A NEW DOMESTIC STEAM ENGINE.

M. Fontaine has recently received a prize of $200 from the French Société d'Encouragement, for the invention of the domestic steam motor represented in the annexed engravings. The boiler of the device contains enough water to furnish some 42 foot pounds, during the continuous period of work of a woman—some four or five hours; and the design is to renew the supply during meal hours, allowing such interval for the generation of steam, ready to begin work again. The device is composed of a generator—an engine and a gas furnace with automatic register. The engraving shows the exterior of the invention, and also a sectional view. A is the body of the boiler, in the lower side of which are twenty-four copper tubes, B, the upper ends of which enter the smoke box, C. D is a sleeve through which the gases of combustion descend to the chimney, and E is a superheating tube which is closed at the bottom and extends down through the smoke box, as shown. F is the feed water tube, closed by a screw plug, indicated by dotted lines. Water cannot be put into the boiler except when there is no pressure of steam. At G, dotted lines, is a cock which draws off the steam when water is to be supplied, through a pipe, H, and thence into the chimney. I is the flue connecting with the sleeve, D. J is the furnace composed of twenty five Bunsen burners. The gas, on leaving the meter, goes to the upper part of the machine and enters at L. Here it meets a flexible tube, M, which resembles a bellows, and forms a pressure regulator. N is a counterweight suspended to the tube, M, maintaining it at a length corresponding to the desired pressure. When the limit fixed is exceeded, the tube elongates and checks the flow of gas by closing smaller the orifice, L. K is the tube conducting the gas from this apparatus to the burners. Steam is taken from the superheating pipe by the tube, O, and is led to the slide valve, P, which communicates with the cylinder, Q. R is the slide eccentric, S the crank, T the belt wheel, U the exhaust pipe leading to the chimney, V the manometer, and W the supporting legs of the apparatus. X is the wooden envelope, having dilatable joints which surround the boiler and cylinder, and is lined with thick felting. Y is a small inclined mirror, which allows the operator to see a reflection of the gas burners, and so to judge of the heat of the fire.

Cylinder, valve, chest, slides, and frame of the engine are all cast in a single block, in which the necessary apertures are bored. No cores are used in the molding. Steam goes to a simple slide valve operated by an eccentric, and is admitted during one third, and exhausted during five sixths, of the stroke. The shaft, crank, and eccentric are cast in one piece. All rubbing surfaces are of steel. The piston is made in segments, of cast iron, on the Ramsbottom system, and all the ports are circular.

The object of the device is to do any light work now performed by hand, such as driving sewing or washing machines, turning wringers, operating pumps, etc. Its hight from floor to top of fly wheel is about 43 inches, and exterior diameter, 14 inches.

Wire and its Manufacture.

We extract from the *Commercial Bulletin* the following interesting facts regarding the manufacture of wire in New England, and the various uses to which it is employed:

There are now sixteen wire-drawing establishments in New England, of which two are located in Maine, two in Connecticut, and twelve in Massachusetts. Of these last, Boston claims two. Among the Massachussetts wire-drawing mills, that of the Washburn & Moen Manufacturing Company, of Worcester, is probably the largest in the country.

VARIED USES OF WIRE.

There are few branches of metal manufacture whose products are in wider use. Wire is employed for the thousands of miles of telegraph lines; it is woven by machinery, strong enough to make fences, and of such delicacy as to make the finest wire cloth; large quantities are used for galvanic batteries and for other scientific purposes; it is twisted into the powerful cables of suspension bridges, and furnishes cables for submarine telegraphs, and ropes for ships, for use in mines, and for other purposes. From steel are made crinoline wire and wire to be drawn into needles of all kinds. A large business has sprung up in the manufacture of wire for piano strings, and of the delicate plated wire for covering the strings. Tinned broom wire makes a considerable item. Of late years there has been a great sale for white wire culinary and ornamental table utensils. It is used in the manufacture of card clothing, heddles, reeds, and other machinery. Woven wire of iron, brass and copper, appears in flour, paper, and other machinery; it makes its way into baskets, screens, sieves, cages, fenders, dish covers, nets, and an infinite variety of similar forms. Coppered pail bail wire is a considerable product. Gold and silver wire is plated or woven into exquisite filagree work, into chains, and into threads for making gold lace; and wires of the various metals are employed for scores of other purposes, in articles useful and ornamental.

PROCESS OF MANUFACTURE.

The wire rods, varying from a quarter to a half an inch in thickness, which are received from the rolling mill in bundles, are heated and re rolled in grooved rollers, one above another, so that the rod can run from the first roll to the second, and so on, without reheating. The rollers run with great rapidity, and the final groove reduces the rod to a coarse wire, about one eighth of an inch in thickness, which is ready for the first hole in the draw plate.

