every season in the south. The olives of San Fernando, San Gabriel and San Diego, when pickled, are said to surpass in flavor and size, during some years, even those of Seville, and the oil is fully equal, when properly prepared, to that of Florence. The olive tree does not bear an abundant crop except every two or three years; and this year the fruit in the old missions of the south is a very scanty crop, although

# HEATH'S CANAL BOAT.

The engines exhibited supplied power to turn the shafting and machinery in some rooms adjoining, and, as a working model, they gave fair promise of producing satisfactory results. The inventors state that the object is to make all the steam admitted into the cylinder available as motive power, to dispense with resistance at the cylinder ends, and to secure increased facility for expansion, thereby gaining copsiderable advantage over the ordinary steam-engines. The manner of performing this is as follows:-They employ two pistons, each of a segmental form, working in a horizontal cylinder. These pistons are on two shafts joining each other end to end, or the one passing through the other; and instead of the pistons moving in a straight line as usual, the steam is admitted between the two segmental pistons, causing them to recede from and approach each other in the arc of a circle in the cylinder, the shafts being the center. The pistons are kept steam-tight by suitable packings, and the slide-valves are constructed and worked in the usual manner. This arrangement is applicable to stationary, marine, locomotive, highpressure, condensing, and compound engines. It is claimed that the expansive force of the steam acts equally on the two pistons, and forces them apart with the power due to the area of the pistons and the pressure of the steam, and that the force thus exerted on both the pistons is united and conveyed to the crank-shaft: whereas, in steam-engines of the usual construction, with a piston working in a cylinder, they state that half the force exerted is always acting on one of the ends of the cylinder. When it is remembered that within a very recent period Watt's standard for working a steam-engine was followed at about 7 lbs. pressure of steam and a velocity of 240 feet of the piston per minute, instead of as at present working steam expansively at ten times that pressure, and 260 feet velocity of the piston, every novelty like this under notice is worth careful atten-

gineering science, should be done at an early date. | large in size. In 1863 the trees yielded immensely and considerable quantities of oil were made, which sold well. The crops of figs have been very abundant in many places this year, but the quality is generally much inferior to that of former seasons.

The prickly pear has been very abundant in 1864; and from its extensive dispersion near the far southern Mission, has been largely made use of in the absence of the usual fruits. Its nutritious and saccharine qualities deserve to be better known at the north than they are.

# MOUSTACHE SPOON.

A moustache is an ornament to the human face divine, under ordinary circumstances, but when it is drenched in a cup of smoking coffee or emerges dripping from the cream, as Venus rose from the sea, the



wearer of it is placed in an embarrassing position. Moustache coffee cups have been sold in stores for many years. These cups have a portion of the top covered with a bridge in which there is an opening whence the beverage finds its way down the throat of the drinker without soiling his hirsute appendage.

This mysterious-looking spoon effects the same object. When soup is taken, unless the eater thereof is dexterous, and "understands his business," he is apt to present an uninviting spectacle, and becomes a very undesirable addition to a small but select dinner party. Hence this spoon. The bridge over the

center prevents the disagreeable results alluded to, and supports the moustache in its passage over the savory flood. The bridge may be made permanent or removable, and can be attached in a few minutes and by any common mechanical device.

A patent is now pending on this spoon through the Scientific American Patent Agency, by Messrs. M. B. and N. A. Patterson, of Kingston, Tenn., whom address for further information.

# African Fruits.

Of African edible fruits and seeds, one could almost go on to infinity, for there are few indigenous that are not eaten by the natives, in some form or another. The Blood Plum of Sierra Leone (Hæmatostaphis Barteri), has a pleasant sub-acid flavor when ripe; in size and form it is similar to a grape, but somewhat larger. Another fruit of the same shape and form, but smaller, and with less pulp, is considered a favorite fruit on the Niger; it is a species of Vitex. The fruit of Sarcocephalus esculentus, called in Sierra Leone Native Peach, is, when full grown, about the size of a large apple; it is of a pulpy nature; the outside is rough and uneven, and bears some resemblance to a Custard Apple (Anona). The pulp of the Baobab (Adamsonia digitata), has a very pleasant and agreeable sub-acid flavor, and is much esteemed by the natives in making a kind of sherbet or cooling drink. Detarium senegalense. called Duttock on the Gambia, where it grows to an immense tree, produces a fruit, the pulp of which is eaten, as well as the kernel or seed. In size and shape it is like a large Chestnut; the outer skin is of a dark dull brown. The small pod of the Codarium acutifolium is remarkable for its velvet appearance; hence it is sometimes called Velvet Tamarind, and is also known as Black Tamarinds. The pulp enveloping the seed has quite the flavor of East Indian Tamarinds, and is valued by the natives of Sierre Leone on that account. The Ochro (Abelmoschus esculentus), is common on the Niger, and is used on account of its mucilaginous properties in various ways in the preparation of native dishes. The seeds of a species of Triculia are also eaten in this part of Africa; the fruit is vəry similar to the Bread-fruit to which it is closely allied. Its size is about that of a child's head; the seeds are small and hard; the native name is Akna. The fruits of Habzelia æthiopica are used as pepper, and are sold in the markets at Nupe as well as at Bahia. The seeds of Monodoro grandi flora, tenufolia, and brevipes, are all more or less aromatic, and would seem to be well adapted, if shipped in any quantity, for a useful condiment in this country. Many of the Anonaceæ have the same decided fragrance, but none so powerful as in this genus. The fruits are very large and round; those of M. grandiflora quite the size of a large cannon ball, the other species somewhat smaller. The seeds are about the size of a common Scarlet Runner Bean, and are very thickly embedded in the pulp, which fills up the interior of the fruit. The fruits of the Wild Mango, probably a species of Spondias, are eaten on the Niger, and on the Zambesi the kernels of a species of Sclerocarya. The stones of this fruit, however, are very hard and difficult to crack; these kernels appear to contain a quantity of oil, and perhaps might be turned to account in that way. The fruit of Malpighia saccharina, called in Sierra Leone the Sugar Plum, in shape and size resembles the Damson. It has a sweet and agreeable flavor, and is in perfection in the months of February and March, when it is to be seen in large quantities in the market of Freetown. The tree producing it is lofty and majestic in appearance, attaining a hight of 80 feet. The large seeds of Pentaclethra macrophylla, known in the Eboe country as Opachalo, and in Gaboon as Owala, are collected at the seasons of their falling, and eaten as food; they also yield a clear limpid oil. The young germinating shoots of Borassus æthiopum are eaten by the natives both of East and West Africa; for this purpose they are taken up soon after the seed has vegetated, and are then boiled in a similar manner as we cook cabbages or some such vegetable. The large seeds of Cycas circinalis, from which the natives of Ceylon and Western India prepare a kind of Sago, are valued as an article of food in some parts of the Zambesi. The existence of a species of Cycas was discovered in Western

tion, as well as by Gustav Mann, both of whom found that that the natives used the seeds as an article of food. Of the Dika or Udika bread, a specimen of which arrived in this country some three or four years since, and was then supposed to be procured from the seeds of the Mangifera gaboniensis, it will be sufficient to say that upon further researches it is proved to be derived from no Mango, but from the seeds of Irvingia Barteri. The fruit is similar in form and size to that of the Mango, but the seeds, which contain a large amount of oil, are separated from the fruits and beaten in a trough till they attain a partially fluid state. This is then put into baskets of Musa leaves, and exposed to the sun, when a white tallow collects on the surface, which is poured off, and the Dika allowed to cool in the shade. The natives esteem it very highly in the various preparations of their food, but more especially in cooking fish. It has, however, a strong, rank, and highly disagreeable taste. The fruit of a species of Parinarium, known on the Zambesi as Mobola, is valued on account of the very sweet pulp which surrounds the seeds. The Gero corn (Penicillaria spicata), is in common use for household purposes on the Niger and Gambia. The seeds of Sorghum vulgare are also extensively used for preparing as malt.-Technologist.

### Enormous Consumption of Laudanum in England.

Dr. Alfred Taylor, commissioned by the Privy Council, has sent in a Report on the means of committing murder by poison which are allowed to exist in England. He says that poison enough to kill two adults can be purchased anywhere for threepence; and that the careless dispensing of poisonous drugs is the cause of most frightful accidents. As to laudanum, it appears to be sold wholesale, single shops often supplying three or four hundred customers every Saturday night. Retail druggists often dispense 200 lbs. in one year, and one man complained that his wife had consumed £100 in opium since he married. It is a mistake to consider the practice confined to the marshy districts. We do not believe there is a town in England where some one chemist does not on Saturday night load his counter with little bottles of laudanum; and we are assured by a wholesale druggist that he could and did sell it in the eastern counties to the extent of some thousands of pounds weight in a year. This gentleman, an old and keen observer, declared that the demand had sprung up shortly after the introduction of teetotalism, and that it would be found to vary everywhere, in accordance with the progress or decline of the sys tem of total abstinence.—Spectator.

#### What Protects the Stomach against its own Secretions.

This question was discussed some time ago by Dr. Pavy before the Royal Society. He stated that the "living principle," suggested by John Hunter as the protecting agency, did not stand the test of experiment, for it had been shown that the tissues of living animals might be dissolved by the stomach secretion; the prevailing notion, he observed, that the mucous lining of the organ served as its source of protection, by its susceptibility of constant renewal during life, was equally untenable, for he had found by experiment that a patch of entire mucous membrane might be removed, and food would be afterwards digested in the stomach, without the stomach itself presenting the slightest sign of attack. The view propounded by Dr. Pavy was one dependent on chemical principles. The existence of acidity was an absolutely essential condition for the accomplishment of the act of digestion.

Now, the walls of the stomach being permeated so freely as they are during life by a current of alkaline blood, would render it impossible that their digestive solution could occur. After death, however, the blood being stagnant, there would not be the resistance to the penetration of the digestive menstruum, with the retention of its acid properties, that existed during the occurrence of a circulation, and thus the stomach became attacked, when death took place during the digestive process, notwithstanding it had previously been maintained in so perfect a state of security. Dr. Pavy, in advocating this view, brought forward experiments which showed that digestion of Africa by the botanist of the Second Niger Expedi- the stomach might be made to take place during life

Whenever the circumstances were such that an acid liquid in the stomach could retain its acid properties whilst tending to permeate the walls of the organ, gastric solution was observed. The question of result resolved itself into degree of power between acidity within the stomach and alkalinity around. It did not appear that the digestion of living frogs' legs and the extremity of a living rabbit's ear, introduced through a fistulous opening into the stomach, offered any valid objection to his view. A portion of living stomach was surrounded by a ligature, digestion was suffered to go on, and it was found that the ligature portion was digested, the remainder of the organ escaping.

In the case of the frog's legs, it might be fairly taken that the amount of blood possessed by the animal would be inadequate to furnish the required means of resistance. In the case of the rabbit's ear, the vascularity of it being so much less than that of the walls of the stomach, there was nothing unreasonable in conceiving that whilst the one received the other might fail to receive protection from the circulating current, on account of the disparity of power that must belong to the two.

### Manufacturing Improvements in Provi. dence, R. l.

The Corliss Steam Engine Co. have, during the past year, more than doubled the capacity of their works. The following buildings have been erected :-A boiler shop,  $100 \times 150$  feet, 30 feet high; a wareroom where castings are first received,  $80 \times 140$  feet; an iron foundery,  $132 \times 237$  feet, and a smaller building,  $28 \times 40$  feet, for brass castings. The foundery building formerly used has been altered into an erecting shop, where the engines are put together and prepared for shipment. This building is 111×131 feet. This establishment is now doing the heaviest class of work that is done in this country, or, in fact, in the world. In a casual look at the work being done at present, we noticed a mold for a 100-inch cylinder, for the sloop-of-war Pompanoosuc, now building at the Charlestown Navy Yard. Two of these cylinders are to be cast, and will require 32 tuns of iron each. The various parts of the engine for the above vessel were lying about the works, in different stages of completion, and they were truly of magnificent proĺΨ. b cylinders, also for Government work, already cast.

The Providence Tool Co.'s works have undergone a most remarkable change since January 1. At that time the old works stood as originally built. Since that time a second story and high attic have been built upon the main building for 210 feet of its length. and a fine tower four stories high adjoining the main building, at the center of the front. This tower contains a fine-toned bell of 1,000-pounds weight, cast by Frederick Fuller, of Providence. A wing, 70×145 feet, one story, running westerly, has been added to the northern extremity of the main building. It is used for forging purposes. A new wooden building,  $30 \times 50$  feet, has been built just south of the center of the forge shops. It is used for various purposes. A tempering room,  $25 \times 15$  feet, joins this building. This room has a fine western light. A brick engine house,  $35 \times 40$  feet, stands next south of the lastnamed buildings. This is the finest engine building we have seen. It contains a magnificent Corliss engine of 160-horse power. The driving belt descends to the basement and connects with the main building, underground. A boiler house,  $40 \times 32$  feet, containing four large fine boilers, is connected with the engine house. Back of the southern extremity of the main building is a wooden building,  $110 \times 30$  feet, one story, for drying stock. This establishment comprises fourteen buildings for manufacturing purposes, mostly built of brick, and seven dwellings for the employees. It is situated on West River street. All kinds of heavy hardware and ship-iron works are manufactured. The outlay has been upwards of \$100,000.

THE excavations at Pompeii have just led to the discovery of a temple of Juno, on the flags of which were scattered about more than 200 skeletons. They are those of women and children who, during the eruption of Vesuvius, had hastened to the temple to seek refuge and implore the protection of the god-

# IRON MINIUM.

Iron minium, a coloring matter founded on the iron principle, is destined to supplant red lead and other pigments that have been used until now for coating wood, iron and other metals. The advantages of iron minium are; its solidity, durability, cheapness, and above all, its property of preserving the iron completely from oxydation, and of hardening the wood. These qualities, now acknowledged by first-rate manufacturers, have assured the fullest success to the iron minium, which is advantageously employed all over Europe in the largest manufactories and sugar works, as well as by the railway and steam naviga tion companies.

The great solidity of this new paint is principally due to its extreme purity. It contains no acid, no adulteration. and is therefore superior to lead minium which contains always some sulphuric acid, a small quantity, it is true, but quite enough to attack the iron and to eat into it, after a very short space of time.

Iron minium forms a very smooth and stripeless coat upon the iron, varnishing, as it were, the metal and preventing the atmospheric influences from having any action upon the paint.

It results, from statements made by eminent English and French chemists and engineers, that the use of red-lead and generally of all preparations in which lead is employed, is injurious to the iron coated with it. They examined vessels in which the iron. after one single voyage to the East Indies, was visibly corroded, and blisters discovered on the coating itself, containing a clear liquid, and exposing thus the iron, which presented a certain number of metallic crystals. Each blister was found to be a sort of galvanic battery, and corrosion in such a case is unavoidable, because there is always a chemical action going on, whenever electricity is produced. This phenomenon must needs continue as long as there remains any red-lead, in consequence of the immediate contact of the lead paint with the metallic surface. Red-lead, therefore, as well as any other lead pigment, ought to be completely excluded from the paint of iron vessels. The best result, therefore, has been obtained by coating with iron minium the exterior and the interior of iron vessels.

Iron minium has been tried by first-rate manufac turers, and always to their greatest satisfaction; it is employed in the most important building vards. for sugar-works, for railways and steam navigation for the prisons of Belgium and other countries, it has been adopted by the great public services, civil and military, in almost all the countries of Europe.

Iron minium is also preferred for the under coat of all the running railway material, the painting inside and outside of the wagons, as well as for the under and upper part of carriages. Locomotives, tenders, and iron and wooden bridges are all, with great advantage, coated by this minium. It also covers use fully all kinds of tarpaulins.

The iron minium is employed the same as all other paints, with boiled or unboiled linseed oil; if the oil is not boiled, some dryers must be added, for instance litharge or any good siccative, but not turpentine For iron vessels or any works exposed to the contact of salt water, it is necessary to take boiled flax oil, and not to employ litharge, but a good siccative, and not to expose the object to the action of the water before the painting is perfectly dry.

Iron minium mixes easily with other colors, such as black, yellow, green, etc.; and by so doing a variety of colors is obtained, to the convenience of persons who would not like the dark brown of the iron minium paint. It has been proved by experiments that the iron minium paint lasts twice and even three times as long as red-lead paint.

Iron minium has also been employed for the painting of sugar vats, standers of iron plate or cast-iron boilers, and all kinds of steam engines; it resists generally the strongest heat. Mixed with mineral tar, it forms an excellent coat for wooden vessels, since it hardens the wood to a remarkable degree It is most advantageous for gas tubes.

It is another important advantage of this paint, that mixed with oil there is no apparent alteration, whilst red-lead, when it remains a few days not used. shows some clots not to be reduced, and brought forward by the influence of the oil on the oxide of lead. The iron minium paint is to be applied in several layers, the first ought to be thin, the second a little thicker. The proportions of the mixtures are as follows:-One pound of iron minium to be ground with one and a half per cent of boiled or unboiled flax oil, to be added one-twentieth per cent of dryer. London Practical Mechanic's Journal.

#### How English Working-people Live.

Nothing can be more surprising to the American people than the extreme indigency and physical degeneracy of the British working-people. Mr. Kay's work on the "Social Condition and Education of the People in England," published last year in England, and reprinted in this country, made some remarkable disclosures, bearing especially upon the moral condition of these people. At the close of his work pressed, more pauperized, more numerous in comparison to the other classes, more irreligious, and very much worse educated than the poor of any other European nation, solely excepting Russia, Turkey, South Italy, Portugal and Spain.'

The medical officer of the Privy Council in England is required to submit annually a report of the proceedings of that body, This duty has devolved upon Mr. John Simon, whose series of reports for the last four years is a harmonized body of practical information on the causes and distribution of disease. His last report, for 1864, is full of interesting and important truth respecting the amount and kind of food taken by the working-classes. As Mr. Kay's book related to the causes leading to moral degeneracy, this report is concerned chiefly with those which conduce to physical deterioration.

For the purposes of investigation inquiry was made in only a few households which seemed to be fair samples of their class. The inquirer set out with this theory; namely, that to prevent starvation or the diseases connected with it. a woman must have in her food, daily, 3,900 grains of carbon and 180 of nitrogen, or as much nourishment as is contained in a half quartern loaf of bread. A man wants one-ninth more.

