SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter.]

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

Vol. XLVII.—No. 15. [NEW SERIES.] NEW YORK, OCTOBER 7, 1882. [$3.20 per Annum. [POSTAGE PREPAID.]

THE ITALIAN IRONCLAD DANDOLO.

The new twin-screw, double-turret vessel Dandolo, belonging to the Royal Italian Navy, completed, not long ago, the trials of the machinery previous to joining the squadron in the Mediterranean. Excepting the omission of the internal torpedo deck, she resembles the sister ship Duilio, in her general arrangement, but she has considerably surpassed her in speed. The Dandolo was built at the Royal Naval Arsenal at Spezia, under the supervision of Director Borghi, at whose suggestion the whole of the bow plating is worked flush, instead of the plates overlapping as usual. The length of the vessel is 337 ft. 8 in.; the breadth 62 ft. 3½ in.; the mean draught at the trials with armament on board was 28 ft. 9 in.; giving a total displacement of 11,225 tons. The battery is heavily armored, and is placed in the middle of the vessel; the two turrets rise above the weather deck, and are placed diagonally in the battery, so as to enable all four guns to be fired fore and aft. The armor of the turrets is impenetrable to all except the heaviest modern artillery. Each turret contains two 100-ton Armstrong guns made at Elswick, having a bore 17·72 inches, throwing a shot 2,018 lb. with a *maximum* of 511 lb. of powder, the ordinary charge being 355 lb. The turrets and guns are moved and worked by a complete system of hydraulic gear made at Elswick. The loading is also done by the same means, the rammers being below the weather deck and arranged to enter the gun when the muzzles are depressed for the purpose. Between the turrets is situated the mast, which really assumes the function of a lookout tower, as there are no sails.

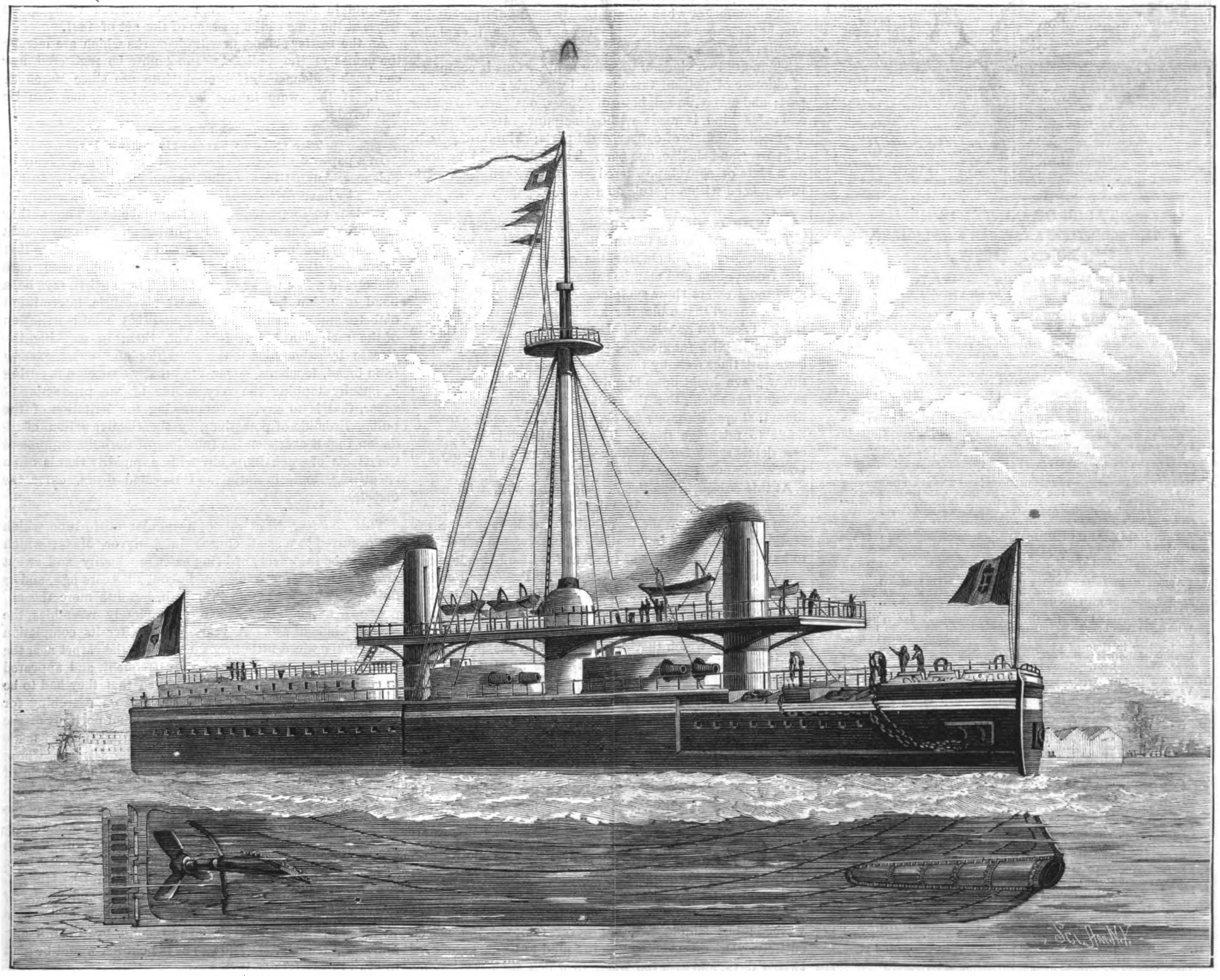
The vessel is fitted with Forrester's steam steering gear, as well as very powerful hand steering gear, and has a beautiful self acting arrangement, designed and fitted by the Italian constructors for checking and holding the tiller; in case of the chains breaking the tiller would lock itself amidships and remain at rest till the new chain was reeved.

The Dandolo carries four large steam launches, and eight other boats, all hung upon hinged davits, which are worked from the steam capstan, and which will hoist them right in board. The Dandolo is propelled by twin screws, worked by two independent pairs of engines, which were contracted to indicate a *maximum* power of 7,500 horses. These engines, together with the pumping and blowing engines, were constructed by Messrs. Maudslay, Sons & Field, of London. They are the first compound engines which were ordered for the Royal Italian Marine, though they have been awaiting the completion of the ship at Spezia since 1876, when they were brought out in the royal transport Europa. Each set of engines is placed in a separate water-tight compartment, one at each side of the vessel; instead of being side by side they are situate one in advance of the other, the alternate spaces being occupied by the magazines, which are placed immediately below the turrets. Each pair of engines has one high pressure cylinder, 64 in. in diameter, and one low pressure, 120 in. diameter, with a stroke of 4 ft. Steam of 65 lb. pressure is supplied by eight large oval and double-ended boilers, having 32 furnaces in all. Four boilers are placed forward of the engines, and the other four aft; but each pair of boilers is contained in a separate water-tight compartment. The chimneys, which are ample in size and height, are built of one-inch plate from the main deck to the flying deck above the turrets, so as to enable them to withstand the great shock produced by the discharge of the guns.

A very perfect system of fans and ventilating pipes has been carried out, so that the whole of the cabins and even the engine room are kept perfectly sweet and fresh. There is also another arrangement for ventilation very closely resembling in principle the furnace system of ventilation in a mine.

On the 25th of May the Dandolo proceeded to sea for her first official trial, under the command of Commandante E. Acton, who was accompanied by Admirals Martin-Franklin and Caimi. The run to Genoa and back was accomplished without stopping in 6 hours and 28 minutes, with a mean indicated horse power of nearly 7,200, and a maximum of 7,415 horses, and the speed obtained was 15½ knots, with a consumption of 51¼ tons of coal. The main object of the run was to ascertain the consumption of fuel on a prolonged full-power run. On the 29th of May the vessel was taken on the measured knot trial, when a speed of 15·55 knots was obtained with 8,050 horse-power. Our engraving is from *La Ilustracion Espanola*.

AMONG the instruments described during the late meeting of the British Association was one exhibited by Sir F. Bramwell, employed for ascertaining the velocity of trains and the efficiency of brakes. With this apparatus it was found that a train weighing 125 tons ran 5 miles 5 yards after steam was shut off while traveling at a speed of 45 miles an hour. The line was level and the day calm.



THE ITALIAN IRONCLAD DANDOLO.

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 261 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year postage included..... **$3 20**
One copy, six months postage included **1 60**

Clubs.—One extra copy of THE SCIENTIFIC AMERICAN will be supplied gratis for every club of five subscribers at $3.20 each: additional copies at same proportionate rate. Postage prepaid.
Remit by postal order. Address

MUNN & CO., 261 Broadway, corner of Warren street, New York.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, $5 00 a year, postage paid, to subscribers. Single copies, 10 cents. Sold by all news dealers throughout the country

Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year postage free, on receipt of *seven dollars*. Both papers to one address or different addresses as desired.
The safest way to remit is by draft, postal order, or registered letter.
Address MUNN & CO., 261 Broadway, corner of Warren street, New York.

Scientific American Export Edition.

The SCIENTIFIC AMERICAN Export Edition is a large and splendid periodical, issued once a month. Each number contains about one hundred large quarto pages, profusely illustrated, embracing: (1.) Most of the plates and pages of the four preceding weekly issues of the SCIENTIFIC AMERICAN, with its splendid engravings and valuable information: (2.) Commercial, trade, and manufacturing announcements of leading houses. Terms for Export Edition, $5.00 a year, sent prepaid to any part of the world. Single copies 50 cents. ☞ Manufacturers and others who desire to secure foreign trade may have large, and handsomely displayed announcements published in this edition at a very moderate cost.
The SCIENTIFIC AMERICAN Export Edition has a large guaranteed circulation in all commercial places throughout the world. Address MUNN & CO., 261 Broadway, corner of Warren street, New York.

NEW YORK, SATURDAY, OCTOBER 7, 1882.

Contents.

(Illustrated articles are marked with an asterisk.)

TABLE OF CONTENTS OF

THE SCIENTIFIC AMERICAN SUPPLEMENT,

No. 353,

For the Week ending October 7, 1882.

Price 10 cents. For sale by all newsdealers

BLUE FIRE AS AN EXPLOSIVE.

Last winter a fire in the pyrotechnic establishment of Professor Samuel Jackson, at Chester, Pennsylvania, resulted in an explosion more severe and disastrous than could be accounted for by the quantity of explosive material known to be stored in the building.

The recent occurrence of an explosion in the yard of a New Zealand chemist who had compounded an unsatisfactory blue fire, and had sent an assistant out to destroy it, has put Professor Jackson on the track, he thinks, of an explanation to the mysterious explosion in his establishment. The New Zealand explosion resulted from throwing a little water on the burning blue fire. Professor Jackson remembered in a small building attached to his factory there were stored a number of blue light stars. He had made blue light for nearly forty years, and had never known it to develop extraordinary force; yet, acting on the hint given by the New Zealand accident, he set about making experiments, which have convinced him that blue light powder fired by a detonating compound is not only explosive, but more powerful than dynamite in its explosive effects. In a public experiment to test the explosiveness of blue fire, made at Woodbury, N. J., a tube containing a couple of pounds of the blue fire was placed in the earth and a huge stone laid on top of it. The party went off a couple of hundred feet, and the detonation was caused by electricity being applied to a percussion cap. The effect was startling. The stone was shattered into fragments, a large hole was dug into the ground, and a cloud of dirt and dust thrown into the air at least a hundred feet. The same amount of powder was exploded under exactly similar conditions, but the result was nothing worth speaking of. A little gunpowder was placed in the top of the can of blue fire, and it was exploded with about the same result as the previous one had been. Fire was applied to a can of the blue fire, and it merely burned up.

Speaking of this and subsequent experiments, Professor Jackson said to the Philadelphia *Record* that concussion will always cause a detonation of blue fire, especially when it is highly heated. He believes that the Chester explosion resulted from a spattering of water on the highly heated cars containing the blue fire mentioned. A direct stream of water, he thinks, could not possibly have resulted in an explosion.

Professor Jackson believes that blue fire will be found valuable as an explosive for blasting purposes. It is more powerful than dynamite, and safer, since it is a more stable compound, and is not liable to explode when struck with a hammer or when dropped. By means of a percussion cap, or the concussion of exploding gunpowder, it explodes readily, wet or dry.

There are two kinds of blue fire made. One is composed of chlorate of potash, three parts by weight; sulphur, one part; and ammonio-sulphate of copper, one part. Another and safer kind is made without sulphur. Its formula is: Ammonio-sulphate of copper, eight parts; chlorate of potash, six parts; and shellac, one part. The salts should be dried on a plate or shovel, powdered separately, and then carefully mixed with a spatula on a sheet of paper.

THE COMMON MUSHROOM AND ITS POISON.

The current belief is that, while many fungi are virulently poisonous, others, including the common mushroom, are free from poison and may be eaten in any quantity. When mushroom eaters show symptoms of poisoning, it is accordingly assumed that a blunder has been made, and noxious species taken for or with wholesome ones. The fact that an eminent English fungiologist is numbered among those who have lost their lives by the alleged mistake, would seem to throw grave doubt upon blunder theory, unless it be true, as some have held, that the edible species are mimicked by those that are poisonous so closely that the most expert is liable to misjudge them. The fear that this may be the case deters many from making any use of this savory and nourishing but treacherous vegetable.

At this season, when the fields abound with wild mushrooms, and when multitudes might find in them a cheap and enjoyable addition to the daily bill of fare if they were not afraid to eat them, it is a matter of considerable importance to have the real standing of fungi as food stuffs made clear.

According to recent investigations by Professor Ponfick, of Breslau, the question seems to be, not how to distinguish poisonous from harmless species, but how to treat mushrooms of every sort in such a way as to remove or neutralize the poison which they all contain, with the proper precaution of using this class of food stuffs at all times with moderation.

Professor Ponfick finds that repeated washing with cold water removes most of the poison of mushrooms, and cooking, especially boiling, dissolves out the rest. The water in which mushrooms are boiled, however, is always poisonous, more so even than raw mushrooms. Experiments made upon dogs showed that if a dog ate one per cent of its own weight of raw mushrooms it fell sick, but recovered; one and a half per cent produced violent illness; and if the dog ate two per cent of its weight, the result was always death. Of boiled mushrooms dogs ate ten per cent of their weight without harm. When the mushrooms were well washed with cold water, a larger quantity could be eaten raw without bad effects than was possible with those that were not washed; but simple washing never removed the poison entirely. Dried mushrooms were found to be dangerous for twenty days, and also the water in which such mushrooms had been boiled. They were not really safe until after four months' drying.

The moral is: treat all mushrooms as poisonous; carefully throw out the water in which they have been washed or boiled; cook them well, and never eat them in large quantities. If men are no more susceptible than dogs are to the poison, a man can as safely gorge himself with well boiled mushrooms as with beef or any other highly nitrogenous food. When otherwise cooked, or when the species is doubtful, a sparing use is always prudent.

The fact that all mushrooms and allied growths are more or less poisonous should be no bar to their use as food, proper care being taken in the cooking and eating. The common potato is not free from poison; and the juice of the root from which tapioca is made is a virulent poison. The latter poison is expelled by heat, and the former is in quantity too small to be harmful, as is the case with many other useful vegetables.

In preparing mushrooms for the table, safety is assured, not by looking for specific characteristics supposed to indicate harmlessness, but in considering all as poisonous and requiring judicious treatment to destroy or remove their noxious qualities. This properly attended to, mushrooms and many other fungi are not only edible, but really delicious and valuable food stuffs.

MODIFICATION OF THE TRADE MARK LAW.

The following act, relating to the registration of trade-marks, was passed at the last session of Congress:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That nothing contained in the law entitled "An Act to authorize the registration of trade-marks and protect the same," approved March third, eighteen hundred and eighty-one, shall prevent the registry of any lawful trade mark rightfully used by the applicant in foreign commerce or commerce with Indian tribes at the time of the passage of said act.

Section 3 of the law relative to the registration of trade-marks, approved March 3, 1881, expressly prohibits the registration of a trade-mark which is merely the name of the applicant.

This rule was found to discriminate seriously against old, well-established, and valuable trade-marks, like "Collins' Axes," "Fairchild's Pens," and others. Accordingly an act was passed at the last session of Congress, and approved August 5, 1882, so modifying the above-mentioned section as to authorize the registration of the prohibited class of trade-marks, provided they were in rightful use by the applicants in foreign commerce or commerce with Indian tribes at the time of the passage of the act of 1881.

As the matter stands, new trade-marks which are merely the names of the applicants cannot now be registered, nor can such trade-marks, if brought into use since March 3, 1881. If they were in use before that date, they can be registered.

The Cure of Saccharine Diabetes.

In a paper by Dr. G. Félizet, read before the Academy of Sciences, August 14, says the *Journal d'Hygiene*, the author claims to have discovered a remedy for a disease usually regarded as incurable—saccharine diabetes. The author states that he has succeeded in putting an end to glycosuria artificially produced in animals, and that the medicine that suppresses that artificial glycosuria will likewise cure diabetes in a few weeks or months. There exists, says he, a bond of union between artificial glycosuria, intermittent diabetes and confirmed diabetes, and that bond is irritation of the rachidian bulb. It is not, then, in masking the disease by submission to the severities of a regime exempt from bread, feculents, sugar, etc., that we succeed in curing it, but by tapping the very source of the production of sugar, that is to say, by suppressing the irritation of the bulb. Bromide of potassium, by the elective action of sedation that it exerts on the functions of the bulb, suppresses the effects of such irritation with a rapidity that is often surprising, and, in large and repeated doses, cures the diabetes.

THE *Building News* relates a singular misfortune which has occurred to a small church in Andover, Mass., which seems to be in process of being eaten up bodily and swept away. The church was erected about six years ago, and is finished with what is said to be ash, but has more the appearance of chestnut, which often closely resembles the coarser kinds of ash. A year or two after its completion the sexton noticed little heaps of dust on the carpet near the walls. These grew more and more frequent, and appeared in various portions of the building, so that they had to be gathered up regularly every week, and on searching for their cause the wood of the base-boards and portions of the pews was found to be completely riddled with holes made by small, round, black or blue worms, the *debris* of whose borings fell out occasionally upon the floor in the form of dust. Unlike most boring worms, this species seems not to object to the taste of varnish, for the polished surface of the wood is pierced in thousands of places. The stock was regarded as completely seasoned and in good condition when put into the building, but it would seem that it must have contained the embryos of the insects, for the finish of the galleries is attacked equally with that of the ground floor. If any of our readers, adds the *News*, met with a similar case we should be pleased to receive an account of it, and if any know of a remedy, the trustees of the church would be glad to avail themselves of it.

MR. GOLDING'S THEORY OF MISSISSIPPI FLOODS AND THEIR PREVENTION.

The Mississippi River Commission, to whom is allotted the planning of works for the improvement of navigation and the prevention of disastrous overflows along the Mississippi, are working on the theory that the existing channel of the river is ample for the discharge of all its waters, and needs only to be made uniform in breadth and depth, and kept within bounds by protected banks, to meet all possible requirements. Where the river is narrow the velocity of its flow enables it to carry a heavy load of silt, which is largely dropped in the wider places, where the flow is naturally less rapid. In this way vast sand bars are built up, at once a hinderance to navigation and a source of danger during floods. The commission believe that the proper work to be done is to confine the low-water width of the channel to about three thousand feet by systems of jetties wherever bars or shoals are found, thus compelling the river to scour out a deeper channel. In times of flood the spaces outside the corrected channel are expected to be built up by earthy materials dropped by the river, the ultimate effect being to develop new and stable shore lines, and secure conditions requisite for a uniform velocity for all stages of the river. This done, it is believed that the discharging capacity of the channel will increase so rapidly with the rising of the flood level, owing to the augmented rapidity of flow secured by uniform width, that any serious overflow will be practically impossible. This system naturally involves the restoration of the broken levees and the closing of all outlets save those at the river's mouth.

Our correspondent, Mr. William Golding, of New Orleans, argues that the work proposed by the commission will be mischievous rather than beneficial. The view he takes of the problems presented by the Mississippi and its overflows are novel, to say the least; and as an independent contribution to the discussion of those problems his argument, which we present substantially in his own words, certainly merits consideration.

There is, he insists, nothing peculiar in the Mississippi River. The power of the river is fixed by its height at Cairo above the level of the Gulf; and this power, whatever it may be, is entirely consumed in overcoming the friction of the river bed, which in length is eleven hundred miles. If there be made at proper places outlets by which the river may reach the Gulf by a shorter route, the friction of the bed will be reduced in proportion, and the rate of incline for the remaining portion of the bed will be increased. The dynamic store remaining the same, the discharging capacity of the river as a discharging trough, he thinks, will be greatly increased by such shortening.

In regard to scouring, he holds that for the river to scour or do any other work requires power, and as this power must be taken from the dynamic store of the river it must lessen the discharge.

In regard to contracting the river for the purpose of scouring, he holds that the first effect will be to lessen the inflow or pastflow at the point contracted. The next effect will be to raise the head until the increased velocity, due to elevation, will discharge the original quantity. Therefore, if we contract the river at an indefinite number of points we will have an indefinite number of steps, the aggregate of which will be an inclined plane extending from Cairo to the Gulf. And in the same proportion as we narrow or contract the river, we reduce the discharging capacity of the trough.

He also holds that to deepen the river by any means to a point lower than the outlet or gulf will not increase its discharging capacity, for the reason that the water which is below the outlet does not progress, but merely rolls over, just as the bed rollers of a sawmill carriage do.

For instance, the river in front of New Orleans is 130 feet deep, yet the surface is only 14 feet above the Gulf surface. Now, if the entire bed progressed like a block of marble, the friction to be overcome would be, first, the bottom, 3,000 feet, and two sides, 100 feet each—say 3,200 feet of contact surface. Whereas, if only the depth of the water above the Gulf be counted as progressing, the contact friction will be 14 feet on each side, and the bottom friction will be only that required to maintain, in a rolling motion, the bed water, which might be termed an anti-friction roller. Special stress is laid upon this feature of water moving in a trough.

