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## THE SCIENTIFIC AMERICAN,

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### A New Power of Propulsion.

A Boston correspondent sends us an extract cut from a paper of that city, but republished from an English journal, and asks an opinion respecting the wonderful invention which it describes. The substance of the extract is as follows:—

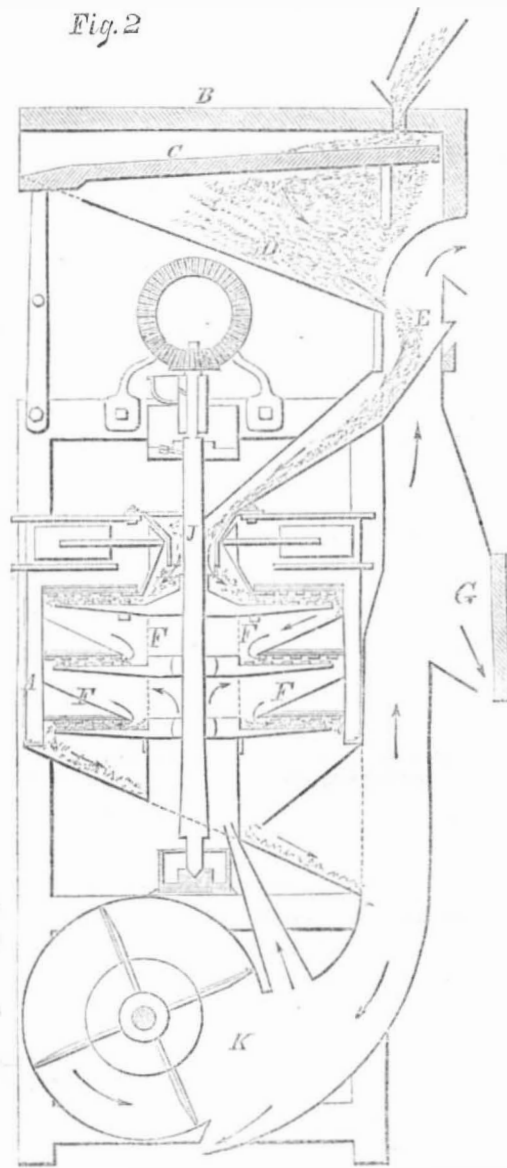
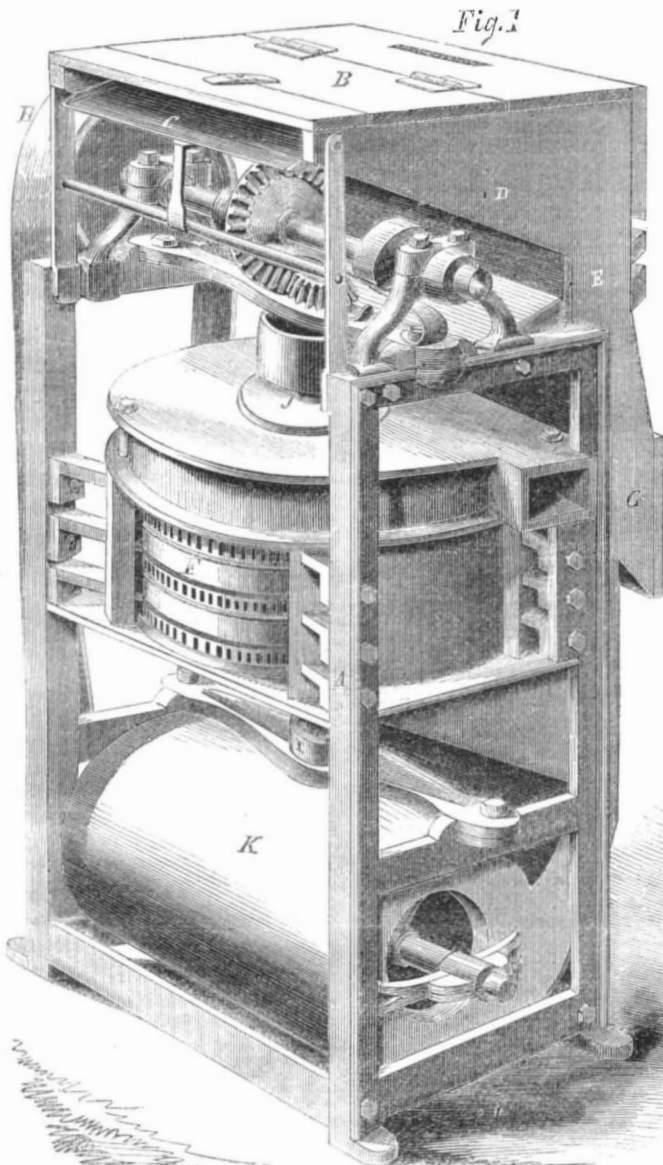
"It is now found that the immense amount of resistance encountered at the heads of ships and steamers, which increases at a ratio approaching to the square of the velocity, can be converted into useful power, instead of being, as at present, all sustained as dead loss. A method for achieving this has been patented by Robert Griffiths, engineer, London, inventor of the screw propeller which bears his name, and consists in forming the lower part of the head of the vessel with a revolving cone, around which are wound spiral flanges. By this arrangement, the resisting water, instead of falling upon the ordinary bows, impinges, when the ship is in motion, upon the screw flange, and this causes the cone forcibly to revolve. The power thus obtained from the cone is transmitted by shafting and multiplying gear to work a screw at the stern, if a sailing vessel, or to go in aid of the engine, if a steamer. Confidence is entertained that not only will the speed of steamers be greatly increased by this mode of dealing with resistance, but that the invention must lead to the creation of a class of profitable self-acting screw clippers, whose speed will far exceed the best modern-built ships."

We consider the invention of Mr. Griffiths as worse than useless. This is not the first time that similar devices have been proposed for employing the resistance of the water through which a vessel is driven, to propel it, and upon the same fallacious principle as that of Mr. Griffiths. All the power which he proposes to obtain from the resisting action of the water is by presenting an extra amount of resisting surface to it, by his spiral flanges. By such devices the loss must be equal to the gain; this appears to be a self-evident fact in mechanics. Instead of such a self-acting screw increasing the speed of vessels, as has been stated, it would diminish their speed; and we must say it is falsely called "self-acting." If it were a self-acting power it could propel a vessel without sails or steam, but this it cannot do.

"THE new steamer *Voyageur de la Mer*, built for the Pasha of Egypt, remains at East Boston, and since her trial trip, her sails have been unbent, the yards sent down, and she will not leave for her destination at present. A failure."

[The above paragraph, from an exchange, is mysterious, and needs some explanation. What are the reasons for this failure?—EDS.]

## TURNER'S COMBINED SMUTTER AND GRAIN SEPARATOR.



Wheat always contains, when brought to market, more or less smut, dust, chaff, and other foul stuff; and in passing it through a smut mill, if the grain be the least damp, the smut dust, &c., is liable to adhere. It is absolutely necessary that the dust should pass out of the machine as soon as scoured from the berry, that the grain may not wallow in it.

In the machine shown in the engraving, the smutter is composed of from three to five sets of horizontal scouring plates, between which the grain passes. The lower plate or runner of each set is provided with beaters, which throw the grain against the upper plate, which is stationary, and also provided with beaters, thereby causing the grain to act against both plates with equal certainty and uniformity. A rough or sharp surface is not depended on for scouring; but it is claimed that what the machine will do the first month it will continue to do for years in the same manner.

Fig. 1 is a perspective view of the whole machine, and Fig. 2 a section through its working parts. Similar letters of reference indicate corresponding parts in both figures. A is the frame in which the machine is mounted. The grain enters at the top, B, where it first falls upon a zinc or sheet iron riddle, C, through which the grain passes, taking off sticks, stones, &c., over it. The grain then falls upon the first inclined plane,

D, then into the first blast, E, from the fan at the bottom of the machine, which takes out most or all of the smut balls, oats, chaff, and other light impurities, before the grain enters the smutter, F. This all millers know to be of the greatest importance, particularly if the grain be damp. The grain then passes out of the blast of the separator into the smutter, F, and passes through the machine as indicated by the arrows in Fig. 2, discharging the screenings at the angle in the enlarged spout, G. This machine makes five distinct separations:—First, The chaff, sticks, &c., over the riddle. Second, Screenings from the first blast, which are the lightest, and before the grain passes to the smutter. Third, The dust. Fourth, Screenings from the second blast of the separator, after the smutter. These last screenings are free from dust, and in a good condition to grind for feed or otherwise. Fifth, The clean grain.

Only one driving belt, H, is required, and but two in all, and can be as easily attached as any upright smutter. Rolling screens may be dispensed with, except for cockle. The inventor states that it takes less power to drive it than is required to drive most of the common smut mills.

