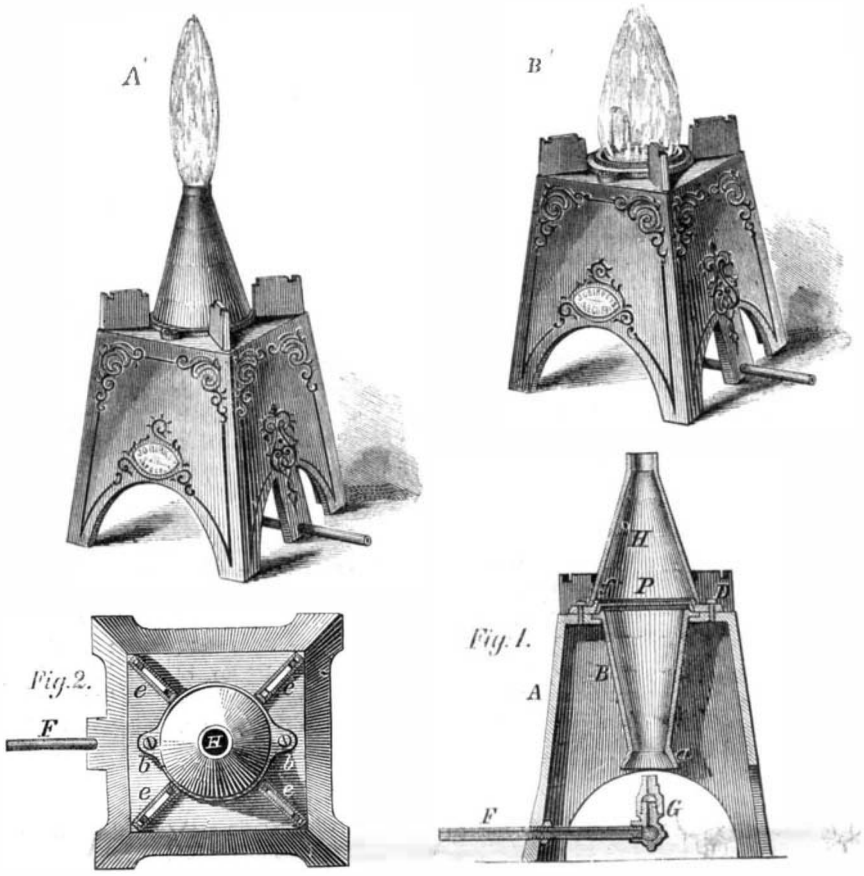
Improved Gas Heater.

The universal application of gas, in cities, for domestic and manufacturing purposes, has called forth a number of inventions for improving and perfecting the apparatus in which it is burned, and we here present an engraving of a new one which is said to be very satisfactory in its operation. The peculiarities of the heater consist in its simplicity, economy, durability, intensity of heat, and power of producing two distinct flames—either concentrated or diffused. It is convenient in size, simple in its construction, and it is always ready for use; and formed in such a manner that it does not smoke. It gives a great amount of heat, consuming at the utmost but six feet per hour, thereby making it most economical and desirable. Having two distinct flames—either to be used at pleasure—gives it a superiority. For common purposes, as the culinary department, the diffused flame will produce all that may be desired; but when a powerful, direct heat is wanted, as for many manufacturing concerns, the object is gained in a few seconds. In the engraving A is a cast iron casing, square and tapering from the base upward. In the top of this casing is let the upper flanged edge of a tube, B, which is in the form of a truncated cone inverted, and which terminates at the lower end, in the flaring mouth, *a*. This tube, B, is confined to its place by an annular plate, D, through lugs in which pass set screws, *b*, into the casing, A, and this annular plate, D, contains a diaphragm, P, of wire gauze, or perforated metal. F is an ordinary gas pipe, passing through and secured to the casing, A, and terminates in an ordinary tip, G, which is central with, but situated below the flaring mouth, *a*, of the tube, B. On the top of the casing, A, are four projections, *e*, on which rest objects to be heated, and on the plate, D, is an annular projection, *f*, on which rests the cone-shaped tube, H, which can be removed and replaced at pleasure.