In regard to levees he holds that nature has shown that to convey the Mississippi water and material 1,100 miles requires a fall of 322 feet. If we build levees as high as the land above and at Cairo, and taper them down to the Gulf, the river will not, at its present width, discharge a single cubic foot more water than it does at present. And if the river bed were deepened to a point 100 feet below the surface of the Gulf, for the entire distance from Cairo to the Gulf, the discharging capacity of the river would not thereby be increased. Therefore, to increase the discharging capacity of the river we must, in his opinion, widen the trough—not contract it; and to increase the velocity of the flow we must either raise the head or shorten the trough. The fact that the river water is muddy and bears with it to the Gulf a large quantity of soluble and insoluble material creates no new law; neither does it necessarily add to the complexity of the subject.

The theory that outlets cause the river to shoal below such outlets he disputes, as unsustained by fact.

We must concede, he continues, that the river will not leave its bed to follow a longer channel to the Gulf; and where an outlet is opened which offers a shorter route there can be no new phenomena in the course of the river in pursuing this new channel, nor can any new conditions arise after it enters the Gulf. The passes, as they are called at the mouth of the river, are neither more nor less than outlets, and there is no reason why another outlet should act differently or present new difficulties.

The periodical overflows to which the Mississippi is subject, Mr. Golding believes to be due to other causes than the malformation of its trough. Chief among these causes he places the attractive influence of the sun, moon, and the several planets when in conjunction. This planetary theory of Mississippi floods is decidedly novel; how well founded it may be in the nature of things may be left to astronomers and hydraulic engineers to determine.

The tides raised by solar, lunar, and planetary influence in open seas quickly subside for the reason that there is nothing to prevent the water's flow. Altogether different, Mr. Golding holds, is the effect of the planetary influence upon the river, in which the water is entrapped by the numerous bends and right angles, and in many places reverse curves, and its progress to obey the law of gravity is halted by the higher law of planetary attraction.

If the spring floods are released during the time that the several planets which produce the tides are approaching conjunction, the effect of the planetary attraction will be to impede the flow due to gravity to some extent each tide, and to gradually fill the banks of the river and tributaries at the point where the planetary influence is greatest, which he assumes from the experience of last spring to have been at Helena, Arkansas.

When the planets separate and change position the attraction gradually weakens, gravity again asserts its sway, thus precipitating the immeasurable accumulation of water upon the lower river.

To receive and bear away this avalanche the utility of properly constructed and properly located outlets cannot, he holds, be seriously questioned.

He does not maintain that the tidal water is drawn up from the Gulf, but that the inflow is retained by the bends in the river. Thus, supposing the "planetary" influence to be equal to the attraction of the water only one foot above the natural line, as soon as the influence is gone the water would have to run at two miles an hour twenty-two miles to get to its normal level, yet before this point could be reached the planetary influence would return and call it back, which condition would be repeated every day for fourteen days, when the influence would begin to weaken. At this stage the flood in the lower river commences.

This, he believes, is exactly the condition experienced last spring, and he is confident that if the flood water had flowed into the lower river fifteen days sooner, or fifteen days later, there would have been no flood to speak of.

To substantiate this position he cites the fact that the Atchafalaya, which is 1,200 feet wide, and usually a very sluggish stream, was conveying more water past Morgan City in the forepart of April than the Mississippi River conveyed past New Orleans, its depth then being 60 feet and its velocity estimated to be 7½ miles per hour.

In addition to this there was flowing over the Morgan Railroad bed, between New Orleans and Morgan City, a stream twenty miles wide by five feet deep, flowing with a velocity of three miles per hour, fully ten times more water than the Mississippi River conveyed past any point below Cairo. It was water which had been held back by planetary attraction.

Mr. Golding believes that the proper way to improve the river is to remove the levee in front of selected outlets during low water, and construct brickwork facings with alternate openings to receive the water and blanks to exclude driftwood. Suitable levees should conduct the flow from the outlets to the swamp. He would place these openings at every available place on both sides of the river between the mouth of Red River and the Gulf. The swamps all connect in some way with the Gulf, so that there would be no danger of filling the swamps unless by turning in too much at any one place. He would also restore the broken levees. The effect of these outlets would be, he thinks, equivalent to bringing the Gulf level to the mouth of the Red River. The slope of the river bed above that point would thus be made steeper and the flow of the stream much faster, the risk of overflow being correspondingly diminished.

TILE FISH.

During the past summer the United States Fish Commission has searched in vain for the tile fish (*Lopholatilus chamæleonticeps*), formerly so abundant along the inner edge of the Gulf stream, south of Long Island; and in the early fall the search has been continued without taking a single specimen.

It will be remembered that this valuable food fish was discovered in 1879 by the Fish Commission, by means of the method of deep trawling which the commission had newly introduced. During the two succeeding years large quantities were taken by the same means, the excellent quality of the new fish making it a most acceptable addition to our list of edible fishes.

An illustration of the tile fish, with an account of its characteristics and history, so far as known, appeared in our issue for April 29, 1882, about the time of the sudden and unexplained appearance of the fish, dead and dying, in vast multitudes upon the surface of the sea. According to the testimony of ship masters, compiled by Captain J. W. Collins, of the Fish Commission, the belt of dead fish—largely tile fish—extended along a line of at least 170 geographical miles, with a width of 25 miles, some accounts indicating a much greater extension of the drift of dead fish southward. It is hard to form a conception of the vastness of the multitude of dead fish reported, the area over which they were profusely strewn equaling that of the State of Connecticut, at least, and possibly that of the State of Massachusetts. The minimum estimate of the weight of the dead fish, made by Captain Collins, exceeds fourteen hundred million pounds; and it may have been twice or thrice that amount.

The cause of this general mortality appears to be beyond discovery. The effect is seen in the apparently total disappearance of the tile fish from its original haunts. Only time can tell whether they have been wholly exterminated. If any survive it is hardly possible that their former abundance can be restored for many years.

Heavy Work on the West Shore Railroad.

The construction of the Hudson River division of the New York, West Shore, and Buffalo Railroad involves some exceedingly heavy work. The contract for this part of the road is in the hands of the North River Construction Company. The Weehawken tunnel, 4,000 feet long, is to be completed December 1. Thence to Haverstraw, where the road comes in sight of the Hudson River again, the work is well advanced and will be ready for tracklaying by the time the tunnel is finished. The tunnel at Haverstraw, which is 1,600 feet long, will be blasted by October 1. The work from Haverstraw to Krum Elbow, along the west bank of the Hudson River, is of the heaviest and most expensive character. The profile has the appearance of huge saw teeth. West Point Tunnel, which is 2,700 feet long, will be ready for the track by the 1st of December. The line on this part of the road passes alternately from a high rocky point or projection to the water's edge of the river, where the water is from 10 to 125 feet in depth. In three places the great depth of the water and the steep slope of the bottom necessitate spanning the deep gorge with iron bridges; in one instance a 290 foot span bridge, which is probably the longest double track bridge ever built. For the other two places bridges of 200 and 137 foot spans are used. The numerous accidents from blasts along the Hudson River in this vicinity are occasioned by the haste and energy used in prosecuting the work. At Krum Elbow the road gradually ascends the sloping hillside sufficiently to leave the river again. At Rondout there is a tunnel of 350 feet, with a very high viaduct spanning Rondout Creek.

Boring with Bort.

In the course of some boring operations, which have recently been carried on by the Government of the Cape of Good Hope in the search for coal, it occurred to the geologist in charge to make trial of native bort in lieu of the Brazilian carbonado, which had, until then, been employed. The experiment proved a complete success. The last six crowns used were of three inches diameter, set with bort. It was found that these bored through 1,100 feet of sandstone and shale, part of it exceedingly hard, being indurated by contact with intrusive rock. The average boring per crown was therefore 183 feet, and the last crown is nearly as good as new. Of the above six crowns, one bored through 322 feet 7 inches, and was still usable; while another bored through 350 feet. In precisely the same class of country, eight crowns supplied from London and set with carbonado bored only 30 feet each. The boring effected with the latter cost at the rate of 27s. 6d. per foot; while the work done with bort, in the same class of rock, cost less than 2s. per foot bored. The advantage in the use of bort is increased by the fact that, owing to the greater depth bored by a single crown, there is less delay caused by the resetting of the stones. Great care is, however, necessary in the selection of bort for the purpose, as a very large percentage of the ordinary bort of commerce is unsuitable.

[The African "bort" here mentioned consists of small diamonds, not good enough for gems. They are used for polishing brilliant diamonds and other purposes. The Brazilian "carbonado" spoken of is a black diamond, that is, an impure carbon. It is extensively used in diamond drills and forms the cutting edges thereof. Black diamonds or carbonados look like bits of anthracite coal.]

A Panama Canal Projected in 1846.

Thirty-six years ago this month (September) the SCIENTIFIC AMERICAN contained the following paragraph on the projected Panama Canal:

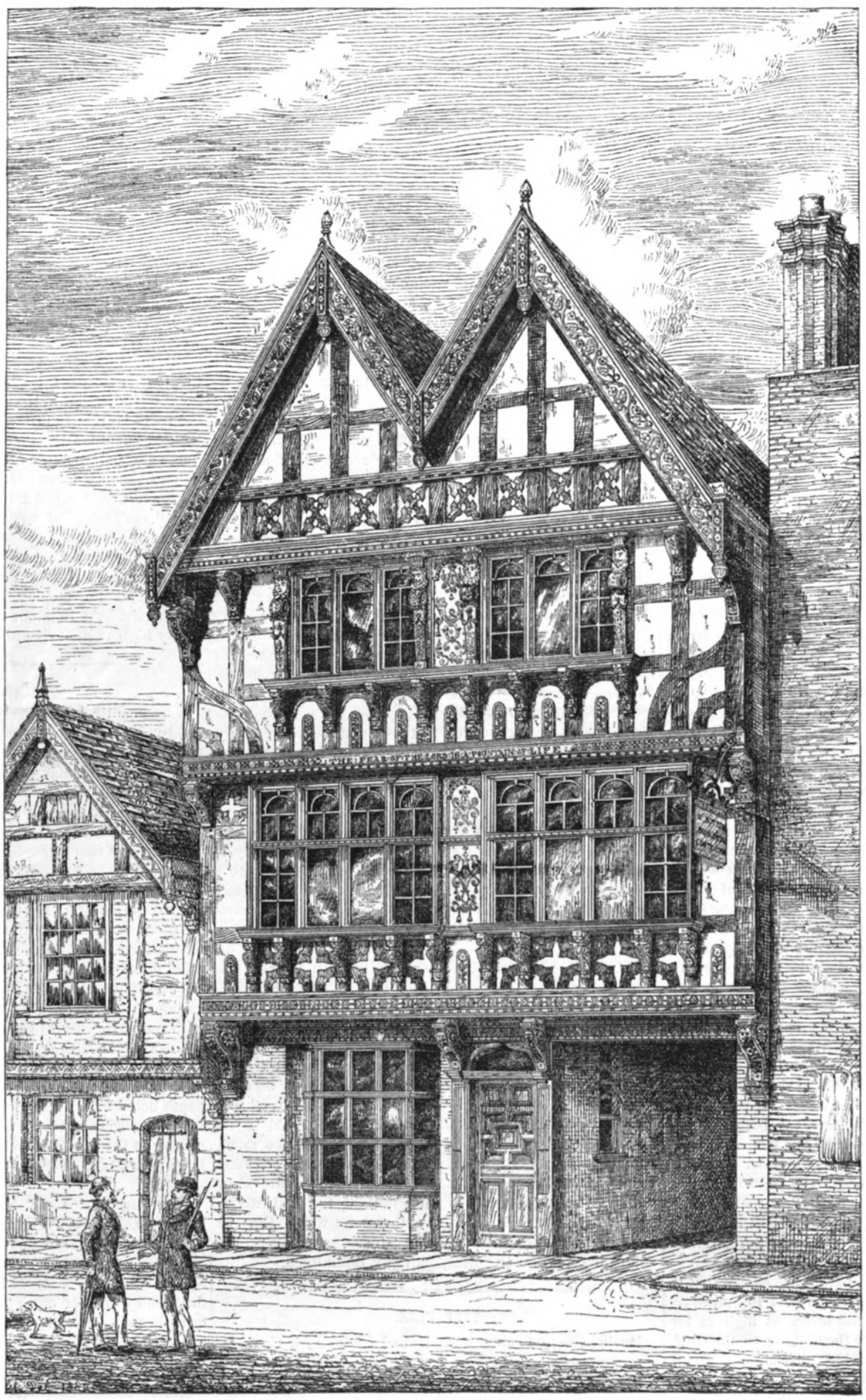
"It has for several months, not to say years, been a matter of incomprehensibility to us that the French should persist in this project of constructing a canal from the Atlantic to the Pacific Ocean, while there has been such palpable demonstration that ship-railroads must inevitably take the preference; but certain recent developments throw much light on the subject, by representing that the mountains through which the canal is (or was) to be cut are supposed to abound in native gold. All probability of the completion of the great commercial enterprise is therefore ended."

[Exactly what idea was intended by the last few lines of this paragraph we do not recollect, but certainly the project of a ship-railroad was clearly foreshadowed in this paper thirty-six years ago.—ED.]

NEW OLD FASHIONED HOUSES.

We give herewith an example of the prevailing tendency in some branches of architectural designing, which is to go back to the good old times of the forefathers. Our engraving which is from the London *Building News*, represents a new dwelling house lately erected in Chester, England, a city that is well known for its various quaint structures.

The house is "half-timbered," and designed in accordance with the old houses in the city, the period being from 1600 to 1650. On the center brest-summer is inscribed "The Fear of the Lord is a Fountain of Life," following the Latin inscription, "Timor . Domini . Fons . Vitæ," on a shilling of Edward the Sixth found near the site. A short distance from this is the interesting house known as "Bishop Lloyd's," with its carved panels, Adam and Eve, Cain Slaying Abel, Abraham's Sacrifice, the Immaculate Conception, the Sorrows of the Virgin, and other devices. The house has been built by Mr. N. Dutton, for his residence, and contains dining and sitting rooms, five bed-rooms, bath-room, w. c., closets, kitchen, scullery, pantry, cellars, yard, also the builders' yard and workshops in the rear.



SUGGESTIONS IN ARCHITECTURE.—HALF-TIMBERED HOUSE AT CHESTER.

Putrefaction and Antiseptics.

In the course of researches on this subject, M. Le Bon has lately obtained results which seem to have important practical bearings. The so-called "normal liquid" he used for putrefaction was an aqueous solution containing hashed meat to the extent of a tenth of its weight. He finds (1) that the disinfectant power of any antiseptic is weaker the older the putrefaction (new products are given off, in time, by the putrefying liquid that are not so easily destroyed). (2) Measuring the power of antiseptics by their disinfectant properties on a given weight of the normal liquid, the strongest disinfectants appear to be (in order): permanganate of potash, chloride of lime, sulphate of iron acidified with acetic acid, carbolic acid, and the glyceroborates of sodium and potassium. (3) There is no parallelism between disinfectant action and action on microbes (or minute organism). Thus, permanganate of potash, so strong in the former respect, has no appreciable action on microbes; alcohol, a strong preventer of microbes, is very weak as a disinfectant. Nor (4) is there parallelism between the power of preventing putrefaction and that of stopping it when it has arisen. Alcohol and carbolic acid, preservative agents *par excellence*, have very little effect on putrefaction once commenced. (5) With exception of a very small number of substances that are strong poisons (as bichloride of mercury), most antiseptics, and notably carbolic acid, have very little action on bacteria. M. Le Bon has at present carbolized solutions several months old, and rich in bacteria; indeed, he thinks this acid one of the best liquids for preserving live bacteria a long time. (6) There is no parallelism between the virulent power of a substance in putrefaction and the toxical power of volatile compounds given off by it; indeed, these properties seem to be even in inverse ratio. A frog is placed in an inclosure with some of the liquid. When putrefaction sets in a very fetid odor is produced, and the liquid swarms with bacteria, and is known to be very virulent if injected under the skin of an animal; but the frog, merely breathing the affluvia, takes no harm. After two months the liquid ceases to have virulent properties, but the animal breathing its volatile products is killed. (7) The very small quantity of advanced putrefaction necessary to kill an animal by simple mixture with air proves these volatile alkaloids to be extremely poisonous. M. Le Bon ascertained that they are so to man. He knows only a very small number of substances, such as nicotine, prussic acid, and the new alkaloid he lately extracted from tobacco, that are as poisonous. (8) The experiments explain the evils arising from bodies long buried, and prove that the atmosphere of cemeteries (contrary to what has been affirmed on the score of there being few microbes present) may be very dangerous. In connection with typhoid fever, too, and other affections, the volatile alkaloids produced by action of microbes on certain organic substances are doubtless largely active.

Factory Bell Ringing.

It appeared on a recent trial before the Supreme Court of Massachusetts that the factory proprietors placed a large steel bell on the mill, which they caused to be rung at five o'clock on the morning of every working day in winter, and again at various hours during the day. Two persons who occupied houses near the mill, one three hundred feet and the other a thousand feet away, complained that the ringing disturbed the quiet and comfort of their homes, and represented that the bell was unnecessarily large, that it was of no use for any purpose of trade or manufacture, and that it was rung at unreasonable hours and unnecessarily long, and was therefore a nuisance. The mill proprietors replied that it was necessary to employ some means for calling the operatives to their work, and that the bell was of suitable size, and was rung at suitable hours for the purpose and in a proper manner. The court decided that the ringing was a nuisance, and granted an injunction.

The Edelweiss.

The curious and interesting Alpine plant, edelweiss, which travelers in Switzerland have so often carried away for its local and poetic associations, and have as uniformly failed in the attempt to cultivate it, has at last been reduced to cultivation by an English gardener. He treats the plant as a biennial, and raises a batch of seedlings every year. This year the seed was ripe July 25, and was immediately sown in a peat soil covered with a little silver sand. Ordinary seed pans were used. In a fortnight many seedling plants were above the surface and growing satisfactorily. The soil in the seed pans is kept moist, and the plants well shaded from the sun under the plant stage of a greenhouse. The young plants are kept in the pans all winter, then pricked off singly into small pots in March. In May they are planted out in a rock garden, where they grow freely and bloom profusely. Sandstone appears to suit the edelweiss well; the roots seem to fasten themselves to it and produce vigorous plants. A position in the open sun appears to be best suited, in England, to the wellbeing of the plant. In this country more shade would probably be necessary.

The demand for edelweiss has been so great among travelers in the Alps that several cantons have prohibited the sale of the plants, lest they should be entirely exterminated.

Technical Art at the Metropolitan Museum.

The class in carriage draughting and construction carried on in connection with the Metropolitan Museum of Art Schools will begin its third season October 9, under the auspices of the Carriage Builders' National Association. The class will be in charge of Mr. John D. Gribbon. The course of instruction covers linear designing, including scale and full size drawing, the geometry of carriage construction, carriage body-making, construction of carriage gearings, wheel making, and the principles involved in the suspension of carriages. The entire course of thirty-two weeks, every evening in the week, may be had for the nominal sum of eight dollars. The class will also be favored with free lectures by specialists on subjects connected with carriage mechanics.

Large Circular Saw.

A Sheffield (England) firm has recently turned out a circular saw 87 inches in diameter, which is claimed to be the largest saw of the kind ever made. This claim is disputed by another firm of the same place who assert that they have manufactured several saws of 88 inches diameter. When the great difficulty of producing suitable plates of this size is considered, the expense of the working appliances, etc., these saws are certainly worthy of notice and highly creditable to the manufacturers.

Light of the Sky.

Captain Abney lately read a paper before the British Association on the light of the sky at high altitudes, based upon observations made in the Alps on the Riffel, at a height of 8,500 feet. His investigations proved that in high altitudes the light of the sky diminishes very much so as to make photography difficult, and that it is only a tenth or a twentieth of that which is found on the surface of the earth. There was a remarkable absence of the rain band spectrum. On the Riffel he only saw it once, and that was during a shower. The solar spectrum was the same on the Riffel as in London. He did not believe that aqueous vapor was present in the upper regions, at all events in the form in which it exists below. In the red part of the spectrum he found that the benzine and alcohol which had been found to exist in the atmosphere actually increased in strength in the higher regions, and he could only suppose that benzine and alcohol are not of terrestrial formation but come to us from space. Dr. Glaisher said he had never failed up to five miles in getting a deposition of vapor, and there was no part of the earth's atmosphere probably in which there was no aqueous vapor. At a height of seven miles in a balloon he had seen cirrus clouds still higher, and there was a great difference between the state of the atmosphere in a free balloon and on a mountain side. Professor S. P. Langley, of Allegheny, Pennsylvania, in a paper on the distribution of energy in the solar spectrum, stated that he had investigated the infra-red spectrum at a height of 13,000 feet in a very dry region, and found that it extends very much further than had been mapped heretofore. The wave lengths of the visible parts of the red end of the spectrum are only one-fourth of those in the infra-spectrum, so that three-fourths of the energy were invisible. His observations proved the existence of great gaps in the spectrum, and he was inclined to support Abney's conclusions on the existence of benzine and alcohol in space.

Vapors of Metals.

M. Eugene Demarçay has recently obtained volatilization at much lower temperatures by diminishing the pressure of the gas by which they are surrounded. His apparatus consists of a crystal tube 12 centimeters in diameter, containing the metal and closed at its extremities. The heating is effected by vapors of sulphur, mercury, aniline, water, and other substances, giving temperatures ranging from 440° Cent. to 100° Cent. The vacuum is obtained by a Sprengel pump, and the tube is then heated in the vapors mentioned, at the same time that the pump is worked. A fine U tube, which enters the crystal tube until its bend is about two centimeters from the piece of metal, is traversed by a current of cold water and serves to condense the volatilized metal. When the heat is applied a considerable quantity of vapor is given off, and this condenses rapidly on the bend of the cold water pipe forming a dark deposit, which in time acquires a metallic tinge. Cadmium, zinc, antimony, bismuth, lead, and tin have been volatilized in this way, at temperatures of 160° Cent., 184° Cent., 292° (antimony and bismuth), and 360° Cent. (lead and tin) respectively. At higher temperatures the deposits are more abundant; but M. Demarçay has not proved any volatilization at inferior temperatures to these given. He does not doubt, however, that volatilization at lower temperatures does exist; but it is masked by the formation of a thin layer of suboxide of a deep color, which is less volatile than the metal itself. In such cases the metallic sublimation begins after this protective skin is broken.