The step, I, of the smutter shaft, J, is the only place from whence arises any danger from fire by the friction of smut mills; hence the absolute necessity of having the step al-

ways in sight, and convenient to be oiled, with no liability to run dry, from its situation being unapproachable without taking the machine to pieces.

It is the invention of G. B. Turner, and was patented May 8, 1855. Further information may be had from the manufacturers, Turner, Parks & Co., Cuyahoga Falls, Ohio.

### New Process of Amalgamation.

The ordinary gold quartz rock of Virginia seldom yields more than \$3 per ton, while the assayers and chemists who assay and analyse it say that it ought to produce from \$50 to \$60 per ton. The reason why it cannot be extracted is, that the gold is in a state of such fine division that without the quartz is ground as fine as flour the quicksilver cannot act on it and amalgamate with the gold. Mr. John M. Wyckoff, of the Melville Mining Co., Spotsylvania Co., Va., has discovered a method of extracting from \$20 to \$30 per ton from this rock by the simple process of boiling the broken rock in water with half its weight of quicksilver, when the quicksilver seems under the influence of heat to acquire some new attractive power for gold and to enter the pores of the rock and liquefy it out. The sand or rock is first concentrated by a mechanical arrangement to about one-fifth its bulk, and the cost of the process is not more than \$5 per ton, at the above mines where it is in operation.





[For the Scientific American.]  
**The Malt House Ruins.**

On the 2d of December last, a new malt house in Bethune street, in this city, fell, and was the cause of two men, who were working in it, losing their lives. As this accident necessarily led to an investigation as to the cause of the catastrophe, various opinions were expressed by the witnesses examined, and some of them contradicted one another. As it involves important questions in architectural engineering, the following article on the subject, will be found deeply interesting, not only to merely scientific, but to all practical men:—Eds.

What was the cause of the "accident"? Were the floor beams or the posts at fault? Upon this point the builders who testified before the Coroner did not agree. An investigation into the strength and strain may decide the question.

First, of the floor beams. Experiments made to test the strength of hemlock when exposed to a cross strain, (as is the case with a floor beam,) show that 363 pounds is the weight that will break a piece one inch square and one foot long—the weight being at the middle. This is the average of seven experiments. From this unit of strength the resistance of beams of any size may be computed, by the well-known laws of pressure. The floor beams in question were 4×12 inches, and about 18 feet long; they were placed 18 inches apart from centers. To break one of these beams it would require, upon the above data, 11,616 lbs. at the middle, or twice this amount if equally distributed over its length, which is equal to 860 lbs. upon every superficial foot of the flooring on the beams. This is the breaking weight. What was the load? Barley weighs about 35 lbs. per cubic foot. The barley on the floor appears to have been from four to five feet deep. The weight, therefore, per foot superficial, could not have been more than about 175 lbs.—equal to about one-fifth of the weight required to break the beams. The barley might have been raised to the height of 24 feet upon the floor before the beams would have broken. Hence it is clear that the barley, being only five feet deep, could not have broken the beams. Yet one of the builders testified "that the size and quality of the beams used in that building were positively insufficient."

In regard to the comparative value of pine and hemlock, experiments show that pine will bear only seven or eight per cent more than hemlock; yet one of the witnesses testified that it would bear 150 (!) per cent more, and another witness subscribed to this, and these witnesses were both practical builders. The unit of strength derived from several experiments on the three kinds of wood, spruce, hemlock and pine, are respectively 345, 363 and 390 lbs. Yet one witness said: "I consider spruce as strong as pine, but hemlock I look upon as insufficient." This witness was correct, however, as regards the elasticity of pine, for experiment shows that pine will suffer a greater deflection without injury than either spruce or hemlock, and it requires a greater load to deflect it through an equal space.

Now the posts. These were of red cedar, and of various sizes, those in the second and third stories being from five to eight inches diameter at the smallest end. They were in their natural shape, and some of them so crooked that the largest perfect straight post that could have been sawed from them would have been about 9×5 inches, or, at the most, 3½×5½ inches. This is the effective size, the length nine feet. Now what weight is required to break such a post? Experiments have been made to test the strength of oak, chestnut and locust posts, but not of red cedar. The latter is, probably, stronger than either oak or chestnut, but not locust, although it may be nearly as strong as the latter wood. It requires to bend white oak 6,950 lbs., chestnut, 7,720 pounds, and locust, 10,920 lbs. In each case, this unit of strength is the average of several experiments, and is the weight required to bend a post one inch square

and one foot long. There is reason to presume that the strength for red cedar is below 10,000, but let it be assumed at this. Upon this data, a post of red cedar, 3½×5½ inches, and 9 feet long, will require 29,113 lbs. to bend it from a straight line, and something more to complete the fracture. Each post in the building supported about 200 feet superficial of the floor; therefore the 29,113 lbs. is equal to about 140 lbs. upon every foot of the floor.

It has been shown above that if the barley was 5 feet deep, there was a weight of 175 lbs. upon each foot of the floor. This, together with some 25 lbs. for weight of floor timbers, &c., was quite sufficient to break a post of the size stated. From this computation, and the fact that a broken post was found in the ruins, we may safely conclude that the want of size in the posts was the cause of the failure. The posts should have been at least six inches diameter, and perfectly straight at that.

R. G. HATFIELD, Architect.

New York, December, 1857.

**Patent Jobs—Commencement of Lobby Operations.**

We see that the Chaffee patent is again before Congress, on a petition presented by Mr. Pugh, of Ohio, for its further extension. This may be regarded as the inaugurator operation of the lobby for the session, and the precursor of a host of other jobs of a more or less profitable kind. The presentation of the Chaffee petition is a proof that the Congressional engineers are already at work, and they count upon making a brilliant and profitable campaign of it.

The amount of corruption that will be brought to bear on Congress during the present session will, we believe, be greater than has ever before been known. The results of the Matteson and Gilbert investigation, instead of checking the evil, have given it a greater impulse and extension. The readmission to the floor of the House of the parties expelled for participation in that disgraceful affair has satisfied the lobby men that they have nothing to apprehend from the tone and temper of the present Congress. The profligate bargain by which the spoils connected with the public printing have been portioned out amongst some half dozen political partisans, with the concurrence and assistance of members, is pretty conclusive evidence of the way in which the public interests will be sacrificed. Never before was the lobby so strong, and never were its opportunities for plunder so numerous.

These patent extensions are in themselves an inexhaustible mine of wealth to the lobby speculators. Besides the Chaffee interest, there are some three or four others, such as the McCormick reaper, the Colt's pistol and Hayward india rubber extensions, which are sufficient to make the fortunes of all concerned in them. In addition to these, there are land jobs and other fat pickings, from which trading politicians, starving journalists and idle lawyers can all glean something. Uncle Sam's estate may be compared to an Irish patrimony—it is entailed for the benefit of the hungry and needy.

Under such circumstances, it is of course useless to remonstrate against the injustice of patent monopolies and the perpetuation of the numerous other jobs that are certain to be carried through this session. Corruption is in the ascendant, and the lobby all-powerful. When the country is tired of seeing its most precious interests bartered away by an organized band of blood-suckers who are fattening upon its entrails, it may perhaps think of applying a remedy. In the meanwhile we must be resigned to play the part of Cassandra to an unwilling auditory, and to groan over abuses that we cannot prevent.

[We copy the above from the *New York Herald*, and we rejoice that this independent journal has opened its batteries in good season and with vigor against the system of lobbying at Washington, which has become a disgrace to our country. The patent extension

cases are very important, not only to the parties interested, but to the whole country, and we have been surprised to notice the stupid apathy of the leading journals upon this subject. The *Herald* is the only daily journal in New York (we had almost said in the United States) that has fully appreciated these cases, and it has dealt them a powerful blow in times past. We hope it will keep on until not one of these schemes shall stand unexposed to public view.

**The Persian Wheel.**

This is a contrivance for raising water to some height above the level of a stream. In the rim of a wheel turned by the stream a number of strong pins are fixed, to which buckets are suspended. As the wheel turns, the buckets on one side go down into the stream, where they are filled, and return full up the other until they reach the top. Here an obstacle is placed in such a position that it overturns the bucket, and the water is poured into a spout or convenient receptacle. It is evident that with this form of wheel the water can only be raised to the height of the diameter of the wheel, and there is no doubt that it is a very rude contrivance. It is much used in Persia for the irrigation of the land, and very many of them may be seen on the banks of the river Nile.

**Polarity.**

This is a property possessed by some bodies, which will, when allowed to move freely, arrange themselves in certain determinate directions, or point, as it were, to given poles. Thus, an iron bar acquires polarity by magnetism, and, when suspended from a single point, arranges itself in the direction of the magnetic meridian of the earth. When light is supposed to consist of material particles emitted from the sun, it is necessary to explain certain optical phenomena to assume that the particles are endowed with polarity, which merely signifies that the opposite sides of a particle have different physical properties.

