Keep the Boiler Clean.

The cleaning out of kitchen boilers is too often neglected. All sediment cocks should be left open at least once a week for the space of fifteen minutes, so as to clean and wash out all foul sediment. Oftentimes, when complaint is made that the water smells, or that

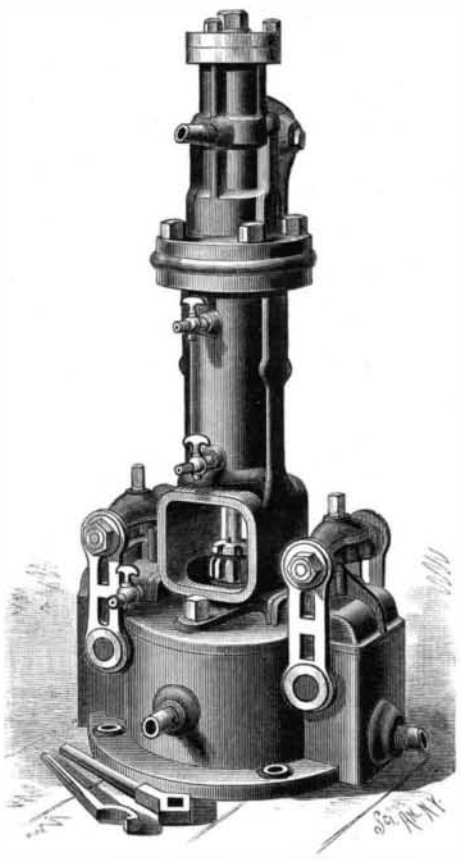


Fig. 1.—THE EMPIRE STEAM PUMP.

it don't heat properly, the real cause will be found to arise from this neglect alone. In fact, people seem to go on the plan that once in order, always in order. All plumbing fixtures, says an old plumber, require cleaning and looking after, just as the plate we eat off of.

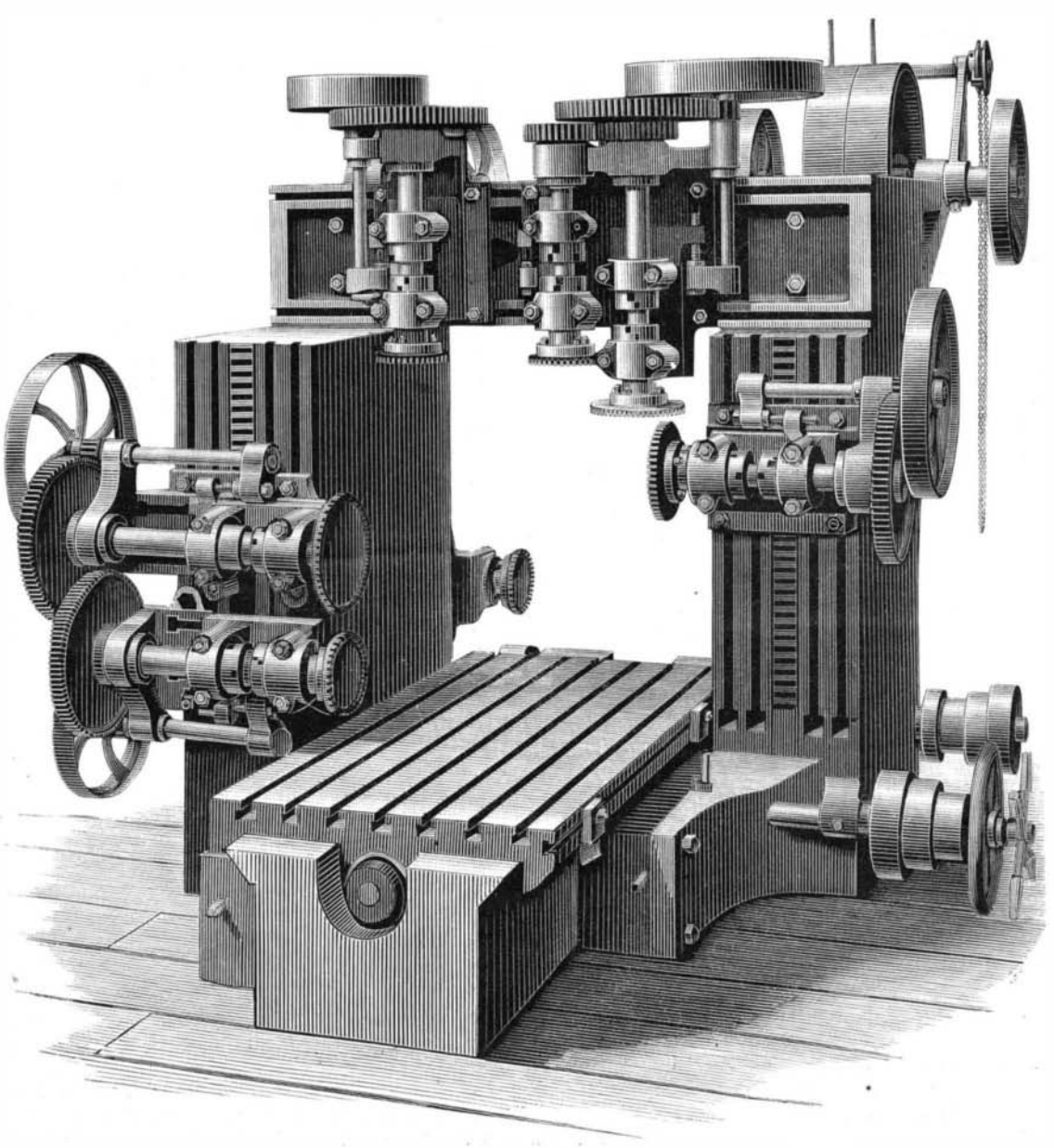
IMPROVED MILLING MACHINE.