Forty-two families of silk weavers were examined, and it was found that these did not quite come up to this minimum standard; thirty-one families of needlewomen fell far very 'short: of farm-laborers' families more than one-third were below the mark. Of course this sacrifice of appetite would be made after every other sort of sacrifice had been made, after nece sary clotning and fuel had been dispensed with.

It was found among silk-weavers and twisters that, while over twelve pounds of bread were necessarv to each adult, little more than nine were eaten. By buying food in pennyworths a great deal of money was wasted. The children working away from home, instead of taking with them dinner prepared by the mother, are supplied with three half-pence or twopence a day dinner money, which they spend at a cook-shop-usually a penny upon pudding and a halfpenny upon potatoes. When they spend two-pence they are permitted to sit down and have a little gravy or fat added to their meal.

Of all classes the needle-women fare the worst. They take to their calling when every other resource fails, and their average income is below four shillings (less than one dollar) per week; sometimes, too, they are out of employment. They use a little over an ounce of tea per day, into which they rarely put milk. Of meat some buy two ounces daily; others a quarter of a pound of cooked meat three times a week. and twice that amount on Sunday.

Glove-stitchers, in order to earn five shillings and sixpence a week, are compelled to work from six in the morning until eleven at night; and even children between nine and fourteen years of .age are kept all day at this employment.

As a general result of the inquiry among all these classes, it appeared that of bread the needle-women ate least, the shoemakers most; that of the persons interrogated in all classes, only four-three of them being kid-glovers-went wholly without sugar, the kid-glovers generally using least sugar, the needlewomen and stocking-makers most; the balance of carbon in the diet being re-adjusted in these cases by an exactly reverse proportion in the use of butter. Only in five of the whole number of cases was there no meat at all eaten, and the five were all found of this black ink. - Moniteur Scientifique, vi. 666, 64.

among the silk-weavers of Macclesfield and Coventry. But twenty in every hundred ate butchers' meat in no appreciable quantity, preferring to use bacon. Beer of the ordinary strength was found to be drunk very generally by the silk-weavers of London, and by the shoemakers, and a very weak beer by the stockingmakers of parts of Derbyshire. In half the families who were taken as fair types of the condition of the poorer laboring class, beer formed no part of the household dietary.

In the case of out-door laborers, where there is not much meat used, it is all cooked for the Sunday's dinner, usually the only one at which the whole family is collected and sits together in unwonted ease. What is left from the Sunday dinner is on the following week-days the husband's, and whether he take It with him bit by bit to his daily dinner in the fields, or eat it at home, it is his, as a matter of course, ungrudged. The household faith is "that the husband wins the bread, and must have the best food." His physical well-being is the 'prop of the house. If he have eaten up his remainder of meat or bacon by the middle of the week, and there be butter or cheese, he takes that for his dinner at the close of the week, and the wife and children at home are then reduced to dry bread, which is converted into a hot meal by the use of tea.

Of course this state of affairs is a great hindrance to marriage. A man alone can subsist comfortably, and the temptation to remain single is reluctantly overcome, when by marrying he is certain to deprive himself of food absolutely necessary to health. The farm-laborer, apart from a family, is adequately fed, long lived, and little troubled with sickness. When he takes his meals at the farm-house, his risk in the way of diet is from over-feeding. He has usually four meals a day-meat and bacon once, twice, and even three times a day; milk twice a day; puddings or pies three times a day in Devon, and usually daily elsewhere; beer also or cider. In Yorkshire he is found to get cheese-cakes and custards almost daily at breakfast and dinner, or even to take an hour's nap atter dinner. He objects to mutton because it is fat, and throws the fat under the table. Living in this sumptuous manner, he will put off as far as possible the evil day which shall bring poverty and starvation. Comment upon this state of society is needless, but it is with gratitude that we compare the happiness of our own working-people with that of the English poor. The emigrant bound for America. even in these troublous times, may well be regarded as both wise and prudent.

# Preparation of Blue Ink.

Prussian blue dissolves in oxalic acid, giving a dark blue limpid liquid. This interesting discovery of MM. Stephen and Rasch, patented in England in 1837, is of great interest in tinctorial chemistry, as by its means Prussian blue may be very simply used in the form of a solution. To dissolve commercial Prussian blue in oxalic acid, first mix the blue with concentrated hydrochloric or sulphuric acid, then add an equal weight of water, leave to digest for fortyeight hours, then carefully extract all the acid by repeated washings. This process being minute and tedious, it is better to employ recently-precipitated Prussian blue, which does not need the previous reatment by a concentrated acid.

By the following process Vogel has always obtained a good solid blue ink with Prussian blue and oxalic acid:-

Dissolve in a matrass, in a large quantity of water, ten grammes of sulphate of protoxide of iron; boil, and then add sufficient nitric acid to sesquioxidise all the iron. Then add a solution of yellow prussiate of potash containing ten grammes of this salt, and leave the precipitate to deposit. After decanting the supernatant liquid, throw the deposit on a filter. wash with cold water, and leave it to drain until it can be easily raised from the filter with a knite; then, without further dryness, mix it in a porcelain mortar with two grammes of oxalic acid in crystals. Let the reaction continue for an hour, then gradually add 400 cubic centimetres of water. A dark blue solution is thus obtained, in which even after long standing no precipitate is to be found. This blue ink will not bear the least addition of black gall-nut ink; it is even advisable not to use a pen retaining a particle

The Scientific American.

#### REPORT OF THE SECRETARY OF THE NAVY.

From the report of Hon. Gideon Welles, Secretary of the Navy, made to Congress on the 6th of December, 1864, we make the following extracts:-

# THE NAVAL FORCE.

The subjoined statements present a general exhibit of the navy, including vessels under construction on the 1st of December, 1864, with a comparative state

ment of the navy in December, 1863 and 1864. A tabular statement is appended of the number of naval vessels, of every class, that have been constructed since March 4, 1861:--GENERAL EXHIBIT OF THE NAVY, INCLUDING VESSELS UNDER CONSTRUCTION DECEMBER, 1864. No. of No. of Description. Vessels. Guna Tuns. .113 1,426 169,231 51,873 80,596 524 275 614 60,384 921 850 78,762 69,549 4.610 510.396 COMPARATIVE STATEMENT OF THE NAVY, DECEMBER, 1863 AND 1864. No. of Vessels. No. of Tuns. 510,396 of Description. Vessels Total navy, December, 1864...... 671 Total navy, December, 1863.......588 Guns. 4,610 4,443 467,967 Actual increase for the year....83 Total loss by shipwreck, in battle, capture, etc., during the year....26 167 42.4 146 13,0 Actual addition to navy from Dec., 1863, to Dec., 1864.....109 313 55,5 VESSELS CONSTRUCTED FOR THE NAVY SINCE MARCH 1861. Description. Screw sloops, Ammonoosuc class,17 to 19 guns, 3,213 to 3,713 tuns each Screw sloop Idaho, 8 guns and 2,638 Guns. No Tunna Screw sloops, Sammonoosuc class, 17 to 19 guns, 3, 213 to 3, 713 tuns each Screw sloops, spar deck, Java class, 25 guns and 3, 177 tuns each...... Screw sloops, spar deck, Java class, 25 guns and 3, 177 tuns each...... Screw sloops, spar deck, Hassalo class, 25 guns and 3, 365 tuns each Screw sloops, clippers, single deck, Contoocook class, 13 guns and 2, 348 tuns each...... Screw sloops, Kearsarge class, 8 to 12 guns, averaging 1.023 tuns each Screw sloops, Shenandoah class, 8 to 16 guns, 1.367 to 1, 533 tuns each. Screw sloops, Shenandoah class, 8 to 13 guns and 1, 240 tuns each..... Screw sloops, Sherapis class, 10 to 13 guns and 1, 240 tuns each..... Screw sloops, Nipsic class, 10 to 13 guns and 503 tuns each..... Screw sloops, Nipsic class, 7 to 12 guns and 593 tuns each..... Screw sloops, Singer class, 2 guns and 350 tuns each..... Screw tugs, Pilnta class, 2 guns and 350 tuns each..... Screw tugs, Pilgrim class, 2 guns and 350 tuns each..... Paddle-wheel steamers, double-enders, Octorara class, 7 to 11 guns and 730 to 955 tuns each..... Paddle-wheel steamers, double-enders, Sassacus class, 10 to 14 guns and 974 tuns each..... Paddle-wheel steamers, of iron, double-enders, Mohongo class, 10 guns and 974 tuns each..... Paddle-wheel steamers, of iron, double-ender, Wateree, 12 guns and 974 tuns.... 7 121 23.6 1 8 2,6 8 200 25,4 2 50 6,7 10 130 23,4 4 40 4,0 6 74 8,5 2 23 2,4 8 96 11,0 32 3,4 4 8 72 4.7 23 123 11.0 9 18 3,1 2 4 3 . 13 97 11.0 . 26 272 25.3 7 70 7,2 1 12 9 1.442 175.986 28 8,576 3 12 9 7 3 3 16 12.800 16 6,356 1.250 4 16 3,880 8 16 8,272 9 21 7,596 35 12,280 2 4 953 13 1,624 ively..... 8 2 768 Total..... 62 189 73,988 Aggregate......203 1,631

249,974

ber and description of vessels that have been constructed, or put in the course of construction, for the navy since the institution of active measures for the suppression of the rebellion. Some of them have been built by contract; others by the Government, in the several navy-yards. If we add to the number those constructed under similar circumstances, and within the same period, that have been lost by shipwreck, in battle, etc., viz:-The sloops Housatonic and Adirondack, and the iron-clads, Monitor, Weehawken, Keokuk, Indianola and Tecumseh, the aggregate would be 210 vessels, 1,675 guns, and 256,-755 tuns.

Picket boats and small craft built for especial purposes. are not embraced in this statement.

EXPENSES AND ESTIMATES.

- Total available means. .115,765,537 The

Making the total available resources for the fiscal rear ending June 30, 1865....139,289,059 The estimates submitted for the fiscal year ending June 30, 1865, are as follows:— Pay of the navy......\$23,327,722

301		1
429	Construction and repair of steam machinery. 17,145,000 Construction and repair of vessels	
	Ordnance and magazines	
084	Fuel, hemp and equipment of vessels 14,050,000	
	Provisions and clothing	1
513	Navy-Yards and superintendents	
τ4,	Surgeons' necessaries and hospitals	
'	Marine corps 1,599,087	1
ige.	Contingent and miscellaneous 2,970,018	1
637	Total\$112,187,663	
638	The expenditures of the Department since the 4th	
	of March, 1861, have been as follows:-	
416	From 4th of March to close of fiscal year,	
730	June 30, 1861	
	For fiscal year ending June 30, 1862	
	For fiscal year ending June 30, 1863	
<b>180</b>	From July 1, 1864, to November 1, 1864 41,257,978	1
092	Estimated expenditures from November 1,	1
	1864, to March 4, 1865 42,000,000	
584	Total for four years	
<b>180</b>	This exhibits an average annular expenditure,	I
)40	through four years of expensive war, prosecuted under	
10	many and great disadvantages, of \$70,161,813.	ļ
<b>162</b>	Could the transactions of the Department have been	
744	conducted on the true standard of value-that of	
061	gold and silver, or of paper convertible into money at	l
701	the will of the holder-our naval war expenses would	I
156	scarcely exceed, perhaps not equal, the current ex-	l
340	perse of either of the great maritime Powers during	l
540	the same period. There is also this great difference	ł
	-those Powers had a navy already constructed and	l
)24	in commission. We have had to create and pay for	ł
	one in addition to our annual current war expenses.	Ĺ
324	- ·	l
	Were the cost of our vessels deducted from the amount	
	above stated, the expenses of this Department would	
210	fall millious below those of other Governments. As	l
	the vessels which were built and purchased have an	
974	intrinsic value, the money paid for them may be con-	l
86	sidered to be well invested.	
00		L

The conditions of the currency, which has enhanced the cost of all materials and supplies, has swelled the naval expenditures many millions, while the failure to pay promptly and when due the bills of contractors and others, has still further increased the aggregate of expenditures and augmented the difficulties in the work of creating and organizing the naval forces.

# REPORT OF THE SECRETARY OF THE INTERIOR.

From the report of the Hon. J. P. Usher, Sec retary of the Interior, made to Congress on the 6th of December, 1864, we take the following extracts:-THE PUBLIC LANDS.

During the last ten years the income from lands were less than during the preceding decade. This was occasioned by the large quantities of landgranted for internal improvements, and for military and other purposes-which have competed in the market with the lands of the United States; and, more recently, by the passage of the Homestead law, The foregoing tabular statement exhibits the num- under which large quantities have been entered at Company to prosecute the work with energy, satis -

nominal rates. The annual receipts from ordinary sales for four years past have been as follows:-

The depressing influences of civil war have been felt during the last three years, but the results for that just closed demonstrate a revival of the annual demand for the public lands, particularly for settlement and cultivation.

During the year ending June 30, 1864, public lands have been disposed of as follows:-

Acres sold for cash       43         Acres located with military warrants       51         Acres located with agricultural scrip       21	5,900	00
Acres certified to State for railroads	57,180	87
Acres disposed of during the year $3,28$ During the quarter ending September 30,	1,865	52

1864, the aggregate quantity taken for the same purpose was..... . 939.476 90

Making a total of
The cash receipts for sales, homestead and location
ees for the same five quarters, were \$1,019,446 44.
The aggregate quantity of public lands surveyed, but
not disposed of, was, on the 30th of September last,
100 517 507 server This has been the among such

133,517,587 acres. This has been the average quantity for several years past. The amount surveyed annually has been about equal to that disposed of annually.

Nineteen States have accepted the provisions of the acts donating lands "for the benefit of agriculture and the mechanic arts," and have received land and land-scripts amounting to 4,950,000 acres.

DISCOVERIES OF PRECIOUS METALS.

During the past year additional discoveries of precious metals, particularly of silver, have been made in the region flanking, on the eastward, the extended mountain ranges of the Sierra Nevada. A vast belt of some one or two hundred miles in width, and eight or nine hundred in length, embracing portions of Idaho, Nevada and Arizona, is rich in silver ore. Owing to the remote locality of these mines, and the difficulty of transportation thereto, but little machinery well adapted to the rapid and economical reduction of the various ores has been introduced. In that portion of Nevada through which the Pacific Railroad will pass, many rich veins have been found, and it is estimated by persons familiar with the subject, that if the mines now opened there were supplied with the proper machinery, they would yield ten millions of dollars per month. In the same region vast beds of salt have also been found, which from its value in the process of separating the silver in the ores, has given a fresh impulse to mining. When we reflect that the region of country in which deposits of the precious metals abound, includes large portions of three States and six Territories, and that the richest veins of ore heretofore discovered, are as yet but slightly developed, while new discoveries are constantly made, it will be perceived that the annual product of the mines in the United States must soon reach a magnitude without precedent in the history of mining operations.

The wealth imbedded in the rocks of that extensive region is actually inexhaustable, and it will furnish in future years, indirectly, a principal part of our means of liquidating the debt contracted by the Government for the overthrow of the great Rebellion.

#### THE PACIFIC RAILROAD.

It appears from a communication to Gen. Dix, the President of the Union Pacific Railroad Company, that it has, since the adjournment of Congress, expended more than half a million of dollars upon the main line of the road leading westward from Omaha, of which one hundred miles have been permanently located, and forty miles are in process of construction.

The company has surveyed lines to Salt Lake City, through the South Pass Laramie plains, Bridger's Pass, by way of Timpanagos and Weber rivers, to determine the most feasible route. Parties have also been engaged in explorations in Colorado Territory through Berthold's Pass and up the Cache la Pendre river, and also in examining the topography of the country in the vicinity of the 100th meridian of longitude, and in locating the line from Omaha to Fort Kearney. Considering the limited time which has elapsed since the action of Congress enabled this

no reason to apprehend any tardiness in the prosecution of this great enterprise.

## The progress made in the construction of the branch road in Kansas, known as the Union Pacific Railroad, eastern division, has not met the reasonable expectations of the public. There was just reason to believe that the second section of forty miles of that road would have been rapidly approaching completion, if not actually completed by this time, instead of which forty miles only of the track are laid, and that not yet in a condition to be examined by the commissioners appointed by the President to inspect and report upon the work.

For this unexpected state of affairs the company is not altogether without excuse. The assassination of its contractor in July last, soon after the adjournment of Congress, the continued insurmountable difficulties of obtaining the necessary materials, either by river or rail, from causes known to all, prevented them for a time from prosecuting the work. Since these difficulties have been partially removed a commendable energy has marked the conduct of the company. The first section of the road to Lawrence, to which place the track is laid, will undoubtedly be open to the public and in use within a few days. The company in California is also making satisfactory progress with its portion of the road.

## PENSIONS.

The liberal provisions of law for the payment of pensions to soldiers and seamen who have been disabled in the service of the country, and to the widows, orphans, and dependent mothers and sisters of such as have fallen in battle or died of disease or wounds. have been administered with industry, fidelity and promptitude.

Of those patriots to whom pensions for services in the Revolutionary war had been awarded, five still survive at very advanced ages. At the beginning of the year twelve were living, and 1,418 widows of Revolutionary soldiers were receiving pensions, making 1,430 pensioners of this class-the aggregate of whose yearly stipends was \$115,217.

The number of army pensioners (other than Revolutionary) who were paid during the fourteen months ending the 30th of June last was 22,767, and of widows (other than Revolutionary), orphans and dependent mothers, 25,433.

The total number of persons who received pensions during that period was, therefore, 49,630, and the amount paid for army pensions during the year ending June 30, was \$4,340,368.

The number of navy pensioners who were paid during the fourteen months preceding the date mentioned was 1.505, and the amount of money paid them during the year was \$164,247. The whole number of pensioners on the 30th of June last was 51,135, requiring for their annual compensations \$4,595,376.

During the year ending Sept. 30, 1864, 1,812 bounty land warrants were issued, requiring 286,960 acres of land to satisfy them.

The act of Congress approved July 14, 1862, entitled "An act to grant pensions," is believed to be one of the wisest and most munificent enactments of the kind ever adopted by any nation. Its beneficial provisions extend to the disabled survivors, and to he widows, orphans, dependent mothers and depenent orphan sisters of the deceased soldiers and seanen of every grade and rank.