NEW ALARM REGISTER.

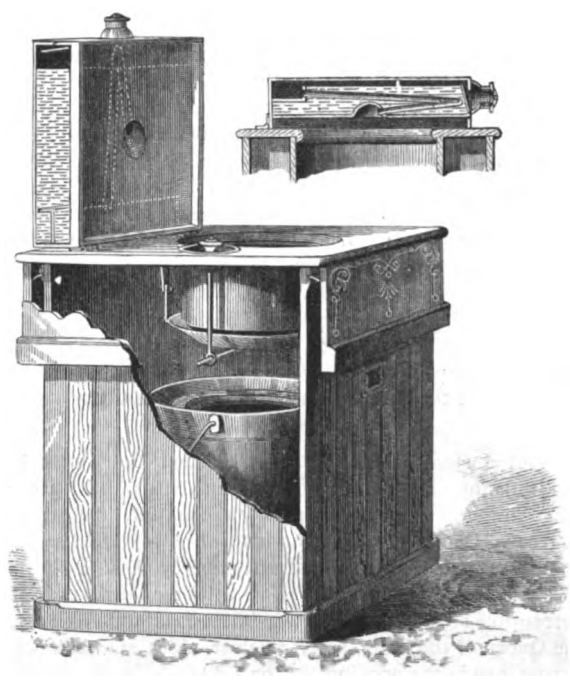
We give herewith an engraving of a novel self-setting alarm register, invented by Mr. C. H. Stoddard, of Kansas City, Mo. This instrument is capable of counting up to 1,000,000, and will give an alarm by ringing the bell at any prescribed number from 1 to 1,000,000. The instrument represented in the engraving has a capacity of 10,000 only.

Two sets of register wheels are geared together, an upper and a lower set. The lower wheels are displayed in the face of the register, while the upper set, which is concealed and only seen when the alarm is open, is for setting the alarm. This set is connected to a knob on top of the bell by a rod, by raising which the wheels are raised out of gear with the lower set, and are free to be turned in either direction to the number at which the alarm must be given. In the engraving the top set of wheels have been raised and turned to show 1860. By lowering the knob on top of bell the register is ready for work, and will not give the alarm until 1860 have been counted and registered on the lower set of wheels. When the number has been run the alarm will be given, and will then continue to sound until the press or other machine to which the register is attached is stopped, giving one tap of the bell to each number run over the prescribed number.

In places where a good many runs are made daily, the man in charge may forget to set the register before starting his machine. In this case the register will immediately warn him of the fact by giving the alarm. If the register is not properly set it will also sound the alarm.

But this is not all that this register will do. The automatic setting attachment is a most valuable feature. The figures seen on the lower set of wheels may all be instantaneously returned from any number, by simply raising the knob on top of bell. This at the same time raises the upper set of wheels out of gear.

This register may be used at any time without the alarm, and without adjustment, it being put in condition to operate in this way by simply raising the bell hammer until it is held by a catch made for that purpose. It can then be used as any other counter or register, with the advantage of the self-setting arrangement, and will never have to be opened.



PORTABLE WATER CLOSET.

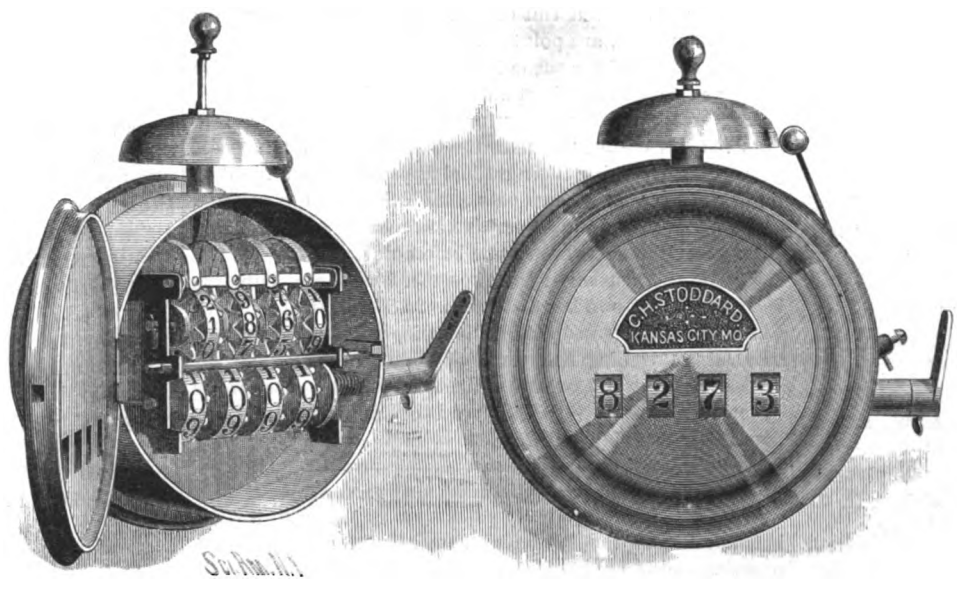
This register can be attached directly to any kind of a machine, or to the wall or post. The crank or lever at the side is held to its shaft by a thumbscrew, and can be worked from above, below, or from the back by a cord or rod.

We are informed that this instrument is now used by some of the largest publishing houses in this country, and has proved itself retirely reliable.

Further information may be obtained by addressing Mr. C. H. Stoddard, Box 1139, Kansas City, Mo.

New Reptile House.

The Zoological Gardens of London are the largest and have the greatest variety and most interesting collection of animals, birds, and other natural history subjects of any public gardens extant. The reptile stock has increased so much that new quarters are about to be built on designs



STODDARD'S ALARM REGISTER.

supposed to suit reptilian needs. The new reptile house will be 120 feet by 60, with a large porch and double entrance at the front and rooms in the rear for the keepers and workmen. It seems that such a house must face due south, and have a roof slated on the north slope and with ample sky lights on the south slope. It is to be of brick, with stone trimmings, and iron work for the roof. Fixed cages will occupy the north, east, and walls, while the south wall, almost entirely of glass, is to be left for some movable cases containing the light weights among the reptilia and batrachia. A large oval pond for crocodiles will occupy the center, and two smaller ponds for other aquatic reptiles. It is to be heated by hot water pipes. The Zoo now owns 57 tortoises, 10 crocodiles, 95 lizards, and 83 snakes, among which latter 10 are large pythons and boas. Almost every issue of *Nature* contains a goodly list of animals bought by, given, or loaned to the Zoological Society.

IMPROVED PORTABLE WATER CLOSET.

We give an engraving of an improved commode or portable water closet recently patented by Mr. John McAuliffe, of Gildersleeve's Landing, Portland, Conn. This commode is cleanly, odorless, and readily taken care of.

The box or case is made of suitable size and shape, and is provided with a loose cover or seat that sets over the upper edges of the box, the latter being provided with a packing strip which renders the joint between the box and cover air tight. The bowl has a pan suspended beneath it by means of jointed links, on which it is made to turn by the knob and connecting rod.

The main cover is hinged upon the seat, and is made hollow to serve as a reservoir for holding water. This cover is filled through an opening in the edge stopped by a screw cap.

Within the cover is a partition which cuts off the water from the cap when the cover is closed, so that the water cannot escape by the air inlet opening in the cap. In the cover is a tube of V form, one end of which passes out through the bottom, while the other end is connected to a small tray or pan, which is fitted in cover near its hinged end. The position of this tray is such that when the cover is raised the tray is filled, as shown in the larger view, and when the cover is closed the tray cuts off a certain quantity of water from the main reservoir, and the water in the tray escapes by the V shaped pipe to the bowl and pan. This ingenious device insures a supply of water to the pan at every opening and closing of the cover.

A pail is placed in the box beneath the pan, in position for receiving the contents of the pan.

Further information in regard to this invention may be obtained by addressing the inventor as above.

A New Food Fish.

During the latter part of September, Captain J. W. Collins, of the United States Fish Commission, renewed, without success, the search for tile fish. But the cruise was rewarded by the discovery of a new food fish which may take the place of the vanished tiles. The new fish is described as very beautiful, with a warm red luster and black and cream colored mottlings. The specimens, a dozen or more in number, weighing from one to four pounds each, were brought up in the trawls from a depth of about 120 fathoms in latitude 40° 2′ north, longitude 71° 2′ west. The fish was found to be a new member of the family *scorpæna*, first described by Jordan in 1880. Two specimens were cooked and pronounced the most delicious of fish, the flesh being firm and crisp, with a delicate crabby flavor.

Making a Dead Man's Heart Beat.

James Tracy was hanged for murder at Chicago, September 15. The neck was broken. One minute after the body was taken from the gallows Drs. Mann and Bluthardt began the experiment of applying electricity with a view to resuscitation. The result is described by the doctors as follows:

"The experiment was begun by applying one pole over the spinal cord and the other over the heart—the latter by means of three needles, one over the apex and two over the base of the heart. The needles were inserted beneath the skin, so as to bring the electric current in direct communication with the heart. On turning on the current the effect was very marked. Muscular contortions began wherever the electric current reached, but especially in the face and neck. The heart began to contract feebly, not regularly. With the ear over the heart we could distinctly hear, or rather feel, the heart's contractions. By removing the electrode we could produce a variety of facial expressions. The arms would contract, the legs move with considerable force, and the muscles of the abdomen contract strongly. The most significant fact, however, was the rhythmic action of the heart, notwithstanding that the neck was broken. It is probable that a considerable proportion of criminals who are hanged in this country are either mechanically strangled – that is, choked to death, or killed by shock—that is, death is the result of the terrible impression made upon the nervous system. In cases where the neck is not broken and the spinal cord is not lacerated, we are of opinion that resuscitation would not be impossible. It might be accomplished by electricity, friction, artificial respiration, the hot bath, and other well-known means of restoration. In this present case resuscitation was impossible, as the neck was broken."

The Sydney Exhibition Building Burned.

A dispatch from London, dated September 22, announces that the Exhibition Building, at Sydney, New South Wales, has been destroyed by fire with all its contents. The building destroyed we understand to be the handsome main building, styled the Garden Palace, erected for the International Exhibition of 1879–80, and kept for permanent exhibition purposes. Its loss is a grave misfortune to Sydney and to the colony.

ASPECTS OF THE PLANETS FOR OCTOBER.

SATURN

is morning star, though he is now near enough to opposition to lend a charm to the October evening sky throughout the whole month. A few minutes before eight o'clock, he may be seen serenely rising in the northeast, taking on a more superb aspect than he has manifested for thirty years. He may be easily recognized by his soft, steady light and his near vicinity to the Pleiades. He rises earlier each night, and, at the end of the month, comes beaming from the eastern horizon a quarter before six o'clock.

When it is remembered that Saturn travels round the sun at a mean distance of eight hundred and eighty-one million miles, twice the distance of Jupiter, and that his mass is only one-third of that of his giant brother, it seems unaccountable that, from his far away home, he should shine as a star of the first magnitude in our sky. But observation substantiates the theory that Saturn as well as Jupiter, and probably the two other giant planets, Uranus and Neptune, have only partially cooled from a condition of incandescent heat, that they are somewhat in the condition of the sun, and give out heat and some light to increase their beautiful appearance in our sky.

It is possible, before the waters and atmosphere of the earth are absorbed into her interior in the long process of decay, and she becomes a dead world like the moon, that terrestrial observers may witness the gradual cooling of these gigantic planets, and the paling of their luster among the stars. Never in the lifetime of present observers will a more eligible opportunity occur for observing with the naked eye the grand appearance of Saturn as during the three coming months. Never will the telescopist enjoy more delightful views of this magnificent and complex system of worlds than those which will delight his eyes for three years to come.

Those who wish to trace Saturn's position on the star-maps will find him in right ascension 3h. 35m., in declination 16° 52′ north. His place in the heavens is in the constellation Taurus, and his nearest brilliant neighbors among the stars are the clustering Pleiades and Hyades. He has reached his extreme northern declination and will now travel slowly southward. His diameter now measures about eighteen and a half seconds.

Saturn now rises at a few minutes before eight o'clock in the evening; at the close of the month he rises about a quarter before six o'clock.

JUPITER

is morning star, and glorious to behold as he comes darting above the horizon, two hours after Saturn, the most princely star that adorns the firmament at the time of his rising. About eleven o'clock the eastern heavens are aglow, with Jupiter and Saturn for the principal actors, surrounded by the sweet influences of the Pleiades. Orion with the symmetrical bands that no one can loose, and the brightest of the northern brilliants Capella.

As Jupiter is only half as far away as Saturn, and very much larger, we see him under much more favorable circumstances, and the amount of heat and light he probably gives forth is in proportion to his giant bulk. It is generally conceded that he is surrounded by a cloud atmosphere some twenty thousand miles in depth, and that commotions in this cloud atmosphere are the cause of the beautiful belts that adorn his disk. It is probable that we never see the body of the planet, unless it may be through some of the enormous rifts that are frequently seen on his surface.

The right ascension of Jupiter is 6h. 4m., his declination is 23° north. His diameter measures 38·6″. His place in the heavens is in the constellation Gemini, about midway between Capella and Betelgeuse, and northeast of Sirius.

Jupiter rises on the 1st a few minutes before ten o'clock in the evening; at the end of the month he rises a few minutes before eight o'clock.

NEPTUNE

is morning star and retains his place as herald of the morning trio. Those who wish to trace his position on the star-maps, and thus track his unseen steps, will find him in right ascension 8h. 6m., and in declination 15° 34′ north. His place in the heavens is in the constellation Taurus, a short distance southeast of Saturn. There are but twenty-five minutes difference in the time of transit of the two planets.

Neptune rises on the 1st at half-past seven o'clock in the evening; on the 31st he rises at half-past five o'clock.

URANUS

is morning star, and as he has but recently taken on the role, he has not progressed very far from his near proximity to the great luminary. Planetary students will find him on the star-maps in right ascension 11h. 25m., and in declination 4° 36′ north, just entering the constellation Virgo.

Uranus now rises about half-past four o'clock in the morning; at the end of the month he rises about half-past two o'clock.

MERCURY,

as if often the case, may be said to be on the fence, for he is evening star until the 22d, and then morning star for the rest of the month. On the 22d, at eleven o'clock in the evening, he comes into inferior conjunction with the sun. He then passes between the earth and the sun, and if his orbit were not inclined to the ecliptic or sun's path he would make a transit over the sun's disk.

On the 13th Mercury is in conjunction with Mars at eight o'clock in the morning, Mercury being 3° 25′ south. They are both too near the sun to make the conjunction of any account to terrestrial observers. Indeed, four of the planets, Neptune, Uranus, Mercury, and Mars, might as well be dropped from the monthly record as far as any visible part they play on its annals is concerned. But the student who is thoroughly interested in these mysterious wanderers will find pleasure in tracing their unseen as well as their visible course. Knowing their right ascension and declination he will find their place in the heavens on any reliable star-maps.

Mercury's right ascension is 14h. 2m., his declination is 15° 45′ south, and his diameter 7″. His place is in the constellation Virgo, and his most brilliant starry neighbor is Spica or Alpha Virginis.

Mercury sets on the 1st about half-past six o'clock in the evening; at the end of the month he rises shortly after five o'clock in the morning.

MARS

is evening star, and pursues his slow course too near the sun to be perceptible to the most sharp-sighted star-gazer. There is nothing in his present movements to interest the student. He has dwindled to insignificant proportions, lost his ruddy hue, and his light is dim among his peers. Sixteen months must pass before his next opposition takes place, and ten years must roll their annual circuit before he takes on his most brilliant phase. We have already drawn attention to his conjunction with Mercury.

His right ascension is 13h. 47m., his declination is 10° 57′ south, and his diameter is 4″. His place in the heavens is in the constellation Virgo, between Mercury and Spica.

Mars sets now about half-past six o'clock in the evening; at the end of the month he sets about half-past five o'clock.

VENUS

is evening star, and though we place her last on the list, she leads the solar brotherhood in size, beauty, and general magnificence during the short stay she makes in the western heavens. She is now near enough to her period of greatest brilliancy to be easily seen before sunset by those who know where to look for her, and she is bright enough to cast a perceptible shadow. No observer can look unmoved upon the Queen of the Stars, as every clear night she makes her appearance in the evening sky, or fail to admire the fascinating grace with which she retraces her steps toward the sun. Her charming pensile loveliness is beyond words to describe as she hangs like a golden lamp suspended by invisible chains from the star depths, fed by celestial fire, forming a picture never two evenings alike, and never ceasing to call forth the reverent admiration of the beholder.

Venus is traveling from her greatest eastern elongation to her inferior conjunction, pursuing her retrograde course with flying feet.

She gets up a charming tableau as she proceeds on her winding way. On the 16th, at five o'clock in the afternoon, she is in close conjunction with the first magnitude star Alpha Scorpii, better known as Antares, the familiar red star in the constellation of the Scorpion.

At her nearest approach she is only eight minutes from the star, and as planet and star will be visible soon after that time, the opportunity for observation will be unusually favorable and will form a delightful study for observers. The contrast in dimensions between Venus, when nearly at her brightest, and a first magnitude star, and the contrast in color between the red tint of Antares and the soft golden hue of the planet, are points to be noted, as well as the exceeding beauty of the scene in which the actors are sure to appear as soon as the short autumnal twilight fades.

Antares is almost as easily found as Venus, being a brilliant red star east of the planet. Observers will find great pleasure in watching their gradual approach from night to night until they meet and pass each other on the celestial highway, approaching at conjunction more closely than any other planet and star have done before during the year.

The right ascension of Venus is 15h. 26m., her declination is 22° 38′ south, and her diameter is 26 8″. Her place in the heavens is in the constellation Scorpio, where she may now be seen approaching Antares.

Venus sets on the 1st about nineteen minutes after seven o'clock in the evening; at the end of the month she sets about half-past six o'clock.

Successful and Unsuccessful Inventors.

Why are many apparently good ideas not successful when brought before the public as new inventions? This is a question, adds an English contemporary, which many inventors have asked themselves, and in answering it have blamed the world all round, but never themselves. This may seem singular to many people, but let us see how this occurs.

Inventions, no matter of what kind, but especially those connected with manufacturing, originate generally either with the person occupied with manufacturing as master or as servants, or with the machine maker who supplies the machines and tools used by the former. The manufacturer, operative or not, finds that his goods are not as perfect as they should or might be; his competitor is doing as well as himself, and may soon distance him through being backed by larger means; so he begins to think how he can distance him; how he can increase this production and diminish the cost, and thus do more with a smaller capital; or how he can make a superior quality out of the same material, and so make his goods more acceptable to the consumer.

The machine maker is in the same position as the manufacturer, only instead of having to cater for the public he has to work for the manufacturer; but still he has the same motives as the latter to produce something new or cheaper, and the prime motive with him is likewise the competition of others. He makes, we will say, a loom such as is used in his district, and for which there is always a demand, but this demand is supplied not only by Smith, but also by Jones, by Robinson, and by Taylor. As Smith is not an easy-going man, but one with brains, he endeavors to get precedence of the others, which he can only do by producing looms more cheaply or better. To make cheaper, without making them as good as the others, would be impossible, as competition has only allowed a narrow margin of profit; so he must make them better by furnishing a loom which will either produce more cloth, or one which takes less power to drive, or less attendance on the part of the weaver, or in other respects accomplishes more than others. In order to produce something better than their competitors, both manufacturers and machine makers try to invent improvements, very often spending over them much time and money. If they succeed they generally reap the reward of their exertions. When, however, inquiries are made among the general body of inventors, many are found who have a different tale to tell. Many have spent their money, wasted months and years, ruined their health, and finally have died poor and broken-hearted. And yet how many have come before the public, satisfied with their inventions themselves, only to find that the thing is pooh-poohed or pronounced ingenious but impracticable! There is still another class of equally unfortunate inventors, who are successful enough as far as it goes, but who go and upset their own inventions as soon as they are introduced by another which supersedes them, and which is, in its turn, put aside after awhile by another, all of which are only different ways of doing the same thing, but none of which have any material advantage over existing modes of working.

Where there are so many failures, there must naturally be something wrong somewhere, and we think we have not far to search to find the cause. Generally, no one is to blame for it but the inventor himself. Not that he does not understand his subject—for we are not considering outsiders who think that they are geniuses and cure-alls—but because they are working unaided and looking at the object in view only from their own standpoint, while, if they had the assistance of others, possessing the knowledge of which they themselves are deficient, their labor would either not be wasted or be more successful. How often does it occur that a machine maker thinks he can improve a machine, but when it comes to work it is not so handy for the operative, or the latter finds it too complicated; this or that part gets out of order under certain conditions of working; or it will do for one material, but not for another, for which it is quite as needed; or a hundred other inconveniences which only the operative who attends to it can discover. The manufacturer is no better off; he finds that the machines he is using have this or that defect; he watches them hour after hour, day after day, and thinks how this could be mended. At last he has found the reason of the defect, and he sets to work to carry his improved ideas out; but here he meets with innumerable difficulties. There ought to be a wheel here, but there is no room for it; there he wants a forward motion, but all the moving parts at hand have a rotating motion, and at a speed which is useless to him; here this is in the way, and there that, and if at last he gets all his motions, there are so many parts about it, that all his time and attention are required in keeping them in order.

Now, if the two could be brought together, the manufacturer would tell the machine maker at once, or very soon, that he was on a wrong track, that the alterations would be unsuitable for certain materials, and his experience with the latter would enable him to show that they require quite a different treatment; or the machine maker would show the manufacturer in a few minutes how to overcome certain mechanical difficulties which are only child's-play to him, but are a puzzle to his friend. The latter is, perhaps, the more frequent case, and is the reason why so many inventions soon pass from the hands of the operative manufacturer into those of the mechanic, who remodels and often reaps the principal benefit from them. Only very recently a case in point occurred where an old workman, one who thoroughly understood his business, had spent many years in producing an invention which turned out to be useless through mechanical faults of the arrangement, and which, when abandoned by the inventor, passed into the hands of a machine maker who had the thing working successfully in less than three months.