These are the details, and the operation of them is apparent to all.

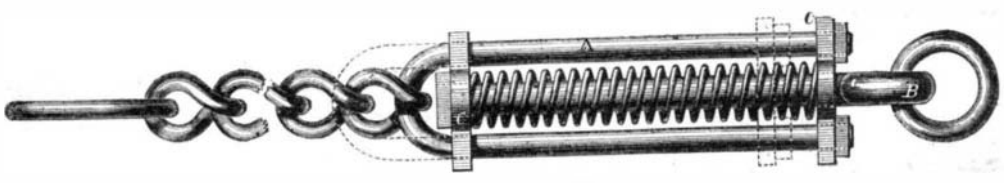
This apparatus will answer admirably for small steam boilers. There are many who use such things, both for pleasure and for business, and it is much more convenient than kerosene oil, which is sometimes employed.

For further information address the inventor, John Q. Birkey, at No. 245 South Sixth street, Philadelphia, Pa., by whom it was patented Oct. 31, 1865.

Improved Jar Arrester.

Every one who has ridden over city pavements must have noticed the frequent shocks and blows horses are subjected to from the wheels falling into ruts, thereby bringing the pole around with great violence. Many animals have been badly injured from this cause, and omnibus horses are not unfrequently so injured as to be laid up a long time.

The engraving published herewith represents a new invention designed to mitigate the evil, and so relieve the jerk that its effect will be lost. The mildest-mannered beast in the world soon becomes cross and fretful when twitched about as described. The instrument consists of a spring confined between a bent bar, A, attached to a ring bolt, B. The latter is fastened to the collar and the chain is connected with the pole, so that any sudden strain on it is immediately taken up on the spring and not felt by the horse except in a limited degree. Testimonials from persons who have used this invention agree in considering it a useful one. The inventor will sell the entire patent or will allow it to be manufactured at a royalty. To those desiring an interest in this invention rights will be sold at a moderate price and on liberal terms. It affords a splendid chance to those wishing to make some money with small capital. The article is easily made, requiring scarcely any machinery to start the business, sells readily, and pays a fair profit, and requires no trial, which most other inventions do, besides it is portable.



M'NAMEE'S JAR ARRESTER.

For further information address J. McNamee, of Easton, Pa., by whom it was patented through the Scientific American Patent Agency on July 14, 1863.

BIRKEY'S GAS HEATER.

RECENT IMPROVEMENTS IN MARINE ENGINEERING.