During the past year more than \$3,500,000 have been paid for pensions granted on account of disability or death ensuing from service in the war of the rebellion. During the continuance of the war no reliable estimate can be made of the amount of money that will be required eventually to meet the obligations thus assumed by the Government to our soldiers and seamen.

The list of pensioners is constantly undergoing both increase and diminution, and at present, and for months to come, it must be rapidly augmented, even should peace be restored without further hostilities. It is estimated that more than \$7,000,000 will be required to satisfy the claims accruing under the pension laws during the current fiscal year.

THE movement for restricting the working-day to n hours is making rapid progress; it is stated that most of the leading manufacturers in Paris have agreed to the change.

# factory progress has been made, and the country has REPORT OF THE SECRETARY OF THE TREASURY.

The second session of the XXXVIIIth Congress of the United States of America commenced on Monday, the 5th day of December, 1864. In accordance with the requirements of law the members of the Cabinet transmitted reports to Congress, giving detailed statements of the condition of their several Departments, with a history of their operations during the past year. From the report of the Secretary of the Treasury we gather the following particulars:-RECEIPTS AND EXPENDITURES FOR THE YEAR ENDING

JUNE 30, 1864. DECEIDES

RECEIPIS.
Customs\$102,316,152 99
Lands
Miscellaneous 47,511,548 10
Direct Tax
Internal Revenue 109,741,134 10
Total\$210,632,717 44 Add balance July 1, 1863\$5,329,044 21
Add balance July 1, 1863 5,329,044 21
Aggregate\$265,961,761 65 From Loans
From Loans 618,114,884 92
Total
EXPENDITURES.
Fiscal Service \$2,755,599 46
Pensions and Indians
War Department 690,791,842 97
Navy Department
Interest on Debt
1 miercen ou Denn
Total\$865,234,087 56
THE DUDIT O DEDT

THE PUBLIC DEBT.

s.\$1,098,793,131 37

The public debt, as stated by my prede-cessor in his report of Dec.10,'63, was 3 To this amount should be added amounts paid into the Treasury pre-vious to July 1, 1863, for which evi-dences of debt were subsequently issued.

23,782,423 20 

It gives the amount of public debt July 1,740,690,489 49 THE CURRENCY.

The whole amount of national circulation not bearing interest, exclusive of fractional currency and of notes issued by National Banks, is limited to \$400,000,000, subject to slight occasional increase from the fifty millions held in reserve for the payment of temporary deposits. Of five per cent. interestbearing notes, there were outstanding on the 1st of November last, \$120,519,110. To a considerable extent, these notes have been, and will continue to be used as currency. Those with coupons have been found particularly objectionable. As though withdrawn to a certain extent, while the interest was maturing, they are liable to be periodically rushed upon the market. In consideration of this teature, a large amount, viz.:-about ninety millions of the original issue of \$150,000,000 of these coupon notes-have been withdrawn and destroyed, and their places occupied by notes pavable in three years bearing interest at six per centum, compounded semi-annually. This is believed to be the best form of interest-bearing legal-tender notes, as being more likely to be withdrawn and held until maturity as an investment. Of these \$15,000,000 in amount were issued under the act of March 3, 1863, and about \$90,000,000 under the act of June 30, 1864. The total amount of interest-bearing notes outstanding on the 22d of November last was \$210,222,870. What proportion of these may be considered as an addition to the circulation I am unable to determine. To that extent, whatever it may be, they contribute to the amount of the currency, and thus in some degree occasion, and in a still greater degree sustain, an increase of the prices and depress values.

The amount of bills issued to the national banks, as appears from the books of the Comptroller of the currency, was, up to the 22d of November, inclusive, \$65,160,210. As these banks have absorbed capital which might otherwise have been invested in State corporate institutions, and, in many instances, have taken the place of those institutions by conversion, these issues cannot be regarded as so much addition to the body of currency. The returns on file at the Department show that the whole circulation of the State banks on the 1st of January, 1864, was \$169,-926,129, while the whole circulation of such banks for the month of July, 1864, returned to the Internal Revenue Bureau, and which embraced, with a few trifling exceptions, all of these institutions outside of the rebellious States, was only \$126,196,606 72. The powder be placed in a closed cavity, and the cavity

diminution is \$43,729,522 28, which deducted from \$65,160,210, leaves \$21,436,687 72 as the amount of increase to November 22, 1864.

COST OF THE WAR.

The Secretary states the current expenses of the Government at \$2,250,000 per day. This for 20,000,-000 of people is equal to 11 cents apiece.

# FURTHER EXTRACTS FROM PROFESSOR TREAD-WELL ON HOOPED CANNON,

THE TRANSVERSE AND LONGITUDINAL STRAIN.

Let us suppose that we have a hollow cylinder, say twelve inches long, the caliber being one inch in diameter, and the walls one inch thick, giving an external diameter of three inches. Suppose this cylinder to be perfectly and firmly closed, at its ends, by screw plugs, or any other sufficient means. Let this be filled with gunpowder and fired. The fluid will exert an equal pressure, in every direction, upon equal surfaces of the sides and ends of the hollow cylinder. Let us next examine the resisting power of a portion of this cylinder, say one inch long, situated in the middle, or equally distant from the ends, so that it shall not be strengthened by the iron which is beyond the action of the powder. The fluid, inclosed by this ring of one inch long, contains an area of one square inch, if a section be made through it in the direction of its axis; and the section of the ring itself, made in the same direction, will measure two square inches. We have then the tenacity or cohesive force of two square inches of iron in opposition to an area of the fluid measuring one square inch, and if we take the tenacity of the iron at 65,000 pounds, the cylinder will not be burst, in the direction of its length, unless the expansive force of the fluid exceed 130,000 pounds to each inch. Next, let us suppose a section made through the cylinder and the fluid, transversely. The area of the fluid, equal to the square of the diameter of the hollow cylinder, is one circular inch, and the area of the whole section is, the diameter being three inches, nine inches. Deduct from this the area of the caliber, and we have eight circular inches. That is, the section of the iron is eight times greater than that of the fluid; whereas in the former case, of longitudinal section, the iron gave but twice as much surface as the fluid, and if we take, as before, the iron at 65,000 pounds per inch cohesive force, it will not be broken unless the force of the fluid exceed 520,000 pounds. It will be found, upon a further examination, that the relations of these sections to each other may be varied, as we take the diameter of the caliber to be greater or less, as compared with the thickness of the sides. but their difference can never be made less than as two to one.

Having been aware of the fact here stated, and, I trust, in a manner which can be easily understood and appreciated, for many years, I determined, between four and five years ago, to attempt to apply it, practically, to the fabrication of cannon. My first attempt was to make a four-pounder cannon, by the best means then at my command, of rings or short hollow cylinders joined together end to end by welding. Each ring was made of several thinner rings, placed one over the other and welded. It will be seen that, in this case, as the bars of which the several rings were formed were curved round the caliber, the directions of the fibers herein shown to be so essential was fully preserved. I may remark here, that this method was subsequently changed in some degree, by first making a single thin ring of steel, and upon the outside of this winding a bar of iron spirally, as a ribbon is wound upon a block. This gun, although imperfectly made, withstood the action of enormous charges of powder, and was only burst by using very superior powder, and shot without windage. The fracture was made lengthwise of the gun, or across the fibers of the iron, and although the welds (technically called jumps) which united the rings to each other endwise, were most imperfect, they yet held together completely against the action of the powder.

## THE PRESSURE OF GUNPOWDER.

The expansive force of gunpowder, which must be resisted by the strength of the cannon, depends almost entirely upon the circumstances under which it is fired. Count Rumford has shown, by his experiments made about seventy years ago, that if the be two-thirds filled, the force will exceed 10,000 atmospheres, or 150,000 pounds upon the square inch and he estimates that if the cavity be entirely filled with the grained powder, and restrained to those dimensions, the force will rise to 50,000 atmospheres. My own experience, made in bursting wrought-iron cannon the strength of which was known to me, leads me to believe that he has not over-estimated its power, although I am aware that it is generally considered as excessive. If, following an opposite course to that herein described, the powder be at liberty to expand upon any side, the force thrown in the other directions is very small. Thus, if a charge be placed loose in a gun, without shot or wad, the force upon the walls of the gun is very trifling; no more than is produced by the restraint of the inertia of the charge itself, or the fluid formed from it. If we would divest a charge of this property of inertia, and fire it in a constantly maintained vacuum, it would not rend walls made of cartridge-paper, if a single end were left open for its escape. From the preceding statement, it will be seen that gunpowder will take any force, from perhaps 50,000 atmospheres when confined to a close cavity, down to zero, if it be deprived of inertia and fired in a vacuum constantly maintained.

To be continued.



# The Coffee Tree and Tea Plant.

MESSRS. EDITORS:-I have noticed some erroneous statements which have crept into your estimable journal. I ask permission to correct them.

THE COFFEE TREE.---Of this tree my father-in-law possessed a plantation of 240,000 trees in Cuba, and I am perfectly familiar with its character. It is a native of Yemen, in Arabia, and of course is tropical. It is so tender that I have had trees ten years old killed by the slightest frost. All the theories about its probable naturalization in our country, which have from time to time appeared in the public prints, are visionary. It is merely possible that this tree might be kept alive on the extreme point of Florida, but certainly nowhere else. It is an evergreen tree of much beauty. The berries are a brilliant red, and the blossoms yield a most exquisite jasminlike odor. Nothing can surpass the delicious fragrance which one enjoys when passing through a coffee field at its period of blossom. The coffee bean grown in the Connecticut valley may prove a good substitute for coffee, but I think nothing will be found to fulfil that office so well as barley, which, I think, ought to supersede the imported article for our domestic use. Chicory, or cichorium intybus, is grown, you are aware, to an immense extent in Germany, and used as a general substitute for coffee. It is a plant of the easiest culture, and can be grown with very little care in any but a sandy soil. It prefers, however, a substantial soil that is reasonably moist. I see no reason why its culture may not become general. It is found growing vigorously along the roads of this island, from seeds which the winds have scattered.

TEA PLANT.-I notice a remark in your paper that tea grows in Pennsylvania, which probably was based on an assertion made by an inhabitant of that State, which was extensively published about two years ago. Such, however, is not the fact. The plant that the writer had reference to is the Ceanothus Americanus, or New Jersey tea or red root. It acquired its name in consequence of its leaves having been used in New Jersey, and probably elsewhere, as a substitute for tea, during the Revolutionary War. It is a suffruticose plant, found in plenty from Canada to Florida. The most appropriate American substitute for tea would be the *llex cassine*, or Yapan tea, of North Carolina, which was in use among the Indians there before the white man trod its soil, and is now universally used by the negroes. It forms a regular article of sale in the country stores of that State. In Paraguay they use the leaves of a tree of the same genus as tea, whose name is Ilex Paraguayensis. Of the genuine tea tree there are upon our

Asia: Thea Bohea, with narrow, deep-green leaves, and thea viridis, with broad, pale-green leaves, both of which are natives of China, and thea Assamica, or Assam tea, grown extensively in Assam, under British control. and which is highly esteemed in England. In Japan they use for the same purpose the camellia sasanqua, a vigorous-growing evergreen shrub. All the four preceding species could be cultivated successfully in the States south of Virginia, and we must not forget to form plantations of these valuable species when we are recolonizing those States.

WM. R. PRINCE.

Linnæan Nurseries and Gardens, Flushing, L. I., Nov. 28, 1864.

#### The Atwater Gun

MESSRS. EDITORS :- In your issue of Nov. 12th. you publish a letter from Mr. H. W. S. Cleavland, "exposing a piece of deception " in a test of the Atwater rifle, which took place in his shooting range, of which he was "a victim." As I was the party who conducted the test of the Atwater gun on the occasion referred to, and the one therefore chiefly responsible for the pretended fraud on the credulous and conscientious gentleman, I ask a brief space in your columns to defend myself. The balls used in the test to which Mr. Cleavland refers, were cast out of balls of the Minie pattern, purchased by me in a gun store in Boston; they had been once used in experiments with a Springfield rifle. If they contained tin in greater or less quantities I had no knowledge of the fact. I supposed them to be lead of the usual softness. The "discovery," however, in reference to the ball, explains a mystery which has long puzzled me. That neither of the Atwater guns tested before Mr. Cleavland on that day obtained their usual penetration by forty per cent, a circumstance which Mr. Cleavland will remember I remarked to him at the time, convinces me that the diminished penetration must have been owing to the reduced weight consequent upon the extraordinary alloy of tin found by Mr. Cleavland. I do not accept Mr. Cleavland's theory, that the harder the projectile the greater the penetration. Even Mr. Whitworth, who confessedly uses tin to harden his bullets, introduces but one part tin to nine parts lead. (Scott's Military Dictionary, page 525.) If the balls used by me did contain 51 parts of tin, the gain in hardness would not, in my opinion, by any means compensate for the loss of weight, in not using soft lead balls of the same dimensions, particularly when firing, as in this case, at a soft pine target. The best penetration made on that day was but 16 inches. In a test at Chicago, before Brig. Gen. J. D. Webster, now at Nashville, Tenn. (to whom I will take the privilege of referring Mr. Cleavland for the correctness of my statement), this same gun, with a loaded ball, made a penetra tion of  $26\frac{1}{2}$  inches. In speaking of this test, Mr. Cleavland, on page 86, of his Hints to Riflemen, re-the Springfield rifle; but is not equal to the best record of the Whitworth." I will only say that a 6inch gun, rifled on the principle, is now in the Washington Navy Yard. The official report of the test of this gun has already settled the question of merit; which report when published will relieve Mr. Cleavland from all responsibility of "propagating an in nocent deception. W. H. BUTLER.

Lafayette, Ind., Nov. 28th, 1864.

#### Gold Fish.

MESSRS. EDITORS:-I had intended giving you all the information I could on gold fish, as I saw some inquiries on the subject, but have only time to state that in my younger days I have fished for hours in the warm water ponds of one of the principal manufacturing districts of Yorkshire, England. In the large warm water dams they breed very rapidly; I have seen them on a bright clear summer's day spread out in a shoal like a large carpet. They vary from one inch to one foot in length. In small ponds where the water becomes very hot the fish are very small. They will live, I have heard it said, after being taken out of a solid lump of ice, and I know from observation that they will stand an incredible degree of heat. They change color three times. The young gold fish is black; he gradually changes to a gold color of every shade to crimson; then his belly globe but three species, and they are all natives of will get white or pearl color, and lastly, he will be-

come white all over. Dough is the best bait. I never knew them to breed in cold water. I have kept them for four years in clear hard well water without any kind of food. They become very thin, however, when kept so long in a glass globe in the house with nothing except a few moss covered ovster shells in the water. The fish which I had became black-spotted when old; I think it was some peculiarity in the water, probably an excess of sulphur or iron. I believe three or four gold fish might be kept for ten years in a glass globe or aquarium that would hold but one pail of water. The water should be changed once a week. The white of an egg thrown in occasionally would help to keep the fish fat; or a crumb of bread, a crumb only. Too much food would puff them up and kill them in quick time.

WM. HILL Noblesville, Ind., Nov. 30, 1864.

# Reduction of Chloride of Silver.

Reduction of Chloride of Silver. MESSRS. EDITORS :—In the SCIENTIFIC AMERICAN, of Oct 28th, page 229, I find an article headed "Coal and Coke," and I think you would not let such an article appear in your paper if you had properly examined it, for chloride of silver is never reduced in the fire by any scientific man, it being a very volatile product, and as I feel quite sure that such a man as Professor Seely would never attempt anything of the kind, as he would know the great loss attending any such operation, and, I should suppose, would at once correct any such error, for an intense heat is not requisite for that purpose. L. B. DARLING.

Providence, R. I., Dec. 1, 1864.

MESSRS. EDITORS :- Mr. L. B. Darling, of Providence, has politely furnished me with a copy of a letter which he has addressed to you, concerning the reduction of chloride of silver. If you find it worth while to publish his letter please allow me to make the following explanation:

The chloride of silver which I have occasion to reduce comes into my hands contaminated with the compounds of silver, and dirt in various forms. It is known as photographers' waste. I know of no way of profitably extracting the metal from such material except by fire.

I seldom have pure chloride of silver; but that also I reduce by heat; no method with which I am acquainted answers the purpose better for me. I am aware that at the mint and some other very large refineries, the silver is precipitated from the chloride in the cold by zinc, not so much, I suppose, on account of loss of silver in the furnace process, but from other combinations which it is not necessary to name.

Chloride of silver is volatile to some extent, but when it is properly united with carbonate of soda the metal will be reduced by heat before a temperature could be reached which would volatilize the chloride. The temperature required practically for the process must evidently be that of melted silver; the metal is first reduced atomically at a moderate heat, when the heat being raised the particles of silver are brought into one mass.

I am aware that the loss of silver is often serious in attempts to reduce it from the chloride by heat. but I am of the opinion that in such cases it might he shown that the loss was due not to volatility of the chloride, but to unskillful mixing of the flux or mismanagement of the fire.

CHARLES A. SEELY. New York, No. 244 Canal street.

#### Rule for Measuring Cisterns.

MESSRS. EDITORS:-I see on page 339, current volume of the SCIENTIFIC AMERICAN, a good rule for the measurement of corn in the crib. A small allowance ought, however, to be made, since it does not require twice as much corn on the cob to make a bushel as when shelled and in large bulks. In barrels or baskets it does, but in larger quantities the corn lies closer. The allowance, however, is small, not over three or four bushels in a hundred, and varies with the quality of the corn. But I have written this to send you a similar rule for the measurement of cisterns, as follows:-

Rule for the Measurement of Cylindrical Cisterns, -Take the length, width and depth in feet; multiply these together, and the product by 1,865; cut off four figures on the right, and the result will be the contents in barrels. Example.-Find the contents of a cistern 6 feet in diameter and 9 feet deep. Six feet, the length, multiplied by 6 feet, the breadth,

and the product by 9, gives the depth, 324, which multiplied by 1,865, and four figures cut off, gives 60 barrels and a decimal.

In this case we consider the diameter as being both length and breadth. The reason of the rule is this, a cylinder one foot in diameter and one foot long, would measure 1865 ten-thousandths of a barrel. A cylinder 9 times as long would contain 9 times as much, and 6 times as wide, 6 times as much as that. The number 1,865 is easy to remember, as it corresponds with the number of the new year.