In advocating the co-operation of manufacturer and mechanic, it may be objected that it is often dangerous to communicate one's ideas to another who might see through them at a glance and appropriate them. Such things are possible, and have been done more than once, but generally only where people have trusted an unworthy person. We think, on the whole, it would be better for the inventors of both classes if they took the trouble to look for a capable man with a good reputation, and who possesses the qualities in which they themselves are deficient, even at the risk of having to give up a share of the profits, for at the end their gains would be more than if they worked for a length of time in the dark.

MM. Pellicot and Jaubert claim to have destroyed the winter egg of phylloxera, and arrested the multiplication of that pest by treating the vines with a solution of 1 kilo of sulphate of iron in 2 liters of water.

Correspondence.

Removing River Obstructions.

To the Editor of the Scientific American :

In your issue of the 16th inst. I noticed an article on the removing of sand bars, etc. The idea of floating or washing out obstructions of this kind in rivers is not new to me, as I have advocated the system for the Mississippi, with its wonderful shiftings, on the following plan. Have large flat-bottom boats with heavy steam machinery, and supplied with fans or force pumps whose power would be conveyed to the object to be removed through hose weighted so as to drag on the bottom when the power is being exerted against the obstruction. The hose (one or more) to be put out from the forward part of the boat and adjustable to the depth required. In the after part of the boat, and at proper depth below the surface of the water, have revolving attachments, constructed so that they will draw the water from under the center of the boat and throw a swell toward each side, which will carry a quantity of the floating or dislodged mat ter beyond the channel. To prevent creating an obstruction by the settlings down stream, it would only be necessary to run further down each time the route is gone over. To keep a river open in this way it would require boats to be stationed at such distances as could be gone over each day, or as occasion required, and I believe the cost would be much less than dredging, and certainly always leave a clear channel.

R. H. ANDREWS.

Washington, D. C., Sept., 1882.

NATURAL HISTORY NOTES.

Insectivorous Plants.—A. F. W. Schimper, in the *Botanische Zeitung*, gives a detailed description of several insectivorous plants native of North America. He describes in this paper more fully than has been done before the ascidiform leaves of the side-saddle plant (*Sarracenia purpurea*), and has determined that the products of decomposition of the insects and other organic substances found in the "pitchers" enter the cells of the leaf, as is shown by the changes which take place in the protoplasm of the cells thus affected. In these cells the author noticed a phenomenon closely resembling that described by Darwin as occurring in *Drosera*, under the name of "aggregation of protoplasm." In *Sarracenia*, however, the aggregations consist of a concentrated solution of tannin—a substance always present in the cell sap. Of North American *Utricularia* (bladder warts), *U. cornuta* was especially examined and found to present several very singular points of structure. The plant possesses no true root, the rhizome branching into several root-like organs, which bear the bladders in great quantities, and which the author believes to be homologous with the floating leaves of the aquatic species. The bladders are similar in form to those of *U. vulgaris* (but want the "antennæ"), as is also their histological structure, which he describes in detail. They contain, in addition to inorganic bodies, small animals and algæ, especially diatoms, rotifiers, and crustacea. The animals were never found alive, but usually much swollen and decomposed; and this was also the case with the diatoms, the contents of the bladders being apparently poisonous to both animals and plants. The hairs of the bladders appear to act as organs of absorption; and in the contents of their cells changes were observed similar to those described in the cases of *Sarracenia* and *Drosera*. As in *Dionæa*, an excess of nutriment is injurious to the plant.

The Elephant in Ceylon.—At a meeting of the Leeds Naturalists' Club, the president (Mr. B. Holgate, F.G.S.) related some curious particulars which had been furnished to him by the Rev. R. Collins, of St. Silas's Church, Hunslet, who has spent twenty-five years in India and Ceylon. Mr. Collins states that elephants are not now allowed to be shot, as they once were, but are permitted to wander at will in the forests belonging to the government. They live to the age of about one hundred and thirty years, and "come of age" at forty. There are three sizes of them in the same herds, and when they are young the size that they will attain is pretty nearly known by the number of their toes. Those which grow to the largest size have eighteen toes, five on each of the two fore feet, and four on each of the hind ones. Those which grow to a medium size have seventeen toes, five on each of the fore feet, as before, and four on one hind foot, and three on the other. The least size of elephant has sixteen toes, five on each fore foot, and three on each hind foot. No Singhalese elephant has a fewer number than sixteen toes. The mahout, or elephant driver, rules his elephant by means of an iron hook, with which he touches a most sensitive part behind the ear, which causes the most unruly elephant to become submissive. When Mr. Collins was in Kandy, an elephant which had killed its keeper, and which had been shot in the head before it could be captured, had to undergo the operation of having the bullet extracted, which was performed by the native doctors, the elephant lying quietly down while the mahout kept his hook on this sensitive part. The elephant drivers are a drunken set of men, and sometimes, while drunk, will treat their charge unmercifully, and the elephant itself is an animal which bears grudges—the result being that nearly all elephant keepers are sooner or later killed by their elephants.

A New North American Rose.—Dr. Geo. Engelmann describes, in the *Bulletin of the Torrey Botanical Club*, a new species of rose that appears to present peculiar botanical and horticultural features. It was discovered by a party of botanists, consisting of Dr. Parry and Messrs. M. E. Jones and C. G. Pringle, while they were riding along a road skirting the shores of All Saints' Bay, in Lower California. Forming as it did a most conspicuous and agreeable feature in the arid landscape, with its finely divided foliage and showy pink or white flowers, it at once attracted the attention of the whole party. It has been named *Rosa minutifolia* by Dr. Engelmann, who describes it as "a most striking and lovely species, distinguished from all other roses by its minute deeply-incised leaflets." The species is quite peculiar among its American congeners, and even among the roses of the Old World, so that it is difficult to determine its true position. As seeds have recently been collected, we may hope to soon see the plant in cultivation.

The Colors of Flowers.—In a lengthy and interesting article by Grant Allen, in *Nature*, on "The Colors of Flowers, as Illustrated by the British Flora," the author says: "The different hues assumed by petals are all, as it were, laid up beforehand in the tissues of the plant, ready to be brought out at a moment's notice. And all flowers, as we know, easily sport a little in color. But the question is, Do their changes tend to follow any regular and definite order? Is there any reason to believe that the modification runs from any one color toward any other? Apparently there is. All flowers, it would seem, were in their earliest form yellow; then some of them became white; after that a few of them grew to be red or purple; and, finally, a comparatively small number acquired various shades of lilac, mauve, violet, or blue. Some hints of a progressive law in the direction of a color-change from yellow to blue are sometimes afforded us even by the successive stages of a single flower. For example, one of our common English forget-me-nots, *Myosotis versicolor*, is pale yellow when it first opens; but as it grows older it becomes faintly pinkish, and ends by being blue like the others of its race. Now, this sort of color-change is by no means uncommon; and in almost all known cases it is always in the same direction—from yellow or white, through pink, orange, or red, to purple or blue. Thus, one of the wall-flowers, *Cheiranthus chamæleo*, has at first a whitish flower, then a citron-yellow, and finally emerges into red or violet. The petals of *Stylidium fruticosum*, are pale yellow to begin with, and afterward become light rose-colored. An evening primrose, *Œnothera tetraptera*, has white flowers in its first stage, and red ones at a later period of development. *Cobæa scandens* goes from white to violet; *Hibiscus mutabilis* from white, through flesh-colored, to red. The common Virginia stock of our gardens (*Malcolmia*) often opens of a pale yellowish-green; then becomes faintly pink; afterward deepens into bright red, and fades away at last into mauve or blue. Fritz Müller noticed in South America a *Lantana* which was yellow on its first day, orange on the second, and purple on the third. The whole family of *Boraginaceæ* begins by being pink and ends by being blue. In all these, and many other cases, the general direction of the changes is the same. They are usually set down as due to varying degrees of oxidation of the pigmentary matter.

Milk as a Curative Agent.

Under the above heading a writer in *Harper's Weekly*, after a warning in respect to the quality of milk to be used, the necessity of good pasturage and pure water for the cows, as well as the care in keeping the milk in a cool, cleanly place, treats as follows on the digestibility of milk and its benefit to dyspeptics for complaints.

The writer's views so accord with the experiences of one of the editors of this paper in the use of various kinds of milk in an obstinate case of dyspepsia on a member of his family, that we are able to indorse the writer's recommendation of a milk diet for the ailment he specifies.

Milk has the power to absorb obnoxious gases and effluvia from the air around it, and it should not be forgotten that the purest butter that ever was made may become tainted and poisoned in one short hour by objectionable surroundings.

Comes now the question of the digestibility of milk.

A glance at a table of the composition of cow's, ass's, and goat's milk would naturally convey the impression that that of the goat is the richest. This is so, but it is on that account the more difficult of assimilation. It cannot, therefore, be recommended for the very delicate, but it is a grand adjunct to the diet of those who are just beginning to regain strength after long, severe illnesses. A residence at the seaside to induce a healthy appetite, and a diet consisting largely of goat's milk, would restore many a convalescent far more speedily to health without the aid of drugs than anything I know of.

A course of goat's milk may often be taken with advantage in the autumn by those who suffer much from cold during the winter months, but who do not care to take cod-liver oil. The extract of malt would go well with it as a tonic adjunct. The milk ought to be taken on the principle of little and often, not drunk wholesale.

Ass's milk contains a larger proportion of water, more lactine, and less oil and caseine. This is the reason it is so easily assimilated, and is so often prescribed by the physician for patients who have delicate digestions. It is possible that it may be of a somewhat too laxative nature for some, but this is easily corrected.

Cow's milk most invalids can take. It is often an advantage to give it in conjunction with a little aerated water; and in cases where it has a tendency to turn sour or disagrees with the stomach, it should be mixed with a little lime water. It should be remembered, however, that lime water must not be taken for any length of time without intermission, or evil results may follow. Cream, if taken fresh in the morning, and if it can be well borne—which it usually can—is an excellent tonic and restorative. It should be taken with breakfast, and the more fresh it is, and the more good and pure the milk from which it has been taken, the better will be the result. The cream of goat's milk is probably better than even that of the cow.

Skim milk is very nutritious, but, of course, being deprived of a large proportion of cream, it is not calculated to sustain the animal heat so well.

It is not every invalid who can take buttermilk, but it has, nevertheless, much to recommend it as a cooling nutritive summer drink. I might almost claim for it tonic properties; however, there is no doubt that, taken an hour or two before any of the ordinary meals of the day, when a feeling of emptiness and fatigue is experienced, it is of great service. The delicate should have it as fresh as possible.

Milk, talking physiologically, is demulcent, and therefore of great service in many cases of cough and lung irritation, as well as in dyspepsia. I need hardly say a word about the virtue of milk as a medicine for those suffering from consumption. In this case it ought to be drunk warm from the cow; it is certain then to be unadulterated. Too much of it can hardly be taken, so long as it agrees.

In all kinds of internal irritabilities, even in dysentery itself, milk is invaluable, and the emollient effects of milk warm from the cow are well marked in cases of chronic or winter cough.

A Sliding Mountain in Oregon.

The government engineers engaged upon the ship canal around the rapids where the Columbia River cuts through the Cascade Mountains, and the engineers of the Oregon Railway and Navigation Company, whose railroad runs beside the government canal, have discovered that a point of the mountains, of tremendous height and three miles in extent, is moving down an incline into the river. The fact of a moving mountain is strange, but not incomprehensible. It seems, says an intelligent correspondent of the New York *Times*, that the great river and the ravines that point to it have cut their way down through a superincumbent mass of basalt into a substratum of sandstone. This sandstone, we will suppose, presents a smooth surface, with an incline toward the river; the river cuts under the basalt into the sandstone, and the natural effect is for the superincumbent basalt, acting like a similar formation of ice in a glacier, to slide down hill.

The same gentleman says, on the authority of Mr. Thielson, engineer in chief of the Western Division of the Northern Pacific Railroad, that when an examination was made a year ago of a disused portage tramway past that point, the track was found to be twisted as much as seven or eight feet out of the true line in some places, caused beyond doubt by a movement of the mountain. It seemed certain to Mr. Thielson that there was a movement of a tremendous mountain spur opposite this piece of road. The correspondent goes on to say :

"It is a fact well known to all river men that above the Cascades, where the river is tranquil, the waters cover a submerged forest, whose trunks still stand with their projecting limbs to attest some wonderful phenomenon. It has been a query in the minds of all as to what convulsion of nature or process of time caused this overflow of waters. Over thirty years ago I saw the dead trunks standing beneath the waves, and the interest in this connection was increased by learning from the Indians that among their traditions was one that ages since the mountains rose precipitously at the river's side, and a great arch of stone spanned the river from shore to shore, and that their canoes passed under it. Tradition further says that in course of time a great earthquake threw down the arch and blocked the river, causing the cascades as we see them now. It is not often that Indian tradition is so specific in detail. As the records of the aborigines of this region are very transient, it is possible that this story rests on some fact of natural history of not very remote occurrence. Joining tradition and speculation with the discoveries and deductions of science, we must conclude that some convulsion of nature has thrown great masses of rock into the stream sufficient to deaden its flow for eight miles above and to submerge the forests just above the rapids. Mr. Brazee, who has been engineer of the navigation company that owned the Portage road around the falls, informs me that he has watched the movements of the mountain for twenty years, and that it is no myth."

Barnard's Comet (D 1882).

This telescopic comet was discovered by Mr. E. E. Barnard, on September 14, 1882, in right ascension, 7h. 17m. 33·7s.; north declination, 16° 14′ 52″. It was then near the star Lambda Geminorum. On the mornings of 24th and 25th inst., I observed it in Canis Minor, about three degrees N. E. of Procyon. It is moving southeast about one degree daily, and nearly on a line drawn from Epsilon through Lambda Geminorum.

It is a bright telescopic comet in the 9 inch reflecting telescope, round, without tail, and somewhat condensed at the center. Observers with only small telescopes will be repaid for their trouble in looking it up and watching its motion among the stars. It is increasing in brightness.

WILLIAM R. BROOKS.

Red House Observatory, Phelps, N. Y., Sept. 25, 1882.

CHRONOGRAPH FOR ENGINEERING PURPOSES, WITH THE HIPP ESCAPEMENT.

The two engravings given herewith show the general construction and details of an improved chronograph for engineering and other purposes.

The instrument has been successfully applied to some of the different types of large pumping engines, such as direct-acting fly-wheel engines, geared pumping engines, and the "Davey engines;" it has also been used to determine the motion and relative motion of pump rods and pumps some 2,500 feet below the surface engine driving same, and at intermediate points. The results are exceedingly interesting and instructive, and as numerous indicator cards were taken from the engines and pumps simultaneously with the motion diagrams, nearly all conditions of motion and power, during the time under consideration, were definitely determined, and may hereafter form the subject of other papers.

Some very important results of the elasticity of long pump rods are clearly set forth; in one case, a rod at a point 1,800 feet below the surface showed a positive pause, while the engine driving it was nearly at its point of maximum motion, and pumps attached to the rods may, and do have, strokes in excess of or deficient to the stroke of engines driving same, and to an important extent. Hence it can be definitely stated that any consideration of motion of pumps, or discharge capacity of same, driven by a long line of pump rods based upon the motion or stroke of a surface engine alone, will in no way be even approximate, unless the elasticity and effects of counterbalancing by balance bobs on that elasticity are also considered.

The effects of different degrees of compression upon the engines and motion of the pump rods in passing the centers have been considered, and the diagrams clearly show the importance of considering it in connection with the strength of the rods and balance bobs.

The latest use of the instrument in conjunction with an engine test has been to determine, if possible, the rate of condensation of steam, per second, in the steam cylinders of a pumping engine, where the change of motion, due to each fractional part of the stroke, was determined. Also, a ten-hour experiment trial to show the economy of compression, as compared with a ten-hour trial of the same engine on the succeeding day where no compression was used (otherwise all conditions being similar), has been made, when changes of velocity of piston were determined by the chronograph.

This chronograph has been put to a variety of uses, among which are recording seconds as well as the velocity curve of engines, and timing horse races, etc. It has also been used in the Navy Ordnance Department for determining the speed of projectiles.

In the following paragraphs we give the references by letters to the engravings of the instrument:

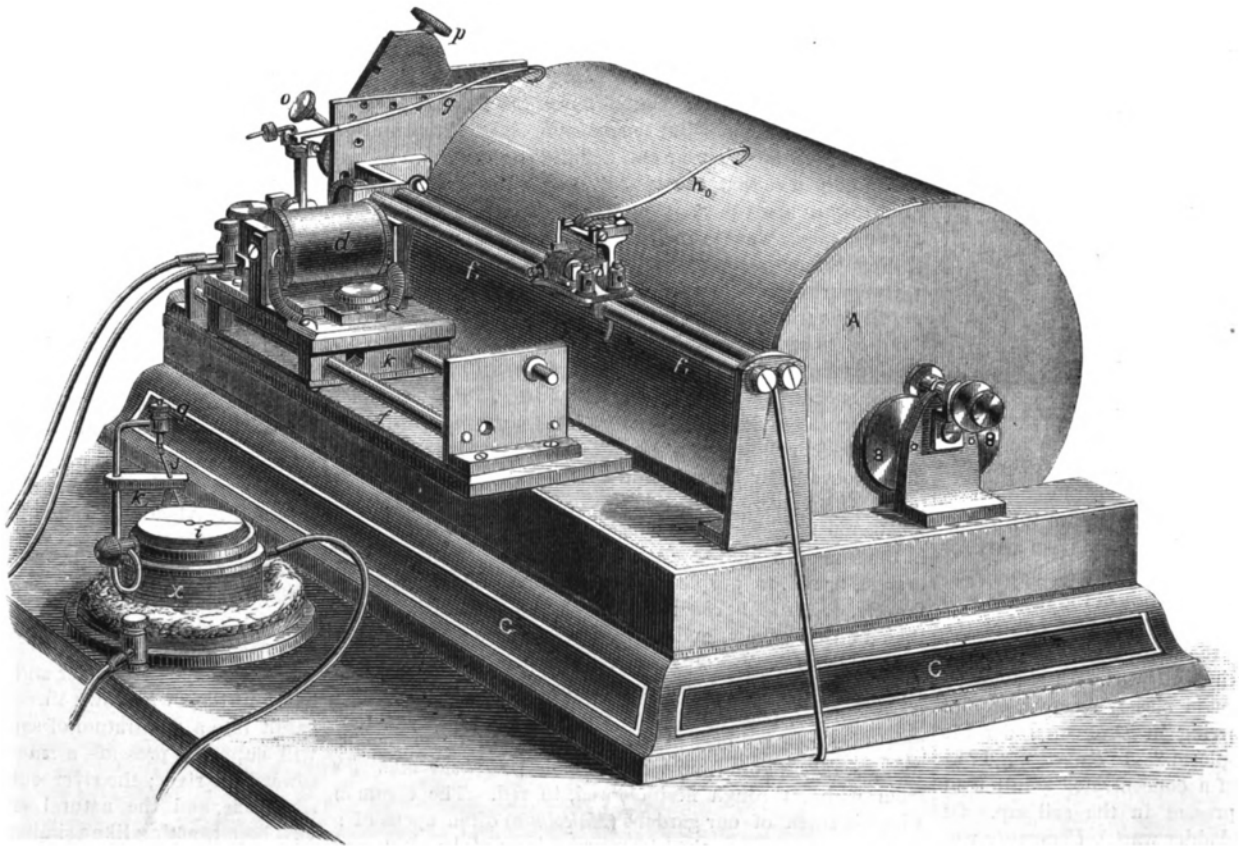


Fig. 2.—CHRONOGRAPH FOR ENGINEERING PURPOSES.

C C, cast-iron baseplate covered with sheet brass, upon which the mechanism is secured.

B, metal frame containing gearing for driving drum, A, and escapement wheel, *b*; motion communicated by means of adjustable weights, D.

A A, light brass drum accurately balanced, revolving on friction rollers, 8 8, at both ends.

f f, parallel guide bars, upon which the tracing point, h_o, and its carriage travel back and forth, receiving motion, in one direction, from the engine or other moving parts, through the cord, P, passing between the bars, *f*, and attached to the tracing carriage; the return motion is derived from a coiled spring in the spring drum, C.

e e, small electro-magnets on tracing carriage, for raising the tracing point, h_o, off the paper and replacing it at any desired point to be especially observed.

d, electro-magnet on separate carriage, *k k*, adjustable on parallel bars, *f*, operating the steel tracing point, *g*, attached to the armature of *d*, for the purpose of recording seconds on the margin of the paper or at other parts of same as required.

i, chronoscope or watch supported on frame, X, the second hand of which swings the light platinum wire, J, breaking contact with the insulated wire, *k*, thereby breaking circuit with *d*, and recording seconds through the tracing point, *g*, on the paper.

q represents the adjusting screw for the wire, J.

a, steel spring of escapement. This spring is securely clamped in Y, its flexibility being controlled to a certain extent by means of the thumbscrews, *o* and *p*.

