

**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

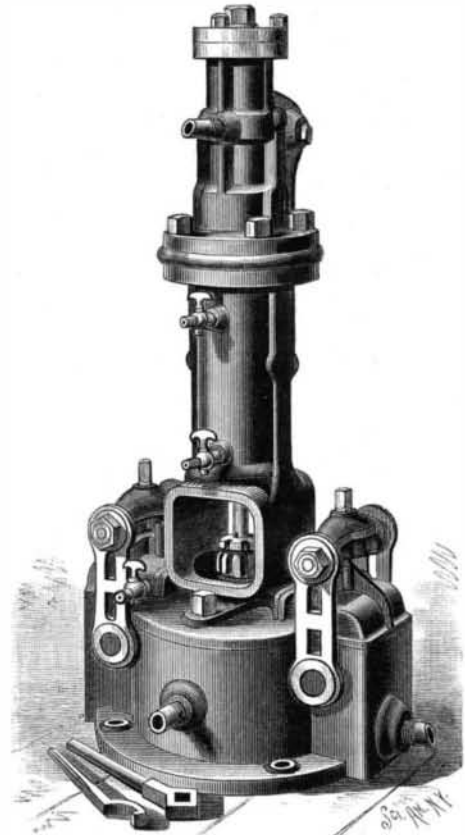


Fig. 1.—THE EMPIRE STEAM PUMP.

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, con-

trolled 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.

**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

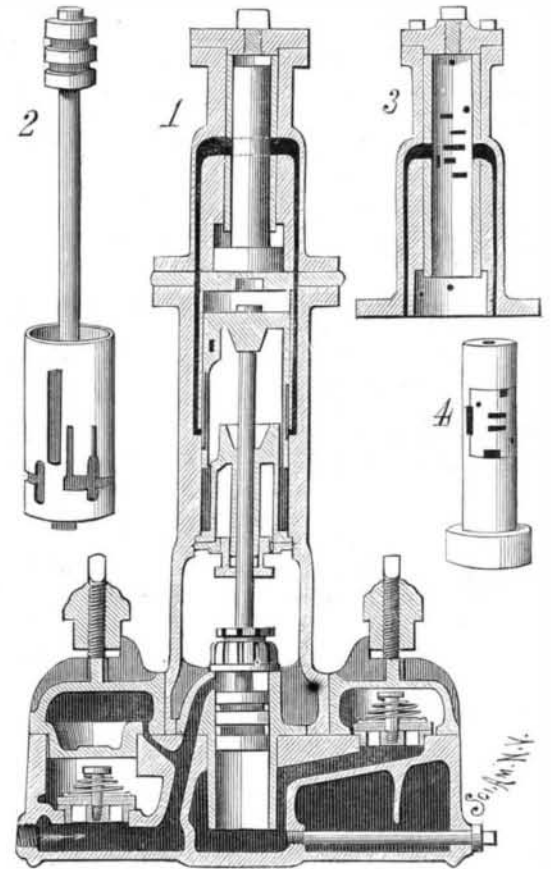
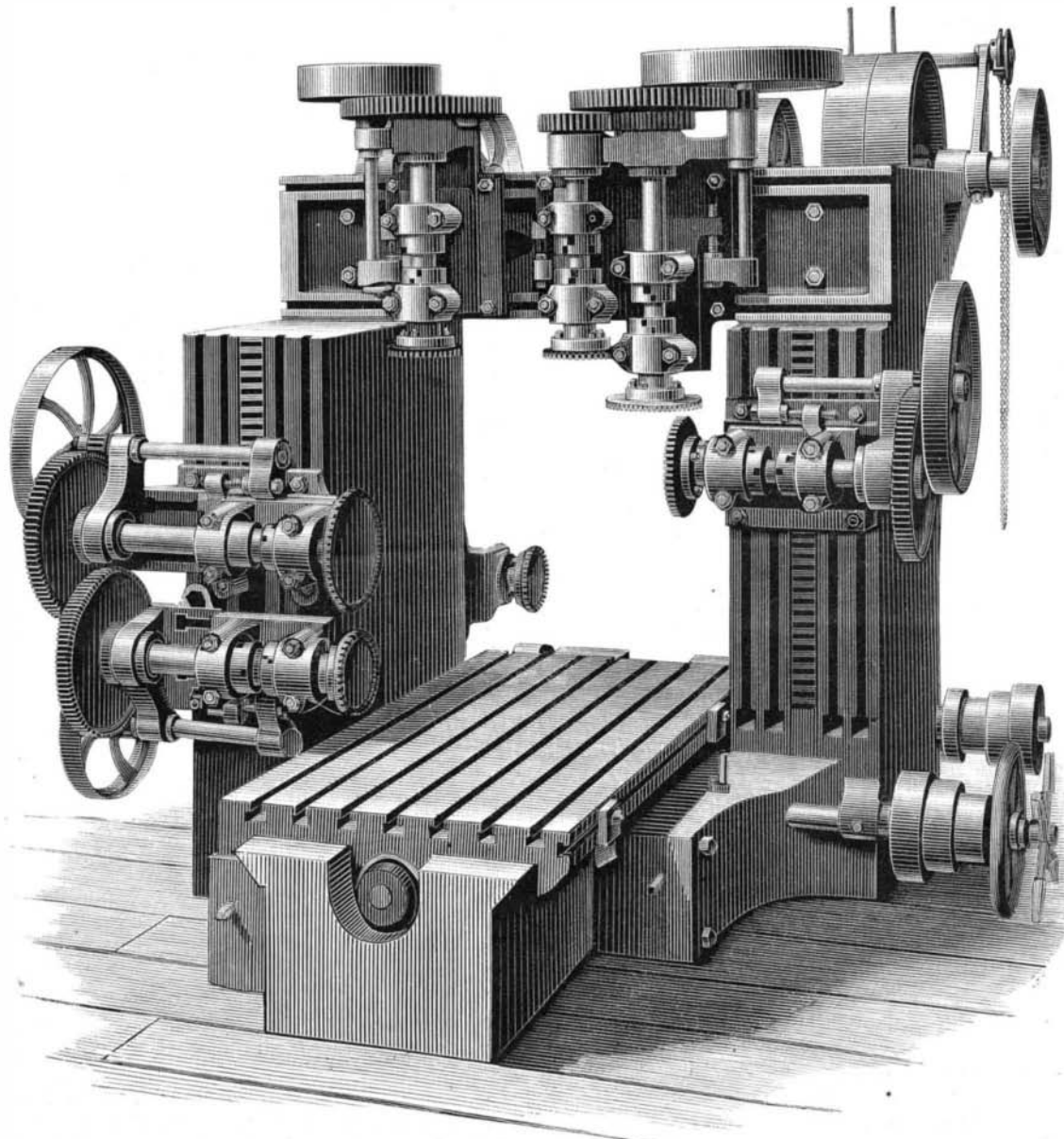


Fig. 2.—DETAILS OF THE EMPIRE STEAM PUMP.

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."



SPECIAL MILLING MACHINE.