**Recent Patented Improvements.**

The following inventions have been patented this week, as will be found by referring to our List of Claims on another page:—

**SPINNING OAKUM.**—A machine for this purpose has been invented by Smith Baldwin, of St. Louis, Mo., which combines the processes of carding and spinning; and the picked oakum, when supplied to it, is converted into a merchantable state, for the use of caulkers, &c., at one continuous operation.

**PLATFORM SCALES.**—This invention consists in the peculiar manner of connecting the scale beam with the platform, whereby but little motion is allowed the platform; and the weight upon the platform is made to bear equally upon the lever that supports it; it being immaterial on what part of the platform the weight is placed. It is the invention of James Kelly, of Sag Harbor, N. Y., who has assigned it to John Sherry, of the same place.

**BUILDING SHIPS.**—This improvement consists in preventing the vibrations of the sides of the ship, and the consequent leakage at the keel, by arranging diagonally two rods and braces in opposite directions from the keel to the top side of the ship; said braces and rods bearing against strong knees or shoes, which securely tie the timbers of the keel together. We regard this as a good arrangement, which ought to be adopted in every large steamer. It is the invention of John Reeves, of Brooklyn, N. Y.

**LIGHTING LANTERNS.**—This invention consists in having a match socket attached to a spring, which is secured to the inner side of the door, and held back to the side of the door by a catch. A corrugated plate is attached to the inner side of the lantern, and the parts are so arranged that the match which is fitted in the socket will, when the socket is liberated from the catch, have its ignitable end forced over the corrugated plate, and the match being then in a line with the wick, lights the lamp. It is the invention of A. C. Richard, of Newtown, Conn.

**PERPETUAL LIME KILN.**—This invention provides a perpetual kiln, wherein lime and coal, or fuel, may be mixed or burned together perfectly, in the same kiln, without the necessity of using side furnaces or grates; and the lime, when burned and discharged, is purer, and freer from carbon, ashes, or other impurities which usually escape from the coal or fuel, by reason of imperfect combustion during the process of burning in perpetual kilns of ordinary construction. It is the invention of H. R. Fell, of Texas, Md.

**IMPROVED SHINGLE MACHINE.**—This invention relates to an improvement in that class of shingle machines in which a circular saw is employed for cutting the shingle from the bolts. The improvement consists in the employment of a pendulous frame provided with a proper clamp to hold the bolt, and arranged relatively with a circular saw, and setting device for adjusting the bolt within the frame; the whole being so arranged that the shingles are cut from the bolt with great facility, and adjusted so as to be cut in proper taper form. It is the invention of Robert Law, of Portage City, Wis.

**CLEARING SEED PLANTER TUBES.**—This invention consists in arranging a shaft set with edged blades behind the cultivator tubes—said blades revolving with the shaft, and in their revolution passing up alongside of the tubes, and carrying with them such grass, weeds, or obstructions as prevent a perfect entrance of the seed into the soil. This is a device much needed by farmers, judging from the fact that considerable inventive ingenuity has been exercised by previous inventors in constructing a device for accomplishing the clearing of cultivator teeth. It is the invention of H. F. Baker, of Centerville, Ind.

**PAPER-MAKING MACHINERY.**—The object of this improvement is to prevent the breaking or tearing of the paper, as it passes from the upper one of the second press rolls to the dryer. This is attained by the use of a small roll arranged parallel with the press rolls, between the highest part of the upper press roll and doctor, about opposite the line where the paper should leave the upper press roll, on its way to the dryer, so that the web of paper will pass between it and the upper press roll. The slight cohesion of the web to this small roll eases it off the upper press roll and prevents it breaking; and if a slight break should occur in the web, it prevents the edge of the break being carried under the doctor, and thereby increased. This improvement, though simple in its character, is highly important in its results, and is found, by practice, to effect a great increase in the quantity of paper produced in a given time, by saving nearly all the time that is expended when breakages of the web occur. It is the invention of Stephen Rossman, of Stuyvesant, N. Y.

**PAINT VEHICLE.**—This is a new compound for mixing paints, and consists of four fluid ounces of oil of turpentine, put into a bottle with one-quarter of an ounce of gum mastic, and one-eighth of an ounce of caoutchouc. These are well shaken three or four times a day for three or four days, and then allowed to rest for a short time. One gallon of soft soap, which should be one year old, and of good quality, is next dissolved over a fire in one gallon of distilled rain water. One gallon of linseed oil is boiled and poured into the soft soap and water with frequent stirring, while both are at about blood heat. The gum mastic and caoutchouc solution is then poured from its dregs and added, and after the whole has been well stirred, it is placed over a gentle fire and heated, the heat being increased for about half an hour until it almost reaches the boiling point, but it must not be allowed to boil. The composition is then strained through a coarse cloth, and when cold is ready for use. It makes a paint that is cheaper than common oil paint, and is more durable, owing to the alkali and gums preventing the oil leaving the paint, and being absorbed by the wood. It is also susceptible of a high polish when well dried, and takes varnish well. A. C. Church, of Union City, Mich., is the inventor.

## New Inventions.

## Preventing Incrustation in Boilers.

R. McCafferty, of Lancaster, Pa., patented a new process for this purpose on the 14th of April, 1857. It consists in putting half a pound of black gum catechu in a boiler of 100-horse power, until the water becomes the color of pale brandy, and during the week the water is kept as nearly that color as possible, by adding small pieces of catechu from time to time. So long as this color is kept up, no incrustation forms; and in boilers where there is already an incrustation, its application gradually decomposes the lime, and it falls down, and is deposited in a kind of slush at the bottom, which may easily be washed away through the blow-off cock.

## Astronomical Discoveries.

Mr. Alvin Clark, of Cambridgeport, Mass., who was a portrait painter, has now turned his attention to the manufacture of telescopes, and with one of his own instruments he has discovered many double stars not hitherto known, and his observations have been communicated to the Royal Astronomical Society of London, who have confirmed some of his observations. It is to be hoped that an opportunity will be afforded him to construct a large telescope, his largest now being only  $7\frac{3}{4}$  inches in diameter. One which he made for the use of the Coast Survey, at a cost of \$2400, is said to have been so good that a pole three inches in diameter could be seen at a distance of fifty miles when the atmosphere was clear, but we think that this distance is almost too far to be true.

## New Method of Filling Front Teeth.

A very ingenious method of filling decayed front teeth, (first suggested, we believe, by Dr. Maynard, of Washington, D. C., inventor of the primer for fire-arms,) has recently been successfully carried into practice by A. J. Volck, M. D. It consists in setting a piece of enamel in the cavity of a decayed tooth much exposed, such as in an upper front one. The enamel for the cavity is of the same material as artificial teeth, and is formed to correspond with the cavity. It is fitted to the tooth loosely, then firmly walled or set in with a ring of gold foil. This is a much handsomer method of filling holes in exposed teeth than by the use of gold foil entirely, as the cavity thus closed only shows a surrounding hair line of gold; all the rest of it resembles the natural tooth.

## Improved Machine for Sawing Fellies.

All parts of wheels are now made by the aid of mechanism. The hub or nave is turned in a lathe by steam, the spokes are cut by rotary knives operated by power, and the fellies are cut by machinery. The above engravings illustrate one of the most recent improvements in machines for sawing fellies, and its construction and operation will be fully understood by the following description, reference being made to the diagrams, of which Fig. 1 represents a vertical section of the machine, being taken through the line,  $xz$ , in Fig. 2, which is a plan or top view. Similar letters indicate the same parts in each. The invention consists in having two band saws attached, one to the outer and the other to the inner periphery of a wheel, by bands or straps, the outer saw being expanded or contracted by interposing bands between the saw and the periphery of the wheel.