Salem, Nov. 30, 1864.

# The Mast Crop of the West and its Commercial Value.

For the Scientific American

W. W. M. M.

The States of Tennessee, Kentucky, Ohio, Indiana, and some portions of Illinois and Missouri, were originally, and are now partially, covered densely with magnificent forest trees and beautiful shrubs. Many of these, such as the different varieties of the oak, the hickory, the black and white walnut, the beech, the chesnut, the pawpaw, persimmon, haw and the hazlenut, produce irregular but average crops of fruit, to which the western people give the general appelation of "mast." This term is well understood for a description of food furnished by provident nature for the subsistance of wild animals and birds during the winter months. It is also keenly relished by the domestic hog of the settler, the value of whose farm has been, and is at present, largely governed by the extent and productiveness of the timber tracts over which his hogs can range and feed without their costing him anything but the trouble of looking after them, lest they should wander from the neighborhood of their owner. As the chestnut delights in mountainous countries and poor soil, and as there is not even a respectable hill in Illinois, nor any chestnutgrove soil, this description of mast is entirely unknown to us. For some other natural reason the beech is not found in our forests, but the oak, hickory and black walnut, extensively diffused over Central and Southern Illinois, and on the bottoms of the Mississippi and Wabash Rivers, and their tributaries, amply supply its place. The walnut is the least val-uable of the masts, the tree being comparatively scarce, the shell thick and hard, and the kernal hard and bitter. The hickory is very abundant, producing quite a variety of nuts, large and small, some with soft and others with hard shells, but all like the walnut, oily, and not calculated to produce a good article of pork for summer preservation, it being soft and dark colored in the fat, and only adapted for consumption in the winter and early spring months, when the meat is most excellent, having a peculiar sweetness not found when the hog is fed on any other description of food. But the most interesting and valuable of the western masts is the oak; its great abundance and general diffusion through the west-every soil on which timber grows producing some description of acorn-its variety, excellent quality and easy adaptation to the wants of wild and tame animals, renders its importance great to the western settler, and its immense commercial value commands a large amount of attention from collectors of statistics and political economists, with a view to its better preservation. The oak masts are divided into "sweet" and "bitter masts," the sweet masts being the acorn of the white burr, overcup and post oaks, the timber of which is of superior quality. The bitter masts are the acorns of the black, red, Spanish, water, pin and other oaks, whose timber is used for certain purposes, and is good in some places, but is not equal for general mechanical appli-ances to the sweet oaks. The great point of difference, however, between the sweet and bitter oaks is, the sweet perfect their truit in one season, while the bitter require two seasons, and, in the long run, are the most valuable for feeding purposes, the trees being all rapid growers, and there being always a reserve of acorns on them. The quality of the pork from the bitter masts is about the same as from hickory, with the exception of the pin-oak pork which is claimed to be equal to the sweet oaks. This mast is the favorite acorn of the wild pigeon, which is sometimes found with twenty in his crop.

The pork made on the sweet masts is of a superior quality, and claimed to be equa in firmness to green brilliant and lucid manner peculiar to Prof. Doremus. root, is said to be successful in cases of diptheria.

coru fed. The western packers make great pretensions about their skill in detecting mast-fed pork, but they purchase from all heavily-timbered districts millions of pounds of it, and are glad to get it. The fact is, to make corn-fed pork such as we see that deluded individual, Uncle Samuel, advertise for in the newspapers, the feed must be corn one year old.

The mast crop is tender and uncertain, frosts and drought effecting it like any of our fruits. The hickory is very sensitive; there is, however, an average yield, some trees bearing well annually, some biennially, and some at uncertain intervals--nature, no doubt, refusing to load the branches with fruit which is not required, at the expense of the growth of the tree.

Well, as to the commercial value, the reader can figure for himself; millions of acres of land are covered with forests furnishing feed for hogs that are annually sold in market. This year, for instance, half the growth of 100,000 hogs may be credited to the "range." Those hogs average 200 pounds each, making 20,000,000 pounds, one-half of which is worth, at 10 cents a pound, \$1,000,000!

In conclusion, if any of your readers should ever come west for farming purposes, take the advice of one who has spent thirty years taking notes-by all means purchase land where your hogs can have plenty of mast on the range-it costs nothing.

J. T. D.

Springfield, Ill., Nov. 26, 1864.

# The Late Prof. Silliman.

# At a meeting of the Chemical Society of Columbia

College, held on Monday, Dec. 5th, the following resolutions of respect to the memory of Prof. Silliman were passed:-

Resolved, That in the death of the venerable Benjamin Silliman an event has occurred well worthy of the notice of this society; the life of this Christian gentleman and man of science offering to the student an elevated standard by which to guide his steps.

*Resolved.* That the youthful energy which induced him to prepare himself as a Lecturer on Chemistry, at a period when the facilities for a scientific education were so limited, entitles him to the gratitude of those who now profit by his pioneer labors

Resolved. That by the establishment, in 1818, of the American Journal of Science and Arts, he added another claim to the gratitude of the scientific student, and earned a right, universally conceded, to give his own name to that periodical.

Resolved, That his life-long example as a polished, genial and Christian gentleman is a source of grateful recollection to this Association, as an evidence that the earnest seeker after scientific truth may, at the same time, cultivate the highest religious and social character.

Resolved. That the devotion to the highest welfare of his country and the cause of human freedom, displayed even in his latest days, commands the admiration and respect of this society.

Resolved, As a mark of respect to this wise and good man, and an incitement to future members of this Association to study his life and character, that these resolutions be entered on the minutes of the society and published.

### SPECIAL NOTICE.

JAMES M. BOTTUM, of New York City, has petitioned for the extension of a patent granted to him on July 15, 1851, and re-issued July 8, 1856, for an improvement in securing pinions, etc., of watches, in lathes.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, June 26, 1865.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing at least twenty days before the final hearing.

### CHEMICAL LECTURES BY PROF. DOREMUS.

We are very certain a simple announcement of the fact that Professor Doremus is about to give a course of lectures on Pneumatic Chemistry will be enough to secure the attendance of every city reader of the SCIENTIFIC AMERICAN. These lectures are to be illustrated by experiments on a large scale, and in the

#### **Patent Office Statistics**,

The Secretary of the Interior presents in his report the following summary of the operations of the Patent Office for the year ending September 30. During this period 6.740 applications for patents and 989 caveats were filed; 29 applications also were made for the extension of patents previously granted. During the same period 4,843 patents, including re-issues and designs, were issued, and extensions granted. The number of applications awaiting the payment of the final fee required by law before patents can be issued, has largely increased, numbering now over 1,000. The finances of the office are in a prosperous condition, as appears by the following short statement:---

The balance in the treasury to the credit of the patent fund on October 1, 1863, was \$37,732 63. The receipts of the affice to September 30, 1864, amounted to \$230,838 60, making a total sum of \$268,571 23. The expenditures during the same period were \$212,453 84, leaving a balance of \$56,-117 39 on hand on October 1, 1864, being \$18,384 76 more than the balance as exhibited on October 1, 1863.

# Machinists' Slide Gage.

A very neat and convenient slide gage for machin ists' use has been shown us by Mr. A. H. Kendall, agent for the manufacturers, R. C. Chandler & Co., Springfield, Mass. These gages are from 3 inches length of blade upward, and are graduated to 64ths of an inch on one side and 100ths on the other. The jaws are adjusted to fractional parts of an inch by a small thumb-screw, so that very minute divisions can be made. For measuring standard sizes, gaging taps or holes, and miscellaneous work of all kinds, these tools are very convenient. They are light and strong and can be carried in the vest pocket. The low price at which they are sold will commend them to many who cannot afford, or have no use for, a finer or more costly instrument. Messrs. Chandler & Co., also make machine screws and tools of all kinds

#### MISCELLANEOUS SUMMARY.

BORAX TO KILL WATER BUGS .- At the last meeting of the Boston Society of Natural History, a report was made by a member upon the effect of pulverized borax upon the water bugs and cock-roaches that infest our houses. The experiment was tried by sprinkling it around every crack and crevice suspected of affording shelter to these insects, with this effect, that after three or four days quantities of dead ones were found on the floors, and hardly a live one found in the house.

LIGHT BREAKFAST.—A custom is now becoming general in Paris for the workman to take a cup of coffee as soon as he rises, his *dejeuner* or breakfast at half past eleven or twelve, and his dinner at home with his family, after leaving work, at half past five or six.

[The work a man could do in five hours on a cup coffee would'nt amount to anything.-EDS.

THE HYGIENIC COOK BOOK .- Containing recipes for making bread, pies, puddings, mushes, and soups, with directions for cooking vegetables, canning fruit, with an appendix containing suggestions in regard to washing, bleaching, removing ink print and other stains from garments, etc. Price 30 cents. Miller & Browning, Publishers, No. 15 Laight street, New York.

THE Philadelphia Ledger says that when it was started, in 1836, the united editions of all the daily newspapers of Philadelphia were between 7,000 and 8,000 copies a day. Now the whole number is about 175.000.

An aerolite which lately fell at Orgueil attracts the attention of the French chemists. M. Pisani has made an analysis, and proved the presence of soluble hyposulphites.

RHEUMATISM.—A correspondent of the Germantown Telegraph recommends the application of kerosene oil to the parts affected by rheumatism, as an effectual remedy for this painful complaint.

THE product of oranges on many plantations in Louisiana will be this season much in excess of sugar and cotton.

CHLORATE of potassium, with tincture of snake-

# Improved Coffee Roaster.

It is well known that coffee requires great care in roasting, so that it will not be scorched and its flavor thus impaired. The mill herewith illustrated combines many excellent features relating to dispatch in the operation and insurance against burning. The following description renders the machine and its ad-<sup>1</sup> nor disconnected from the stuffing box, for the motion

vantages intelligible. The cylinder, A, is set in the furnace, B, and is supported on each end by friction rollers set in the furnace walls. The cylinder rests on these rollers and has a  $\cos$  wheel  $key\,\mathrm{ed}$ or cast on the projecting flange, C. This wheel gears with the wheel, D, through which power is transmitted by a belt over the pulley, E. In the cylinder there are two screw blades, F and G, one of which is  $\operatorname{cut} away \operatorname{to} \operatorname{show}$ the other. One of these blades works inside the other, and the object of them is to keep the coffee constantly moving; for, as it is pushed up to one end of the cylinder by one blade, it is immediately driven to the opposite end by the other blade, thus preventing scorching from long contact with the hot cylinder. The coffee is let into the cylinder from the hopper, II, and it is discharged from doors in the front, I, which can be opened without stopping the motion of the cylinder. In this way the coffee can be examined without stopping, and, if roasted suf. ficiently, immediately removed, as the rotating

blades push it out into any receptacle placed beneath of the hand is too unsteady, and valves so ground | hindrance, so that some of the richest lodes have operation progresses as before. A great saving of time and heat is effected by the use of this coffee roaster, as the cylinder need not be stopped or removed from its bearings during the whole process.

A patent was procured through the Scientific American Patent Agency, on the 18th of October, 1864, by Jabez Burns, of New York city. For further information address him at 269 Washington street, as above.

#### On the Solubility of Gold in Nitric and Sulphuric Acids.

Since sending you the note on the solubility of gold, a chemist of my acquaintance has informed me that the information given was not sufficient to enable him to perform the experiment satisfactorily. I therefore send you a more complete account of the experiment performed by me.

The alloy of silver and gold was exposed to the action of nitric acid until the gold was left in a powder. On heating this powder with sulphuric acid a yellow solution was obtained, which, when poured into water, gave a purple precipitate. This at first led me to suppose that the sulphuric acid had dissolved some gold; so, after washing, the gold was heated for some time with strong sulphuric acid, without any solution taking place: but on adding a little nitric acid an immediate yellow color was observed in the liquid, and on pouring it into water the same blue precipitate was obtained. The experiment has been repeated, and the acids were of course tested to ascertain their purity; but the solution contains the gold evidently in a different state of combination from that produced by nitric and hydrochloric acids, for it is again precipitated by water.

A tenth of a grain was easily dissolved in this manner; but had the heat been continued no doubt a larger quantity would have been abtained in solution.-Chemical News, Oct. 1, 1864.

# LUNKENHEIM'S GLOBE VALVE.

It is a difficult matter to grind an ordinary globe valve tight, for the action of turning the stem causes the valve to rise off of its seat, and out of contact with it. Neither can the valve be ground separately,

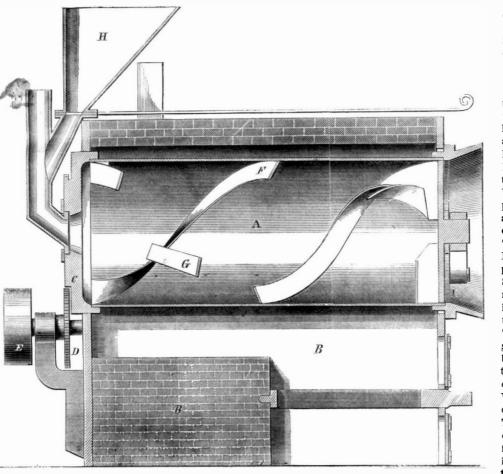
slacked off, however, the nut turns in the opening, and allows the valve to rotate freely on its seat, thus insuring a perfect guide in the same position that the valve is in when working. The plan of constructing this valve is simple and cheap, and will much facilitate the operation of grinding.

An application for a patent is now pending through

the Scientific American Patent Agency, by F.Lunkenheim, of the Cincinnati (Ohio) Brass Works. For further information address him at that place.

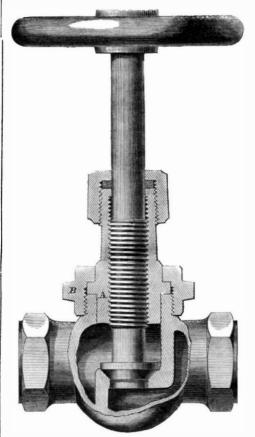
# Great Mining Work.

The work of draining the Dubuque lead region, where mining operations have been embarrassed by a copious flow of water, has been commenced on a large scale by a combination of New York and Western capitalists, and promises to take rank among the most notable enterprises of the day. These mines and those in Missouri are the most important in the United States, and among the richest-the former yielding annually from five to ten million pounds of ore. The Northwestern lead region, as it is called, embraces a section of country about sixty miles in diameter, half of which is in Wisconsin and the remainder in Illinois and Iowa. The Dubuque district is confined to a strip varying from seven to ten miles in width. After cutting through the cap rock of the first opening, water here becomes a serious



# BURNS'S COFFEE-ROASTER.

the doors. A fresh charge is then supplied and the have oval seats. In the valve here shown a very



complete method for grinding it is provided. The nut, A, and the stuffing box the stem works through is in one piece. This nut is held down by the cap, B, when the latter is screwed up tight. If it be

been abandoned on account of the impossibility of freeing the mines by artificial means. The plan now  $is torun \, an \, adit \, level \, or \, subterranean \, passage \, through$ the solid rock to a neighboring ravine. For the distance of 1,200 feet this tunnel is already complete, and when finished, about eighteen months hence, the entire length will be one mile. Some of the shafts sunk from the surface to the level are 150 feet in depth. The gentlemen concerned in this enterprize expect to lay bare a quantity of mineral of incalculable value. They certainly deserve a rich reward.

# The description of a very rapid process for reproducing pencil drawings has been going the round of the Russian journals. The process will be particularly useful in campaigns, where it is often desirable to have a number of copies of a hasty pencil sketch. Some time ago M. Villani-Villanis remarked, that if a sheet of paper on which a plan or any drawing or writing has been executed with pencil be moistened with acidulated water, and afterward inked, the pencil marks alone will take the ink, and the whole

drawing may then be transferred to metal or stone. Captain Sytenko, of the Russian Artillery, director of the photographic service of the staff at St. Petersburg, has introduced very ingenious modifications into this process, and contrived a portable military press, which, as already hinted, may be extremely useful in campaigns. It does not take more than ten minutes to effect the transfer of the drawing upon a zinc plate or lithographic stone.

ZEIODITE.-This substance, says the American Druggist's Circular, is made by mixing twenty to thirty parts of roll sulphur with twenty-four parts of powdered glue or pumice, which forms a mass as hard as stone that resists the action of water and the strongest acids. Prof. R. Boettger recommends it for making water-tight and air-tight cells for galvanic batteries.



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VOL. XI. NO. 25.... [New Series.].... Twentieth Year. NEW YORK, SATURDAY, DECEMBER 17, 1864.

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#### WHAT CAN BE DONE FOR INVENTORS .- ADVICE GRATIS AND ADVICE FOR PAY.

For the information of Inventors, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons paving made what they consider improvements in any branch of machinery, and contemplate securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past eighteen years, during which time they have acted as Attorneys for more than TWENTY THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address

> MUNN & CO. No. 37 Park Row, New York.

# WHAT CAN BE FOUND IN THE "SCIENTIFIC AMEBICAN."

On page 193, Vol. X., can be found an illustration of Root's engine, one of the greatest novelties as well as the most compact form of steam engine ever invented.

On page 24, Vol. X., can be found an illustration and descriptive article on the manufacture of the spirits of turpentine: most valuable information at the present time.

On page 165, Vol. X., and in consecutive numbers can be found a serial article on "The Drill and its Office," replete with illustrations of every known form of the tool in use.

On page 24, Vol. XI., and in numbers following, may be found an article on the Torpedoes used by the rebels, together with illustrations.

On page 244, Vol. X., may be found an article, accompanied by full illustrations, of the manner in which an eight-strand gasket, used by engineers, can be braided.

On page 20, Vol. XI., can be found an illustrated article on "Boring Tools," showing all the styles in general use at the present day.

On page 20, Vol. X., and in subsequent issues of the same volume, can be found the fullest and most complete exposition of the Government ordnance experiments on iron-clad targets ever made public; and in the same volume there are illustrated articles on the Springfield rifled musket, and visits to other factories which show, in the most distinct manner, how the several articles are made.

The information contained in these several articles. taken at random, is of the most general interest and importance, and is peculiar to the SCIENTIFIC AMER-ICAN. The approaching volume will not in any respect be inferior to those which have preceded it. We hope our readers will use their influence in extending its circulation among their neighbors, as we feel assured that they will be doing both them and us a substantial service.