This subject, a most important one, doubtless, to our readers, and especially to those more directly connected with marine engineering and steam navigation, has been handled in a very creditable manner by Mr. Charles Smith, a short time since, in the paper following his opening address as President of the Association of Assistant Engineers in Glasgow. He states that, though he has adopted the title given, it must not therefore be supposed he is also to use the trite phrase, and say that he is almost overwhelmed with the great advances that have been made in marine engineering within the last ten years, for really, although the efforts towards improvement have been innumerable, and acting in almost every available direction, yet unfortunately, the success that has attended these efforts has been very limited indeed. Whatever may be the cause of this, it is certainly not that there is no room for improvement, for that, in this respect, there is still a vast field for the marine engineer is known to the merest tyro. We find these efforts toward improvement displayed in the almost endless variety of the marine engine. We have in paddle engines, the side-lever engine (now, however, fast falling into disuse), the oscillating, the diagonal direct-acting engine, the trunk, and the steeple engine. For screw engines we have the inverted-cylinder engine, the direct-acting horizontal, the horizontal return connecting-rod engine, the trunk engine, and, lastly, the geared engine, which last, in fact, any of the screw engines enumerated may be, but which is a kind of engine that is also fast falling into disuse, although, like the side-lever paddle engine, it has its own peculiar advantages which its advocates will be loth to sacrifice. The internal arrangement of gearing in many ways may be considered the best form of this kind of engine. The engines which have been enumerated, for paddle and screw ships, are the best known as being the most extensively used, but are far from including the whole of the varieties. And, even in its best form, the marine engine is a most wasteful machine, when we consider that 9-10ths of the heat developed in a furnace (or which ought to be developed) is absolutely lost to us, and only the remaining fraction utilized, and an equivalent in power obtained from it. That this statement is correct the valuable researches of Joule in thermodynamics go far to prove. It may be that we are on the wrong track altogether, and instead of endeavoring to obtain the equivalent of heat in power through the medium of water, that we should be rather obtaining that power by more direct operation on the heat itself. Be that as it may, it certainly will not be very surprising if, in the next century, our modern steam engine be considered a more antiquated and wasteful machine than we have ever regarded the Savery or Newcomen engines. But to commence with the boilers of marine engines, of which in a paper such as this there is really little to say further than that there has been little or no improvement of a permanent character that has been successfully applied to any of the various kinds of them. We find, however, that the tubular boiler being now so generally adopted, we may consider it to be the boiler best suited for marine purposes The grand principle to be attended to in all boilers is one too often neglected, viz: that the boiler be of such an internal arrangement as will best promote the most rapid circulation of the water, by which not only is the value of the heating service much increased, but the boiler plates are rendered less liable to be over heated. Perhaps there have been more attempted improvements on boilers, however, in the way of smoke-consuming than in any other way; but we may call the result of all attempts failures so far, seeing it has been found that the admission of cold air for the purpose of burning the smoke has, in an economical point of view at least, proved injurious rather than beneficial, and it has been in this direction that most smoke-burning apparatuses have tended. And all that can yet be said of smoke burning is that it can be best effected on a well constructed fire grate, by careful firing, with plenty of space between the bars for the admission of air. The result of a deficiency in the latter respect is the formation of carbonic oxide, which is often seen in flame at the mouth of the funnel, where it catches fire on meeting with the oxygen of the air in its exit.

The author states, the most perfect smoke-consuming furnace he had yet seen was that according to Wilson's patent, a furnace with which he had something to do in adapting it to steam boilers. It may, with some modification, be yet adopted for marine purposes, with great economy only, however, for those working with low pressures. Besides being a smoke consumer, it likewise possesses the double advan-

tages of being a self-feeder, requiring little or no attention from the fireman, and the ashes only requiring to be removed every two or three days. These are advantages that would be of greatly-increased value at sea. This furnace however, requires to be considerably modified and improved before it can be confidently applied to marine boilers.

It seems all the advantages to be gained from superheating may be obtained by simply drying the steam so much as to convert all the watery particles and the bubbles held in suspension into dry steam. And in order to accomplish this the complicated arrangement of pipes and winding flues in the uptakes may be considered altogether unnecessary, for not only are they expensive in first cost, and difficulties in after repair, but their presence in the uptakes often acts injuriously in vitiating the draft. The author proceeded to say that the best and simplest form of superheater for marine boilers he was acquainted with consists simply of steam drums encircling the uptakes, these drums being united to each other as well as to the steam space of the boiler by copper pipes, the steam pipe to the engines being taken from the highest point of one of the superheating drums.

The author then introduced the subject of high-pressure steam worked expansively, and stated that the economy resulting from the use of high-pressure steam, setting aside expansion altogether, is measured by the fact of about half a tun of coals being saved in twenty-four hours per 100 horse-power actual, by using 100 lbs. steam instead of 40 lbs; and, of course, when steam of high pressure is judiciously economised by expansion, the advantages accruing from its use are greatly multiplied.

Take, for example, a cylinder into which steam is admitted of 48 lbs. pressure during a quarter of its stroke, it will be found (seeing that as the volume increases the pressure decreases) that the mean pressure behind the piston at half, three-quarters, and end of stroke are 24 lbs., 16 lbs., and 12 lbs., respectively, thus giving a mean pressure over the whole of 25 lbs. per square inch, which represents a pressure of 52 per cent of the initial pressure, but seeing that the quantity of steam used was only 25 per cent of the whole stroke, the gain resulting from this amount of expansion, viz., 48 lbs. steam, cut off at a quarter, is therefore 27 per cent.