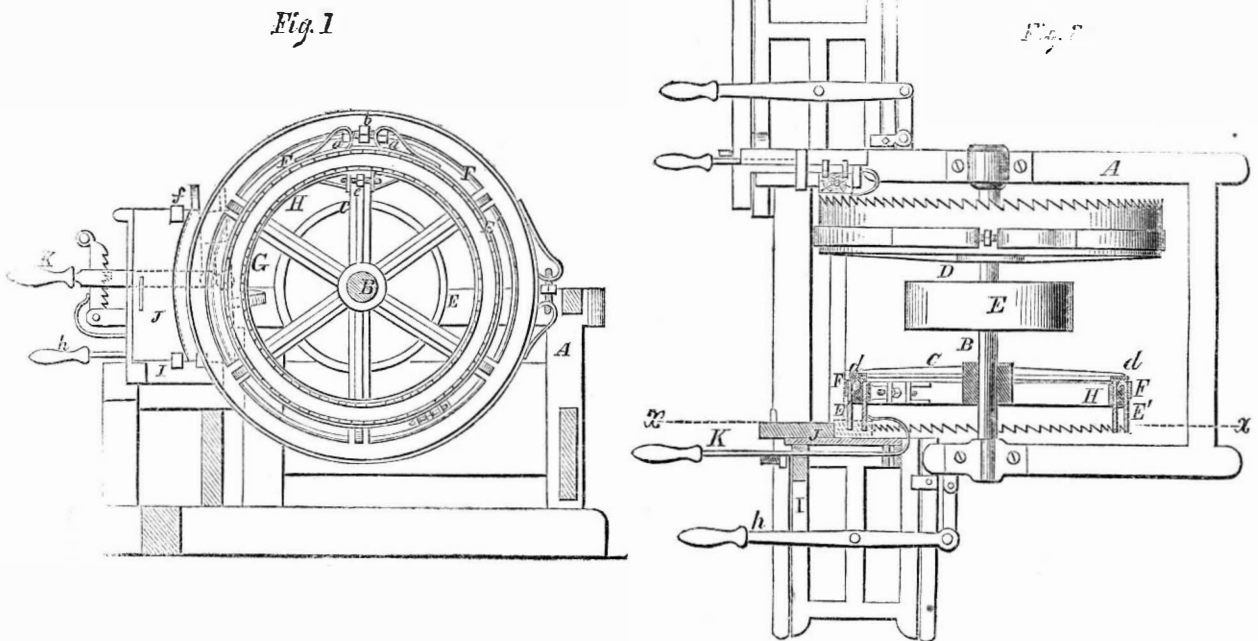
A represents a frame to support the working parts; B is a shaft which is placed on the upper part of the frame, and carries two wheels, C and D, with a driving pulley, E, between. The wheel, C, is considerably smaller than D. E' is a band saw made of a strip of steel plate with teeth cut on one edge. This saw is secured around the outer rim of C, by means of a metallic band, F, the ends of which are looped and connected by a right and left screw, b, and nuts, a. By turning the screw,

b, in the proper direction, the band, F, may be made to clasp the saw tighter, and by turning it in the reverse way the band and saw will be slackened. The diameter of the saw, E', may be increased or diminished by interposing bands, c, between the rim of the wheel and the saw. The saw, E', and the bands, c, (their back edges) rest against the shoulder, d, on the outer surface of the rim of the wheel.

The cutting edge of the saw projects some distance beyond the rim. G is a saw precisely similar to E', and it is secured to the wheel, C, by the band, H, (exactly as E' is attached to C,) which can be expanded or contracted by the screw and nuts, e. The two saws, E' and G, project an equal distance from one side of the wheel, C. On the frame, A, and at one side of the wheel, C, a sliding carriage,

I, with a vertical bed, J, is secured. The bed, J, has movable dogs, f, applied to it at its upper end, stationary dogs being at the lower end of the bed. The movable dogs, f, may be connected with a lever, K, so that they can be raised or lowered. The staff or bolt from which the fellies are cut is secured against the bed, J, by means of the dogs, f; and when motion is given to the wheel, C, the bolt is

## VAUGHAN'S MACHINE FOR SAWING FELLIES.



ed against the two band saws by moving the carriage, I, towards the saws by means of the lever, h. The two saws cut the fellies from the bolt exactly the shape they are required to be, and the thickness of the felly must depend on the number of rims between the saw, E', and the wheel, C, and fellies for wheels of different diameters may be cut by having a series of wheels, C, of various diameters. In Fig. 2, D

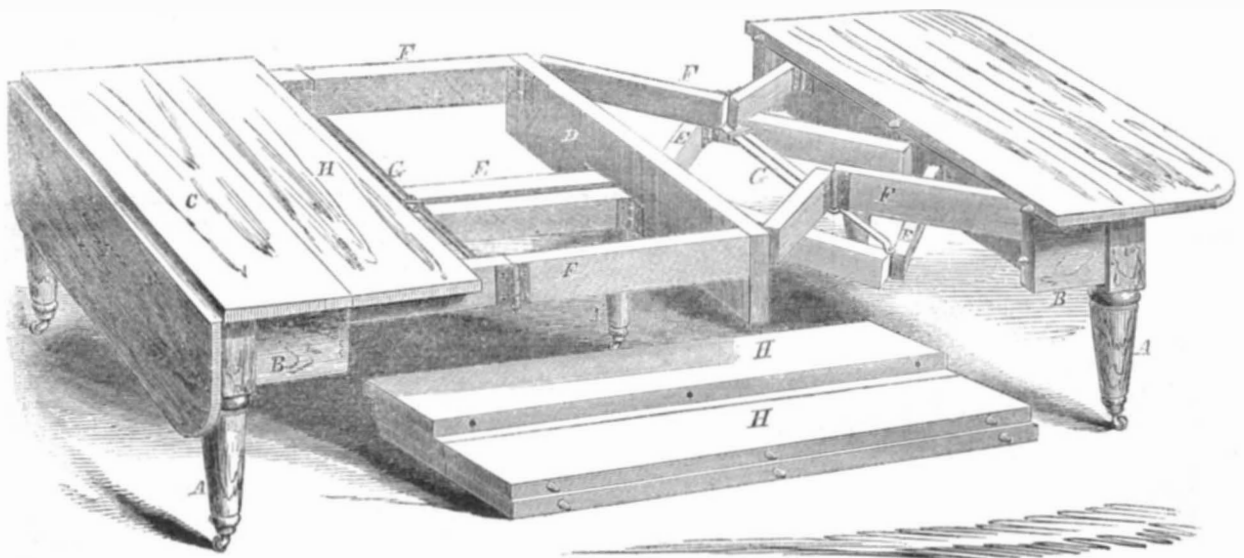
is a wheel precisely similar to C, only of a larger diameter.

This method of securing band saws to the periphery of wheels prevents the passing of bolts and screws through the saws at intervals, and the perforation of the saw blades to receive them is unnecessary, so that all the original strength of the saw blade is maintained, and it facilitates their removal

for sharpening or other purposes. The saws run clear and cool and cut very rapidly, leaving the felly smooth.

It was patented Nov. 17, 1857, by the inventor, Jacob Vaughan, of Exchangeville, Pa., who will furnish any further particulars. We noticed this invention on page 91 of the present volume of the SCIENTIFIC AMERICAN, when the patent was granted.

## GROSS'S PATENT EXTENSION TABLE.



The common and laudable desire of all to have a house nicely and conveniently furnished, according to the taste of the individual, has given rise to the exercise of much ingenuity and artistic conception. In all houses there is a necessity for such articles as will be compact and neat, and occupy but little space when not in use, also that will, when required, spread out to accommodate the wants of a larger number than usual. This demand has called forth a supply in the shape of folding chairs, sofa bedsteads, extension tables, and many other articles of a similar nature.

The extension table we are about to describe, and which is represented in our engraving, is capable of being extended to four times its length, thus one made upon this plan would form a convenient side-board in a

recess of two feet wide, and could also be made available as a dining-table of eight feet long. The table proper is supported on four legs, A, supporting the ends and folding leaves, together with the sides, B, and permanent top, C. There is another leg, A', supporting a cross-piece, D, to which are attached by hinges on each side the jointed stretchers, F and E. The base of the hinge-pin of each side of the central hinge in F is attached to a rod, G, whose opposite extremity is connected with the central hinge-pin of E, thus connecting the two systems of stretchers; and the two rigid bars, G, are connected together by a small loose link passing around them. In any position, the table will be fully braced and supported. When the table is wide open, the stretchers assume the strong position seen in the left hand half of D, in the

engraving, and when semi-open, they are in the position indicated by the right hand half of the same. The auxiliary leaves, H, fit into one another by pegs and suitable holes and when not in use they can be packed away in any convenient receptacle.

It was patented Nov. 17, 1857, by the inventor, Henry Gross, of Tiffin, Ohio, who will be happy to furnish any further information.

## German Newspapers.

It is stated that there are ten times as many newspapers printed in the German language in the United States as there are in Germany. This is certainly creditable to the German population of our country, and they are usually a thrifty, peaceful class of citizens, especially outside of our large cities.

Scientific American.

NEW YORK, JANUARY 16, 1858.

The Homogeneous Metal.

The article which recently appeared in our columns (page 117) on the above subject has arrested the attention of Joseph Dixon, of Jersey City, N. J., who has sent us a few lines on the subject, in which he states it as his belief that the metal in question is the very same as that which he manufactured in 1847-8, and which was held to be pure iron. We were well aware of Mr. Dixon's experiments, and had seen a plate of his metal; but we cautiously stated in the article referred to that we had not received satisfactory information in relation to the exact nature and composition of the metal; but "if it possessed the advantages claimed for it by its inventor, it was one of the most important inventions of the age." We shall yet be able, we think, to elicit the whole truth in relation to it.