# BOILER EXPLOSIONS NO MYSTERY.

We have repeatedly declared our opinion in the SCIENTIFIC AMERICAN that boiler explosions need not be mysterious. Required a vessel to resist a certain pressure, the engineer proceeds to construct one of the proper size and strength, and if it answer for the first year, it will for twenty years, with a reasonable allowance for the duty done. When a cannon bursts, men say that the charge was too great for it. When a soda-water fountain bursts, they say there was too heavy a pressure from the carbonic acid gas within. When a beer bottle bursts, the same thing is said, but we never analyze the gases to discover the cause, for it is practically settled, from the generation of the force to the moment of disruption, that the vessel was too weak to resist the strain.

A steam boiler, more than any other mechanical structure, is continually liable to accident. It is liable to change of form from constant alternations of heat and cold; from differences of temperature, even when at work; from the shock and impact of the current of steam suddenly checked on its way to the piston: from the variations in that strain; from internal corrosion: from the usual defects in workmanship; from flaws in the material; from carelessness and inattention; from dirt and sediment; from the action of fire on the heated plates; from the expansion and contraction of the hot flues on the cooler shell, and other exigencies not necessary to specify at length. From the hour when the first fire is lighted till the day it is turned out in the street for scrap iron. a boiler wants the closest and most conscientious attention that can be given. Not a week should pass without thorough and rigid inspection of every part that can be got at, even to a hand-hole plate, and the most trivial repairs should be instantly made. If this course were the rule, not the exception, we should have fewer catastrophes. Engineers are apt to be careless about their boilers, but those who take pride in their calling, and realize the power intrusted to them, are invariably vigilant. The various elaborate theories advanced concerning the evolution of gases from water decomposed by hot iron have been disposed of in previous numbers of the SCIENTIFIC AMERICAN, and we may here add, that in nine cases out of ten, but for carelessness, the water could not us?

have got low. Those who are committed to certain theories and speculations about boiler explosions will of course disbelieve and discredit these assertions, but the best evidence of the value of care and attention as preventives of steam boiler explosions is found in marine boilers. The proportion of these that explode is not one in a hundred to twenty-five in a hundred of land boilers.

# MAKING MOLASSES FROM CORN.

On page 314 of the current volume we gave publicity to the story, then circulating in the community, that a German chemist had discovered a process for making sirup from Indian corn. At the last meeting of the Farmers' Club, the President, N. C. Ely, Esq., stated that a company had been formed for manufacturing sirup by this process, and that the capital, amounting to \$1,000,000 had been all paid up in cash. It will be remembered that we pointed out on page 314, that if the chemist had discovered a process for making cane sugar from corn it was one of the great discoveries of the century, but if he merely converts the starch in the grain to grape sugar he does nothing new.

By a communication to a local paper, we see that Dr. Theodore A. Hoffman, of Beardstown, Ill., assumes that he is the chemist referred to. On May 25, 1858, Dr. Hoffman received a patent for "Improvements in the manufacture of dextrine and sugar," of which the following is the claim:-

"I disclaim the separate action of steam and acids for converting starch, corn, or other grain into dex-trin, or sugar, and alcohol therefrom by the usual boil-ing point of one atmospherical pressure. But I claim the combination of steam and acids for converting starch, corn, or other cereals into dextrin gum, or sugar, when said grain is subjected to the action of diluted acids, and the temperature of the mass is ele-vated to 225° or 300° Fahrenheit."

The usual method of converting starch into grape sugar, is by steeping the starch in dilute sulphuric acid at a temperature of 212°, or a few degrees higher. It seems that Dr. Hoffman's improvement consists simply in raising the temperature.

In France and Germany the manufacture of grape sugar from starch is an established industry. The article is employed for adulterating cane sugar, and for manufacturing French brandy. By fermentation it is converted into alcohol, and may therefore be employed in making brandy, or for other operations in which alcohol is required.

We have in the hands of our engraver complete drawings of the apparatus used in France for making sugar or sirup from starch, and shall publish it as soon as it is completed, with full directions for the manufacture. At the present price of sugar the business may be profitable, but purchasers will bear in mind that the sweetening power of this sirup is only about one-third that of ordinary sugar-house sirup which is obtained from cane.

The Buffalo Commercial Advertiser says that the chemist alluded to is Frederick W. Goessling, of that city, and that he has discovered the art of converting grape sugar into cane sugar. The Advertiser also says:-

also says:— "We learn that a company has just been formed, em-bracing many of the wealthiest men in the city of New York, and among them several of the principal sugar refiners, with a capital of a million of dollars, which has purchased Professor Goessling's patent, paying therefor, to him and his associate proprietors, the sum of six hundred thousand dollars. They propose to en-ter at once upon the manufacture of sirup and su ar from corn by the new process, upon a large scale, and to introduce its manufacture throughout the country as fast as expedient." fast as expedient."

If it be really true that Mr. Goessling has discovered a method of converting grape into cane sugar, he has made a very interesting discovery in chemistry, and if the process is cheap and simple, it is worth the \$600,000 which he is said to have received for it.

We have been unable to find that any patent has been issued to Professor W. Goessling on any process for producing molasses from Indlan corn, notwithstanding the Patent Office furnished us with his claims to two patents, which were published in the SCIENTIFIC AMERICAN May 21st. 1864. numbered 42,727 and 42,728. We have sent to Washington for copies of these patents a number of times, but an answer is invariably returned, "No such patent has been granted." Now, we would like to know how the claims came to be officially reported if no such patents were issued. Can the Commissioner enlighten

# FESSENDEN ON THE CURRENCY.

In his recent report to Congress Secretary Fessenden says:--- "It is observable that, notwithstanding the apparently large circulation of paper money issued under the authority of the various acts of Congress, before enumerated, its scarcity in the market has occasioned no slight embarrassment in the negotiation of loans."

A Secretary of the United States Treasury ought to understand that the facility of negotiating loans does not depend upon the amount of currency in circulation, but upon the surplus capital belonging to the community in all kinds of property. To carry on the war the officers of government must obtain beef, flour, gunpowder, tents and the other commodities requisite for the prosecution of military operations. There are two ways only by which the Government can procure these articles; it can send a sufficiently powerful body of soldiers to seize them by force, or it can persuade the owners to deliver them up by offering something of equal, or slightly greater, value in exchange. The latter is the method adopted by our Government, and during the last four vears it has obtained in this way more than two thousand millions of dollars' worth of property. Let us take the case of one of these loans, and see what actually takes place in the transaction.

Mr. D. B. is a gentleman who frequently calls at our office, and who informs us of his operations. He is a retired merchant, and four years ago he employed a portion of his property in discounting commercial paper-in other words, it was invested in the notes of business men. This property was said to be money at interest; but it was not money. The merchants who hired it could not afford to payinterest on it and keep it in the form of money; they wanted it to increase their stocks of merchandise; and it existed in the form of shirtings, flannels, canvas and other kinds of dry goods. In the progress of the war these goods have been sold to the Government, the notes have been paid, and Mr. D. B. has invested the proceeds in Government bonds.

In making these several transactions money has been employed, performing in each case its peculiar office, which is to effect the transfer of commodities. And this is all that money can do. The actual transactions are precisely the same as if they had been done by direct barter without the employment of money—as if the Government had given its bonds to the merchant in payment for the goods, and the merchant had passed these bonds to the capitalist to redeem his notes. While the Government has been hiring two thousand millions of dollars' worth of capital, the whole money in the country has not amounted at any time to one-fourth of this sum.

The power of D. B. to take Government bonds depended wholly upon the amount of capital which he had to invest, and not at all upon the quantity of currency circulating in the community; and this is the case with all other capitalists who subscribe for government bonds. The ability of the people to supply Government with the means for carrying on the war is measured by the quantity of capital which they have to spare in all forms of material wealth. and is not affected in the least by the amount of paper notes which the Secretary of the Treasury chooses to put in circulation.

# PROSPERITY OF THE WOOLEN MANUFACTURE.

Hon. Edward Harris, of Woonsocket, R. I., commenced without capital, and has made all his money in the manufacture of woolen cloths. He is now extending his works by the erection of a mill, in which the several floors have an area of more than three acres. This mill is described as follows in the Providence Journal:-

The new mill of Hon. Edward Harris is one of the finest and most massive in the State, and in respect to the solidity of its masonry it certainly surpasses any building erected for manufacturing purposes that we have ever visited. The work of construction is now nearly completed and much of the machinery ready to go in. Hopes are entertained of being able to start about the first of January next. The mill is situated on Mill River and the Air Line Railroad, about half a mile from the Post-office at Woonsocket. The main mill is 224 feet in length the lesser buildings, the most careful provisio, nas

and the ell 21, making a total length of 442 feet. The basement and upper story are each fifteen feet hig the three intervening stories thirteen feet high. Connected with the building on the south side of the east tower are the dye house and dry house, each 40 by 100 feet. A short distance from the mill on the west side is a brick building 83 by 50 feet, two stories high with cupola, designed for a packing house and counting room. On the other side is a store house of the same dimensions, for the storage of wool. The boiler house is under the dry house. A Corliss engine of 200 horse-power, to assist the water wheel, is now in and ready to start. The ponderous water wheel is now nearly ready to raise. It is a breast wheel forty feet in diameter, twenty-eight feet in width, and weighs three hundred tuns. The wheel and all its appurtenances are made of oak. Its effect will be equal to three hundred horse-power. The east wing of the mill rests upon a granite arch, the strength and solidity of which there is no figure of speech to describe. It is over the trench which lets the water from the wheel pit. It is twenty-eight feet wide and fifteen feet high from the surface of the water. The length of the trench is seven hundred feet. To furnish water power from Mill River, which is a comparatively small stream, an immense pond two miles long and more than thirty feet deep has been formed artificially, by overflowing portions of several farms. The dam is from three to four hundred feet long, one hundred feet wide at the base and forty feet at the top, and about forty feet in hight. The outlet for the waste water is at what is popularly known as the horse-shoe, which is a semi-circular structure of granite having five regular steps, over which the water flows in a series cf picturesque cascades. This structure is very large, costly and beautiful. three years ago.

"The magnitude of the enterprise involved in erecting so large a mill and conducting its subsequent operations has made it expedient to establish work shops on the premises for many varieties of mechanical labor. The planing mill is a very large brick building on the west side of the railroad. T+ contains first a saw mill, where the lumber of all kinds used in the various buildings has been sawed Next is the factory for sash, blinds out from logs. and doors. Then there is the wheelwright shop. These are in the second story. All the doors, sashes and blinds in the mills and all the wheels for the wagons are made on the premises. All the timber and boards are planed in the planing department. which contains three planing machines. There is a grist mill in the same building where the corn is ground for the teams and to supply the help. The establishment contains a Woodruff & Beach engine of forty horse power. The furnaces are fed exclusively with the sawdust and shavings supplied by the saw and planing machines. There is also a brick kiln, connected with the works, on the railroad just north of the main mill. Five hundred thousand bricks were burned there a short time since. There are also on the premises a blacksmith's shop and a paint shop, where the blacksmithing, painting and glazing for the establishment are done. A store 106 by 50 feet and three stories high is in process of erection for groceries, flour and provisions, and for the accommodation of the help.

"The distribution of water about the premises. and the provision made to prevent the ravages of fire, are unusually ample, and devised upon a scale of liberality which cannot fail to make them effectual should emergency arise for their use. The laying of water pipes, six inches in diameter, connecting with those of the corporate village of Woonsocket to the mill, a distance of thirty-five hundred feet, has just been completed. To these pipes are attached eleven powerful pumps in the village. This is in addition to the steam force pumps of the mill. Of course the erection of a large number of tenement houses has been necessary to accommodate the help in so large a mill. There are twenty-five houses, mostly of brick, on the road, fifty tenements nearly or quite completed; also a hoarding house, accommodating forty, near the mill, and another in process of erection. The mill vard will be laid out and embellished with a great deal of taste and at much expense. In the construction of the mill, in its every part, and ot been made to promote the convenience, comfort and health of the employees.

RAMS

When the rebel ram Merrimac butted the wooden frigate Congress and sunk her, two years ago, there was a very general and long continued cry for rams. "Ramming is the thing," said enthusiasts; and for awhile there was little else thought of for offense or defense should an enemy enter this harbor. The case of the North river steamer Empire, which some years ago ran into a heavy pier at the foot of 29th street, and went half through it without material injury, be shot through a board: ergo, a light sleamer can cut down a heavier one, no matter how strong, provided she can obtain sufficient speed." Instances were cited: where ships had collided it was shown that the vessel struck was demolished, while the other was unhurt, although the weaker. From these and similar premises it was, and is, argued that of all ships a ram-ship would be the most formidable. Assuming the points taken by the ram advocates to be correct, although they are far from being so, a ship is not a board, neither has it the velocity of a bullet. A solid structure, such as a crib filled in with stone, bears no resemblance nor has it any conditions identical with a ship floating on a yielding medium like water; nor yet can one ship butting another in the ribs, aiming at the adversary's weakest, and striking with its strongest part, be fairly quoted as the invincibility of the assailant and the vulnerability of the assailed. But admitting that they arc correct in the main, what does it prove? That rams are essential, that they are reliable, that the action The water improvements were commenced itself is always an efficient one, that a heavy ram may run down a heavier armored ship? Not at all. The results in Mobile Bay and the action in Albemarle Sound both prove that ramming a ship by no means insures its destruction. Even the gallantry of the commanders in these several combats could not overthrow physical forces, or do away with them. The Sassacus, a wooden side wheel ship, while moving at the rate of eleven knots, ran at the Albemarle, a rebel iron-plated ram, and struck her. She failed, however, to destroy the rebel vessel, although she pushed it before her for a long distance. The Sassacus was a light vessel, and ill-fitted for an encounter with such a craft, for in addition to being built of wood, her stem has a rudder in it which of course weakened it very much. In Mobile Bay the results were the same. The Tennessee was repeatedly rammed by heavy ships at high speeds, but these attacks were futile and only damaged the assailants.

It will not do to rely solely upon a possibility in naval warfare. Success must be assured as far as possible, and victory lies not in rams but in weight of metal; in guns stood up to, and broadsides hurled unceasingly. An unremitting fire from heavy guns in ships, practically invulnerable, will hereafter win the day, and rams, as rams solely, are of little worth. When opportunity serves, the momentum of a heavy body at even a moderate velocity, like a ship, may effect more than a broadside, but the chances for a fair blow in an action between two ships alone are very few, and a skilful seaman can always parry one. We have ships of iron, and guns of iron; we have also hearts of iron to man and manœuvre them, and these will, as heretofore, continue to maintain our national renown upon the sea.

THE NEW SCIENTIFIC SOCIETY .- At the meeting on Tuesday evening, Dec. 6th, the committee on organization reported in favor of organizing under the auspices of the Cooper Union, and it was decided to adopt this arrangement. The name selected by the Trustees of the Cooper Union for the new society is, "The Society of Associates of the Cooper Union for the Advancement of Science and Art." The initiation fee is one dollar, and the annual dues two dol-

A BOARD of naval officers are examining the Dunderberg with a view of making some changes in her casemates. The casemates will probably be lengthened, and the turrets dispensed with, so that she will be a very formidable floating battery. The propeller and shaft will soon be ready to put in their places,

#### RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list :-

Clothes-washing Machine.-This invention consists in the employment of two sets of swinging plungers, operated by a crank shaft, which have the cranks placed alternately in opposite directions and fitted in oblong vertical slots in the plunger bars, the latter being suspended on a shaft, the bearings of which are at the upper ends of springs, all being arranged in such a manner that the two sets of plungers will, by the turning of the crank shaft, be moved simultaneously in opposite directions, and alternately act against or upon the clothes in the suds-box. and with a pressure due to the springs to which the shaft of the plunger bars is connected. E. McKinley and W. Wilkie, of Mayville, California, are the inventors.

Depthing Tools .- This invention relates to an improvement in that class of tools which are used by watchmakers to determine the correct position or "depth" of the lever in relation to the balance. An ordinary tool of this description is provided with two sets of centers placed side by side; one set to take in the arbor of the balance, and the other to take in the lever staff so that the correct position of the lever, in regard to the balance, can be determined. In such tools one of the centers intended to take in the lever staff passes through the balance and the arms of the latter, by hitting said center, prevent the mechanism from being set in motion until it is taken from the depthing tool and adjusted in the watch, and the final adjustment of the "depth" has to be accomplished with great difficulty and loss of time. These disadvantages are overcome by the improvement which forms the subject of this invention and which consists in the application to one of the centers intended to sustain one end of the lever staff of a U-shaped supporting bar provided with a suitable center to take in the outer or loose end of the lever staff, in such a manner that the entire mechanism while being supported in the depthing tool can be let in motion precisely in the same manner as if placed in the watch, and the lever can be adjusted to the correct "depth" with care and facility; the invention consists, further, in the combination with the Ushaped supporting bar of an adjustable spring with projections on the ends for the banking pins, in such a manner that the motion of the lever is confined be tween certain limits and the motion of the lever watch is imitated; the invention consists, finally, in the employment of a movable post or stud attached to one of the centers intended to take in the arbor of the escapement wheel, in such manner that the loose end of the hair-spring can be conveniently held and all the parts of the mechanism adjusted in the depthing tool in precisely the same relation towards each other as in the watch. Artemus Rush, of Fairfield, Iowa, is the inventor.

Side-saddle.-This invention consists in providing the saddle with an adjustable horn arranged and applied in such a manner as to render the saddle capa ble of being adjusted with the greatest facility to suit either a large or small woman or girl and without the necessity of the rider leaving the saddle, also in the employment of a rest or support for the right foot of the rider; and further, in the use of a support extending along the right side and back of the saddle, terminating in front with a ball or knob to serve as a rein holder, and having the right side of the saddle skirt provided with pockets for the convenience of carrying articles. Clara A. Bartelett, of Ferndale, Cal., is the inventor.

## TO OUR READERS.

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

MODELS are required to accompany applications for Pat ents under the new law, the same as formerly, except on design pat-ents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS .- When money is paid at the office for subscriptions, a receipt for it will always be given ; but when sub remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funda



ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING DECEMBER 6. 1864.