—*W. R. Eckart.*

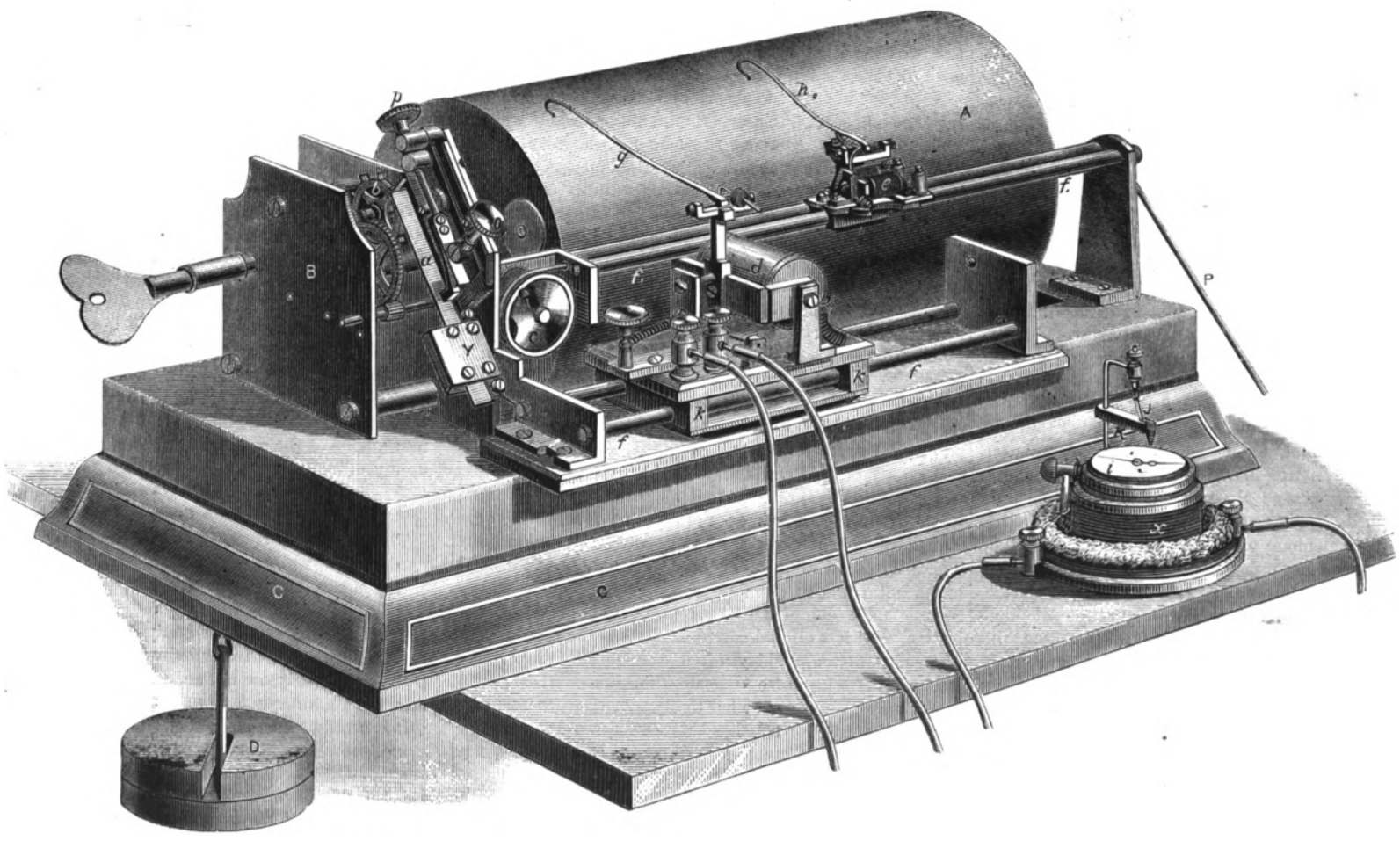


Fig. 1.—CHRONOGRAPH WITH THE HIPP ESCAPEMENT.

The Cost of Bombardment.

Speaking of the monetary cost of bombarding the Alexandria forts the London daily *News* says that every round fired from the four 80-ton guns of the Inflexible cost the nation £25 10s. (about $125) per gun. The 25-ton guns, of which the Alexandra carries two, the Monarch four, and the Téméraire four, cost £7 per round per gun. The 18-ton guns, of which the Alexandra carries ten, the Sultan eight, the Superb sixteen, and the Téméraire four, cost £5 5s. per round per gun. The 12-ton guns, of which the Invincible carries ten, the Monarch two, and the Sultan four, cost £3 12s. per round per gun. The Penelope, which alone carries 9-ton guns, has eight of them, which were discharged at a cost of £2 15s. per round per gun. The Monarch and the Bittern each fired a 6½-ton gun; the cost being £1 15s. per round per gun. The Beacon and the Cygnet have two 64-pounders each, the cost of discharging which is 18s. per round per gun. The Penelope carries three 40-pounders, the Beacon two 40-pounders, and the Bittern two 40-pounders, the cost of discharging which was just 12s. per round per gun.

Death of a French Electrician.

M. Leclanche, inventor of the Leclanche electric pile and other improvements in electricity, is dead.

THE HELODERMA HORRIDUM.

The discussion of the curious lizard found in our Western Territories and in Mexico, and variously known as the "Montana alligator," "the Gila monster," and "the Mexican heloderma," is becoming decidedly interesting.

As noted in a recent issue of the SCIENTIFIC AMERICAN, a live specimen was sent last summer to Sir John Lubbock, and by him presented to the London Zoological Gardens. At first it was handled as any other lizard would be, without special fear of its bite, although its mouth is well armed with teeth. Subsequent investigation has convinced its keepers that the creature is not a fit subject for careless handling; that its native reputation is justified by fact; and that it is an exception to all known lizards, in that its teeth are poison fangs comparable with those of venomous serpents.

Speaking of the Mexican reputation of the lizard, in a recent issue of *Knowledge*, Dr. Andrew Wilson, whose opinion will be respected by all naturalists, says that "without direct evidence of such a statement no man of science, basing his knowledge of lizard nature on the exact knowledge to hand, would have hesitated in rejecting the story as, at least, improbable. Yet it is clear that the stories of the New World may have had an actual basis of fact; for the *Heloderma horridum* has been, beyond doubt, proved to be poisonous in as high a degree as a cobra or a rattlesnake.

"At first the lizard was freely handled by those in charge at Regent's Park, and being a lizard, was regarded as harmless. It was certainly dull and inactive, a result probably due to its long voyage and to the want of food. Thanks, however, to the examination of Dr. Günther, of the British Museum, and to actual experiment, we now know that *Heloderma* will require in future to be classed among the deadly enemies of other animals. Examining its mouth, Dr. Günther found that its teeth formed a literal series of poison fangs. Each tooth, apparently, possesses a poison gland; and lizards, it may be added, are plentifully supplied with these organs as a rule. Experimenting upon the virulence of the poison, *Heloderma* was made to bite a frog and a guinea pig. The frog died in one minute, and the guinea pig in three. The virus required to produce these effects must be of singularly acute and powerful nature. It is to be hoped that no case of human misadventure at the teeth of *Heloderma* may happen. There can be no question, judging from the analogy of serpent-bite, that the poison of the lizard would affect man."

In an article in the London *Field*, Mr. W. B. Tegetmeier states that this remarkable lizard was first described in the *Isis*, in 1829, by the German naturalist, Wiegmann, who gave it the name it bears, and noted the ophidian character of its teeth.

In the *Comptes Rendus*, of 1875, M. F. Sumichrast gave a much more detailed account of the habits and mode of life of this animal, and forwarded specimens in alcohol to Paris, where they were dissected and carefully described. The results of these investigations have been published in the third part of the "Mission Scientifique au Mexique," which, being devoted to reptiles, has been edited by Messrs. Aug. Dumeril and Bocourt.

The heloderm, according to M. F. Sumichrast, inhabits the hot zone of Mexico—that intervening between the high mountains and the Pacific in the districts bordering the Gulf of Tehuantepec. It is found only where the climate is dry and hot; and on the moister eastern slopes of the mountain chain that receive the damp winds from the Gulf of Mexico it is entirely unknown. Of its habits but little is known, as it appears to be, like many lizards, nocturnal, or seminocturnal, in its movements, and moreover, it is viewed with extreme dread by the natives, who regard it as equally poisonous with the most venomous serpents. It is obviously, however, a terrestrial animal, as it has not a swimming tail flattened from side to side, nor the climbing feet that so characteristically mark arboreal lizards. Sumichrast further states that the animal has a strong nauseous smell, and that when irritated it secretes a large quantity of gluey saliva. In order to test its supposed poisonous property, he caused a young one to bite a pullet under the wing. In a few minutes the adjacent parts became violet in color, convulsions ensued, from which the bird partially recovered, but it died at the expiration of twelve hours. A large cat was also caused to be bitten in the foot by the same heloderm; it was not killed, but the limb became swollen, and the cat continued mewing for several hours, as if in extreme pain. The dead specimens sent to Europe have been carefully examined as to the character of the teeth. Sections of these have been made, which demonstrate the existence of a canal in each, totally distinct from and anterior to the pulp cavity; but the soft parts had not been examined with sufficient care to determine the existence or non-existence of any poison gland in immediate connection with these perforated teeth, until Dr. Günther's observations were made, as described by Dr. Wilson.

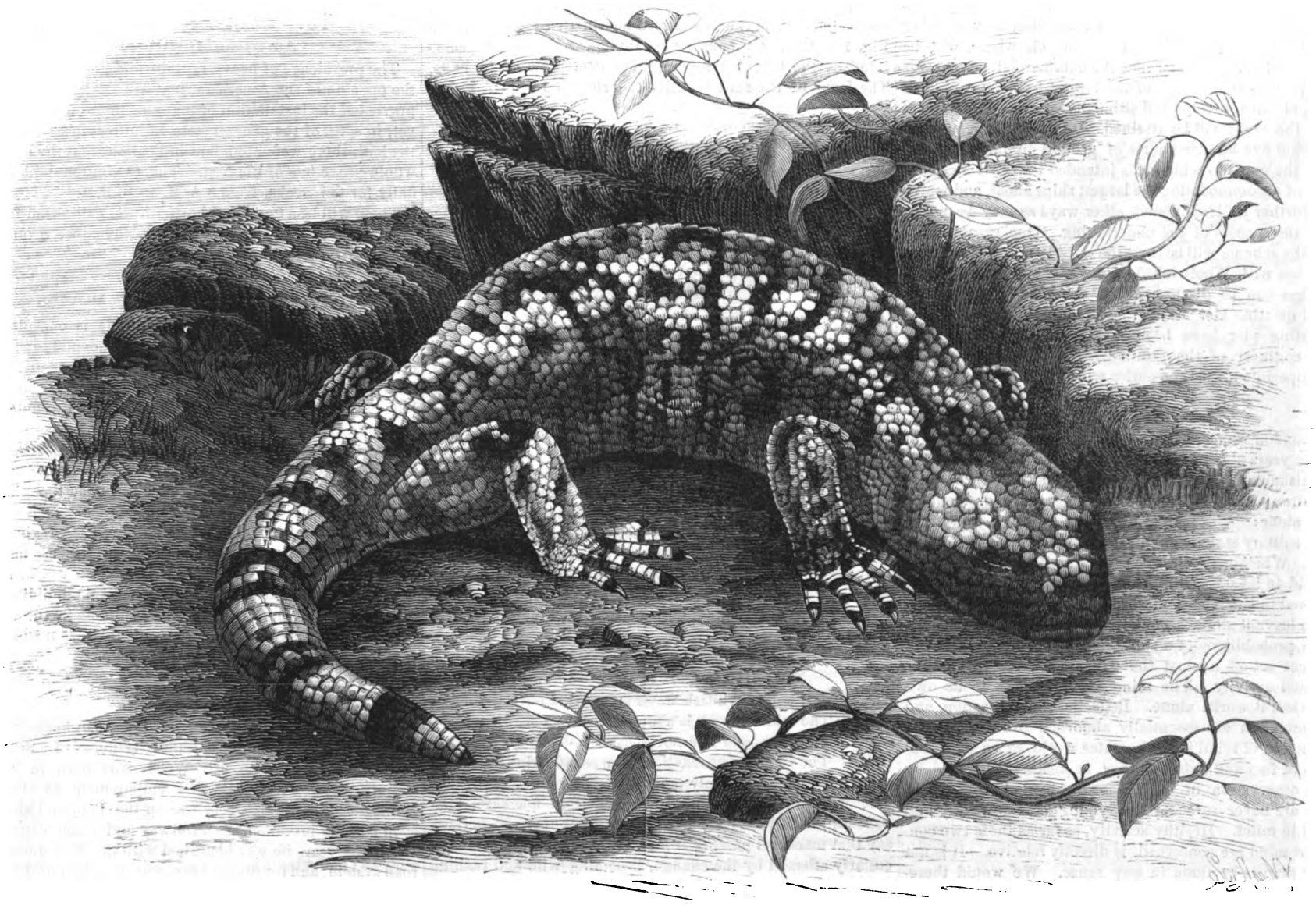
Hitherto, as noted in a previous article, American naturalists have regarded the heloderm as quite harmless—an opinion well sustained by the judgment of many persons in Arizona and other parts of the West by whom the reptile has been kept as an interesting though ugly pet. While the Indians and native Mexicans believe the creature to be venomous, we have never heard of an instance in which the bite of it has proved fatal.

A correspondent, "C. E. J.," writing from Salt Lake City, Utah, under date of September 8, says, after referring to the article on the heloderm in our issue of August 26:

"Having resided in the southern part of this Territory for seventeen years, where the mercury often reaches 110° or more in the shade, and handled a number of these 'monsters,' I can say that I never yet knew anybody or anything to have perished from their bite. We have often had two or three of them tied in the door-yard by a hind leg, and the children have freely played around them—picking them up by the nape of the neck and watching them snap off a small bit from the end of a stick when poked at them. We have fed them raw egg and milk; the latter they take with great relish. At one time a small canine came too near the mouth of our alligator (*mountain alligator*, we call them), when it instantly caught the pup by the under jaw and held on as only it could (they have a powerful jaw), nor would it release its hold until choked near to death, which was done by taking it behind the bony framework of the head, between the thumb and finger, and pressing hard. The pup did considerable howling for half an hour, by which time the jaw was much swollen, remaining so for two or three days, after which it was all right again. By this I could only conclude that the animal was but slightly poisonous. I never knew of a human being having been bitten by one. My sister kept one about the house for several weeks, and fed it from her hands and with a spoon. The specimens have generally been sent (through the Deseret Museum) to colleges and museums in the East.

"The Indians have a great fear that these animals produce at will good or bad weather, and will not molest them. Many times they have come to see them, and told us that we should let them go or they would talk to the storm spirit and send wind and water and fire upon us. An old Indian I once talked with told me of another who was bitten on the hand, and said it swelled up the arm badly, but he recovered. From some reason we never find specimens less than 12 or 14 inches long. *I* never saw a young one. There is a nice stuffed specimen, 18 inches long, in our museum here."

Sir John Lubbock's specimen, shown in the engraving herewith, for which we are indebted to the London *Field*, is about 19 inches in length. Its general color is a creamy buff, with dark brown markings. The forepart of the head and muzzle is entirely dark, the upper eyelid being indicated by a light stripe. The entire body is covered with circular warts. It is fed upon eggs, which it eats greedily.



THE HELODERMA HORRIDUM.

It would be interesting to know whether the northern specimens, if venomous at all, are as fully equipped with poison bags and fangs as Dr. Günther finds the Mexican specimen to be. Some of our Western or Mexican readers may be able to make comparative tests. Meantime it would be prudent to limit the use of the "monster" as a children's pet.

The Largest American Cable.

The cable which the Baltimore and Ohio Telegraph Company laid September 20, across the Narrows at the entrance of New York Harbor is believed to be the largest cable made in this country. It contains seven conductors of No. 14 copper wire, insulated with kerite, and wound with galvanized iron wire. Its length is 6,500 feet, diameter 2¼ inches, and weight 3,600 pounds. It was made by the Kerite Company, at Seymour, Connecticut. Telegraphic connection with the West and South has hitherto been through cables across the Hudson. The new connection is by wires across the East River Bridge, thence to Fort Hamilton, crossing the Narrows to Staten Island by the cable. A cable across the Kill von Kull will connect Staten Island with the main land.

A New Port for London.

This new means of communication has been obtained by the Southeastern Railway Company, acquiring the line of the Hundred of Hoo Railway Company, who obtained their act two years ago. The new line leaves the North Kent system about three miles below Gravesend, and reaches the banks of the Medway at Port Victoria, as the new port has been called, a point nearly opposite to Queenborough in the deep-water channel of the river. The advantages claimed for the new line and the docks which it is intended shall form part of the completed scheme, are that it shall at once give facilities for loading and unloading the largest sea-going vessels, in any state of the tide, at a point within fifty minutes by rail of London, and without any of the delays which necessarily result from navigating the tortuous and crowded waterway of the Thames between Gravesend and the docks; with the additional prospect when the new pier is built of having the means of accommodating, for loading and unloading purposes, vessels in twenty-seven feet of water at low water in ordinary spring tides. The pier, which has already been completed, is four hundred and fifty feet in length by fifty feet wide, and has, close in, a depth of twenty-two feet at low water. The main pier, which will be commenced immediately, will be built in the stream about one hundred yards distant from the present structure, and will have a length of six hundred feet and a width of sixty feet. The trains will run directly on to the pier over lines laid on cylinders and latticed girders, and will discharge passengers and cargo directly into the vessels moored alongside. By this means much of the inconvenience to passengers and delay in the transit of merchandise, now existing not only in the port of London but elsewhere, will be avoided, and it is expected that the commercial advantages afforded by ocean steamers of the largest tonnage combined with rapid railway communication between London and all parts of the world will be attained. The company have secured some five hundred acres of ground in the neighborhood of the port, on which it is intended to construct docks capable of accommodating the largest ships afloat, and which will be further utilized in such other ways as may be necessary for the success of the undertaking. One great advantage of the scheme will be that, the railway now having communication with Woolwich Arsenal, a heavy train of military stores can be discharged on shipboard within a few hours of quitting Her Majesty's storehouses. The line and the existing pier have been constructed by Mr. Francis Brady, engineer of the South Eastern Company, under whose superintendence the entire works will be completed.

Alone.

The London *Lancet* relates a distressing case of suicide of a boy ten years old, who had been shut up in his bedroom as a punishment. The editor comments adversely on leaving children or young persons and the weakly or troubled in mind alone:

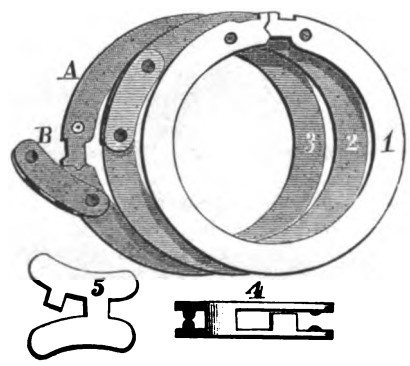
"The solitary state is abhorrent to the nature and mind of man. Whether the brain be immature in its development or morbid in its state, it is wrong in a scientific sense—that is, opposed to the laws and teachings of physiological science—to leave it alone. The possibility—we will even concede the probability—of a subsidence of excitement is not a sufficient set-off against the dangers of a self-destructive intellectual activity. The mind always works to its own injury when it works alone. Reflection, introspection, and self-examination are essentially abnormal processes. The proper action of mind is on the outer world, or on such conceptions of fact and object as may be readily corrected by present observation or experience. Abstract processes of thought are never safe for the young or the weakly and troubled in mind. Healthy activity, so far as these two conditions of mind are concerned, is directly relative. It is not good for man to be alone in any sense. We would therefore again protest against the recourse to solitary confinement as a punishment for children, and against 'seclusion' in any form for the unsound of mind. The two methods of treatment stand on the same footing, and they are both equally bad."

Hailstorms and Forests.

The Geneva correspondent of the London *Times* writes, under date September 1: "Hailstorms, as is well known, often play sad havoc in Switzerland as well as in other parts of Europe. They generally last only a few minutes, but in that time the crops of a whole district may be destroyed, trees stripped of their fruit and leaves, and even potatoes in the ground hacked to pieces. Birds are sometimes killed by the hundred, and a grape-vine touched by a hailstone is ruined for ever. Seven years ago there was a hailstorm in this canton, which in less than five minutes did damage estimated at a million of francs. In some districts there are mutual hail insurance societies, as in other countries there are mutual fire insurance societies. In these circumstances everything relating to the phenomena and causes of these visitations is studied with great interest, and papers on the subject read at the late meeting of the association of Swiss Geographical Societies, held this week at Geneva, by Herren Beaumont and Riniker, of Aargau, are attracting considerable attention in scientific circles. The utility of forests as a safeguard against avalanches and a hinderance to *tourments* and snow-drifts has often been pointed out, but it has never before been suggested that forests are a preservation against hailstorms. Such, however, is the opinion of Herr Riniker, who is chief forester of Canton Aargau. He says that where there are forests there are no hailstorms, and in support of this theory he adduces a remarkable fact, for the accuracy of which he and many others can personally vouch. In the south of Aargau there is a little chain of mountains known as the Lindenberge. The Lindenberge are about twenty kilometers long, of an average height, above sea level, of some eight hundred feet, and completely covered with wood. About twenty years ago, the forest was divided in two places by wide gaps, with the consequence that the valleys at the foot of the mountains were soon afterward visited with frequent hailstorms. The hail-charged clouds were seen to traverse the gaps. In 1868 the wider of the open spaces were closed by a plantation of firs, and since 1871 no hailstorm has crossed the forest. In explanation of this phenomenon Herr Riniker suggests that, as hailclouds are saturated with positive electricity, and trees conduct from the earth negative electricity, the meeting of the two currents develops sufficient heat to prevent the complete congelation of the clouds and even to thaw the hailstones contained in them—for the clouds of this description pass very near the earth—and so convert the frozen particles into rain. If further observation should confirm the accuracy of Herr Riniker's conclusions in this regard, the importance of forests in countries where hailstorms are frequent will be greatly increased."

NEW KEY RING.

A novel and convenient key ring has recently been patented by Mr. Bryant H. Melendy, of Battle Creek, Mich. The ring, A, is made of steel or other suitable spring metal, the body being flat, and stamped out in the shape shown in Fig. 1 in the accompanying engraving, the ring being separated at the top, and having holes near each of its ends. The form of the ends permits the ring to be opened sidewise, but prevents its opening edgewise. The clasp, B, of the ring is stamped out in the shape shown at Fig. 5, and when its sides are bent over the clasp is as shown in Fig. 4, the projections at the ends of the clasp fitting into the holes in the ends of the ring, the sides of the clasp springing sufficiently to allow the projections to pass into the holes. At Fig. 2 the ring is shown with clasp closed, and at Fig. 3 with the clasp opened.



MELENDY'S KEY RING.

White Water off the Maine Coast.

A curious belt of whitish water is reported off the coast of Maine. The white streak is about 30 miles in width, and extends from Monhegan in a northeasterly direction, 65 to 70 miles. The line of demarkation between the blue water and the white streak is plainly marked and as regular as a wall. The white water is semi-transparent, and mackerel seen beneath the surface have a reddish appearance. Fishermen say that mackerel passing from blue to white water are peculiarly affected by the change, becoming wild and rushing madly to and fro. They do not come to the surface, but their movements can be plainly seen under water. No explanation is given of the phenomena. Captain Stephen J. Martin, a veteran fisherman and an employe of the United States Fish Commission, says the same condition of things existed at about the same place in 1849, and that a similar phenomenon occurred on the southeastern part of Georges Bank in 1851, when from aloft sword fish could be seen sporting beneath the surface a quarter of a mile distant from the vessel.