The arrangement of valve gear now mostly adopted, in preference to the foregoing arrangement, is some modification of Stephenson's original and elegant link motion, which, besides being well adapted for reversing the engines, may also be, with tolerable efficiency, empolyed as a means for obtaining with great ease a variable amount of expansion within certain limits. It is limited, however, in this respect by the injurious amount of cushioning that takes place on the eduction side of the piston when the engine is being wrought at a high rate of expansion, an amount which at certain grades would annul the benefit that would be otherwise attained.—*London Artizan.*

A Steeple Jack at Westminster.

A daring individual named Burns, from Manchester, has succeded at the House of Parliament in the dangerous operation of fixing the copper bands round two of the finials on the center tower. The last November gale blew off one of the finials, and loosened another; and if it had not been for the lightning conductor, one would have dropped down, and might have done considerable damage, being one of the the highest, and 9 inches square by 6 feet 5 inches from its basement to top, surmounted by a vane that would not revolve. From that cause the wind had such power over it that the third joint gave way, and the finial fell against the steeple; the west wind, however, moved it again, and placed in its position where it rocked. Burns made his way, 210 feet high, outside the tower, without scaffold, by a series of seven ladders, in an ingenious manner, and safely repaired it. Burns very recently got up to the top of the steeple of St. Mary's Church, Rotherhithe; succeeded in taking down the weather-vane, which is 7 feet four inches long, and 84 pounds weight, and after it had been repaired and regilded restored it to its place.—*Builder.*

THE gyroscope was invented by M. Foucault, and first attracted attention from its power of rendering the rotation of the earth visible.

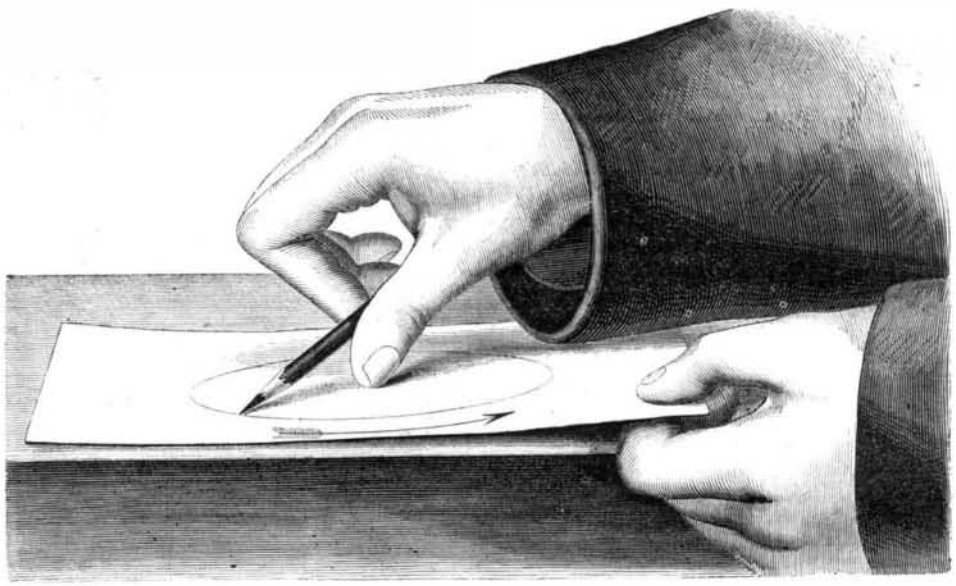
Correspondence

To Strike a Circle with a Pencil.

MESSRS. EDITORS:—

"Some, like the spider, circles can design,
Sure as De Moivre, without rule or line,"

while a more numerous class find their best efforts present the profile of a corpulent doughnut or a peach-bloom potato. Let such grasp the pencil, about in the same way that a Celestial does his writing brush, between the thumb and fore-finger, and resting the thumb and point of the pencil upon the paper, as in



the accompanying sketch, rotate the sheet around the thumb as a center and the work is done. For larger or smaller circles lengthen or shorten the grasp.

G. H. KNIGHT.

Cincinnati, Ohio, Feb. 1, 1866.

Rusty Iron.