Mr. Dixon's pure iron was homogeneous, very strong, quite free from the mechanical imperfections of bar iron; was easily converted into good steel, and rendered suitable for tools, engraver's plates, and other purposes. If the homogeneous metal of Mr. Howell is the same as that of Mr. Dixon, the latter deserves the credit of the invention, as he was the first person, we believe, who effected the melting of a mass of malleable iron, and the purification of it while liquid. Previous to this a few grains of the malleable iron had been fused in the laboratory, but it was considered impossible to render it available for practical purposes. Why is it that no more of Dixon's homogeneous metal has been manufactured than the few specimens under his own special superintendence?

The British government has ordered several tons of Howell's metal for the boilers of naval steamers; and the manufacture of it is said to be established and increasing in Liverpool. Have our people proved so insensible to the advantages of this metal as to allow Uncle John to "take the wind out of their sails"? Specimens of this metal were exhibited at the Fair of the American Institute, and were tested in various ways. A plate of it was found to be double the strength of boiler iron; and yet the invention has been allowed to slumber for the past ten years without good reasons. This is inexcusable.

We have stated that pure iron is more easily oxidized than iron containing silicon and carbon, owing to the great affinity which iron has for oxygen, especially when exposed to moisture. Mr. Dixon informs us that this is true, chemically, but owing to the homogeneous structure of metal made by his process, it is not so subject to destructive corrosion as common wrought iron, because the fibrous construction of the latter, mechanically, presents more favorable points for the action of the oxygen. This is a very good reason indeed, as it is well known, that a piece of bar iron, exposed to the action of salt water, which is very corroding, soon becomes honey-combed. The moisture seems to permeate through the lamina of wrought iron and thereby finds a more extensive surface for oxidizing action, than if it were homogeneous.

There are some materials which occupy a far more distinguished position than others, as aids to man. The chief among these are fuel in a compact form (such as coal or wood) and iron. Without the former, man might cook his food with dry herbage, like the squalid barbarians on the bleak plains of Asia and South America, but he never could rise to the condition of practising the useful arts. Without iron, man could, indeed, rise to that state in the arts of the ancient Phœnicians and Egyptians, in their favorable climates, for they were unacquainted with this metal but without it, practical mechanics and the manufacturing arts never could have arisen to their present high position, which as far

transcends that of those ancient nations as the light of the sun exceeds that of the moon. Without iron, steamships, locomotives, printing presses, power looms, and the hundreds of machines which are the assistants and aids of man in his present civilized state, would be unknown. Unlike fuel, such as coal and wood, however, it is a manufacture itself, and is produced by expensive processes. It is evident, therefore, that any improvement in its manufacture must be of great and general consequence. It is for this reason we so frequently direct attention to everything which comes under our cognizance that has a bearing upon its improvement. If this homogeneous metal is so valuable to the arts, and embraces such important advantages over other kinds of iron, its manufacture in our country should not be delayed for a single month longer.

Making Bread by Machinery.—Berdan's Patent Automatic Oven, &c.

It is somewhat remarkable that up to the present time, when almost every want of civilized man is supplied by machinery, the manufacture of bread—the first of all necessities, the "staff of life"—should be almost universally carried on in as rude a manner as by the ancients. It is true that the primary process of converting the grain into flour may be said to have arrived at perfection, but beyond this, the manufacture, as generally practiced, differs little from what it was in the days of Moses. The subject has, however, within the last few years, attracted much attention from scientific and ingenious men, both in this country and in Europe, and it now seems that this most important of all the useful arts is to be no longer behind those which minister to our other wants.

A mechanical bakery has just commenced operation in Philadelphia, the ovens and machinery of which are the invention of H. Berdan, of New York city, which is capable, when worked up to its full capacity, of converting into bread the enormous quantity of 1,000 barrels of flour daily, estimated sufficient to supply the entire population of the Quaker City. By the immense saving of labor, fuel and space, the bread can be supplied from this establishment to the consumer, at a cost very greatly below that charged by bakers, and even cheaper than it can be made by families, purchasing their flour at retail. A brief description of this immense concern will, doubtless, be interesting to the majority of our readers, though it would require engravings to give anything like an adequate idea of it.

The building is four stories high, to the uppermost of which the flour is conveyed in the barrels by a hoisting apparatus, and after being turned out of the barrels, is sifted by suitable machinery, and afterwards conveyed into a large hopper belonging to the kneading machine, which is on the floor below. This machine is composed of a horizontal cylinder, in which rotates a bar for stirring the flour, water and ferment together, a scraper for preventing the adhesion of the dough to the cylinder, and a "flopper," which cuts into and opens the dough, takes up several hundred pounds of it at a time, and throws it about in a most remarkable manner, somewhat imitating, on a large scale, the operation of kneading by hand, causing much air to enter into it and be retained within it distributed in small cellules, and making the bread very light, with a small quantity of yeast. From this machine the dough is conveyed to the hopper of the loaf-making machine, the principal portion of which is on the second floor. This machine cuts or molds the dough into loaves, and registers the number made. The molds or cutters of the last-mentioned machine are variable, to enable the loaves to be varied in size exactly in proportion to the market price of flour. The loaves, after being formed, are carried off by an endless apron to a convenient point, to be taken by attendants and placed on brick-bottomed cars, on which they are passed into the ovens and baked. The ovens, of which there are two, are upright, and occupy comparatively little hori-

zontal area. They are independent of each other, and each complete in itself, containing a system of upright endless chains, which are constantly in motion, to convey the bread from one door of the oven on the second floor of the building, where the bread is introduced, down to a door on the first floor, where it is discharged when sufficiently baked; the time occupied in its descent being just sufficient for the baking process, which is made continuous for any length of time, by the introduction of new supplies as fast as the discharges take place, the oven being thus kept constantly filled with the bread at progressive stages of the baking process. While the baking bread is passing down the oven on one side, the cars which have been emptied on the first floor and introduced at another door on the same floor, are passing up through the oven on the opposite side to a door on the second floor, where they are discharged, to be re-loaded and introduced at the first-named door again. There are four doors in all, two on the first, and two on the second floor. The endless chains of the ovens are made with rails, on which the cars run in and out. The doors are opened one at a time, at proper intervals, for the admission and exit of the cars, which are drawn into and expelled from the oven, and moved from the discharging to the receiving doors outside the oven all by machinery; and the only manual labor in the whole establishment is that of loading and unloading the cars. The oven is built entirely of brick, and the cars on which the bread is baked are, with the exception of light iron frames, made entirely of brick. Of the advantage of brick ovens it is needless to speak. The ovens are heated by fires which are tended in the basement of the building.

This bakery, which is the property of a joint-stock company, composed of some of the most influential men in Philadelphia, is one of the most perfect manufacturing establishments we have ever seen; and its machinery works with the precision of a clock. We had the pleasure of witnessing its operation on the opening-day, which was celebrated last week by a public *déjeuner* within its walls, at which some of the most distinguished men of the city were present; and in the speeches that were made on this occasion, Mr. Berdan received some very flattering compliments, to which he replied with great feeling and good taste.

The oven and kneading machine have both been patented through the Scientific American Patent Agency in this country, and in almost every country where patents are granted. Bakeries on the same principle are now in course of construction in New York, Boston, Baltimore, New Orleans, and other large cities; and it is hardly venturing too far to predict that similar concerns will be started, and come into successful operation, in every city of the Union, for cheap and pure bread is one of the greatest desiderata in large communities.

The Tele-stereoscope.

The stereoscope is an instrument which, from two pictures taken at different angles, presents to our view objects at a short distance in the solid form. Common pictures have a flat, dead appearance; stereoscopic pictures stand out in life-like relief. The reason of this is that, with the stereoscope, each of our eyes obtains a somewhat different view of the object, and they find the true form of it out of the two perspective views or pictures taken at different points. If, however, the distance from which we view the pictures in the stereoscope is considerable, the eyes are too slow in their action to enable the observer to form a correct idea of the distance and the form of the object represented, unless some very favoring circumstances of light and shade assist in doing so.