The Ear Drum Ruptured by Diving.

Dr. H. A. Wilson, aural surgeon to St. Mary's Hospital, Philadelphia, reports two cases of rupture of the drum of the ear caused by diving. In both cases the hearing was seriously impaired, but the wound healed in the course of ten or fifteen days. Dr. Wilson says:

The mechanism of the rupture is not difficult of explanation. The water, forcibly impinging upon the column of air in the external auditory meatus, suddenly increased its pressure upon the membrane, while the normal pressure upon the inside remained unchanged. The eustachian tube permitted the air to escape from the middle ear, and thus it will be seen that there was no resistance given to the internal column of air. The internal force of resistance being suddenly exceeded by the external impinging force, the rupture ensued. To prevent rupture when diving, it is necessary that the pressure upon the membrana from without should be compensated for by an equal resisting pressure from within. To accomplish this, a full inspiration should be taken prior to diving; the mouth kept shut; and, to prevent the escape of air by the nose, the posterior nares should be closed by elevating the soft palate. This is done almost involuntarily, and retains the inhaled air in the lungs, buccal and aural cavities, its compression being produced by the contractions of the chest and cheek muscles. The act of swallowing will force sufficient air through the eustachian tube into the middle ear to resist the pressure from without.

Holding the nose is not essential to the closure above referred to, but is a crude method of accomplishing the same result, and is resorted to by those who either have not sufficient control over the palatine muscles, or who do so through fear of swallowing the water.

Bathers should be careful to guard against accidents of this nature, which Dr. Wilson believes to be more common than is suspected.

After a rupture of the drum-head, if the parts do not unite, there will be left a permanent opening, and the inconvenience caused by air whistling through it is not the only thing to be dreaded. The delicate structure of the middle ear being directly exposed to the action and changes of the atmosphere, serious inflammatory changes are apt to take place, and purulent discharges and permanent impairment of hearing result.

The eye being exquisitely sensitive to the slightest touch takes cognizance of the presence of the most minute irritant, and prompts the patient to seek immediate relief. The absence of this sensibility in the ear is very frequently the cause of neglect to attend to it when injuries of this organ take place.

American Institute Fair.

The prevalence of heavy rain during the week preceding the opening of the American Institute Fair, September 27, prevented the installation of many of the promised exhibits; yet, in spite of the general state of unreadiness throughout the hall, there were abundant indications that the exhibition would prove one of the best. The exhibition will be open daily for ten weeks, from 8 A.M. to 10 P.M.

There will be a floral and horticultural exhibition from the 11th to the 14th of October, and on November 8 an exhibition of chrysanthemums.

Pneumonia an Infectious Disease.

That acute, lobar, croupous pneumonia is considered by some an infectious fever, with evident tendency to the lungs, or as now better expressed, a zymotic disease, caused by the inhalation of bacilli, which accumulate mostly in a lower lobe of one lung, we have often had occasion to note. The proofs of this statement accumulate daily.

Dr. Köhnhorn found that the disease had become endemic in one of the barracks at Wisel. Occasionally it broke out as a local epidemic. The regiment stationed there had suffered frequently from the disease. Not a year passed without many falling a victim to pneumonia. The regiment was then placed in other quarters, and no further case happened in this regiment. The barracks were torn down, the soil disinfected most thoroughly, as also all the building material. Since the regiment has been camping in these rebuilt barracks not a solitary case of pneumonia has made its appearance.—*Medical and Surgical Reporter.*

Ashbel Welch.

Ashbel Welch, President of the American Society of Engineers, died at his home at Lambertville, N. J., September 25, in his 71st year. Mr. Welch was born in Madison County, New York. His first employment as civil engineer, at the age of eighteen, was on the Lehigh Canal. He soon became prominent as a railway and canal constructor. For many years he was identified with the New Jersey Railroad system, and for fifteen years was president of the United New Jersey Railroad and Canal Company. From 1840 to 1845, he was engaged with Captain R. F. Stockton in the experiments which resulted in the building of the war steamer Princeton, the first screw steamer built in this country, and the pioneer naval vessel of the class.

At the time of his death, Mr. Welch was consulting engineer of the New York, West Shore, and Buffalo Railroad, now under construction.

Snow in Melbourne.

The first recorded snowfall in Melbourne occurred July 26. There are traditions of snow during the first decade of Victorian history, but the meteorological records of the colony do not confirm them. The late snowfall extended over the whole southeastern portion of the colony, and on the higher lands was quite heavy. At Kiandra, near the source of the Snowy River, the ground was covered with twenty inches of snow.

A Long Ditch.

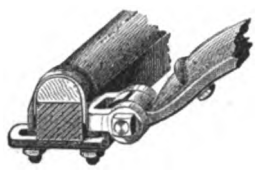
The Colorado Coal and Iron Company are preparing to open an irrigating ditch from a point on the Arkansas River, 8½ miles below Cañon City, across the tableland in a southeasterly direction to the St. Charles River, a distance of 76 miles. The ditch is to be 30 feet wide, carrying 5 feet of water.

A Great Northern Railroad train, with an 8-foot single driver outside cylinder engine, lately ran from Leeds to London, 186¼ miles, in exactly 3 hours—62 miles an hour.

RECENT INVENTIONS.

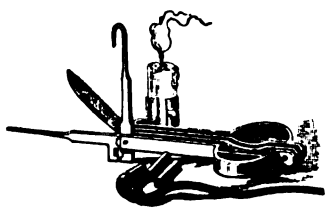
Mould's Anti-Rattling Thill Coupling.

A novel and simple device, by which the rattling of ordinary thill couplings is prevented, recently patented by Mr. William Mould, of Saugerties, N. Y., is shown in the annexed engraving. The axle and bow of the axle clip are of the usual construction. The clip bar is slotted to receive the ends of arms of the clip bow, to which it is secured in place by nuts screwed on the arms. Upon the forward end of the clip bar is formed a spring, which extends upward, and is curved forward to fit upon the inner side of the eye of the thill iron. Should the thill coupling become loose and rattle, by slightly loosening the nuts of the clip bow and striking the rear end of the clip bar with a hammer, the spring on its end will be firmly pressed against the eye of the thill iron, taking up the wear and holding it so firmly that it will not rattle.



Combined Miner's Candlestick and Loading Tool.

Mr. Charles P. Des Moineaux, of Leadville, Col., has recently patented a device in which the tools required by a miner in preparing blasts are combined with a candlestick in such a manner that they may be compactly folded. The frame is formed of metal strips placed parallel and connected at the ends, as shown in the engraving, the strips being curved at one end to form pockets for the ends of some of the implements. A series of longitudinal compartments are formed in the same manner as in an ordinary knife, in which are pivoted the ends of the implements, as in a knife. The implements consist of a knife blade, a pointed prong, and a hook. One end of one of the side strips is curved outwardly to form a spring loop for receivin a candle. The groove shown on the cap of the fuse, that holds it to the fuse, is formed by inserting the cap in a recess formed in the ends of the pointed prong and hook, and pressing the two apart. With this device the implements are folded so as to occupy but little space.



Dinner Pail.

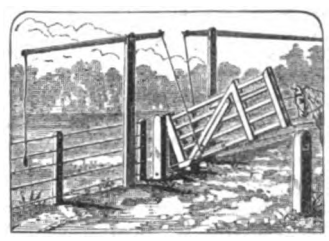
A dinner pail of convenient form and of such construction as to enable the user to carry a great variety of food without danger of mixing one kind with another, has been patented by Mr. William C. Dabney, of Princeton, Ky. The pail has attached at one side, to the top, a rectangular extension for containing boxes for condiments, and also a casing for receiving a knife, fork, and spoon. The pail is also provided with three compartment food pails for carrying different kinds of food and vegetables, each kind being separate from the other. A canteen for containing liquid forms a part of one of the pails, and a cover hinged to the back of the pail covers the whole, and is adapted to be secured by a padlock. The pail is especially adapted for the use of travelers, laboring men, and school children, and is much more cleanly than pails of ordinary construction. The device is clearly shown in the engraving.

Wallis's Calligraph.

An instrument, called by the inventor a "calligraph," for holding the hand and fingers, as well as the pen or pencil, in proper position for writing, is shown in the annexed engraving. The frame of the instrument is made of wire, or metal strips, and has at its lower end two curved prongs, bent toward each other to form an open ring to receive the forward part of the fore finger; and it has at its upper end a ring formed in a similar manner to receive the upper part of the finger. The upper ring has a projection on its outer side, upon which the penholder rests. A similar device, except the rest, is provided for the middle finger, and the two are connected together by a chain. A ring is also provided for the third and fourth fingers, that may or may not be used, as desired. With this device the pen will be held at the proper angle for writing, so that it will pass smoothly and evenly over the paper, and the fingers are compelled to remain in the correct position, which soon becomes natural to the writer. This instrument has been patented by Mr. Claude I. Wallis, P. O. Box 507, Atlanta, Ga.

Decker's Improved Gate.

A gate adapted to be opened and closed by a person at a distance from it has been patented by Mr. John M. Decker, of Kingston, O. The gate is formed by attaching crossbars to the opposite sides of the ends of horizontal bars, and is strengthened by crossbars and by inclined bars, as shown in the accompanying engraving. The rear lower corner of the gate is notched to receive a pivoted crosspiece, the ends of which work in blocks secured to posts placed on each side of the gate. The gate is strengthened vertically by triangular braces attached to the roller, and laterally by iron brace rods attached to the roller and gate. The gate being hinged at its rear lower corner, it is raised by means of rods secured to the sides of the gate near the rear end, and at the opposite end to the inner ends of levers pivoted in posts set at each side of the gate, the outer ends of the levers being extended and provided with a rope by which they are pulled down to raise the gate. The gate is secured when it is lowered by a sliding latch that engages with a recess in a post set at the lug of the gate.



The Alcohol of Fermented and Distilled Liquors.

It has generally been assumed that the alcohol of fermented and distilled liquids is identical, but it is by no means certain that such is the case. We know, says the *Brewer's Guardian*, that alcohol is produced by fermentation, and can be concentrated, and even isolated, by distillation, but it is possible that the action of heat necessary for distillation modifies and perhaps changes the chemical constitution of this substance. Although there is no direct evidence of the existence of these two kinds of alcohol, it is not altogether unreasonable to suppose that the action of heat causes a partial dehydration, and that in this way the alcohol of distilled spirits differs somewhat from the alcohol of fermented liquids. This hypothesis is supported by the well known fact that distilled spirits have a different and more injurious effect on the human system than the alcoholic liquids produced by fermentation. Medical men often prescribe beer and wine, but prohibit the use of brandy, whisky, gin, and all spirits which have undergone the process of distillation. It is within the personal experience of many that a wine which has been fortified by the addition of distilled spirit is far more potent, and, we may even say, unwholesome, than a wine of equal alcoholic strength, but produced by fermentation only; in like manner we believe that a larger quantity of alcohol may be safely consumed in the form of beer than in that of spirits. The question deserves further investigation, not only in the interests of the brewing trade, but in the interests of temperance and health.

The Oldest Newspaper.

The oldest newspaper in the world is the *King Pau*, or "Capital Sheet," published in Pekin. It first appeared A.D. 911, but was irregular in its issues until 1351. Since then it has been published weekly until the 4th day of June last, when by order of the reigning emperor, it was converted into a daily, with three editions, morning, midday, and evening. The first edition appears early and is printed on yellow paper. This issue is called *Hsing-Pau* ("Business Sheet"), and contains trade prices, exchange quotations, and all manner of commercial intelligence. Its circulation is a little over 8,000. The second edition, which comes out during the forenoon, also printed upon yellow paper, is devoted to official announcements, fashionable intelligence, and general news. Besides its ancient title of *King-Pau* it owns another designation, that of *Shuen-Pau*, or "Official Sheet." The third edition appears late in the afternoon, is printed on red paper, and bears the name of *Tilani-Pau* ("Country Sheet"). It consists of extracts from the earliest editions and is largely subscribed for in the Provinces. All three issues of the *King Pau* are edited by six members of the Han-Lin Academy of Science, appointed and salaried by the Chinese State. The total number of copies printed daily varies between 13,000 and 14,000.

Penalty for Stealing an Invention.

The attempt to steal an invention and the consequences is told by the London *Building and Engineering Times*.

The prosecutors were Messrs. John Wright & Co., of Essex Works, Birmingham, gas engineers, and the theft by a clerk was of certain memoranda and drawings made by a member of the firm concerning a new invention which they are about to patent. The memoranda have never been seen but by the principals, and hence they are, so to speak, the inventor's private thoughts and property. The clerk had possessed himself of these, and was engaged copying them, as he averred, for his own private information. The report does not tell us under what act the appropriation of unpublished ideas is defined as felony, so we are left to guess that in all probability the actual charge related to the pieces of paper on which the copy was made. Paper is property, and perceptibly more so than ideas are, and for annexing one or the other the prisoner became amenable to the law, and he was therefore senteneed to three months' imprisonment. During that period of solitude he may, if he can, work out the plan which his employer's experience suggested to him.

An Early Gas Engine.

In looking over an early volume of the SCIENTIFIC AMERICAN, we find in the issue of July 28, 1846 (thirty-six years ago), the following description of a gas engine which had just been invented, and which, the article says, might have been seen at the store of Samuel Perry, in Front street, near Whitehall, in this city. This was probably one of the earliest gas motors constructed:

"The machinery consists in part of a cylinder, piston, pitman, flywheel, and governor; in this respect similar to a steam engine. A small quantity of spirits of turpentine is kept in a warm state, and the vapor arising therefrom is mixed with fifty times its volume of atmospheric air. A small quantity of this hydrogenated air is drawn into the cylinder, and ignited by a movement of the machinery, producing a slight explosion, whereby the remaining air—at least nine-tenths of the whole—becomes so heated that it drives forward the piston with great force. This engine is said to be capable of working ten horse powers, and it is intended to substitute rosin instead of turpentine, which will reduce the expense of feeding it to about 50 cents per day. The ingenious inventor has had some difficulties to encounter in the construction of the first engine, but has a fair prospect of being well remunerated for his labor."

Areas of our States.

The total area of the United States is 3,025,606 square miles, divided as follows among the various States and Territories:

Alabama	52,250	Missouri	69,415
Arizona	113,020	Montana	146,080
Arkansas	53,050	Nebraska	76,855
California	155,980	Nevada	110,700
Colorado	108,925	New Hampshire	9,305
Connecticut	4,990	New Jersey	7,815
Dakota	149,100	New Mexico	122 580
Delaware	2,050	New York	49,170
District of Columbia	70	North Carolina	52,250
Florida	58,680	Ohio	41,060
Georgia	59,475	Oregon	96 030
Idaho	84,800	Pennsylvania	45.215
Illinois	59,650	Rhode Island	1,250
Indiana	36,350	South Carolina	30,570
Indian Territory	64,690	Tennessee	42,050
Iowa	56,025	Texas	265,780
Kansas	82,080	Utah	84,970
Kentucky	40,400	Vermont	9,565
Louisiana	48,720	Virginia	42,450
Maine	33,040	Washington	69,180
Maryland	12 210	West Virginia	24.780
Massachusetts	8,315	Wisconsin	56,040
Michigan	58,915	Wyoming	97,890
Minnesota	83,365	Unorganized territory	5,740
Mississippi	46,810	Delaware Bay	620

Of the above area 56,600 square miles is water surface.

New Explosive.

An Austrian patent for an explosive, which is said to offer less danger than others in use, has just expired. It was taken out only a year ago by Koeppel. The inventor claimed for it that it is cheaper than any other, gives no injurious smoke or gases, and does not explode from concussion or friction. It is manufactured in two kinds, of which the following is the composition. No. 1 is specially adapted for hard rocks, basalt, etc.; and No. 2 for sandstone, lime, etc.

	No. 1. Parts.	No. 2. Parts.
Saltpeter	35	42
Soda	19	22
Refined sulphur	11	12 50
Sawdust	9·50	19.00
Chlorate of potash	9·50	..
Charcoal	6	7
Sulphate of soda	4·25	5
Prussiate of potash	2·25	..
Refined sugar	2·25	..
Picrin acid	1·25	1 50
	100	100

Each ingredient is finely pulverized and passed through a sieve, then mixed in a mixing cylinder of copper or wood, until the sawdust is hardly noticeable. From 10 to 15 per cent of water is then added, and the whole stirred until large pieces are formed.

A Horse in Spectacles.

In a paper on nearsightedness lately read before the New York County Medical Society, Dr. W. F. Mittendorf told of a fine horse in Berlin that became intractable, and on examination proved to be suffering from myopia. The owner had a pair of glasses made for it, and it became as tractable as ever. American students, Dr. Mittendorf said, are not so subject to nearsightedness as German students. Sedentary occupations and want of exercise develop myopia, and women, therefore, are likelier than men to contract it. It generally sets in in childhood; rarely appears after 21 years of age. Blindness often follows neglect of it. Glasses should be worn early in life to prevent its progress. They should be rather weak than strong, and a slight blue tint is desirable.

THE total population of the United States is, in round numbers, fifty millions (50,000,000); of which 43,476,000 are native born, and 6,680,000 are foreign born. The colored people number 6,682,549. Thus about every seventh person, nearly, is a negro; and every seventh person, nearly, foreign born.

ENGINEERING INVENTIONS.

An eccentric having means for connecting it adjustably to a shaft, so that the motion imparted by the eccentric may be reversed, has been patented by Messrs. George T. and Dwight W. Metcalf, of Hillsdale, Mich. The eccentric is slotted and is loosely secured to a block that is rigidly fixed to the shaft. A slide inclosing the block and having a diagonal rib that fits in a corresponding groove in the eccentric is adapted to move longitudinally upon the shaft, thereby reversing the action of the eccentric.

Improvements in steam piston valves have been patented by Mr. William S. Hughes, of Long Island City, N. Y. The engine cylinder is formed with the usual exhaust and steam ports, and the valve case is cored longitudinally to receive a tube that forms the seat for the valve, the valve being a hollow piston, to one end of which the valve rod is connected directly, the valve working steam tight and needing no stuffing box. By a suitable arrangement of the openings in the valve it is made self-balancing.

Improvements in rotary engines have been patented by Mr. D. M. Johnson, of Trinity College, N. C. A wheel, having a solid rim rounded on its sides, has formed in it a series of cavities alternating on the opposite sides. A steam chest or bonnet fits snugly to the face and sides of the wheel rim so as to cover the cavities. A transverse slide fits openings connected with steam ports, and is operated to oscillate to admit steam to the cavities by alternating pins placed on face of the wheel.

Messrs. William H. Sanders and Henry H. Talley, of Petersburg, Tenn., have patented improvements in sawmill dogs. The head block of the sawmill moves transversely on the log carriage. The dog is pivoted to a standard on the head block, and has at its pivoted end a segmental geared head that engages with a corresponding segmental head on a lever to which power is applied to force the dog into the log. The standard is adapted to be raised and lowered according to the size of the log, and to be rotated to turn the dog away from the log.

An improved water elevator has been patented by Mr. Henry F. L. W. De Romily, of Paris, France. A partly covered drum is secured to an upright rotating spindle, and supplied with water which rotates with the drum. A fixed pipe is so bent at one end as to present its open end to the current of water. The other end of the pipe leads to an ejector nozzle immersed in a reservoir of water. The velocity of the water in the ejector carries it to a height depending on the speed of the rotation of the drum.

An improved car coupling has been patented by Mr. Frederick W. Brooks, of Oak Grove, Wis. The coupling pin is held in an elevated position ready for coupling the cars, by means of a vertically sliding frame. This frame is released by the backward movement of the drawhead, when the cars are backed together, causing the pin and frame to drop, and the pin to pass through the drawhead and coupling, thus automatically coupling the cars.

Mr. David E. Grove, of Dallas, Texas, has patented an improved plow for removing snow from railroad tracks. A car has an adjustable funnel at its front end, that raises the snow from the track, and endless aprons carried upon rollers at the bottom and sides of the car carry the snow back to a second series of aprons and rollers that carry the snow to the side of track and out of the way.

An improved rotary engine has been patented by Mr. William D. Cook, of Harvard, Neb. The piston of the engine is smaller than the cylinder, leaving an annular space between them. At one side of the piston an abutment projects against the inner surface of the cylinder. Steam is admitted through suitable ports, and carries the piston. When it is nearly around the steam escapes through an exhaust port. After passing this port the abutment raises a valve, and passes again in front of the steam pressure. Suitable devices are provided for reversing the engine.

Mr. William L. Fisher, of Bay City, Mich., has patented an improved car coupling. The mouth of the coupling head is made hopper shape, and is formed in two parts, the upper part being hinged to and fitted in a recess in the lower part. In a recess in the throat of the coupling head, back of the pin hole, is a stirrup that holds the pin in an elevated position. When the cars are backed together the link moves the stirrup back, allowing the pin to drop and couple the cars.

Mr. Otis D. Thompson, of Elkhart, Ind., has patented improvements upon a windwheel for which letters patent were granted him December 14, 1880. The improvements consist in the peculiar manner of attaching the sails to the rims of the wheel, and also in attaching the vane or governor to the wheel in such a manner that a strong wind will strike it before reaching the wheel, and turn it on its pivot, to put the wind wheel out of the wind to protect it from being shocked by sudden gusts.

Messrs. David Clark and John Lee, of Hazelton, Pa., have patented a steam brake mechanism for locomotives and tenders. A small steam cylinder is attached to the rear part of the engine frame, and to the piston is hinged an arm that connects with a rocking shaft and levers to operate toggle bars, to the outer ends of which are pivoted brake shoes that engage with the rims of the drive wheels. From the rock shaft suitable devices are also operated to move the brakes of the tender. The devices are operated by foot pedals in the cab of the engine.