The machine here illustrated has been specially designed by Hetherington & Co., of Manchester, for facing the various bosses and seatings on mule headstocks at one operation and at one setting, and is intended, says the *Engineer*, to supersede the old and costly method of planing. On the table of the machine is a strong chuck bracket—which is not shown in our illustration—so arranged that the mule headstock can be readily chucked into position, and supported while being operated upon. The machine itself, as will be seen from our engraving, consists of a strong bed, with table sliding upon it; attached to the bed on either side are massive double-faced uprights, carrying on the top a strong cross beam.

Mounted on the face of the uprights and cross beam are powerfully geared cutter heads, each having an independent compound movement for the adjustment of the cutters, provision having been made that when the cutters have been finally adjusted the heads can be firmly bolted to uprights, thus insuring the utmost rigidity. The machine will admit 3 feet 6 inches between the uprights, and the table is 6 feet long, with a traverse of 4 feet 6 inches. There are in all seven cutters, six on the front side of the machine and one at the back, and these seven cutters operate upon the different facings of the mule headstock, finishing them all to standard sizes with once traveling through the machine.

The table is arranged with a variable feed and quick-return motion, controlled by a hand wheel at the side of the front upright. This wheel, being turned in one direction engages the slow cutting feed, and turned in the opposite direction causes the table to run back quickly on the return, while the middle position disengages both motions, and thus brings the table to a standstill. On the front edge of the table are two stops, which act upon the end of a lever coupled with a clutch on the feed cone pulley, and so arranged that when the stops come in contact with the lever, the feed motion or quick return is at once disengaged. A cross handle is also provided, for moving the table by hand if necessary. All the motions are driven separately from a countershaft carried by two brackets bolted to the back of the uprights and provided with an adjustable strap-shifting apparatus. The headstocks on the uprights are driven by open belts, and those on the cross beam by half cross belts. This arrangement allows the headstocks to be moved in position, when necessary, by altering the length of belt.

As already stated, the special feature of this machine is the great saving of labor effected over the old system of planing; and as an illustration of this we may mention that whereas formerly three days were occupied in the planing of a mule headstock, the same result is, with the special milling machine we have described, obtained in two hours; in addition, the further advantage is secured that all the headstocks are in exact duplicate, while the machine requires no attention after it has been started, the stopping motion coming automatically into action when the table has made the required traverse.