Ranges of distant mountains generally appear to the naked eye like perpendicular walls attached to the firmament. In the stereoscope, it is possible to combine two perspective views of a landscape taken from two different points sufficiently distant so as to give the ob-

server a correct idea of the real or true forms embraced in the views. A stereoscopic picture, therefore, conveys a more perfect representation of a landscape than an observation made with the naked eye. It is only by changing positions, and thereby obtaining different perspective views of a landscape, and by comparing these views, that an observer is enabled to perfect his observations, and to obtain something like a correct idea of the forms of the objects embracing the scene. If the observer could take different views of a landscape at the same moment, the scene presented to his vision would be charming and life-like. But this he cannot do, neither can it be done with the common stereoscope for distant objects; but in *Dingler's Polytechnic Journal*, published at Augsburg, Germany, it is stated that this is accomplished by a simple instrument called the "tele-stereoscope," recently invented by M. Helmholz. It consists simply of a smooth board, four feet long, on each end of which a looking glass is fastened perpendicular to its plane, and making an angle of 45°, with a line drawn longitudinally through the center of the board. In the middle of the board, two other smaller looking-glasses are fastened parallel to the first two, and so close together as to enable the observer to look at once with an eye into each. If it is desirable to magnify the object, an opera glass or spectacle lens may be inserted between the eye and the looking-glasses. By these means the right eye sees the landscape as it appears in the looking-glass at the right end of the board, while the left eye sees it as it appears on the looking-glass at the left end. The distance of the observer's eyes is increased by these means from about three inches (the common distance) to four feet, and he thereby obtains a view which as far surpasses stereoscopic photographs as an oil painting excels an engraving. The journal referred to also states that objects distant from one to two miles appear correct in the background, and nearer objects very perfect, particularly trees, the limbs and branches of which are distinctly separated, and the whole landscape stands out solid and beautiful.

Gomez & Mills' Safety Fuse.

Last week, at the New York State Arsenal, we were present during a series of experiments with the above fuse. It is a peculiar chemical composition, enclosed in a paper case and wrapped round with cotton, and for land service it is passed through tar to render it impervious to rain and the dampness of the ground, but for submarine purposes it is coated with gutta-percha. It is of flat form, and in consequence not so liable to injury as the ordinary round miner's fuse. The fire passes through this fuse at the rate of one mile in four seconds; and one of the experiments consisted in firing two guns, the one with a length of about fifteen feet of fuse, and the other with about two hundred feet, both lighted at once, and from our position on the steps of the arsenal, each seemed to go off at the same moment. The fuse is inserted in the cartridge, and passes through the mouth of the gun to the hand of the gunner, so that an enemy spiking a gun does not render it any more unfit for service than it was before. One man can fire a battery of any number of guns at almost the same instant with this fuse, and it is without doubt a great and valuable addition towards that perfection of the art of war which shall ensure universal peace.

This invention was recently tried with success at Washington, under the personal direction of the Secretary of War.

Water in the Sea.

If we would obtain any idea of the water which the sea contains, let us suppose a common and general depth for the ocean; by computing it at only two hundred fathoms, or the tenth part of a mile, we shall see that there is sufficient water to cover the whole globe to the height of 503 feet; and if we were to reduce this to one mass, we should find that it would form a globe of more than sixty thousand miles in diameter.



**Earth and Ocean Temperatures.**

As we descend into the interior of the earth the temperature gradually increases. In mines, and during the sinking of artesian wells, it has been constantly observed that, at a certain distance from the surface, a point is attained at which the heat of summer and the cold of winter produce no effect upon the temperature; and beyond this point the heat augments in a regular ratio of 1° Fah. for every 55½ feet of descent. It is true that this increase of heat is not uniform in every part of the earth, as it differs in different strata at the same depth from the surface, but this variation is so small as not to affect the general rule. Reasoning from this data, geologists naturally conclude that at the depth of say 200,000 feet, the temperature must be 3,600°—a heat which must keep all the materials in the center of the earth in a state of fusion. It is, therefore, taught by many, that the center of the earth is a fiery mass, and that the globe's solid crust does not amount to more than a fiftieth part of its diameter. But if this is a law or rule regarding the solid parts of the earth, the contrary seems to be the case with the fluid portions of it. Lieut. Berryman, U. S. N., in his deep sea soundings, seems to have eliminated a totally opposite law reigning in the ocean, viz., that the cold increases according to the depth; and in connection with this other remarkable phenomena. He says:—

"Five hundred miles north of Bermuda we found the greatest reliable depth ever obtained, it being over four miles; and accompanying this were thermometrical observations of a singular character, indicating phenomena never before discovered or conceived, and which at this moment are an unsolved problem to the scientific world. In a long series of experiments the temperature was indicated as existing ten, fifteen, and twenty degrees below the freezing point. This may be owing to the defective instruments; but if so, a consistency of error was preserved almost beyond the possibility of chance."

The records of these deep sea soundings go to contradict the well-known and established law that water freezes at 32° Fah.; also that there is one law relating to temperatures for the ocean and another for the dry land. There must have been some defect in the instruments referred to, which indicated an ocean temperature below the freezing-point, or else the stratum of fluid reached at the great depth mentioned was not common salt water, but some other fluid, incapable of freezing, except at a much lower temperature. We do not believe, however, that any such fluid exists where these deep sea soundings were taken.

**The Vine Disease.**

This disease, which has ruined the crops of the vine-growing countries of Europe, is at last conquered. Mr. Kyle, a Scotch gardener, has discovered that the application of sulphur to the plant is an effectual preventive and remedy. Of such importance had this disease become to France, that the Society for the Encouragement of Agriculture offered a prize of \$2,000 for a cure, and many smaller ones for researches on the subject. This first prize has been divided between Messrs. Kyle (who was also awarded the \$100 gold medal of the Society), Duchartre, Gouties, and Maris. M. Barral, in his report to the Council, makes the following remark:—"It was England who inoculated the vine disease into Europe, but it is remarkable that it was in that country that it was most perfectly studied by Mr. Berkeley, and again in the same country that a cure was discovered by Mr. Kyle."

In this country, and especially those parts of it where the vine is cultivated, it ought to be recollected that it should be studied as well as nurtured, and that, like every other plant, the more care and attention that is paid to its growth, the more abundant and luscious will be its fruits. It is not enough that our soil is so rich that it will grow luxuriantly without much care. We yet ought to pay attention to it to produce still more luxuriance.

**Lieut. Maury in the Navy.**

"Lieut. Maury, who has been physically incapacitated for naval service by a broken leg, having been restored to rank by the Naval Courts, other officers now demand that he either be sent to sea, or got out of the way of their promotion by resignation."

We copy the above paragraph from an exchange, and we hope, for the honor of the country, that the last statement is not true. Lieut. Maury is an ornament to his country, and we rejoice that he has been restored to rank by the Naval Courts, and that he will neither resign nor get out of the way, to make room, perchance, for some lazy, worthless fellow, who might disgrace the American navy. Lieut. Maury has done more to promote nautical science than any man now living, and hence we urge that he should be retained just so long as he lives. If he is incapacitated to do physical service because of a lame leg, his head is not broken, and by the aid of its workings he can do quite as much as can those who would supplant him, by the combined power of their legs and all their other qualifications. Nelson, when he achieved his greatest victory, was blind of an eye, and had only one arm.

**The Stubborn "Leviathan."**

The talk and the writing about the launching of this vessel have now become leviathan-like in dimensions. We wait with patience for the period when we can say, "like leviathan afloat, lay her bulwarks on the brine." By the latest news from Europe, five attempts at launching had already been made and failed, and further operations are suspended for a long time to come, on account of the breakage of chains and hydraulic pumps employed to move her. No less than three hydraulic rams, one powerful windlass, and the double chains which drag the vessel towards the river have all been burst or broken. She still sticks on her ways, at two-thirds the distance from where she was built. The *London Times* states it will cost \$500,000 to launch her; the *London Engineer* says it has cost \$350,000 already, and as it has to be moved twice the distance it has already traversed, it may cost more than \$1,000,000. Just think of one million of dollars being expended upon launching this monster! What in the name of common sense possessed its builders to construct her at such a distance from the water?

**Circle of the Scientific Press.**

France, with her accustomed energy in the cause of science, has made another great step forward, by the forming of a new society under the above title, and which is to consist of members of her scientific press, who, at their meetings, will discuss the inventions and discoveries of the past month, in every branch of science and art, and lay before the world the results of their discoveries. At their first meeting in Paris, on the 16th of November last, they were presented with a full account of the submarine tunnel to connect England and France, by the designer, M. Thomé de Gamond, and after an animated discussion it obtained their approval. Many inventions were then exhibited, such as a watch which will give the correct hour at any meridian, a way-measurer for vehicles, and many articles of *vertu* and interest. We look with great hope to the future of this society, comprising, as it does, among its members, the chiefs and subordinates of a scientific literature which is the most *purely* scientific, although not perhaps, the most practical, existing in any country in the world.