Reported Officially for the Scientific Ameri

AP Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

-Bullet for Small-arms .-- E. G. Allen, Boston,

Mass.: I claim the elongated, cylindrical projectile, having a projecting and at or near its center of gravity, as set forth. 45,307.-Magazine fire-arm.-Albert Ball, Worcester,

Mass.: I claim the arrangement and combination of the spring contract-or, E, with the barrel and the magazine provided with a spring and follower, as specified. I also claim the spring contractor made substantially as described. I also claim the combination of the lever latch. F, or its mechani-cal equivalent with the magazine, the spring and follower thereof and the spring contractor. I also claim the combination of arrangement of the tip band, G, with the barrel, the magazine, the lever latch, and the spring con-tractor, substantially as set forth.

-Side Saddles.-Clara A. Bartelet, Ferndale, 45,308

5,308.—Side Saddles.—Ulara A. Lartono, Cal.: I claim, first, A side saddle provided with horns, arranged and pplied substantially as shown, to admit of being adjusted in a ion-itudinal direction, to vary the size of the saddle to suit the rider, is set forth. Second, The foot-rest, G, applied to the plate, F, and the latter at-tched to the saddle, substantially as and for the purpose specified. Third, The support, D, composed of the rail, e, and standards, g, rovided with the knob, E, and applied to the saddle, substantially a and for the purpose set forth. Fourth, The pockets, II, applied to the right skirt, H, of a side addle, substantially as described.

45,309.—Egg-beater or Agitator.—J. W. Bliss, Hartford, Conn. Ante-dated Nov. 25, 1864: I claim as a new improved article of manufacture, viz., a vessel made of glass, the inside surface of which is provided with protu-berances or projections for agitating substances, fluids, etc., substan-tially as desoribed.

45,310.—Machine for Slicing Cork Wood.—Harris Board-man, Lancaster, Pa.:
1 claim the carrying rollers, B, 1, B, 2, when constructed as de-scribed in combination with the circular vertical knife blade, A, ar ranged and operating substantially in the manner and for the pur-pose specified.

45,311.—Flour Bolts.—Alonzo T. Boon, Galesburg, Ill. :

45,311.—Flour Bolts.—Alonzo T. Boon, Galesburg, Ill. : First, I claim the use of a blast of air of the ordinary temperature of the atmosphere or below it, applied to the exterior of a bolting cloth or similar apparatus, for cooling and drying the flour or other meshes of the bolting cloth. Second, I claim the conical bipe, with its lines of orifices and stop-cock, e, as shown in fig. 1, 3 and 4, or the cylindrical pipe with its ori-fices and diaphragms as shown in figs. 5, 6 and 7, for applying a blast of air in jets to the outer surface of a bolting cloth for cooling and drying the flour or clear powder therein, and for cleaning or clean-ing the meshes of the bolting cloth, substantially as described.

ng the meshes of the bolting cloth, substantially as described. 15,312.—Apple-corer and Cutter.—John Bowser, Basil, Ohio: I claim the tube, B, with the knives fastened thereon, in combina-ion with tube, H, and knives, g g g, the moving and setting of the lisk, A, by means of a screw or otherwise, so that the core is always ut in the center of the apple, also the motion of plug, m to open and close the hole in disk, A, for tube, B, to pass in for coring small upples, substantially as specified.

-Railroad Switches.-John F. Brickley, Hunts-

5,510. — train over 2...... ville, Ind. : I claim the operating of the "scotch," H, automatically from the witch, C, through the medium of the cross rods, G G, and T-shaped ever, E, connected with the switch, substantially as and for the pur-

This invention relates to an improvement on a means employed or throwing automatically by the increment of the switch, an ob-truction or "scotch," across the rails of a turn-out to prevent the cars switched off on said turn-out from passing back on the track.]

45,314.—Machine for Cutting the Front Edge of Photo-graphic Albums.—Samuel D. Burlock, Philadelphia. graphic Albums.-

P.2.: I claim the combination and arrangement of the revolving cutter Q, with the clamps, B B, and carriage, T, by means of the screw shaft, U, the intermediate shaft, W, and driving shaft, Y, the whole being arranged for joint operation, substantially in the manner and for the purpose above set forth,

1or the purpose acove set forth, 45,315.—Urinal.—Wm. S. Carr, New York City: I claim, first, The combination with a basin or water-closet, hopper of the pipe, i, extending below the surface of water, in a receptacle below said basin or hopper, as and for the purposes specified. Second, I claim theralve, s, actuated by the cam-shaped end of the plug, m, that is moved by swinging the urinal or basin, as set forth.

d, I claim the cover, k, with raised edges in combination with pe, l, for the purposes and as specified. 45,316.-Railway Car.-Thomas Caster, Philadelphia,

Pa.: I claim, first, A dog, F, so constructed and so hung to a railway car, in respect to the wheel that it will operate on obstructions on the right, as set forth. Second, The combination of the said dog, F, with a bar attached to the axle boxes, substantially as set forth. Thirdly, The arm, D, dog, F, and bar, C, combined and arranged in respect to a railway car, substantially as specified.

in respect to a railway car, substantially as specified. 45,317. — Washing Machine. — N. B. Clabaugh, Freder-ick, Md.: I claim, first, The rubber and squeezer constructed with openings, d, between the rubbing and squeezing devices, substantially as and for the purposes set forth. Second, The combination of a polygonal rotating rubber, B, with a wash-board, C, and slotted bed, f, substantially as described.

wash-board, c, and stoted bed, i, substantially as described.
45,318.—Casting Stamps and Dies for Crushing Quartz.
—George W. Coffee, Aurora, Nevada Ter.:
I claim a stamp for crushing quartz constructed by casting in a chilled mold an outer case or shell of cast-iron around a mandrel or core of culliled cast-iron, substantially as herein described.

45,319.—Cartridge for Revolving Fire-arms.—James M. Cooper, Pittsburgh, Pa.: Pirst, I slaim a metallic cartridge case having a perforated metal-

lic cone (for percussion caps) projecting from its rear end and having no flange or other projection of greater diameter than that of the charge chamber in which the cartridge is to be inserted, and having a neck at or near the rear end of the case to fit a cavity in the cham-ber, or equivalent construction for holding the cartridge in place, so as to resist the impact of the hammer in firing, substantially as hereinbefore described.

so as to resust the impact of the nammer in mrng, substantially as hereinbefore described. Second, Making metallic cartridge cases with or without a nipple, and naving a shorn needs at the rear end, of less diameter than the substantiation of the substantiation of the substantiation of the result of the substantiation of the cylinder so as to hold and center the cartridge in the chamber of the breech or cylinder and at the same time sustain the recoil of the cylinder, so as to hold and described

45,320.-Weather-strip.-Thomas Cowden, Norristown.

Pa.; I claim the piece, D, with its sockets, d, and the lips, e, forming part of the said socket in combination with the piece, B, its sockets, h, and weights, i, within the said sock ets, the whole being construct-ed and applied to a door and door frame, as set forth.

ed and applied to a door and door frame, as set forth. 45,321.—Manufacture of Paper Pulp.—John W. Dixon, Philadelphia, Pa.: First, I claim the process of manufacturing pulp from wood and from straw, or the equivalent of straw above described. to pulp the straw or its equivalent, as above described. Second, The process of manufacturing two grades of pulp from straw or its equivalent, as above described. Second, The process of manufacturing two grades of pulp from straw or its equivalent, as above described. Second, The process of manufacturing two grades of pulp from straw or its equivalent, as above described. The straw pulp of the straw pulp or its equivalent first obtained. to manufacture coarse pulp from straw, or its equivalent for binder's boards, wrapping paper, etc.

Third, The process of pulping wood by caustic soda and then using the residual liquor to treat straw, or its equivalent, and again using the second residual liquor to form an inferior grade of pulp from straw or its equivalent, as above described.

straw or its equivalent, as above described. 45,322.—Variable Valve Gear.—George and Elihu Dodds, Alleghany, Pa.: I claim the comb.\_stion and arrangement of the opening cam, k, and cut-off cam, h, cam yoke, g g, and the spiral cylinder, q, as a cut-off apparatus, constructed substantially as described, with the governor and out of valve of a steam engine, for the purpose of so regulating the closing of the cut-off valve as that the point of cut-off shall change, with the increased or diminished force of steam in proportion to the rapidity of stroke of the engine thus forming a variable cut-off.

-Machine for Cutting Staves. -Thomas Hanvey,

45,323.—Machine for outbing sector. Elma, N. Y.: I claim the combination of the movable box, B, stationary table, C, cutter, D, and adjustable table, E, for the purposes and substan-tially as described. In a machine for cutting staves, substantially as lerein described. I claim a spring, J, attached to the movable box, B. so that it will bear against the wood block to be cut and press it against the sideof the box or strip, G, therein, to prevent the wood block from sliding sidewise while the process of cutting is going on, substantially as set forth.

5,324.—Horse Hay-fork.—Porter Hill, Millport, N. Y.: 1 claim a horse hay-fork the tines of which are connected by a oggle to which the hoisting rope, B, is attached in combination it h the rope, C, provided with the hook, D, and the ring, F, on the oisting rope, all arranged substantially as described. 15,324.

This invention consists in the employment of two times connected y a toggle and having ropes applied to them in such a manner that the tines may be readily inserted in the hay to receive its load and the latter, when the fork is elevated to the desired position, discharged from the fork with the greatest facility.]

45,325.—Cigar Tip Machine.—Wm. W. Huse, Brooklyn, Y

N. Y.: I claim the combination of two or more disks or rollers who faces are formed, substantially as specified, to present between the a space of the form of the section of the tip or pointed end of cigor, and each mounted to turn on an axis at or nearly at rig angles with the axis of the cigar, and turning independently of it other or others, to make pressure successively on every portion the circumference of the tip of a cigar by rolling therecon, substa-tially as and for the purpose set forth.

tially as and for the purpose set forth. If the purpose set forth, the purpose set for t

45,327.—Letter York City : Letter and Music File.-Richard B. Irwin, New

YOTK UITY: I claim combining two or more sharp pins with one leaf or cover f a letter file, in such a manner as that the papers may be pierced hereby at uniform intervals, for the reception of binding cords, to nite said leaves or covers and secure said papers, substantially in he manner herein set forth.

the manner herein set forth. 45,328.—Shoal Water Indicator.—Robert M. Knapp, Jerseyville, III. Ante-dated Dec. 1, 1864 : I claim, first, The combination of the bar, B, shaft, C, arm, E, connecting rod, F, gearing, H I, and index shaft, J, arranged and operating substantially as shown and described. Second, The combination of the lever, L, with its catch, O, cord or chain, N, and arm, G, with the bar, B, and shaft, C, whereby the said bar may be stowed compactly away when not in use.

[The object of this invention is to provide an automatis and self adicating sounding apparatus, by which when in operation and within a certain depth of water the sounding or depth may be contantly indicated to the eye of the pilot. ]

45,329.—Spring.—Edward Lindner, New York City: I claim the construction and arrangement of a spring mechanism substantially as described, consisting essentially of a plunger capa-ble of a sliding motion within a vessel contaming compressible fluid surrounded by a non-compressible fluid (and whether combined or not with metallic springs), under the arrangement and for operation as herein set forth.

45,330.-Mechanical Motion.-Daniel Lynahan, Buffalo, N V

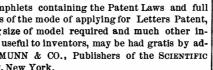
N. Y.: I claim the reciprocating bar, B, provided with a series of double aclined planes or their equivalent, in combination with the verti-ally reciprocating gate, C, working beam or lever, D, and fly-wheel, C, arranged and operating substantially as set forth. I also claim in combination with the reciprocating bar, B, provided with a series of double inclined planes, the reciprocating shaft or juman, H, or its equivalent, when said combination has for its ob-et the conversion of a reciprocating into rotary motion independ-nt of the power which operates said shaft, substantially as set orth.

Find on the particle values operation of the particle values of the

45,331.—Washing Machine.—E. McKinley & W. Wilkie, Mayville, Wis.:

45,331.—Washing machine, Mayville, Wis.: We claim the combination of the yielding shaft, D, plunger, F, at the lower ends of the bars, E, which are suspended on the shaft, D, the crank-shaft G, with the cranks, J, fitted in the oblong slots, i, in the bars, E, and the suds-box, A, all arranged to operate substan-tially as and for the purpose herein set forth. Wilding Sheen etc.—Nehemiah Mer-

taily as a nu for the purpose herein set forth. 45,332.—Stocks for Holding Sheep, etc.—Nehemiah Merritt, De Ruyter, N, Y.: I claim the above described frame or stocks for holding the legs of sheep while shearing or slaughtering, and the legs of calves, pigs, or other animals while doctoring or slaughtering, substantially as de scribed.



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45,333.—Adjustable Sight for Fire-arms.—Charles M. Miles, Vineland, N. J.:
I claim the spring, B, containing the sight notch or opening, f, sliding longitudinally through the base-piece, A, substantially as and for the purpose herein specified.
[This invention consists in forming the sight notch or opening in

one end of a spring of thin steel plate which is fitted to slide through a curved slot in the fixed base piece, by which the sight is attached to barrel off the fire-arm, a portion of the said spring being pre-sented above the base in an upright or nearly upright position, and the notch or opening being raised or lowered for different distance by sliding the spring longitudinally through the base piece.]

45,334.—Wrench.—D. M. Moore, Windsor, Vt.: I claim the combination in a wrench of the ratchet wheel, B, co taining the socket for seizing the work with the detents, b, a lever, g, so constructed as to lock the ratchet against rotation in a direction and also to lock it at will so that the implement may worked as a right hand or left hand wrench, without removing from the work, substantially as described. wheel, B, con-etents, b b, and rotation in any ement may be t removing it

(This invention consists in the construction of a wrench which may be used either as a right or left hand wrench by a change in the position of two detents which work against a ratchet wheel.]

45.335.—Seed Drill.—Wm. II. Nauman, Dayton, Ohio: Iclaim, first, The feeder, A, having fanges, b b, with rings, c c c, projecting towards either flange and leaving a space between the fange and wing on either side, said feeder running over and In com-bination with an aperture in the bottom of the hopper. Second, I claim the slide, b, placed next to the hopper bottom in combination with the adjustable slide, B', cut-oil, F, and slides, G G, when arranged and operating as and for the purposes set forth.

45,336.—Grain Elevator.—A. B. Nimbs, Buffalo, N. Y.: I claim, first, The combination of the suspension arms, C, with the grooved jaws, B B, and the elevator leg, A, constructed and operat-ed in the manner and for the purposes substantially as herein set

forth. Second, The extension foot, a2, constructed and operating substan-tially as and for the purpose set forth. Third, Controlling the inclination of the jaws, B B, and leg, A, by means of the rack, J, pinion, J, and connecting rod, K, substantially as and for the purpose set forth.

as and for the purpose set forth. 45,337.—Grain Elevator.—A. B. Nimbs, Buffalo, N. Y.: I claim, first, Suspending the elevator leg in a movable carriage, C Cl C2, by means of which it may be moved outward, horizontally or returned inward, substantially as and for the purposes set forth. Second, Raisin: and lowering the elevator leg by means of a rack, E and pinion, F, substantially as described. Third, Controlling the inclination of the elevator leg by means of the pinion, I, and gear segments, I3, the gear segment being formed for the purposes described.

for the purposes described. 45,338.- Cooking Stove.-Samuel Nowlan, New York City. Ante-dated Nov. 16, 1864: I claim the apparatus herein described for generating steam, the same consisting of a generator composed of two or more wire gage plates arranged in a chamber as shown, the said chamber being in-closed in a drum of a cooking stove so that the heated gases may sur-round the same, *mb*-stantially as and for the purposes set forth. 45,339.-Water Elevator.-Wm. Painter, Afton, Iowa: I claim the cover, B, placed on the curb, A, as shown, in connec-tion with the latch or fastening, composed of the bar, C, and lips or projections, m m, and connected with the bucket tripping device, J, and the latter connected with the windlass shart, substantially as and for the purpose herein set forth. (This invention relates to a new and improved device for elevating

(This invention relates to a new and improved device for elevating water from wells and is designed for domestic or household pur-poses. The object of the invention is to obtain a water elevator of the kind specified, which will be simple in construction, admit of the bucket being raised and tilted with facility and which will be capa-

ble of retaining or holding the bucket at any desired point.]

45,340.—Safety Oil Can.—John M, Perkins & Mark W. House, Cleveland, Ohio: We claim the can, substantially as described and for the purpose We clai

set forth. 45,341.—Machine for Collecting and Amalgamating Gold and Silver.—Eli B. Prater, Washoe County, Nevada Territory: I claim in combination with the convex shaped bottoms of pan, B, the outlets, C, near the center of the pan for the passage of earthly matter, the rim, x, and the circumferential gutter, g, for the collec-tion of the amalgam when used with or without the inner rim, e, as and for the purposes described.

45,342.—Manufacture of Soap.—J. B. Rand, Fishersville, N. H.: I clam, first, The combination and saponification of caustic soda, be and grease fat or oil, by the process and in the proportions

The stated of the second secon

set forth in the specification. 45,343.—Application of Hot Blast to Puddling Furnace's. Jacob Reese, Pittsburg,Pa.: I claim, first. Creating a hot blast for supplying the fire-chamber of puddling thamber from the furnaces, by drawing the hot waste arr, gases, and smoke, after they have passed over the iron in the puddling chamber from the furnace stack a chimney by means of a fare or similar device and forcing such hot blast, previously re-charged with oxygen in the shape of atmospheric air or steam, into and through the fire whereby it is again deprived of its oxygen and receives an accession of caloric, etc., is thus fitted for use in the pud-dling chamber thus keeping up a constant circulation through the furnace.

Second, The application to the working chamber of pudding, boil-ing and heating furnaces of a hot blast consisting of the waste heated air, gases and smoke, drawn from the stack or chimney of the furnaces and previously to entering the waking chambers, deoxy-dized, by a highly heated passage through the body of the fire in the furnace, substantially in the manner hereinbefore described. Third, Constructing a fan for hot blast with hollow axle arms and wings, or any of them, for preventing the injurious action of the in-tense heat by passing a current of cold water through the fan, sub-stantially as hereinbefore described.