SPECIAL MILLING MACHINE.

THE EMPIRE STEAM PUMP.

The accompanying engravings represent a vertical steam pump, the most prominent peculiarities of which are its automatic valve gear and quick return plunger, which moves down at a given speed, but returns much more quickly. Its steam valve is operated without the aid of tappets, compound levers, or metallic connections of any kind.

It neither strikes a blow nor operates suddenly upon the plunger. The piston cushions noiselessly upon steam at the end of each stroke, recedes gradually for an instant until the water valves close, and then completes its stroke; this cushioning upon the steam allows of the pump being driven at great speed without danger of hammering. There is no outside moving gear or delicate adjustment, the only visible moving part being a portion of the piston rod, and even this when necessary can be inclosed.

In the steam chest there are but two pieces—shown in Nos. 2, 3, and 4, of Fig. 2, No. 1 being a sectional elevation through the entire pump—a slide valve and a differential piston to move the valve, these constituting the whole valve gear. The steam piston and water plunger are cast in one piece of steel or composition, as shown in No. 2. The stuffing boxes and water valve seats are made of composition. The links and bolts

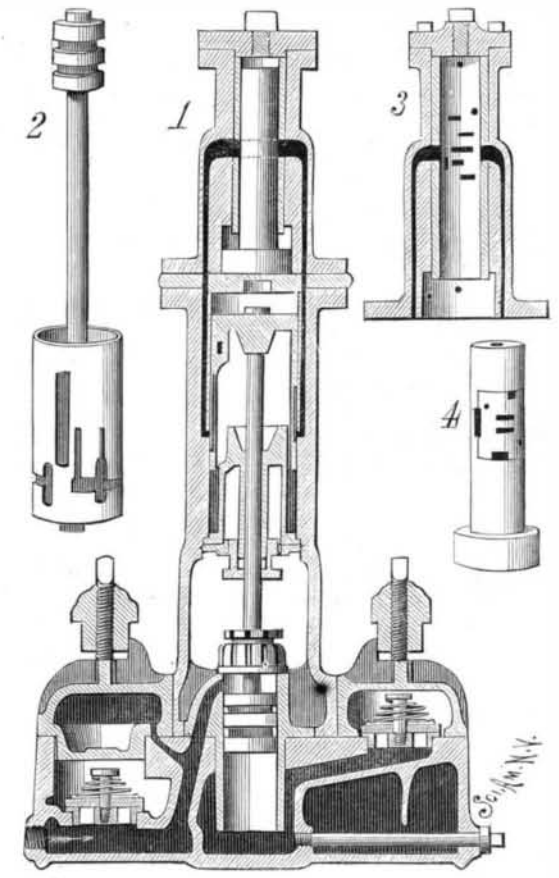


Fig. 2.—DETAILS OF THE EMPIRE STEAM PUMP.

holding the valve caps are steel, and all other bolts are casehardened. These caps can be easily and quickly removed, thus permitting access to the valves whenever necessary. Although having but two water valves, the pump possesses the same advantages, as respects a steady flow, as the ordinary double-acting pump, by reason of the quick return of the plunger and the creating of a partial vacuum on both the up and down stroke. The quick return movement of the piston prevents any vibration or quake, such as usually accompanies quick reciprocating motion. The pump being vertical, there is no wear to the cylinder or piston occasioned by the weight of the piston, and all foreign substances pass under or over the plunger, thereby preventing all abrasions or cutting, so destructive in many other styles of pumps. The arrangement of the parts is such that there can be no such thing as dead centers, and hence it can be run at one stroke per minute if desired. The pump is so made that the water cylinder may be changed, at a trifling cost, in accordance with the work to be done.

Any further particulars regarding these patents can be had by addressing the inventor, Mr. E. G. Shortt, of Carthage, N. Y. The pump is manufactured by the Empire Steam Pump Co., at whose office, 12 Cortlandt Street, this city, one may be seen in operation.