Improvements in fan blowers have been patented by Mr. Edward F. Schneider, of Racine, Wis. A pair of fan wheels having spiral blades, the blades of the two wheels being pitched in opposite directions, are arranged side by side, a little distance apart, on the same shaft. When the wheels are turned, the air is delivered each way along the shaft into hoods, and carried by branch pipes into one main pipe. The two currents may be used separately if desired.

Mr. John McLachlan, of New Orleans, La., has patented improvements in the running gears of railway cars. The trucks of the car are provided with a tongue that has at its end a curved head piece that abuts against the curved face of a block on the bottom of the car. The blocks are connected by rods on which are spiral springs, and when the wheels of the truck have passed round a curve, the springs draw the wheels back to a parallel line.

METALLURGICAL INVENTIONS.

Improvements in mortars for stamp mills have been patented by Mr. Henry Botthoff, of Central City, Col. The mortar is divided horizontally, at about the middle, into two sections, an upper housing section and the lower section, the mortar proper. The two sections have an elastic packing between them and are connected by bolts. The upper section is also divided vertically, the parts being held together by bolts. By this construction the mortar can be taken in pieces for repairs and for transportation.

Improvements in apparatus for amalgamating gold and silver ores have been patented by Mr. Walter Hamilton, of New York city. A vertical pipe of suitable length conveys the ore discharged into it by a chute, to near the bottom of a large basin partly filled with amalgamating material. The upper part of the pipe passes through a fire chamber, so that the ore is properly heated, the weight of the ore causing it to be forced out at the bottom, and rise through the amalgamating material.

Mr. Hamilton has also patented an apparatus in which upper and lower pans are connected by a pipe for the passage of the amalgamated ore from the upper to the lower vessel, and an elevator for raising it again from the lower to the upper vessel. A furnace keeps the amalgamating substance melted, and suitable devices are also provided for distributing the ore and removing the refuse.

ELECTRICAL INVENTION.

Mr. John W. Weakley, Jr., of Bond Hill, O., has patented an improved electric brush. This brush is for the relief of nervous complaints. On the back of an ordinary metallic brush is placed a battery and induction coil. In the back of the brush is a recess containing a copper or other metal plate, so placed as to rest on the metallic pins of the brush. The electric current is carried through the pins to the scalp or body.

TEXTILE INVENTION.

Improvements in perforated plates for forming hat bats have been patented by Mr. Seymour C. Palmer, of South Norwalk, Ct. The perforated plate is made with three radial division lines and a curved division line parallel with its circumference, and has angular plates attached beneath the radial division lines. With a plate thus constructed the bat will be formed in sections, and the edges of the body sections will be thinner along the edges to be lapped, making the body when finished of even thickness.

AGRICULTURAL INVENTIONS.

An improved form of cultivator tooth, by which a more perfect and uniform pulverization of the soil and easier draught are secured, has been patented by Mr. Robert L. Turner, of Olena, O. The tooth is formed with a shank portion, and a wider blade portion, the end of which is curved to one side. The body of the tooth is secured to the frame in an inclined position, and the blade portion enters the ground with a shear cut, while the curved portion scrapes and pulverizes the earth more and more to the end of the blade.

Improvements in peanut planters by which they are adapted to drop peanuts accurately without bruising or breaking their skins have been patented by Mr. James R. Ayers, of Petersburg, Va. The feed wheel of the planter has alternate projections and recesses formed on its periphery. Conical cups are secured to the projections, that are adapted to receive one peanut at a time from the hopper and deliver it by gravity into the recesses, the recesses carrying it to the ground.

Mr. John C. Ferree, of Marysville, Ia., has recently patented an apparatus that combines all the machines a farmer needs, after plowing the ground, to put in a crop of grain. The devices combined are a harrow to prepare the ground, a device for marking the ground, for sowing the seed, for harrowing in the seed, and for rolling the ground, thus completing the work in once going over the ground.

Improvements in straw cutters have been patented by Mr. James T. Flanagan, of St. Marys, Kentucky. The cutter box is made with inclined sides and a flat bottom. The knives on the cutter bar are inclined reversely to the sides, and a pointed cutter works opposite the bottom of the box. This arrangement gives long cutting edges, and all the edges draw cut, thus making a straw cutter that cuts easily and rapidly.

Mr. Edward O. Cook, of Worcester, Mass., has patented improvements in potato diggers. A scoop set in an inclined position, so that its forward end will enter the ground and raise the potatoes and soil, is supported from the axle of the digger, and adapted to be raised or lowered from the driver's seat. Paddles operated from the axle push the potatoes and soil back over the scoop and on to a vibrating screen that separates the potatoes and the earth.

Messrs. James M., Thomas D., and Nelson Toy, all of Washburn, Ill., have invented an improved check row attachment for corn planters. To the seed boxes of the planter is attached a cross bar that projects beyond the sides of the planter frame. On the ends of the bar are pivoted guide pulleys which carry a rope that extends across the field and is knotted at suitable intervals. The knots of the rope pass through and move levers that operate the seed dropping mechanism.

Mr. Jacob Van Zandt, of Marshall, Tex., has patented improvements in cotton gins. The gin is of the usual construction, and below the brush roll beveled edged boards are placed, with the beveled edges in the form of an arc, concentric with the brush roll and extending from a point near the saw to a point opposite the lowest point of the dust roll. The boards serve to straighten the cotton fiber or lint and give it a finer and lighter appearance.

MISCELLANEOUS INVENTIONS.

A machine for compressing lozenges from dry powder, and for other work of a similar character, has been patented by Mr. Charles Killgore, of Utica, N. Y. A circular disk is pivoted at its center to turn on a bed plate. The disk has near its edge suitable apertures to form the compressed article, and the bed plate has corresponding apertures. By means of cam mechanism, vertical plungers having dies at their lower ends compress the substances fed into the apertures from a hopper, the device being automatic and working rapidly.

Mr. Thomas McNicholas, of Memphis, Mo., has patented improvements in brick moulds, consisting in a mould having its bottom divided longitudinally into narrow strips, corresponding in number to cells of the mould, the strips being connected at their ends by bars. By this arrangement air is admitted more freely, under the bottom, at the beginning of its rise when lifted off the bricks, permitting the bricks to pass easier from the mould and leaving them smoother, as there is no suction in the mould.

Mr. Jacob F. Scherer, of New Bremen, Ill., has patented improvements in sawing machines, intended for sawing logs and cordwood. The working parts are supported by a horizontal frame, and consist of devices by which the circular motion of a crank wheel is converted into rectilinear motion for operating a drag saw. A curved bar, that is hinged at one end to the frame, passes over the log to be sawed and is secured under a ratchet bar at its free end, holding the log firmly to its place.

Mr. Charles S. Barnard, of New York city, has patented a drop handle. The handle is formed of a knob having a longitudinal perforation forming a shoulder near the upper end of the knob. Upon this end a cap is placed and secured by filling the cap and the perforation with melted metal. The knob is secured to the front of the drawer in the usual manner. A stamped plug placed in the lower end of knob completes it.

An elastic bearing for spinning spindles has been patented by Mr. Albert R. Sherman, of Pawtucket, R. I. The bobbin spindle is stepped in a yielding or oscillating bolster permitting it to vibrate freely with the bolster, so that it will run steadily and at a high rate of speed, the bolster leaving the spindle free to rock slightly for maintaining its center of gravity when carrying an unevenly wound bobbin.

Messrs. Andrew B. Banghart and Charles H. Treat, of Frankford, Del., have patented improvements in wooden table casters, by which they are so constructed that they will not warp or split. The base, center part, top and bottom holder, are held together by a screw rod which passes through the other posts and screws into the top post. The various parts of the caster are made of timber built up of veneers of different colored woods.

An improved method of attaching the block of a brake shoe to the brake bar has been patented by Mr. Edwin S. Davis, of Kelseyville, Cal. The blocks are secured to the brake bar by means of clamping jaws and a clamp screw, the jaws being formed on a band clip fitting around the brake bar. By this device the block is firmly held to the bar, and is adapted to be shifted on the bar as may be desired.

Mr. Jean Jacques Magne, of Les Lilas, France, has patented a process for reproducing all kinds of printing with absolute exactness and without injury to the original. The process consists in impregnating the prints to be reproduced with an acid solution containing alcohol, prior to taking the impression. Mr. Magne has also patented a fluid ink composed of albumen, bichromate of an alkali, ferrocyanide of potash, a suitable coloring matter, and water.

An improvement in iron fence posts has been patented by Mr. Frank Schmitz, of Cornell, Ill. The base of the post is constructed in two parts, each part having an interlocking web, and when the parts are joined together the base is pyramidal in form, to resist being thrown out of the ground by strains or frost. The bottom ends of the upper parts of the post are formed to correspond with the shape of the base, and the parts are held together by iron bands.

A cheap and strong bale tie, that can be unfastened without compressing the bale, has been patented by Mr. John B. Allen, of Nashville, Tenn. An elliptical ring is first secured to one end of the bale strap, by passing the end of the strap through the ring and bending it back to form a loop. A second ring is then placed on the band over the lap, and when the strap is put around the bale, the free end is passed through both the rings, and back over the second ring and under the first, securely locking the strap.

A hand lever press for pressing dried fruit, etc., into small packages, has been patented by Mr. Andrew J. Hunt, of Albany, Or. To a suitable base uprights and cross piece are secured, forming a vertical frame. To the crosspiece a lever is pivoted in such a manner that when it is pressed down it forms a toggle that retains it in that position, the follower in the box keeping the fruit pressed until another box is filled. The fruit becoming set does not expand when the pressure is removed.

A combined calendar and letter box has been patented by Mr. William L. Caldwell, of Chicago, Ill. The invention consists in a box, constructed so as to hold in its front and expose successively a series of calendar cards. Back of the calendar cards is a space for letters. The box is made from one piece of paper, the cost being such as to make it a suitable article for use for advertising purposes.

Messrs. Henry C. and Joseph R. Still, of Austin, Tex., have patented improvements in the forks of saddletrees, by which greater strength is secured. The fork and pommel of the saddletree are cast from malleable iron in one piece, the neck of the pommel being cast hollow for greater lightness. The upper end of the pommel is cast open, the opening being closed by a cap of wood which gives finish to the pommel.

An improvement in wire netting, by which the edges are finished in such a manner that they cannot catch on objects, has been patented by Mr. Gustav Pickhardt, of Darmstadt, Germany. The link sections of the netting are formed of one or more spirals, screwed into each other, and a connecting wire passed through the loops formed of the overlapping parts of the spirals. The ends of the spiral wires and the connecting wires are bent over on the ends of the sections, finishing the edges of the netting.

Mr. Alfred S. Clark, of New Orleans, La., has patented a novel combination, consisting of a foot scraper and brushes for cleaning boots and shoes. A fixed brush is secured at the back of the scraper for cleaning the bottom of the boot, and a brush hinged at each side of the scraper is used for the sides of boots. These brushes are hinged, so that they may be swung apart to permit passing the foot between them, and under another brush to clean the top of the boot.

Mr. Harvey W. Burr, of Gloversville, N. Y., has patented improvements in gloves and mittens that prevent the ripping or tearing of the wristlets from them. A tongue of the leather of the glove extends from the glove across the wristlet, so that the glove may be drawn on to the hand by pulling on the tongue instead of on the wristlet.

Improvements in twine holders have been patented by Mr. Charles W. Jones, of Lowell, Mass. The twine spool is mounted on a shaft journaled in eyes in a ring suspended from the ceiling. In this is also journaled a shaft having a curved arm, and to this arm a ring is attached that surrounds the ring in which the spool shaft is journaled. This outer ring is hung eccentrically, and is provided with a weight and a spring arm at the outer end. The twine passes through this eye, and when it is pulled down the weight swings up, and when the twine is cut the weight raises the end of the twine.

Mr. John A. Conwell, of Aurora, Ind., has patented a sled that is so constructed as to fold at the points where the runners and the top are united, and also to fold along the middle of the top, the object being to enable the manufacturer and shipper to economize space, and also to allow the sled to be folded and carried under the arm if desired.

An improved chocolate package, consisting in a box provided with a grater cover, that can be removed from the body of the box and used to grate the chocolate, has been patented by Mr. Henry McCobb, of New York city. In grating chocolate the grater is soon clogged from the sticky nature of the substance. With this box a grater is provided with each package, so that when the box of chocolate is used up and the grater becomes filled it may be thrown away.

An improved device for securing covers upon cans has been patented by Mr. Epaminondus Bottenberg, of Astoria, Ill. The can is formed with a flange near its top, and has the usual sealing ring and cover. On top of the cover is placed a spring plate having three arms that reach a little past the cover, their ends being turned up to form lips that receive and hold wire loops that are bent at their opposite ends to catch under the flange for sealing the can. The loops are applied by means of suitable pinchers.

Mr. Thomas F. Palmer, of Painesville, O., has patented improvements in re-enforcing seamless sheet metal boxes. The improvement consists in extending the contiguous sides of the metal around each corner, and connecting them at the ends by the surplus metal between the extensions, thus forming three thicknesses of metal around each corner, and making the corners strong and durable as well as water and gas tight.

An improved frame for car gongs has been patented by Mr. James M. Matheny, of Woodstock, Ill. The gong is of the usual construction, and is secured by a screw bolt to a metal holding bar that passes within the gong, and is bent out and then projects over the edges of the gong, the gong being suspended from the frame with its outer surface downward. With this shaped frame the hammer is supported so as to always strike the gong.

Mr. Adam Metz, of Burlington, Ia., has patented an improved meat chopper consisting of a rocking knife suspended by rods from a rocking shaft, the rocking shaft being connected by suitable connecting rods to a rotating shaft. The rocking knife being suspended in this way cannot cut into the block, and only cuts the meat on the block.

Mr. Isaiah W. Shoemaker, of Rosston, Pa., has patented a fire place fender for attaching to the hearth of a grate. It is so constructed that it will fold down compactly within the hearth when not required for use, or the front may be wholly or partly open. The screen is also constructed so as to entirely inclose the fire, or the top be wholly or partly open, or if it is desired the top of the screen may be made of sheet metal to serve as a shade.

An apparatus for removing snow and ice from the sidewalks and streets has been patented by Mr. Francis D. Riker, of Brooklyn, N. Y., and it consists of a hollow cylinder resting upon the ground and revolving on rollers attached to the head of a furnace inside the roller, and held from revolving by suitable devices as the roller is moved. The furnace heats the roller, and the roller melts the snow as it is drawn along the walks.

An improved sash cord fastener has been patented by Mr. Charles Bush, of New York city. In the side of the sash stile, at a suitable distance from the top and edge, a pocket is made, and from the upper end of the pocket a slanting hole is made to the outer edge of the sash. In this pocket is placed a plate that has on its inner side an eye plate in which the knot of the sash cord is secured.

An improved device for fastening earrings, bracelets, etc., has been patented by Mr. George Krementz, of Newark, N. J. The fastener is composed of two segmental parts having at their upper ends knobs, one of the knobs being recessed to receive the end of an ear wire secured in the other, and at the lower ends plates adapted to be rotated on each other to swing one of the segmental plates out of the plane of the earring, to allow the lobe of the ear to pass for the ear wire.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) G. A. C. sends formulæ for solders for nickel. They are the result of practical experience and may be recommended. The solders are more malleable than those recommended in SCIENTIFIC AMERICAN, August 12, but not so white. They are: For fine or high grade nickel, 3 parts yellow brass, 1 part coin silver. For low grade nickel, 15 parts yellow brass, 5 parts coin silver, 4 parts zinc (pure or plate zinc). Melt the brass and silver with borax for a flux, and add the zinc in small pieces, stir with an iron rod, pour in a slab mould, and cool slowly, when it can be rolled thin for cutting

(2) S. K. H. asks: 1. Is there any preparation which can be applied to horses and cattle, as well as to men, that will effectually keep away flies and mosquitoes? A. Some one of the mixtures containing oil of pennyroyal might answer. 2. How long will one application be effective? A. Until its presence ceases to be perceptible by its odor. 3. How can the preparation be procured or made? A. See SCIENTIFIC AMERICAN, August 5, 1882.

(3) J. R. S. writes: 1. I am about to build a boat 19 feet long, 3 feet 10 inches broad, and 18 inches depth in center. Are my proportions right for a screw wheel yacht for speeds? A. We think 20 inches or 21 inches better depth, and if 3 feet longer, would be better for speed. 2. What size engine and boiler, also wheel, are required to run it from 8 to 10 miles per hour? A. 4 inches diameter of cylinder by 4 inches stroke; boiler with about 110 feet heating surface. 3. About what will such a boiler cost? A. It will depend upon the kind of boiler you use, probably $200 to $220; propeller 20 inches to 24 inches diameter, and 36 inches or 38 inches pitch. 4. Will such a boat have to be inspected? It is to be run only on a small river. A. Yes.

(4) J. F. L. asks: Can a locomotive pull more than its own weight? Example: If a 70 ton engine had 70 tons of solid matter in one cart attached to it, could it draw it? If so, could it pull it more easily than if it were put into 7 cars of 10 tons each, the engine not to use any substance to assist it, the track to be straight and level? A. Yes, the friction and resistances of air, etc., are less to one car than to a larger number. The pull of a locomotive is not the dead weight of the load, but merely the resistance due to friction, resistance of air, etc. See "How much will a Locomotive Pull," in SUPPLEMENT 184.

(5) B. A. L. asks: 1. Is there anything that is really straight, or is it possible to draw a true straight line? A. Depends upon what is meant by "really straight," and "true straight line." A mathematical straight line is not a "thing." A conventional straight line is a mark which more or less exactly covers the shortest distance between two points. The imperfection of our means for describing such a line makes it practically impossible to attain absolute straightness. 2. Can a true circle be made? If these are impossibilities how is it demonstrated? A. A circle practically "true" can be made. An absolute "true" circle cannot be made. 3. What means were used in showing that the earth itself exerted attractions on bodies, such as drawing a plumb line from the vertical? A. Every falling body proves it. 4. What influence has the moon over the weather? A. The moon's influence upon the weather is so exceedingly slight that its amount is not determinable. 5 If none, how is it that the so-called wet and dry moons very frequently and mostly come out as predicted? A. Weather predictions based on the moon's changes "do not mostly come out as predicted."

(6) E. M. C. writes: 1. I am erecting a factory in which I shall have occasion to convey steam for both power and heat (boiling) considerable distances and in considerable quantities. Boiler pressure will be about 80 pounds. Would there be any advantage either in economy or otherwise in *superheating* the steam? A By superheating you would lose less pressure by the traverse of the pipe, and have higher temperature for boiling. 2. What is the best material and mode of protecting the pipes, many of which will traverse open air intervals, where the thickness of the covering may be carried to any desirable extent without inconvenience? A. Hair, felt, asbestos, and mineral wool are all good if not exposed to moisture. 3. Can you refer me to any work in which the qualities and employment of superheated steam are comprehensively treated in a practical manner? A. This information is scattered through various works on steam and the steam engine.

(7) D. H. R. asks how to make good black or red indelible ink; red is preferable. A. See "Inks," in SUPPLEMENT, No. 157.

(8) C. B. J. asks: Please describe a cheap solution for rendering wood waterproof and fireproof. A. "Preservation of Wood," in SUPPLEMENT, No. 272.

(9) C. C. R. writes: I am building a three-cylinder engine to take steam at one end only of each cylinder The cylinders are 2½ inch bore, with 4-inch stroke, with a boiler pressure of 75 pounds; engine to run 400 revolutions. How can I figure out the power of said engine? A. You can calculate the engine as a single cylinder, taking steam at both ends, and then add 50 per cent to the result for the third cylinders. But the loss by friction and radiation will be greater in the three cylinders than in one cylinder giving out the same power.