**The Black Hills.**

There are some sections of our extensive country almost as little known as the interior of Africa. The *St. Louis (Mo.) Republican* states that a party has just recently returned to that city from an exploring expedition in a wild region known by the above appellation. It is a vast country of movable sands, sterile, bleak and inhospitable. There are small streams at remote distances in it, upon which there is spare vegetation; sufficient, however,

for the subsistence of the Indians' horses and some buffalo. It must ever be the home of nomadic tribes, who wander about like those of the wild wastes of Asia in search of the small patches of pasturage which are fructified by the irrigation of distant rivulets. This country has been supposed to be fertile from its geographical position and its appearance upon the map, but it proves to be wholly otherwise. The party consisted of sixty men, and the Sioux, who are numerous there, forbid the return of any more white men. They said that this party might pass, because it was the first, but no others must come, as they scared away their game, and would discover their strongholds and hiding-places.

**Quack Names for Burning Fluids.**

A correspondent writing to us from Fall River, Conn., states that a burning fluid called "Helion Oil," has recently come into extensive use in that city, and he asks if it is one of those fluids liable to explosions, which we described lately in an article in our columns. We have had other inquiries of a similar character relating to a fluid called "Excelsior Oil." Not having seen the oils which have received such names, we cannot tell what they are, but we suppose they are coal oils with flashy names to astonish the marines. All such fluids should receive their true name in connection with that of the manufacturers, such as "Breckenridge Coal Oil," "Newark (Ohio) Coal Oil," &c. The quality of the oil will thus become an advertisement to the manufacturers, and incite them to make improvements, in order to excel one another in producing the best and cheapest article.

**Vocal Machinery of Birds.**

It is difficult to account for so small a creature as a bird making a tone as loud as some animal a thousand times its size; but a recent discovery has shown that, in birds, the lungs have several openings communicating with corresponding air bags or cells, which fill the whole cavity of the body from the neck downward, and into which the air passes and re-passes in the progress of breathing. This is not all. The very bones are hollow, from which air pipes are conveyed to the most solid parts of the body, even into the quills and feathers. The air being rarified by the heat of their body, adds to their levity. By forcing the air out of the body, they can dart down from the greatest heights with astonishing velocity. No doubt the same machinery forms the basis of their vocal powers, and at once resolves the mystery into a natural ordering of parts.—*Gardner's Music of Nature.*

**Preserving Railroad Timbers.**

MESSRS. EDITORS—I would suggest a cheap plan for increasing the durability of railroad ties and other timbers in exposed situations. Make a cheap long tank, with a furnace under it, and place it on a railroad car. Fill it with coal tar, (which can be obtained at any of the gas works for \$1 50 a barrel,) and bring it to a boiling heat. Now introduce a set of ties or timbers, and boil them for a short period, raising them up and down, by some simple contrivance, four or five times, when undergoing the operation; then take them out, and allow them to dry for a few days. It will require but a short time to prepare timbers in this manner, and the cost is not worth naming, in comparison with the durability imparted to them over those laid down in their natural condition. One set of tar-prepared ties will last three times longer than an unprepared set. Fence-posts should also have their ends which enter the ground treated in this manner. J. SCOTTON.

Newark, Ohio, January, 1858.

[Our correspondent is perfectly right in his conclusions respecting the advantages to be derived from this mode of treating railroad timbers. The only objection to the process is the handling of dirty sticky timbers; but that is of no consequence while plenty of persons can be found ready to do the work.—Eds.]

**Preparing Liquid Glue.**

MESSRS. EDITORS—The following is a method by which I have prepared liquid glue, and have found it very convenient:—

Take the glue in any quantity desired, and dissolve it in as small a portion of boiling water as possible; it will then be found too thick for use. While it is still hot, take the glue-pot from the fire, and reduce or thin the glue to the proper consistency with alcohol; then put it in a bottle, the mouth of which must be covered with india rubber or other material impervious to the air.

Liquid glue made in this manner, and placed in bottles, may be kept ready for use for a number of years. I have some glue which I now use that was thus prepared six years ago, and is as good as when newly made. It only requires to be slightly warmed for application during cold weather.

MERCHANT KELLY.

Bentonville, Ind., Dec., 1857.

[This is a very good method of making glue for use where only a little is required, and that but at considerable intervals of time. Liquid glue is very liable to rapid putrefaction in warm weather, and it freezes in cold weather. Alcohol preserves it from both of these influences. A bottle of liquid glue is very convenient for use in families to mend broken chairs and other pieces of furniture.]

**Cure for Chapped Hands.**

MESSRS. EDITORS—I have seen in a late number of the *SCIENTIFIC AMERICAN* directions for curing chapped hands. I have used the following for many years, and have recommended it to a number of friends, and wherever it has been used, the result has been all that could be desired:—

Take two ounces of glycerine, and one ounce of rosewater, mix, and rub your hands well with it before retiring to rest. It is pleasant, agreeable, and cleanly, and its effects are truly wonderful; indeed, whatever business a party may be engaged in, it will not fail to effect a cure. The glycerine alone is equally as good, but the rosewater is more pleasant to use. WILLIAM NASH.

Branford, Conn., January, 1858.

**Destruction of Models.**

Periodically—at the end of every six months or so—it becomes imperatively necessary that we should destroy or otherwise dispose of such models as have been sent to our office for examination, have been declared by us to be not patentable, have then remained uncalled for by their inventors, and have consequently accumulated in our possession. As the commencement of a new year is a period of general cleaning-out and brushing-up in every well-ordered establishment, and constitutes one of the above-mentioned epochs of destruction in our own, we hereby notify all inventors wishing to preserve those of their models which have now lain long in our hands, that they must order them away immediately.

The best of the models of unpatentable devices are retained by us, discretionarily, even if they have been in our possession as long as six months; but we do not keep such as have been so poorly constructed as to be not worth the expense of carriage homeward to their owners, and we do not hold ourselves accountable for any model which has been stored in our office longer than six months.

The above remarks equally apply to all models which have been sent to us for the purpose of having engravings prepared from them.

Of course, it is almost unnecessary to add that we most carefully preserve all such models as we have received with positive instructions to make applications for patents thereon, and that such are forwarded to the Patent Office at Washington at the earliest opportunity.

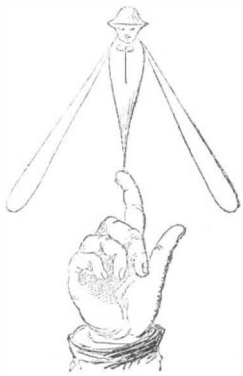
Finally, we again admonish all who wish to save models which have been long lying in our office, that they must quickly order them to be boxed up and shipped to their respective owners; or otherwise, by and by, the latter will wish to have their models when restitution will be an impossibility.







One more illustration on the subject of gravity, and we leave that branch of physics for the present, not that there is any lack of illustration, but because there are so many other subjects which we have to place before our juvenile readers.



The above little figure may be made to balance itself amusingly. Get a piece of wood about two inches long; cut one end of it into the form of a man's head and shoulders, and let the other end taper off to a fine point. Next, furnish the little gentleman with a pair of wafers, shaped like oars, instead of arms; but they must be more than double the length of his body; stick them in his shoulders, and he is complete. When you place him on the tip of your finger, if you have taken care to make the point exactly in the center, he will stand upright, as seen in the engraving. By blowing on the wafers he may be made to turn round very quickly. It is explained by the reasons that were given in our last number.

This little machine consists of three vanes, the form of each being the segment of a circle, the obliquity of whose surface increases as it recedes from the center of motion. The flyers are attached to a spindle, which fits loosely in the stand, and around it is wound a string, like that around a humming-top. If this string be suddenly pulled, a powerful rotary motion will be given to the vanes or flyers,



and from being set at an angle they will cut the air obliquely, consequently a reaction takes place; and if the weight of the flyers and spindle be less (as it should be) than the force of the reaction, it ascends, whirling its way upwards, like a bird, into the sky. If it be made to spin in a room, it rises to the ceiling, and spins around on the ceiling for some time. It is a highly amusing and instructive toy, as it is on the same principle that birds fly; or perhaps its action is more like that of the screw propeller in the water, and it might justly be called an aerial propeller. If we are ever able to travel in the air by means of balloons, it will be by the aid of some such contrivance as this, although we think that that day is very far distant.

#### To Show the Pressure of the Atmosphere.

Invert a tall glass or jar in a dish of water, and place a lighted taper under it; as the taper consumes the air in the jar, its pressure becomes less on the water immediately under the jar; while the pressure of the atmosphere

on the water *without* the circle of the jar remaining the same, part of the water in the dish will be forced up into the jar, to supply the place of the air which the taper has consumed. Nothing but the pressure of the atmosphere could thus cause part of the water to rise within the jar above its own level.