PASTEUR'S discoveries, according to the German press, were anticipated. It is pointed out that, on pages 213 and 467 of G. H. Jahr's "Clinical Directions," published in 1849 by H. Bethmann, Leipsic, under the headings of "Hydrophobia" and "Cases of Poisoning" mention is made of "inoculations with the virus of rabies" as a remedy against the bite of rabid dogs. "The physician who advocated and practically employed this remedy was a German, Constantin Hering by name, and resided in Philadelphia."

Push or Being Pushed.

As we have said repeatedly, there is nothing in the world like energy. In order to succeed, it is required that the aim in view be pursued with unwavering determination. It is the persistent effort to advance which we commonly designate by the term *push*. A business man without push might as well shut up shop and save his money, for sooner or later he will be swamped by the irresistible onward rush of progress.

Quite different, however, from this faculty of push, exerted in a particular direction for individual advancement, is the being pushed by others. He who is awake to his own interests, who is possessed of push, needs no pushing from others, and, on the other hand, no amount of pushing will benefit the weak and the laggard. Constant spurring will only induce stubbornness and sulkiness, and we all know how the mule will act if urged against his will.

We believe that he who does not feel that diligence and earnestness and a constant striving for improvement (be it in his own business or in that of another, if he is not his own master) will pay best in the end, cannot be brought to it by compulsion.

Compulsion, force, driving, moreover, is unworthy of the spirit of our age. Let him who will not move his arms and legs to keep himself afloat go to the bottom, the sooner the better. It is a deed of charity to such a being and in the best interests of others.

We have no patience with men who are like *dumb, driven* cattle, and who work solely because they must have their earnings in order to fill the stomach, whose chief prayer is

"*Come day, go day,*
God send pay day."

They are not *men,* but *machines,* and in the case of machines we expect a certain amount of work from the expenditure of a certain amount of fuel, and we take steps to get it. But a *man,* be he employer or employe, will do his best; what he may lack to-day, he will make up to-morrow. He will have *push*, but will object to being *pushed.*

Push is absolutely a requisite in this world; *pushing* is unnecessary, and may result in the very opposite of that which it was intended to accomplish.—*Lithographer and Printer.*

Petrifaction of Organic Bodies.

At a recent meeting of the Italian Medical Society at Perouse, Prof. Angelo Corni, of Rome, made known the processes of preserving anatomical specimens and of petrifying corpses, the secret of which he has kept to himself for more than fifty years. These processes are two in number, and are as follows:

1. *Process of Making Organic Bodies as Hard as Stone.*—The substances employed are boiled linseed oil and dentochloride of mercury, which are to be stirred up in a mortar until a soft paste is formed. In this oily paste is immersed the corpse or any anatomical specimen that it is desired to render unalterable by giving it the consistency of stone. The immersion is prolonged for several months, according to the bulk of the body which is to absorb the above-named substances.

When the induration seems sufficient, the objects are washed with turpentine, and exposed to the air until they become thoroughly dry. Then they are polished with an agate, and burnished as is done in the silvering and gilding of wood, but without the use of water or soap. These operations necessarily require considerable practice combined with a certain dexterity.

If the objects to be preserved contain cavities, the latter must be previously filled with a mixture of equal parts of finely powdered cement and dentochloride of mercury. Finally, if it be desired to preserve the body with its eyes open, artificial eyes must be substituted for the natural ones before immersion in the paste.

2. *Process of Preserving Bodies in a Soft and Flexible State.*—For preserving organic bodies in a soft and flexible state for several months, and permitting them to be dissected without any danger to the preparator or the anatomist, they are placed in some sort of a receptacle or other and covered with a layer of the thickest and purest honey that can be found in the market. If it be desired to preserve an entire cadaver by this simple and cheap process, we begin by carefully filling the encephalic, thoracic, and abdominal cavities with a sufficient quantity of tannin. This process, when applied with care, gives remarkable results, and a corpse thus prepared appears for several months to be asleep. One might say that the alcoholic fermentation that occurs under these circumstances serves it as food while preserving its softness and flexibility. When the fermentation ceases, a hardening of the parts occurs and renders the artistic forms of the body still more marked.—*Revue Scientifique.*

A CURIOUS ICE FORMATION.