MESSRS. EDITORS:—Please inform a new subscriber to your journal what is best to take rust of long standing off steel-faced tools, such as augers, chisels, hatchets, hammers, etc. Have tried emery powder and paper, in connection with sweet and lard oil, and pumice stone, without success. Perhaps some of you can throw light on this subject.

WM. D. NEESE.

Parkersburgh, West Va., Feb. 9, 1866.

[There is no way to remove rust from metal but by getting below it, or renewing the surface. Where it is not deep seated, emery paper will do, but if long standing the goods must be refinished.—EDS.

Cold Cast Iron on Melted Cast Iron.

MESSRS. EDITORS:—I have been a careful reader of your valuable paper for a number of years, and have added largely to my stock of knowledge by so doing. The articles published by you on the foot lathe were particularly interesting to me, and I have since purchased a small lathe where I can work when I feel like it. In a late issue I see the cold and molten iron question again. I am a pattern maker for a machine shop, with foundery attached, and have a good chance to try the experiment, and I did yesterday afternoon. I found the cold floated in every case. I took the molder's skimmer and pushed the cold to the bottom of the ladle five or six times, and, as soon as released, it came to the surface, nearly as buoyant as a block of wood in a pail of water. It will float, but why I cannot tell, but expect to see it explained in your paper before long.

D. D. BRIGGS.

New Bedford, Mass., Feb. 25, 1866.

Hints to Molders.

MESSRS. EDITORS:—In reply to "S. V. E., of Illinois," who inquires how to mix facing sand, I would say there is much in the manner the mold is treated by the molder. If it is of such a nature that the trowel and other smoothing tools can be employed, they ought to be used freely before dust is put on the mold, and again after it is put on. Cannel coal is the best to mix with sand for facing—about one to five for heavy, and less for light castings. Metal very hot will not make so smooth a casting as dull metal will, but hot metal makes a solid and strong casting, and will finish up better. If these few hints will be of any use to S. V. E., he is heartily welcome to them. From a fifty year old MOLDER.

Indianapolis, February, 1866.

Shellac Solvent.

MESSRS. EDITORS:—One of your correspondents desires a solvent for gum shellac; perhaps the following will give him better satisfaction than the solution of borax. Heat 1½ lbs. of shellac in one gallon rain water until the gum is soft and stringy then add 1 lb. saleratus, which will cut the gum and render the compound clear. This is used by some furniture dealers under the name of "light varnish." JEAN JOHN.

Rockford, Ill., Feb. 5, 1866.

A Believer in Witch Hazel.

MESSRS. EDITORS:—In reply to C. B. S., of Connecticut, in your paper of the 3d inst. you say the belief that water may be found by means of witch hazel "is one of the delusions of ignorance."

I am not a little surprised to find such an opinion in your paper.

There are persons so qualified—either electrically, magnetically or otherwise—that are now employed with astonishing success in the oil regions. Their way of operating is to select a well-grown hazel limb, with forked branches, with the forks held firmly in each hand, and with the larger end of the stick bored, filled with native earth oil, and plugged, elevated in air, they walk over the district assigned them. In the locality which I am now speaking of, there is a slatish strata, at a uniform depth 50 to 70 feet, and wells to be successful require to tap the open veins which run in right angles. Once through this, oil is reached and pumped in greater or less quantities.

It is found by extended experience that oil attracts oil, as water does water, when used as I mention, in the witch hazel, when in the hands of properly-constituted operators. The operator when he passes over a vein, finds at once an influence at work to depress the hazel rod, and firmly as he may hold the forks upright, the end with oil bends down to the earth in several vibrations, and then resumes its upright position—having evidently expended the electrical or other force in the vibrations. Now this account is a fact, and one which can be verified to satisfy the most incredulous. In view of that fact, I must say, your opinion that it is based on the "delusion of ignorance" is remarkable, and shows a deplorable condition of enlightenment in the writer. If location and names of operators will aid in dispelling your ignorance they shall be forthcoming

C. M. S.

New York City, Feb. 14, 1866.

[The chirography of this letter was very good, and the spelling correct, showing—notwithstanding the use of the plural *strata* for the singular *stratum*—considerable education on the part of the writer. We publish it on account of the description which it con-