(10) G. M. writes: A and B have a controversy concerning a hollow brick wall built to exclude the heat of summer. A claims that the inclosed air space should be entirely cut off from the external air and no circulation allowed. B claims that the circulation should be as free as possible. Which is right? What is the best way to build such a wall? A. B is right. Build the wall double, with an occasional "header," to tie the walls together, but not to be so tied as that difference of expansion and contraction shall crack the walls.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

September 12, 1882,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired and remit to Munn & Co., 261 Broadway, corner of Warren Street, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

Advertising match box, C. Greenwood 264,148
Aerial ship, R. L. Downton 264,261
Agricultural boiler and feed steamer, J. K. Purinton 264,101
Alarm. See Railway crossing alarm.
Amalgamating and separating gold, etc., from their ores, apparatus for, S. L. Trippe 264,422
Amalgamator, Schmidt & Streernwitz 264,344
Annealing furnace, James & Handley 264,296
Atomizer, J. G. Justin 264,169
Auger, earth, Potter & Gilliland 264,335
Augers, slate or earth, J. N. Rainey 264,196
Axle, car, G. W. Miltimore 264,188
Axle lubricator, N. H. Davis 264,251
Bag fastener, J. W. Estes 264,068
Bark cutting machine, J. C. Hagerty 264,152
Battery. See Galvanic battery. Ore battery. Secondary battery.
Bed spring, J. & R. Ainslee 264,212
Bedstead, cot, F. M. Case 264,187
Beehive, M. Van Ensley 264,276
Beer cooler, G. M. Newman 264,330
Bell, polarized, C. E. Scribner 264,109
Bell pull, C. L. Bates 264,223
Bell ringing apparatus, pneumatic, R. P. Garsed 264,273
Belt fastener, B. Hogan 264,290
Belt fastening, waist, I. Cairns 264,239
Belt, waist, F. Sternheimer 264,205
Berth, ship's, A. P. Bickmore 264,128
Bevel gauge, F. H. Sweet 264,421
Bicycle tire, J. O. Brown 264,133
Billiard table, C. Joergens 264,165
Blind, window, G. P. Gee 264,275
Block. See Snatch block.
Board. See Dash board.
Boiler. See Agricultural boiler. Cooking boiler. Locomotive boiler. Steam heated boiler.
Boiler, J. T. Smith 264,357
Boiler feeder, D. C. Walter 264,209
Bone black kilns, automatic cut-off for, Reyner & Stenhouse 264,337
Book rest, E. J. Bonett *et al* 264,234
Bottle cleaner, W. C. Baldwin 264,123
Box. See Advertising match box. Cigar box. Cigarette box. File box.
Brace. See Dental jaw brace.
Brake. See Car brake. Carriage brake. Sewing machine tension brake. Vehicle brake.
Brick, burning, A. Yates 264,117
Brick kiln, E. E. Polster 264,334
Brick kiln, A. Yates 264,118
Brick machine, M. Wright 264,498
Bridge, T. Barland 264,220
Bridle and halter, S. A. Marker 264,178
Bucket valve, well, W. H. Roe 264,342
Bullet greasing apparatus, H. S. Burns 264,237
Burnishing machine, N. S. Valentine 264,423
Calipers, beam, J. A. Reece 264,339
Can. See Cracker can. Fruit can. Milk can. Sheet metal can.
Cans of fruit, cooling, T. Shaw 264,200
Cane, walking, S. K. Bayley 264,068
Car brake, J. R. Wilhelm 264,389
Car coupling, J. B. Goodwin 264,075
Car coupling, S. A. V. Hartwell 264,288
Car coupling, J. E. Mendenhall 264,181
Car coupling, D. J. Schulte 264,108
Car spring, J. D. Thomas 264,371
Car starter, F. E. Allen 264,119
Car starter, M. M. Barnes 264,124
Car starter, W. H. Barnes 264,221
Cars, wall safe for, J. H. Laskey 264,172
Carbureting apparatus, A. W. Frail 264,406
Carpet stretcher, J. B. Fuller 264,144
Carpet sweeper, P. C. Wright 264,399
Carriage bow, I. C. Smith 264,203
Carriage, child's W. A. Hepburn 264,157
Carriage brake, child's, G. R. Peare 264,415
Carriage seat, T. Weaver (r) 10,195
Cartridge shells, apparatus for capping, uncapping, and loading, L. Sonntag 264,204
Caster, E. B. Merriam 264,094
Casters, manufacture of, J. E. Merriman 264,095
Chain, cable, J. M. Dodge 264,139
Chain, drive, H. M. Gray 264,280
Chair. See Opera chair.
Check row wires, knot or stop for, R. Faries 264,069
Cherry stoner, J. G. Baker 264,217
Cigar box, F. McWinnie 264,318
Cigarette box, M. T. Moore 264,326
Cleaner. See Bottle cleaner.
Clock, watchman's, C. Weinedel 264,382
Clothes hook, Griffis & Dunn 264,079
Coin separator, J. M. Quinn 264,425
Colter, rolling, R. Kloss 264,307
Commutator brush holder, W. K. Freeman 264,271
Condensers for escape pipes, drain for, W. T. & J. J. Maypole 264,093
Cooking boiler, grain, W. E. Arnold 264,215
Cooler. See Beer cooler. Milk cooler.
Coop, fowl, J. M. Householder 264,293
Corset, E. Hambujer 264,153
Corset, A. Strouse 264,366
Corset-shaping apparatus, J. A. House 264,292
Coupling. See Car coupling. Shaft coupling.
Cracker can, I. Sexton 264,347
Crate. See Folding crate.
Crosshead for engines, etc., J. E. Sweet 264,368
Crusher. See Stone and ore crusher.
Cultivator, I. B. Beard 264,060
Cultivator, J. J. Mize 264,323
Cultivators, rotary hand, B. Colvin 264,138
Curtain fixture, W. C. Kelly 264,303
Curtain fixture, C. J. Truemper 264,206
Cut-off for cisterns, G. Wilson 264,393
Cutter. See Straw cutter.
Dash board, W. Callaway 264,240
Dental jaw brace, J. A. Donaldson 264,260
Desk and chair, combined, V. W. Woodward 264,397
Die and stamping press, F. & O. Kampfe 264,170
Ditching machine, J. P. Bonnell 264,062
Ditching machine, railway, D. E. Grove 264,282
Draught equalizer, T. Harding 264,285
Draught equalizer, P. G. Rowlee 264,343
Drawer pull, J. F. Johnson 264,166
Drier. See Fruit drier.
Drill. See Ratchet drill.
Drilling machine, metal, F. Dubrul 264,263
Dropper. See Seed dropper.
Drying fruit, vegetables, grain, and analogous articles, apparatus, F. Cook 264,246
Duster, J. T. Smith 264,358
Eaves trough hanger, J. Draper, Jr 264,262
Electric circuit connection, E. H. Johnson 264,299
Electric machine, dynamo, G. W. Beardslee 264 227, 264,228, 264,229
Electric machines, commutator for dynamo, G. W. Beardslee 264,230
Electric motor, W. K. Freeman 264,272
Electrical conductors, coupling device for, E. H. Johnson 264,298
Electrical signaling apparatus, W. J. Dudley 264,264
Elevator safety device, W. H. Skerritt 264,352
Embroidery pattern, C. Preisig 264,194
Engine. See Oscillating engine. Self-adjusting engine. Steam engine. Traction engine. Wind engine.
Evaporating apparatus, T. G. Walker 264,208
Evaporating pan, S. Davis 264,252
Evaporator, J. A. Baldwin 264,122
Eyeglass, H. Bauer 264,225
Fan, fly and household, H. E. Clinton 264,064
Faucet, lock, W. S. Campbell 264,241
Faucet, vent, A. Lührs 264,177
Feed water heater, A. R. Young 264,400
Fence, J. Denning 264,259
Fence barb, wire, J. F. Scutt 264,110
Fence, barbed wire, F. M. Harris 264,286
Fence, combination post and rail, S. W. Lahue 264,171
Fence, hedge, H. Gilbert 264,276
Fencing, apparatus for the manufacture of barbed, E. S Lenox 264,174
Fibrous plants, machine for dressing and stripping the leaves of, A. Angell 264,055
File and file holder, combined paper, J. H. Linney 264,175
File box, M. L. Weiner 264,383
Filter, W. Maynard 264,314
Firearm, breech-loading, Lefever & Smith 264,173
Firearm, revolving, D. Moore 264,325
Fire escape, E. A. Costigan 264,065
Fire escape, J. P. Curry 264,404
Fire escape, W. T. Davis 264,254
Fire escape, C. A. Schnell 264,345
Fire extinguisher, C. B. Chace 264,242
Fish hook, F. De Forest 264,256
Fishing reel, Matthews & Ostell 264,092
Fishing rod ferrule, T. H. Chubb 264,243
Fishing wheel, S. Wilson 264,395
Flood gate, H. Handschy 264,283
Flour bolting machine, A. R. Smith 264,353
Flour, middlings, etc., apparatus for dressing, Hind & Lund 264,159
Flower, artificial, J. Lambert 264,308
Folding crate, W. B. Van Hutton 264,377
Frame. See Picture frame.
Fruit can, W. F. C. Quehl 264,102
Fruit drier, J. H. Street 264,365
Furnace. See Annealing furnace. Locomotive furnace. Smoke and gas consuming furnace.
Furnace for burning cane trash, peat, or similar fuel, M. Gros-Desormeaux 264,080
Gauge. See Bevel Gauge. Leather cutting gauge.
Galvanic battery, F. E. Kinsman 264,304
Galvanic battery, L. D. McIntosh 264,096
Gas burners, automatic cut-off for, G. W. Metcalfe 264,320
Gas engine, C. G. Beechey 264,126

Gas from one main, process of and apparatus for supplying and measuring a heating and an illuminating. T. G. Springer 264,359
Gate. See Flood gate. Swinging gate.
Gimlet bit shanks, die for upsetting, G. Bole 264,233
Glass. See Opera glass.
Glass screw caps, making, W. M. Wallace 264,379
Glucose or grape sugar, manufacture of, H. W. Bartol 264,222
Governor, elevator, C. S. Westcott 264,386
Governor, marine engine, J. H. Smith 264,356
Grain and straw separator, D. Murphy 264,190
Grain binder, P. F. Hodges 264,160
Grate, shaking, Taylor & Palmer 264,370
Grinding mill, T. Strobridge 264,115
Grinding mill, G. W. Wilson 264,394
Guard. See Railway guard. See Saw guard.
Gun barrel, R. L. Stevens 264,361
Hair, process of treating short animal, W. J. Reynolds 264,108
Hame, draught, R. F. Baker 264,218
Hame fastener, J. Vincent 264,207
Hanger. See Eaves trough hanger.
Harness, P. P. Winn 264,396
Harrow, G. H. Johnson 264,300
Harrow, J. Mewhinney 264,183
Harrow, double rotary, H. H. Monroe 264,324
Harrow tooth, L. J. Stanton 264,360
Hat setting and curling machine, Smith & Hall 264,420
Hay or cotton press, H. Bankston 264,219
Heater. See Feed water heater.
Heating apparatus, E. H. Graves 264,408
Heating apparatus, hot water, H. Swindell 264,116
Hermetically sealed pot, C. S. Westcott 264,385
Holder. See Commutator brush holder. Lead or crayon holder. Rein holder. Spoon holder.
Hook. See Clothes hook. Fish hook. Whiffletree hook.
Hoop cutting machine, barrel, F. L. Wilson 264,392
Horse rake, G. W. Burrier 264,135
Horse hoof pad, G. A. Dean 264,255
Horseshoe nail clincher, W. H. Dietz 264,067
Hose nozzle, McTighe & Robertshaw 264,317
Hydrocarbon burners, absorbent cushion for, C. F. Burleigh 264,402
Ice creeper, C. G. Rust 264,105
Incubator, J. W. Hannam 264,284
Inking apparatus, W. Lightfoot, Jr 264,088
Iron. See Tuyere iron.
Ironing table, M. G. Barbour 264,057
Key. See Pole changing key.
Kiln. See Brick kiln.
Knitting machine presser attachment, C. E. Bean, 264,059
Lacing fastening, shoe, J. L. Joyce 264,302
Ladder, A. S. Coles 264,245
Lamp, electric, A. W. Morton 264,328
Lamp, electric, H. Sedlaczek *et al* 264,346
Lamp, electric arc, F. K. Fitch 264,267
Lamp, electric arc, W. K. Freeman 264,269, 264,270
Lamp, voltaic arc electric, C. F. De La Roche 264,257
Lantern, Tallman & Blankley 264,369
Lasting and fastening machine, J. E. Crisp 264,347
Latch, locking, F. Hasdenteufel 264,081
Lathe for turning irregular forms, H. C. Paine 264,332
Lead or crayon holder, C. W. Boman 264,131
Leather cutting gauge, H. C. Babcock 264,056
Links, machine for making, J. Bridge 264,132
Liquids, apparatus for drawing and dispensing, L. Bergen 264,127
Lock. See Nut lock. Wagon brake lock.
Locomotive boiler, J. Campbell 264,136
Locomotive furnace, H. M. Smith 264,355
Looms for weaving tufted fabrics, tuft frame or carriage for, W. Greenhalgh 264,281
Loom shuttle, H. A. Williams 264,390
Lubricator. See Axle lubricator.
Lubricator, J. B. Low 264,176
Manure distributer, A. J. Grady 264,279
Mattress, folding woven wire, J. & N. Nelson 264,192
Meat cutter, J. Streicher *et al* 264,114
Meter. See Water meter.
Milk can, I. Chapman 264,403
Milk cooler, W. Colditz 264,244
Milk cooler, J. F. Swab 264,367
Mill. See Grinding mill.
Millstone paint staff, T. E. Davis 264,253
Motor. See Electric motor.
Mowing machine, S. T. Holly 264,291
Newspaper folding, wrapping, and addressing machine, R. W. Waters 264,390
Nozzle, sprinkler, F. B. Smith 264,354
Nut lock, W. H. Farra 264,142
Oiler, W. H. Reece 264,340
Opera chair, Bailey & Schade 264,216
Opera glass, B. H. Blank 264,130
Ore battery, P. Kirkwood *et al* 264,305
Organ, reed, G. R. Newman 264,097
Oscillating engine, double, R. L. Stevens 264,362
Ovens, implement for laying bricks in baking, M. Boessler 264,232
Overalls, A. A. David 264,249
Pad. See horse hoof pad.
Pail, dinner, W. C. Dabney 264,248
Pan. See Evaporating pan.
Panel raiser, E. N. Gore 264,278
Paper bags, method of and machinery for making satchel bottom, J. McCullough 264,180
Paper, folding, E. B. Stocking 264,364
Paper, protecting the ends of rolls, W. Scott 264,198
Paper pulp and apparatus therefor, refining, W. Jones 264,167
Paper pulp and paper, manufacture of, J. Jordan, 264,168
Pattern. See Embroidery pattern.
Pegging machine, G. Gray 264,077
Pencil sharpener, H. Burgess 264,236
Photographic negatives, automatic retouchers for, E. A. Gilbert 264,146
Picture frame, J. G. Batterson 264,224
Pigment for distemper painting, J. R. Alsing 264,214
Pipe, machine for making, T. H. Walsh 264,424
Planter check rower, corn, C. A. Masterson 264,224
Planter, corn, J. D. Smith 264,419
Plow, C. M. Simmons 264,351
Pocket, safety watch, J. F. Miles 264,321
Pole changing key, T. Shaw 264,348
Pot. See Hermetically sealed pot.
Press. See Die and Stamping press. Hay or cotton press.
Printing machine, yarn, H. Skinner 264,112
Pulp, manufacture of articles from wood or vegetable, E. F. Prescott 264,100
Pump, chain, C. Whipple 264,387
Pump, liquid measuring, H. E. Marchand 264,312
Pump reel, sand, H. T. Hunt 264,083
Pump, steam, P. Brown *et al* 264,134
Pump, vacuum, H. J. Miller 264,329
Pump valve, C. C. Redmond 264,338
Railway crossing alarm and signal, J. Bieder 264,129
Railway guard, S. J. Gray 264,078
Railway, rope, Low & Grim 264,413
Railway switch levers, lock catch for, J. Richards, 264,417
Railway track, S. W. Hudson 264,122
Rake. See Horse rake.
Ranges, broiling and roasting attachment for, Duparquet & Huot 264,265
Ratchet drill, W. Sandiford 264,107
Reel. See Fishing reel. Pump reel.
Refrigerating apparatus, ammonia, G. W. Stockman 264,113
Refrigerator, J. Miller ..... 264,184 to 264,187
Refrigerator, C. F. H. Waterman 264,210
Registering apparatus, G. D. Burton 264,238
Rein holder, G. W. Gibbs 264,145
Rendering fats, etc., apparatus for, W. Moackler, 264,199
Rubber, coating metallic articles with vulcanized, N. Avery 264,121
Saddle tree, side, J. C. Sexton 264,199
Saw guard, H. F. Kuhlmann 264,412
Saw guard, circular, J. G. Groff 264,149
Sawmill dog, J. Little 264,089
Sawmill dog, M. Shawver 264,111
Scale, spring, C. Forschner 264,070
Scoop, J. A. French 264,072
Scoop, tile, S. Ingels 264,295
Seat. See Carriage seat. Vehicle shifting seat.
Secondary battery, C. F. Brush 264,211
Seed dropper, F. W. Young (r) 10,196, 10,197
Seeding machines, drill tooth attachment for, S. C. Mendenhall 264,319
Self-adjusting engine, variable, W. H. Clark 264,063
Separator. See Coin separator. Grain and straw separator.
Sewing and other machines, treadle mechanism for operating, S. Ross, Jr 264,418
Sewing machine plaiting attachment, C. S. Goldman 264,147
Sewing machine shuttle, W. R. Parsons 264,333
Sewing machine tension brake, W. W. White 264,388
Shaft coupling, C. Barber 264,401
Sheet metal can, E. Norton 264,099
Sheet metal, spinning, H. Grom 264,150
Shirt, J. M. Quinn, Jr 264,195
Shoe, ventilated, T. Hawley 264,409
Sled, bob, D. G. Miller 264,322
Sliding gates, guide post for, I. S. Sherwin 264,350
Signal box, non-interfering, Palmer & Rolfe 264,193
Siphon, J. Saunders 264,197
Siphon, M. N. Webber 264,381
Smoke and gas consuming furnace, D. C. Hill 264,158
Smokestack, G. Gray 264,076
Snatch block, T. R. Ferrall 264,143
Sock or stocking and art of making the same, J. Shelton 264,349
Spard arrester, G. B. Nichols 264,331
Spindle. See Spinning frame spindle. Spinning machine spindle.
Spindle bearing, G. H. Allen 264,054
Spinning frame spindle, W. G. Morrison 264,327
Spinning machine spindle, G. Jaquith 264,297
Spoon and corkscrew, combined, C. T. Williamson 264,391
Spoon holder, J. B. Beach 264,226
Spring. See Car spring.
Springs, machine for coiling, O. S. & W. S. Foster, 264,071
Stanchion, Robertson & Warriner 264,104
Steam boilers, portable arch for, J. C. Haag 264,151
Steam boilers, removing and preventing scale in, L. Merrell 264,182
Steam engine, gravity, R. L. Stevens 264,363
Steam heated boiler, G. Edmondson 264,266
Steam muffler, J. Hill 264,289
Stone and ore crusher, S. L. Marsden 264,179
Stove barrel, safety expanding, J. A. Horton 264,161
Stove farm, J. J. Johnston 264,410
Stove, gasoline, P. Hickisco 264,082
Stove grate, W. H. Loomis 264,090
Stove, oil, L. C. Heckman 264,154, 264,155
Strap for bells, etc., S. Kirby 264,411
Straw cutter, Walker & Perrigo 264,378
Straw stacker, adjustable, W. R. Maloy 264,311
Surveyor's transit, H. Blattner 264,061
Swinging gate, J. P. Nichols 264,098
Table. See Billiard table. Ironing table.
Table leaf support, W. Kline 264,306
Table blocks, machine for making straps for, E. Fletcher 264,268
Telegraph, duplex and multiplex, B. Thompson 264,372
Thrashing machine, J. Hughes 264,294
Till, money, T. E. Boyce 264,235
Tobacco curing apparatus, C. E. Doyle 264,141
Tobacco marking strip and tag, combined, F. E. Heinig 264,156
Tool, combination, F. H. Richards 264,341
Tool, combination, G. A. Townsend 264,373
Toy, W. E. Crandall 264,066
Toy, magnetic, O. J. Dimmick 264,258
Toy shooting apparatus, A. Reynolds 264,416
Toy shooting gallery, W. W. Barnes 264,125
Traction engine, J. E. Mustard 264,191
Tray for drinking goblets and glasses, S. E. Hurlbut 264,163
Trestle, T. P. Maddox 264,310
Tricycle, H. C. Gallup 264,073
Triturating cylinder, J. R. Alsing 264,213
Truck, car, S. D. King (r) 10,194
Trunk tray support and lifter, Farel & Stumm 264,405
Tuyere, A. Werner 264,384
Tuyere iron for blacksmiths' forges, I. W. Mead 264,414
Type distributing apparatus, Johnson & Low 264,085
Type setting apparatus, L. K. Johnson 264,084
Type writer, J. S. Martin 264,091
Upholstering material and method of making the same, W. G. Benedict 264,231
Valve, J. Jones 264,087
Valve gear, variable, W. Johnson 264,301
Vehicle brake, D. Shelton 264,401
Vehicle running gear, F. Gill 264,277
Vehicle shifting seat, W. B. Sales 264,106
Vehicle top, J. W. & G. A. McMillen 264,316
Vehicle wheel, A. J. Hart 264,287
Velocipede, R. Tragardh 264,374
Wagon brake lock, W. K. Johnston 264,086
Wagon buckboard, J. B. & C. L. Preo 264,336
Washboard, P. T. Gates 264,074
Washing machine, J. P. Gage 264,407
Waste pipe valve, automatic, F. A. Davis 264,250
Water closet, portable, J. McAuliffe 264,315
Water meter, W. T. Travis 264,375
Wheel. See Fishing wheel. Vehicle wheel. Wind wheel.
Whiffletree hook, D. J. Dossey 264,140
Wind engine, G. Garside 264,274
Wind wheel, P. H. Jackson 264,164
Wool on skins, machine for cleaning, J. Laroche 264,309

DESIGNS.

Advertising label, H. Pennington 13,294
Button, sleeve, S. C. Howard 13,291
Coffin pedestal, J. Maxwell 13,293
Dish, vegetable, J. Slater 13,295
Eyeleting machine, H. L. Lipman 13,292
Finger ring, C. Wilkening *et al* 13,296
Type, font of printing, C. E. Heyer 13,290

TRADE MARKS.

Cosmetic, H. C. Abbott 9,649
Lamps, J. J. Kittel 9,659
Medicinal compound, J. J. Pater 9,660
Medicines, certain, C. R. Thomasson 9,663
Pens, pencils, pen and pencil cases, desk holders for pens, gold toothpicks, etc., gold, L. W. Fairchild 9,650
Salve, N. Stenger 9,662
Saws, H. Disston & Sons 9,664
Sewing machines, St. John Sewing Machine Company 9,667, 9,668
Teas, coffees, and spices, Olcovich Brothers 9,665
Tobacco and cigars, fine-cut chewing, smoking, and plug, C. B. Hull 9,653, 9,658
Tobacco and cigars, smoking, C. B. Hull 9,655
Tobacco, chewing, C. B. Hull 9,654, 9,656, 9,657
Tobacco, fine-cut chewing, Globe Tobacco Company 9,651
Tobacco, fine-cut chewing and plug, Globe Tobacco Company 9,952
Undergarments, W. Benger Soehne 9,666
Vulnerary balsam, N. J. & B. F. Rice 9,661

English Patents Issued to Americans.

From September 5, 1882, to September 8, 1882, inclusive.

Bilge water, apparatus for discharging from vessels, A. Cordes, Hoboken, N. J.
Bone black, removing from filters, etc., J. C. Donner, New York city.
Bottle stopper, N. Thompson, Brooklyn, N. Y.
Chains, J. M. Dodge, Chicago, Ill.
Dust, apparatus for separating from air, Geo. T. Smith, Middlings Purifier Company, Jackson, Mich.
Electric signal apparatus, J. H. Cary, Boston, Mass.
Fire escape, G. W. Smith, Harlansburgh, Pa.
Loading and unloading vessels, apparatus for, J. W. & J. W. Brown, Jr., Baltimore, Md.
Motive power, G. V. Sheffield, New York city.
Rotary engine, I. Lojda, New York city.
Starch, manufacture of, J. H. Ross, Buffalo, N. Y.
Starch, manufacture of, W. T. Jebb, Buffalo, N. Y.
Type setting apparatus, A. A. Low *et al*., Brooklyn, N. Y.