The accompanying illustration represents a photograph of an air bubble found near the center of a cake of ice by one of our correspondents at Eau Claire, Wis. The beautiful shapes which ice often assumes in such formations are sometimes quite notable, but it is very rare, we think, to find a specimen of nature's work in this direction where the idea of some design seems to be so well suggested as here. The whole may indeed

CURIOUS FORMATION IN ICE CAUSED BY AN AIR BUBBLE.

be taken as a shadowy representation of a beautiful flower stand, most delicately carved in crystal, suspended above which, and partly seeming to spring from it, are formations which give no bad suggestion of flowers and vines, while tapestry and bric-a-brac of rare excellence can be evoked, with but little effort of the imagination, from various other details of the representation.

EXTENSIVE soda works have been begun at Owens Lake, in California. A portable engine is employed, and as soon as a vat is filled the engine is moved to another, and the water is left to evaporate from the one that had been filled. This process will be repeated at all the vats until the soda sediment in the water accumulates in the pit until it reaches the surface. It will take about a year to get a crop of soda by this method, which will bring $35 per ton. They expect to gather fifty tons of soda to the acre annually. The number of vats will be increased till they hold an area of 50,000 acres of soda, the income from which is expected to be nearly $2,000,000 a year.

THE CALIFORNIA ROADRUNNER (*Geococcyx Californianus*).

JOHN R. CORYELL.

A very singular and yet a very little known bird is the roadrunner chaparral cock, or, as it is known in Mexico and the Spanish sections of the United States, the paisano.

It belongs to the cuckoo family, but has none of the bad habits by which the European cuckoo is best known. It is a shy bird, but is not by any means an unfamiliar object in the southwestern portions of the United States and in Mexico. Sometimes it wanders up into middle California, but not often, seeming to prefer the more deserted, hotter, and sandier parts of southern California, and from there stretching its habitat as far east as middle Texas.

It is not by any means a brilliantly colored bird, although some of its hues are very beautiful. The prevailing color of the roadrunner is olive green, which is marked with brown and white. The top of the head is black blue, and is furnished with an erectile crest. The eyes are surrounded by a line of bare skin.

It is not a large bird, being seldom twenty-four inches long, with a tail taking more than half of that length. The tail, indeed, is the most striking feature of the bird, being not only so very long, but seemingly endowed with the gift of perpetual motion, since it is never still, but bobs up and down, and sidewise, too, into every possible angle, and almost incessantly.

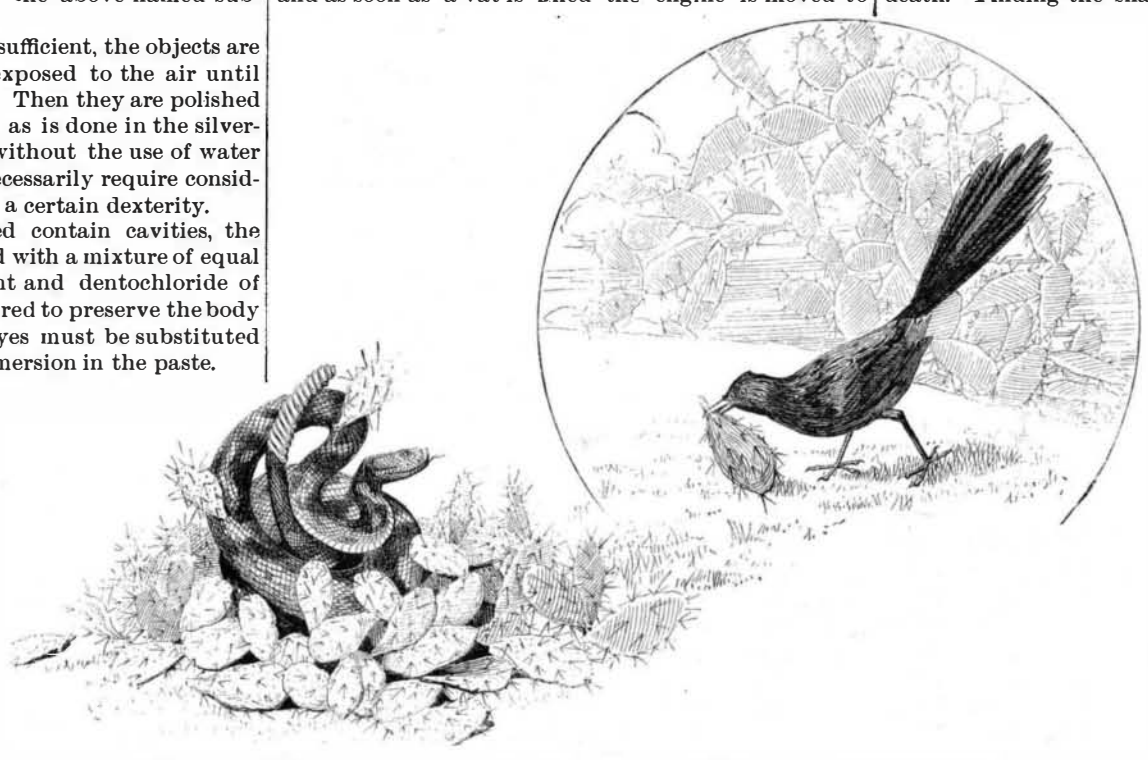
But while its tail is most striking, its legs are most remarkable, being not only long and stout, but wonderfully muscular. How muscular nobody would be able to imagine who had not put them to the test.