#### Tinning Cast Iron.

Vessels for cooking and other purposes, commonly called "tin-ware," are in general use, because they are so cheap, cleanly and strong. The material of which they are composed is sheet iron coated with tin. The latter metal adheres so tenaciously to cleaned wrought iron that it is almost impossible to separate the two metals; hence the iron, otherwise so liable to corrode, is almost perfectly prevented from rusting. Sheet tin can now be spun in the lathe into cheap vessels of various forms; still there is a variety of forms of cheap articles which can only be made of cast iron, and they would come into more extended use, were some method discovered for tinning them, it being a curious fact that while tin will adhere tenaciously to wrought iron, it has no affinity at all for cast iron. Various efforts have been made to tin cast iron, but they have generally been unsuccessful. It is true that the interior of hollow cast iron ware is generally tinned, but this coating is not very durable.

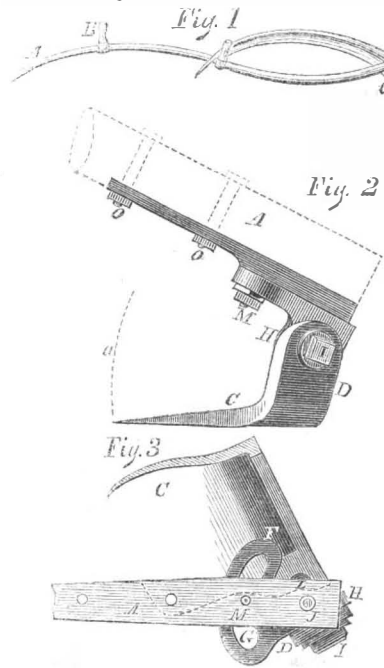
Quite recently, however, it is stated in some of our foreign cotemporaries, that M. Weinberger, of Paris, has succeeded in tinning cast iron, and rendering the tin coating as durable as on common tin-ware. For this purpose he subjects the cast iron vessels to a decarbonizing process, in the same manner that malleable iron is treated, by enclosing them in cases filled up with some decarbonizing agent, such as the red oxyd of iron, and then submitting them to a red heat for several days. Such vessels, after being decarbonized, are scoured clean with acid, sand and warm water, to remove all the oxyd, then they are submerged in molten tin in a vessel, having its surface covered with tallow, in exactly the same manner that sheet iron is tinned. This is a valuable and simple process for treating cast iron to be tinned, and may be carried on very extensively in our country, as the most suitable iron for the purpose is that made from charcoal, of which we have an abundance.

#### New Folding Scythe.

This scythe is constructed with several very valuable improvements. In the first place, the blade may be set at any required angle with the ground; secondly, the position of the blade with respect to the handle or snath may be altered and fixed in any position desired; and thirdly, the blade will fold and lie in a line with or be protected by the handle, for portability.

Fig. 1 of the annexed engravings represents the scythe complete and folded. A is the snath; B B are the handles mounted thereon; C is the blade, which has a portion of the heel, D, turned up at or about right angles to the blade; in the end of the turned-up portion, D, an eye is formed. The several parts are better seen in Figs. 2 and 3, which are different and detached views of the jointed parts. Fig. 3 is a plan of a portion of a scythe blade with the parts for fixing it to the snath attached thereto; Fig. 2 is a view of the same looking towards the heel of the scythe from behind. In this view the snath is represented by dotted lines, A. F is a quadrant-shaped piece of metal, which has a similarly shaped slot, G, formed in it. H is a portion of the quadrant piece; it is formed on and projects downwards from the quadrant, at right angles, or nearly so. In the projection, H, a hole is formed and tapped; a screw, I, is passed through the hole or eye in the heel part, D, of the scythe blade, and then screwed into the tapped hole in the projection, H, thus firmly securing these parts together. J is a pin or pivot formed on the quadrant piece, F. This pivot projects upwards and is inserted in a hole or eye in the plate, L. Through the

slot, G, a screw, M, is passed, and is then screwed into a tapped hole formed in the plate, L. The plate, L, is placed in a recess formed in the butt of the snath, and is firmly and permanently secured thereto by bolts, screws and nuts, O O, which bolts are passed through holes in the plate, L, and through corresponding holes in the snath, A.



To set the blade, C, in a proper position relative to the snath, A, and to the surface of the ground, the screws, I, and M, are unscrewed, the blade is then at liberty to be moved into the position required, when the screws, I and M, are tightened, and thus the snath and blade are secured as they have been set. Either the screws, I or M, may be made use of separately to set the blade, the screw, I, being made use of when a vertical movement is required, and the screw, M, for a horizontal, as represented by the dotted line, Q, in Fig. 3. When the scythe is not required for use, both the screws, I, and M, are unscrewed until the blade, C, is capable of receiving a vertical movement on the screw, I, and likewise the blade, C, and quadrant, F, a horizontal movement on the pivot, J. The blade, C, is then made to approach the snath, A; the screw, M, thus traverses in the slot, G, until the blade and snath assume the position shown in Fig. 1, when it is more easily and safely carried from one place to another, and also more readily stowed away.

We transcribe the above from the London *Mechanics' Magazine*.

#### Sugar-making.

Some recent improvements in the process of making and purifying sugars consist in applying to the juice a saturated mixture of alum and lime, in the proportion of two pounds of the mixture to a hundred gallons of the juice. These being intimately mixed, the acid is to be neutralized by the application of milk of lime, in the proportion of three pounds to a hundred gallons. If there be an excess of acid, it will be discovered by the application of the test paper usually employed by chemists to detect acids, and more milk of lime must be added; and if there be an excess of alkali, it may be discovered by the application of the test paper used for detecting alkalies, and more juice must be added. When the mixture ceases to affect either the test for acid or alkali, the impurities will be precipitated, and may thus be separated; and the juice thus purified is to be subjected to the usual mode of clarification and concentration. Pure raw sugar is now obtained direct from the sugar cane, without having undergone any subsequent process of decolorization or refining, prepared by effecting the last stages of the concentration of the cane juice in a vacuum, at a temperature insufficient to produce any chemical changes in its constituent parts. By this improved and scientific process of manufacture, no molasses or uncrystallizable sugar is formed, and there is, hence, an increase of 25 per cent. in the quantity of sugar obtained.

#### Literary Notices.

THE KNICKERBOCKER MAGAZINE for January, 1858. John A. Gray, New York.—This, the oldest of American monthlies, in commencing its fifty-first volume, starts well. "The Life of a Midshipman" is still continued, and seems to increase in interest as it progresses. A good sketch, entitled "John Bradshaw's Adventures in Smithburgh," enlivens its pages, while the "Editor's Table" is covered with all the riches of literary lore for the past month; and right pleasantly does the editor carry the reader through these realms of printed thought, giving information, cautions and advice by the way, which, if regularly perused with that attention they deserve, will not be altogether powerless in forming the future literary mind of our country. The criticisms are just, and a just criticism is worth a volume of praises to a young or even old author.

THE ECLECTIC MAGAZINE.—W. H. Bidwell, Editor and Proprietor, New York.—We have received the January number of this excellent periodical. It contains a portrait of Mrs. Barrett Browning, the poetess, and a picture representing Sir Walter Scott and his literary friends at Abootsford. The articles are well chosen, as fair representatives of the kind of selections that will be made throughout the year. It is one of the best magazines published in our country, and we wish it for the New Year all that success it so well deserves.

BLACKWOOD'S EDINBURGH MAGAZINE.—Leonard Scott & Co., New York.—This number contains an excellent article entitled "Phrenology in France," in which it adduces many instances of remarkable exceptions to the laws of this system, and asks the phrenologists not to explain, but to refute them. There is also an article on the "Religions of India," and many others equally interesting.

AMERICAN FARMERS' MAGAZINE.—J. A. Nash, Editor and Proprietor, No. 7 Beekman street, New York.—This highly interesting and valuable periodical has entered upon its eleventh volume, and contains much matter that will interest the farmer, mechanic, and all who have the beauties of nature around them, and wish to know how to improve natural advantages by cultivation.

CHARLESTON MEDICAL JOURNAL AND REVIEW.—J. D. Burns, M. D., Editor and Publisher. This bi-monthly periodical, so often favorably noticed in our columns, has changed its editor, and seems from the January number to be as full of valuable information in the medical science as ever, if not more so.

THE NORTH CAROLINA JOURNAL OF EDUCATION.—No. 1 of Vol. 1 is received. It contains an excellent article entitled "The Bible as a School Book," in which the writer urges weighty reasons in its favor. We hope never to see the Word of God banished from its proper place as the first of all books as an educator of youth. It is a priceless gift to man.

THE YOUNG MEN'S MAGAZINE for January, published at 348 Broadway, New York, by R. C. McCormick, is an excellent number for the young men of our country, and deserves to be widely circulated and carefully read.



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