45,344.—Seeding Machine.—John W. Richards, Newark, N. J.: I claim, first, The combination with one conductor of two slides, E E', working side by side and two cranks, G G', set at right angles to each other on the axle, I, substantially as and for the purpose herein specified. Second, The slots or openings, a a, and the brush'ers, J J, arranged both at the front and at the back of the hopper, so that the slides will receive and deposit the seed both in their backwards and for-

45,345.—Harvester.—G. W. Richardson, Grayville, III.: I claim the combination of the brace rods, H H, and draw-bar, I, when attached or applied to the machine and to the shoe, G, of the finger bar, F, to operate in the manner as and for the purpose here-in set forth.

[This invention consists in a novel and improved manner of at-taching the finger bar to the main frame of the machine, whereby it is believed several advantages are obtained over other machines in present use.]

45,346.—Horse Rake.—Ira Robbins & James Old, Pitts-burg, Pa.: We claim placing the bar to which the teeth are attached in front

of the axle of the machine, and hinging it thereto, so that the weight of the teeth bar and teeth shall bear directly upon the axle and be nearly balance: thereon. Also in combination with the teeth bar, g, placed in front of the axle as described, the arms, k k, and short arm, P, of the lever, I, attached at one end to the teeth bar in front of and hinged to the axle so that on depressing the teeth bar by a forward motion of the lever, I, the points of the teeth are raised from the ground while the teeth still rest upon the axle, which serves as their fulcrum or turn-ing point, thus dispensing with the use of a separate cross-piece to sustain them in an elevated position, substantially as described.

45,347.—Electro-Magnetic Machines for Ringing Bells. —Charles Robinson, of New York City: I claim the directing wheel, stop lever and stop wheel, in combina-tion with the armature of an electro-magnet and pin wheel of a striking apparatus, substantially in the manner and for the purposes hereinbefore described. Also, I claim in combination with the stop mechanism, the regula-tor of the speed of the machine, substantially as described.

45,348.-Depthing Tools.-Artemus Rush, of Fairfield,

Inw Iowa: I claim, first. The U-shaped bar, g, in combination with the cen-ers,  $i^{\pm i^{os}}$ , of a depthing tool, constructed and operating in the nanner and for the purpose substantially as herein shown and de-

scribed. The adjustable spring, n, with the projections or pins, on Second, The adjustable spring, n, with the projections or pins, on the ends, to serve in place of the banking pins, and applied in com-bination with the U-shaped bar, g, substantially as and for the pur-pose specified. Third, The adjustable hair spring stud, l, in combination with the center, i, of the depting tool, constructed and operating in the man-ner and for the purpose substantially as set forth.

ner and for the purpose substantially as set forth. 45,349.—Corpse preserving Cases.—Ichabod Searing, of Morristown, N. J.: First, While not claiming broadly the use of an ice box, con-structed and arranged so as to form a refrigerating top for the body chamber, C, I do claim the combination of such box, top or cover, with the body chamber, C, when the whole are so constructed that the air entering the jee box will be conducted down the sides of the body chamber, and allowed to escape through the outer wall thereof, substantially as described. Second, Providing the double wall chamber, C, or the spaces be-tween the walls thereof, with divisions, c, and communications with the ide chamber, and also with the external air, substantially as herein described.

as herein described. 45,350.—Combined Grain Drill and Corn Planter.— Thomas Short, of Fáirmount, Ill.: Iclaim the swivelled furrowing shares, F, and the seeding ar-rangement, B D E, in combination with the covering roller, G, whose angular projections follow in the track of the follower, the whole ar-ranged substantially as shown and described.

(This invention relates to a machine in which the seed cylinders are so arranged that two alone may be called into requisition for the purpose of dropping corn, or the entire series may be employed for dropping seed. In connection with these cylinders the invention in-cludes a peculiar manner of using shares or runners for making fur-rows, and a roller for covering the seed after it has been deposited.]

45,351.—Dove-tailing Machines.—Willard G. Sibley, of Weston, Mass: I claim the above-described improved dovetailing machine, or ar-rangement of the mandrel carrying the cutter tools or adjustable supports the belt incheners, and the devices for holding them in place, the carriers with their gauges and stops, and the shafts and gear that operate the rising and falling of the stuff-carriers, when constructed and operating substantially as described.

45,352.—Machine for Making Screw Blanks.—Charles W. Smith.of New York City. Ante-dated Feb. 7.

W. Similardi New Fork City. Ante-tated reb. 1-1861: I claim, first, Forming screw blanks, rivets, nails, pins, and other analogous articles, by means of a series of rotary avedges, arranged with their heads and points alternating, and operating substantially as herein set forth. Second, Forming the niches in the head of screw blanks, substan-tially as herein set forth.

353.—Making Printers' Type.—John Joseph Charles Smith, of Philadelphia, Pa. Ante-dated Nov. 30,

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type, in the manner substantially as above described. 45,354.—Manifold Writing Book.—A. S. Solomons, of Washington, D. C.: I claim, first, Combinirg with one cover of a manifold writing book, a suitable case for containing carbonized paper, substantially in the manner herein set forth. Second, When a case having a removable sliding top, C, is com-bined with one cover of a manifold writing book, as is herein de-scribed, I also claim lining one side of said sliding top, C, with car-bonized paper; in the manner and for the purpose herein set forth. Third, I also claim the united stylas and lead pencil. D, when com-bined with a manifold writing book, substantially in the manner and for the purpose herein set forth.

5.355.—Raisin Seeder.—Charles L. Spencer, of Provi-dence, R. I.: I claim the improved instrument for seeding raisins described, when constructed to operate in the manner substantially as specified. 45,355.

45,356.—Cartridge Retractor for Magazine Fire-arm.--Edward Stabler, of Montgomery Co., Md.: I claim, in combination with the retractor, A, the spring, b, sub-stantially as and for the purpose set forth.

45,357.— Ventilator.—E. H. Strong, of Janesville, Wis.: I claim the combination of a series of tapering curvilinear air tutes of a form nearly corresponding with a flattened cone, with a series of ejecting or injecting surfaces, of which the upper frustrum, B, forms one section of the cone, and terminating a certain propor-tionate distance inside of the discharge pipe, and cut at their apex, by a plane passing through them at a specific angle with the upper one of a series of ejecting surfaces so arranged and disposed as to prevent spiral currents of air and secure an upward, or, by reversion of parts, a downward current, regardless of the force or angle of im-plogement of the wind upon it, substantially as shown and de-scribed.

Schoed. 45,358.—Bee Hives.—Henry Stump, of Adel, Iowa: I claim the arrangement and construction of the entrance an connecting passage in the double hive, as described, consisting of the guarded entrances, the connecting passage consisting of a slo and a series of holes in the adjacent sides respectively, and close by a slide, together with the auxiliary entrances, fi and the passage f, from the brood chambers to the honey boxes the whole forming means of communication from the outside, and from one part toan other, to be used as circumstances require, substantially as describe

[The above is one of the most practically useful hives that we have een. By its employment the condition and creation of the bees may be observed; they may be separated into new families; swarm-ing may be readily controlled or prevented, and the spare honey may be conveniently removed.]

45,359,—Chuck for Lathe.—Joseph Sutter of New York City. Ante-dated Nov. 23, 1864: I claimthe hub, h, arms, g, and links, f, in combination with the screw, k, and sliding clamps, c, substantially as and for the purposes specified.

specified.
45,360.—Pumps for Locomotive Tenders, Etc.—A. W. Sodd, of Chicago, Ill.:
I claim the combination and arrangement of the well, A. cylinders, K. frames, G G, wedges, M. Moops, G G G, pipe, L. valves, O and J, hoop, N. ropeand weight, P. rod, Q. transverse bar, H. orlifce, V, windless andrope, I, stanchions or posts, D. pulley, C. with ship and unship arrangement pulleys, F F, ropes, T T, hooks, S' S, lever, E, and fulcrum, E, sills, B, substantially upon the principle and in the manner herein set forth.

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45,361.—Magazine or Self-loading Fire-arms.—Louis Triplett, of Columbia, Ky.: I claim, first, Gradnally but fully discharging the cartridge case, and gradually returning the retractor to a position for removing an-other cartridge case, by the means substantially such as described, or the equivalent thereof, during the downward curcular movement of the barrel, substantially as set forth. Second, Retaining the retractor in position for withdrawing an-other cartridge case, and in position for admitting the full introduc-tion of a loaded cartridge by hand, by the means substantially as described, or the equivalent thereof, during the upward circular movement of the barrel, and at any desired point, substantially as set forth.

described, or the equivalent thereof, during the upward circular movement of the barrel, and at any desired point, substantially as set forth. Third, In combination with a barrel that is hinged or pivoted to the breech-piece D, II claim the V-slot, e, straight or return slot, e', switch, f, and carridge retractor, b, or the equivalents thereof, substantially as described Fourth, The application of a latch to the pivot pin. C, and tubular socker, D, for locking the barrel in a position for discharging the load, substantially as described. Fifth, So constructing the tubular magazine for containing the cartridges, and automatically reduing the into the barrel, that it constitutes the sole stock of the gun, substantially as described. Sixth, A gun stock constructed with a looped extension beyond the butt, whether the same be made tubular or sold, substantially as and for the purposes described.

45,362.—Paint Composition.—James Trippe, of Orange, J N

N. J.: aim, first, The within-described composition for a whit' pig-made of ingredients specified and mixed together, substan-as set forth. Jond, Also the use of a deposit of silica and alumina, or white in the manufacture of white paint, substantially as described. I clai tially a

45,363.—Mode of Utilizing the Waste Gas from Petro-leum Distilleries.—Herbert W. C. Tweddle, of Pitts-

leum Distilleries.—Herbert W. C. Tweddle, of Pitts-burgh, Pa.: I claim the mode hereinbefore described, of heating the furnaces of stills for distilling petroleum or carbon oil, by means of the perma-nent gas evolved from the petroleum in the stills during the process of distillation, substantially as and for the purposes hereinbefore described.

45,364.—Chuck.—A. B. Underhill, of Meadville, Pa.: I claim the formation of the cavity in the hub, to which the circle plate c, is attached, and around the mandrel, for the purpose of using a longer cone than could otherwise be used to move the jaws of a chuck, if there were no such cavity formed in the plate. I also claim, in combination with the said circle plate, c, made as described, the use of the conical wedge. G, and mandrel, A, for the purpose of operating the jaws of a chuck, substantially as described.

45,365.—Lubricator.—Wm. Van Anden, of Poughkeep-sie, N. Y.:

sie, N. Y.: I claim, first, an oil chamber in a crank pin frame, for the pur-pose as described. Second, An oil hole or passage running from the chamber, E, to the journal, C, substantially in a manner and for the purpose as de-scribed. Third, The crank pin, in combination with a frame having a chamber for the purpose substantially as described.

chamber for the purpose substantially as described.
45,366.—Window Shutter.—Jossee A. Vrydagh, Cincinnati, Ohio:
I claim, first, The reversely flexible shutter composed of slats, A a a', joint d together by tongue and groove of circular transverse section and connected by secret hinges, in the manner set forth. Second. A reversely flexible shutter composed of vertical slats, A a a'', jointed and hinge das above and guided in a serpentine or other horizontal path, by rollers, d, bearing wheels, E and VR, and bearing and guiding lateral tracks, I J, substantially as set forth. Third, The doubly flexible shutter, Figs, 1, 2 and 3, composed of wide vertical slats shod with coved mountings, b, and having vertical friction rollers, for the purposes set forth. Fourth, The doubly flexible shutter, Figs, 8, 10 and having vertical friction rollers, for the purposes set forth.

wide vertical slats shod with coved mountings, b, and having ver-tical bearing wheels journeled below the body of sail mountings and lateral friction rollers, for the purposes set forth. Fourth, The doubt flexible shutter (Figs. 8 to 14 inclusive), com-posed of wide vertical slats, of which every third slat is without friction roller and is provided with a large bearing wheel, the whole being arranged and operating substantially as set forth. Fifth, In the described connection with the reversely flexible shut-ter I claim the serpentine track, I, Figs. 2 and II, and the convoluted track, Fig. 10, substantially as described. Sixth, The serpentine track, J, Fig. 8, occupying a coved party wall, o, and enabling the housing of a reversely flexible shutter so as to afford an entirely unobstructed window or doorway, as herein ex-plained.

plained. Seventh, The hollow pier, Fig. 9, having the two reversely curved tracks, I I, for the housing of as many independent shutters, as rep-

Sighth, Connecting the slats of a reversely flexible shutter by a Expirit, Connecting the slats of a reversely flexible shutter by a Winth, The provision of the folding track, "", adapted and applied a dow as in the manner explained. The function of the slats of the removable track, R S T, as we fin described.

herein described. Eleventh, The mode of screening the lower track by means of the hinged folding sign plate, K, Fig. 12, and carpet strip, K', Fig. 3.

45,367.—Machine for making Carriage Bolts.—J. Theo-dore Wood and Edward Cone Smith, Pittsburg, Pa.: We claim the use of feed rolls so grooved as to form the round shank and square shoulder of carriage bolts on the rod continuous-hy, before the blank is severed from the rod, or the head formed thereon, in combination with suitable dies for pressing the shank and shoulder, and severing the bolt from the rod, and a heading tool for forming the head, constructed and arranged substantially as de-scribed. or forn cribed.

45,368.—Bathing Machine.—Louis Desens, Paris, France. Patented in France Sept. 24, 1862: I claim an apparatus which, while supporting a person on the sur-face of the water by means of airtight balls, cork wood, or any equivalent substance lighter than water, allows the water to freely pass through said apparatus, in the manner above described.

5,369.—Mashing Apparatus.—Charles Maitland, Alloa,

40, 303. — Masning Apparatus. — Charles Mailiand, Alloa, Scotland: I claim an apparatus for mashing, substantially such at herein de-scrihed, whereby the mush, grain, or grist, in descending to the mash tun, is met by a series of transverse and of vertical jets of water or sparge forced in by liquid pressure or by any other com petent power, and by these means the agglomeration of the mash, grist, or grain is effectually prevented, and the mash water or sparge is caused to penetrate each single grain.

[This invention consists in an apparatus for mashing whereby the nash, grain, or grist, in descending to the mash tun, is met by a eries of transverse and of vertical jets of water or spurge forced in by liquid pressure or by any other competent power, and by these revented, and the mash water or spurge is caused to penetrate each ingle grain.]

single grain.]
45,370.—Manufacture of Magnesium.—Edward Sonstadt, Loughborough, Great Britain. Patented in En-gland Nov. 8, 1862:
I claim the manufacture of the metal magnesium by acting by means of sodium on a material obtained by evaporating to dryness and then heating to redness a mixture in solution of chloride of magnesium with chloride of sodium, substantially as described, and combined therewith the employment of an iron crucible or vessel for conducting the aforesaid process, substantially as described

ionducting the aloresaid process, substantially as described i5,371.—Machine for preparing Cotton and other Fi-brous Material.—Cullen Whipple, Providence, R. I. Patented in England July 1, 1863 : I claim, first, The mode of operation by means of which the fibrous naterial is transferred from each cylinder to the next in succession, uch mode of operation consisting in causing the rows of combing eeth to be sheathed below the surface of the cylinder, and thereby ee withdrawn from the material at the points and for the length of ime in the revolution of the cylinder that will allow the teeth of the ext cylinder to take off the silver, substantially as herein dsscribed . Second, Causing the material to be combed to trayel throughout he series of combing cylinders alternately over andiunder eachin a vave line of regular curves for the purpose of drawing out the tock without breaking the fiber, substantially as described.

45,372.—Spring Tape Measure.—Wm. H. Bangs, Jr. (assignor to Nathaniel L. Bradley and Walter Hubbard), West Meriden, Conn.:
I claim the combination of the case of a spring tape measure with a spring click constructed in such manner that the click is an extension of the spring, substantially as set forth.
Talso claim the combination of the case of a spring tape measure with a compound spring click scoke, substantially as set forth.
45,373.—Bottling Still Liquids.—Josiah Beərd and Moses Fairbanks, Boston, Mass., assignor to Automatic Bottle-closing Company, New Haven, Conn.:
we claim the method of bottling still liquids, i. e. liquids not charged with gases, or stopping bottles containing such liquids, by the employment in combination with a bottle of suitable form and a ball made of ruleanized in the bottle and brougit up into the neck thereof, and which on being withfrawm from the bottle will leave betind the ball, which shall remain tightly wedged in the neck without the ad of internal pressure.
45,374.—Curtain Fixture.—Alonzo Hicks, Factoryville, Warden and the supervision of the s

45,374.—Curtain Fixture.—Alonzo Hicks, Factoryville, N. Y., assignor to Lionel Jacobs, New York City: I claim the crank pin and pendant rod in combination with the curtain roller, substantially as specified.

5,375.—Coal Oil Burner.—John G. Leffingwell, Newark, N. J., assignor to Wilmot & Kissam Manufacturing Company, Brooklyn, N. Y.: I claim, first, Attaching the upper and lower parts of a burner ith one piece of metal for the purpose of forming ahinge or guide, o that the cone or gallery can be turned over, for the purpose de-cribed 45.375

scribed. Second, I claim forming a hinge as shown in the drawing and marked 8, for the purpose described, whether made of one or two pieces of metal, as described.

45,376.—Straw Cu<sup>+</sup>ter.—Nelson Lezat (assignor to him-self and Egbert M. Palmer), New Baltimore, N. Y.: I claim the recipr ocating two-edged knife, actuated by the cranks in the manner spec. fied in 'combination with the feeding rollers, h and i, and with the bars or standing shears above and below the opening through which the straw or similar material is protruded, as and for the purposes set forth.

45.377.—Brick Machine.—William H. Paige (assignor to himself and Elisha Child, Jr.), Springfield, Mass.: I claim, first, The combination of the box, W, having suitable openings in its bottom with the bed, S, presses, D and E, operated by the eccentrics, B and C, or their equivalents, substantially as de-scribed. Second, The combination of the cam, F, arms, 1\* 1\*, connections,

scribed. The combination of the cam, F, arms, 1\* 1\*, connections, C and K, pawl, g, ratchet, h, rolls, P P, and band, R, when used in the manner and for the purpose described. Third, The combination of the cam, F, connection, c, levers, 1'i'', shafts, d d', cams, f f' f''f''', and bed, S, when used for the purpose described.

described.
45,378.—Soap for cleaning Harness, etc.—James E. Powell, Troy, N. Y., assignor to Samuel C. Glenney and Wm. E. Weeks:
I claim the composition made of the ingredients and in the man-ner substantially as above described.