A traveler in Mexico tells of going out with his ranchero host to hunt hares with a brace of very fine hounds. Going over a long stretch of sandy plain, relieved only by pillars and clusters of cactus, the Mexican called the attention of his guest to an alert, comical-looking bird, some distance from them.

With the remark that the gentleman should see some rare coursing, the Mexican slipped the leashes of the straining hounds, which sprang off as if used to the sport, and darted after the bird. For a moment it seemed to the stranger a very poor use to put the dogs to, but he was not long in changing his mind.

Instead of taking wing, the bird tilted its long tail straight up into the air in a saucily defiant way, and started off on a run in a direct line ahead. It seemed an incredible thing that the slender dogs, with their space devouring bounds, should not at once overtake the little bird; but so it was. The legs of the paisano moved with marvelous rapidity, and enabled it to keep the hounds at their distance for a very long time, being finally overtaken only after one of the gamest races ever witnessed by the visiting sportsman.

The roadrunner, however, serves a better purpose in life than being run down by hounds. Cassin mentions a most singular circumstance among the peculiarities of the bird. It seems to have a mortal hatred of rattlesnakes, and no sooner sees one of those reptiles than it sets about in what, to the snake, might well seem a most diabolical way of compassing its death. Finding the snake asleep, it at once seeks out the spiniest of the small cacti, the prickly pear, and, with infinite pains and quietness, carries the leaves, which it breaks off, and puts them in a circle around the slumbering snake. When it has made a sufficient wall about the object of all this care, it rouses its victim with a sudden peck of its sharp beak, and then quickly retires to let the snake work out its own destruction, a thing it eventually does in a way that ought to gratify the roadrunner if it have any sense of humor. Any one watching it would say it was expressing the liveliest emotion with its constantly and grotesquely moving tail.



THE CALIFORNIA ROADRUNNER (GEOCOCCYX CALIFORNIANUS).

The first impulse and act of the assaulted snake is to coil for a dart; its next to move away. It quickly realizes that it is hemmed in, in a circle, and finally makes a rash attempt to glide over the obstruction. The myriad of tiny needles prick it and drive it back. The angry snake, with small wisdom, attempts to retaliate by fastening its fangs into the offending cactus. The spines fill its mouth.

Angrier still, it again and again assaults the prickly wall, until, quite beside itself with rage, it seems to lose its wits completely, and, writhing and twisting horribly, buries its envenomed fangs into its own body, dying finally from its self-inflicted wounds. After the catastrophe, the roadrunner indulges in a few gratified flirts of its long tail and goes off, perchance to find its reward in being run down by hounds set on by men.