[This investion consists in a new and useful composition of mat-ter, the different ingredients of which are hereinafter set forth, by which the inventor produces a new soap for treating and cleaning harness, and all other articles made of leather, and also for taking stains out of cloth, cleaning painted work, removing stains from the coats of horses, and for washing and softening their feet after traveling.]

45 379.—Composition for coating Oil Barrels.—David Ahl, Newville, Pa.: I claim the composition as herein specified, for the purposes here-in set forth. 45 379.

45,380.—Tobacco Pipe.—L. K. Bowen, Baltimore, Md.: Iclaim the new article of manufacture above described, viz, a to-bacco pipe, with a cup or receptacle constructed of metal. 45,381.—Time Fuze for Explosive Shells.—Geo. Wright,

bacco prov. and 45,381.—Time Fuze for Explosive concerns. Washington, D. C.: I claim making the fuze case annular, and fitting or pressing it into a groove or channel around the charge-hole, and connecting it with the cavity of the shell by an inlet distinct from that through which the bursting charge is introduced, substantially as and for the management of a fuze and

which the bursting charge is introduced, substantially as and for the purpose specified. I also claim such a construction and arrangement of a tuze and shell as admits of the bursting charge being introduced or withdrawn from the shell of the insertion of the fuze, substantially in the man-ner and for the purpose set forth.

# RE-ISSUES.

I.831.—Device for heating Waxed Threads in Sewing Machines.—Amos Holbrook, Jr., Lynn, Mass. Pat-ented June 21, 1864 :
 I claim combining with the rotating horn of a sewing machine a conduit for supplying gas to a burner to heat the horn, when so ar-ranged as not to interfere with the free continuous rotation of the horn in either direction, or the supply of gas to the burner.
 1832 — Horea Roka Locanb H Shiraman East Beatling

ranged as not io interfere with the free continuous rotation of the horn in either direction, or the supply of gas to the burner. 1,832.—Horse Rake.—Joseph H. Shireman, East Berlin, Pa. Patented Sept. 9, 1862 : I claim, first, Suspending the hand lever, N, upon the axle, B, so that the former may articulate upon the latter, in the manner and for the purpose described. Second, I claim the inclined way, K, in combination with the hand lever, N, arranged and operating substantially in the manner and for the purpose set forth. Third, I claim the perforated bar, T, in combination with the hand lever, N, arranged and operating substantially in the manner and for the purpose set forth. Touch, The arrangement of the driver's seat to one side of the center of the length of the continuously rotating axle, B, and in re-lation to the tight driving wheel, Al, lever, N, inclined way, K, and perforated bar, T, in the manner and for the purpose set forth. Fifth, The arrangement of the hangers, T', of the tooth board, B', on the same rod or shaft that the rake text are supported and ar-ticulate upon, in combination with an axle which transmits the power of the team to the rake during the act of discharging the hay from the set of the team to rotar of set of discharging the hay from the set of the team to rake which operates to file tooth board, B', on the set of the team to rake which operates to the angle set forth. Filed the manner of the team the operates of the start and brance pield the manner of the team through the agency of the axle, substan-tially as set forth.

#### DESIGNS.

2,004.-Table Caster.-Michael Moore, Brooklyn, N. Y. 2,005.—Cook's Stove.—Russel Wheeler and Stephen A Bailey, Utica, N. Y.

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last ex-Commissioners of Patents. MESSRS. MUNN & CO.:--I take pleasure in stating that, while I hele the office of Commissioner of Patents, MORE THAN ONE-FOURTH ON ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. have no doubt that the public confidence thus indicated has bee 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.

Judge Mason was succeeded by that eminent patriot and statesman Hon. Joseph Holt, whose administration of the Patent Office was s distinguished that, upon the death of Gov. Brown, he was apponted to the office of Postmaster-General of the United States. Soon afte entering upon his new duties, in March, 1859, he addressed to us the following very gradifying letter.

MESSRS, MUNN & CO. :--It affords me much pleasure to bear test mony to the able and efficient manner in which you discharged you duties as Solicitors of Patents, while I had the honor of holding th office of Commissioner. Your business was very large, and you sus tauned (and I doubt not justly deserved) the reputation of energy marked ability, and uncompromising fidelity in performing your pro fessional engagements. you the

# ments. Very respectfully, your obedient servant, J. Holt.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows: MESSRS. MUNN & CO.:--It gives me much pleasure to say that, dur-ing the time of my holding the office of Commissioner of Patents, a very large proportion of the business oi inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant, WM. D BisHoP. WM. D

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**T**REJGHT CONDUCTORS AND BRAKEMEN WANT-ED.—The BALTIMORE & QHIO RAILROAD COMPANY want a number of experienced RAILROAD MEN to run upon its numer-ous freight trains, on its five several divisions between Baltimore and Wheeling and Parkersburg. The best wages will be paid and regular employment given to such men as will report to either of the following agents, who are authorized to take them on duty:— A. J. FAIRBANK, Agent First Division, Mount Clara Station, Baltimore City, Md. D. DARBY, Agent Second Division, Martinsburg, one hundred miles from Baltimore. J. F. WALL, Agent Third Division, Piedmont. W. CARR, Agent at Gradton for the Parkersburg Road; and

ailes from Baltimore. J. F. WALL, Agent Third Division, Piedmont. W. CARR, Agent at Grafton for the Parkersburg Road; and J. B. FORD, Agent at Wheeling for the Fourth Division. W. P. SMITH, Master of Transportation. Baltimore, Md., Dec. 8 1864.

ARMY SUPPLIES. OFFICE OF ARMY CLOTHING AND EQUIPAGE, NO. 602 Broadway, New York, Dec. 8th. 1864. SEALED PROPOSALS WILL BE RECEIVED AT baling Army Blankets, until the 1st of May next, the Contractor to furnish all materials nccessary to bale the blankets in a satisfactory manner to this department. The services to be performed in the buildings of this Depot, the Contractor to supply the machinery. Further information can be obtained at this office. Bidders will state the number of bales they can put up per week, and send with their proposals a proper guarance signed by two responsible per-sons, stating that if a contract is awarded to the bidder, they will enter into bonds for the faithful performance of the work. The United States reserves the right to relect all bids deemed ob-jectionable. Proposals should be endorsed "Proposals for Baling Blankets," and addressed to COL. D. H. VINTON, D. Q. M. Gen. U.S.A.

COL. D. H. VINTON, D. Q. M. Gen. U.S.A.

 ${f F}^{
m or}$  the holidays and winter evenings. Innocent Moral Fireside Games have become a necessity in

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Market streef, Philadelphia. A T A Market streef, Philadelphia. A NTED. — TWO YOUNG MEN (BROTHERS), with a number of years' experience in the Hardware trade in this city, of first-class business ability, and unquestioned char-acter, with \$10,000 at their command, are desirous of finding some 'a tent article in their line of trade, the introduction and sale of which would occupy their entire time and energy to advantage. None but good and useful articles of real merit will be considered. Address H. A. P., Box 5,499, New York City Post-office. 24 13

THE OUNCE BOOT-DRAWER AND PANTALOONS GUARD.—This article, recently illustrated in this paper, is not a rapid sale, and is pronounced by every one to be a com-plete thing. Yankee notion dealers, sutlers, shoemakers and dealers in military trimmings, also general hardware stores and country merchants can make large profits and find a ready sale for this arti-cle. They are in japanned iron and will fit any boot: easily attached in two minutes, and really the neatest thing for a small article ever seen. One pair sent free by mail for 40 cents. I will send on. dozen pair by express for \$2 40, charges not paid; one gross for \$24; half more, not \$20 or 30 or 50 or 50 or 50 or \$24; half

gross for \$13. N. B.-Parties ordering in this way will please send the exact price, not 20 or 30 cents, and say they have no more change. Do business in a business manner. Money orders on the Post office re-ceived. EGBERT P. WATSON, Box 773, New York Post-office.

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WANTED.-\$125 A MONTH! AGENTS EVERY. Machine, the only low price machine in the country which is li censed by Grover & Baker, Wheeler & Wilson, Howe, Singer & Co. and Bachelder. Salary and expenses, or large commissions allowed All other Machines now sold for less than forty dollars each are in fringements, and the seller and user liable. Illustrated circular sent free. Address Address sent free. 23 12\* SHAW & CLARK, Biddeford, Maine

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# ARMY SUPPLIES.

ARMY SUPPLIES. CLOTHING BUREAU, QR. M. GENL'S OFFICE, Washington, Dec. 8th, 1864. SEALED PROPOSALS WILL BE RECEIVED AT the respective offices of Army Clothing and Equipage in New York City and Philadelpha, until 12 o'clock M. on Wednesday, the 21st inst., for furnishing by contract at the Depot of Army Clothing and Equipage in either City, at the option of the Contractor, 200 000 Army Blankets, wool, gray (with the letters U. S. in black, 4 inches wide, to weigh five pounds each. Proposals will be received for the delivery of Blankets of either American or Englishmanufacture, but must be in all respects equal to the army standard at the respective Depots where they are to be delivered. Bidders will state the number they wish to furnish how soon they

delivered. Bidders will state the number they wish to furnish, how soon they can commence, and the number they can deliver monthly: Proposals must be accompanied by a proper guarantee, signed by at least two responsible parties, setting forth that if a contract is awarded to the party making the bid, that he or they will at once ex-ecute the contract and give bonds for the faithful performance of the same.

ecute the contract and give bonds for the fathing performance the same. The United States reserves the right to reject all bids deemed ob-jectionable. Proposals should be endorsed "Proposals for furnishing Blankets," and those for New York should be addressed to Brig. Gen. D. H. Vinton, Dy. Qr. Mr. General, New York City; and those for Phila-delphia should be addressed to Col. Herman Briggs, Qr. Mr. Depart-ment, Philadelphia.

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MUSICAL BOXES, PLAYING FROM 1 TO 24 tunes, costing from \$3 50 to \$750. Every variety of the new-est accompaniments: VOIX CELESTES (Celestial Voices), ORGANO-CLEIDES, MANDOLINES, EXPRESSIVES, PICOLO, BELLS, DRUMS, CASTI-NETS, etc., etc. Musical BOxes are very durable, and are exceeding-ity desirable for HoLDAY PRESENTS. They are fine ornaments for the parlor, as well as pleasant companions for the invalid. Having given my special attention to that trade for over 15 years, I am able to supply any want quicker and better than any house in this coun-try. M. J. PAILLARD, Importer, No. 21 Maiden Lane (up stairs), New York. Musical Boxes repaired. 235

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FOR SALE.—ONE FLUE BOILER, 30 FEET LONG by 45 inches diameter, with two 14-inch return flues, including ooiler front, bonnet, pipes, valves, etc., all complete; has been in use about five years, and is in good condition. Please address Plant a Manufacturing Company, New Haven, Conn. 21 tf

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DIAMOND PARLOR MATCHES.

These Matches are the BEST IN THE WORLD, SURE FIRE, WITHOUT SULPHUR, no disagreeable smell, and a luxury and comfort to smokers and people with weak lungs. For sale, wholesale

comfort to smokers and revel. and retail, by THE LODI MANUFACTURING COMPANY, No. 66 Cortlandt street, New York.

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The publishers of the SCIENTIFIC AMERICAN have just prepared with much care, a pamphelt of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after read-ing the following synopsis of its contents :---The complete Patent Law Amendment Act of 1861-Practical In-structions to Inventors, how to obtain Letters Patent, also about Models-Designs-Caveats-Trade-marks-Assignments-Revenue Tax -Extensions-Interfrences-Infringements-Appeals-Re-issues of Defective Patents-Validity of Patents-Abandonment of Inventions -Best Mode of Introducing them-Importance of the Specification -Who are entitled to Patents-What will prevent the granting of a Patent-Patents in Canada and European Patents-Schedule of Pat-ent Fees; also a variety of miscellaneous items on patent law ques-tions. D

tions. It has been the design of the publishers to not only furnish, in con venient form for preservation, a synopsis for he PATENT Law and PRACTICE, but to answer a great variety of questions which have been put to them from time to time during their practice of upwards of secences years, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps. Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, NO, 37 Park Row New York.

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CAVALRY HORSES WANTED CAVALRY BUREAU, OFFICE OF ASSIST. QUARTERMASTEN, NO. 18 State street, New York, June 10, 1864. I WILL PURCHASE IN OPEN MARKET ALL THE Calva'; Horses that may be presented and pass inspection at the Government Stables, corner of 10th avenue and 35th street, in this city, until : "her notice. Payment will be made in checks payable in certificates of indebted-ness, whe is siven (7) or more horses are received. Price, one hun-dred and suxy dollars each. 6 tf GEO. A. BROWNING, Capt. and Assist. Qr. Mr

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Notice. Steels or Irons for all kinds, Farming Machines forged or worked into any shape desired, and finished in any style required. All communications promptly answered. Address D. B. ROGERS & SONS, Pittsburgh, Pa. 16 10<sup>e</sup>

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BELKNAP & BURNHAM, MANUFACTURERS OF Globe and Check Valves, also Steam and Gas Cocks, Bridge-port, Conn.

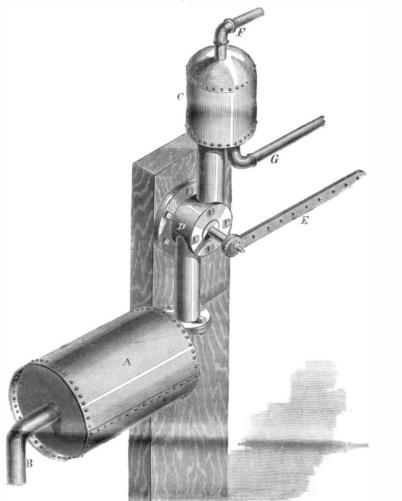
TO INVENTORS OF ANY IMPLEMENTS FOR FAR-MER'S use, requiring the use of iron or steel, an opportunity may be found to dispose of or develope the same, by addressing, with description, Box 532, Pittsburgh, Pa. 16 19\*

# Improved Apparatus for Oil Wells.

The object of this invention is to augment the flow of petroleum in sluggish wells; also to collect and save the gas arising from the oil, so that it can be used for illumination or fuel. To effect these objects the receiver, A, is provided, having a pipe, B, leading into it from the well. Between the receiver and the gasometer, C, there is a double acting lift and force pump, D, placed, which is worked by the brake, E, either by hand, or power. When this pump is operated, the air in the receiver, A, is exhausted,

piece of cast iron could be made into such form, or be applicable to so many different uses, as the one represented in this engraving. The ordinary stove lifter has been the subject of many patents, which have returned money to the inventors of them. This fact shows that there is nothing in daily use so small, or so insignificant, that it cannot be made to vield a good profit to the person who shall improve upon it so as to increase its utility.

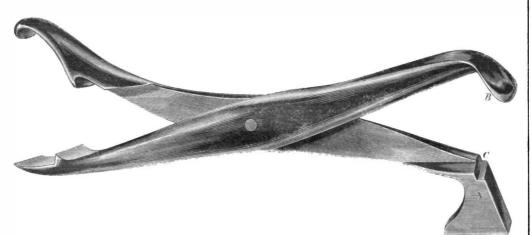
The hook here shown, which the inventor styles a "Dexter," can be used for lifting pans from the oven,



HOBBS'S APPARATUS FOR OIL WELLS.

the receiver the oil is pumped into the gasometer, C, the fire, and for other purposes that stove hooks are in the upper part of which is a pipe, F, to carry the gas to any desired point; there is also another pipe, G, through which the oil enters tanks or barrels ting down carpets, etc. When closed, the jaw, B, placed beneath it. As the gas passes through water | forms a pair of pincers with the back of the hammer,

which causes the oil to flow readily into it. From | for raising the covers to stoves or ranges, to replenish applied to. In addition, there is a hammer head, A, which is exceedingly convenient for driving nails, put-



# REYNOLDS' STOVE HOOK.

it is rendered perfectly safe to use. This apparatus | so that the hem of a carpet can be caught and therefore saves all the oil and increases its flow by the pressure of one atmosphere. It was patented Sept. 27, 1864, by Isaac H. Hobbs, of Philadelphia, Pa.; of whom all further information can be had.

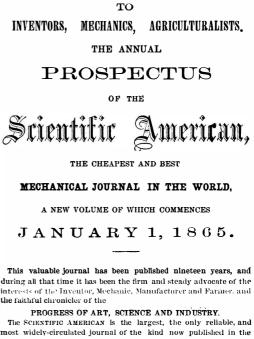
Improved Stove Hook. Few persons would imagine that a common

stretched by it, and the little notch. C. lets the wired edge of a tin pan in so that the body is firmly caught. The other end of this stove hook can be used for lifting hot sad irons; in fact anything that cannot be touched by the hand. There is a spring inside between the two parts of this utensil which keeps the jaws 'open, ready for use, as shown in the engraving. This is a very convenient article, and will doubtless be popular with all housekeepers.

A patent is ordered to issue on it through the Scientific American Patent Agency, by Edwards Reynolds, of Corunna, Mich. For further information address him at that place.

CAPTURE OF MORE BLOCKADE RUNNERS .- The blockade runner Vixen, a new English vessel built especially for speed, was recently caught by the Rhode Island, a large ocean steamer. It is stated that the Vixen's wheels revolved with such velocity that all the buckets were thrown off. We do not hear that the *Rhode Island* threw off any. The Armstrong was also recently captured by the Gettysburg. The blockade runners are all fine new vessels, but are no match whatever for our own steamers in speed.

THE plow makers of the Northwest had a convention at Chicago last week, at which it was resolved to advance the price of plows twenty per cent.



United States. It has witnessed the beginning and growth of nearly all the great inventions and discoveries of the day, most of which have been illustrated and described in its columns. It also contain a WEEKLY OFFICIAL LIST OF ALL THE PATENT CLAIMS, a feature of great value to all Inventors and Patentees. In the

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this latter department being very full and of great value to Farmers and Gardeners; articles embracing every department of Popular Science, which everybody can understand.

PATENT LAW DECISIONS AND DISCUSSIONS

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