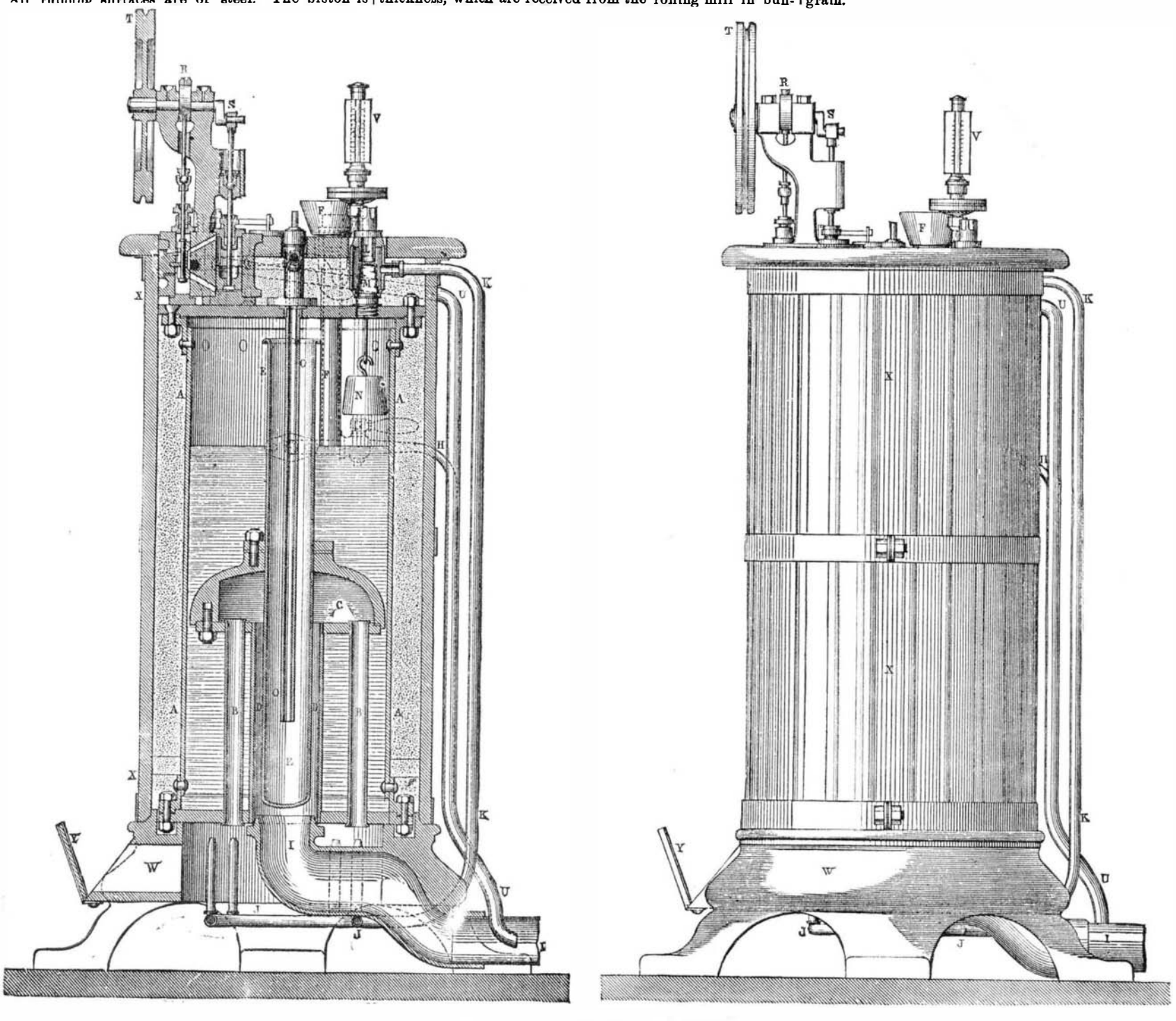
The draw plate, the most distinctive piece of mechanism in this manufacture, is a flat piece of hard steel, with holes corresponding to the various numbers or sizes to which wire for different purposes is drawn. The best ones are made of a combined plate of highly tempered wrought iron and steel, the steel face being on the side through which the wire is to come. The holes are tapering, the smallest end being on the steel side. For drawing very fine wire, in which the greatest uniformity is necessary, the plates are prepared with perforated rubies or other hard stones.

The wire is annealed and drawn cold. The machinery for doing this includes a draw bench, which lifts the wire from a reel to the first hole in the draw plate. The wire passes through this to another reel or drum, on which it is wound, ready for its journey through the second orifice. The same process is continued down the series, until the wire is reduced to the required size. The wire has to be often annealed and cooled during the process, since it becomes less ductile and more brittle as it is drawn down. Grease and wax are used for lubricating. A method has come into use lately of covering brass wire with a thin film of copper, which is of great help in drawing, while the copper can be wholly removed at the last annealing.

The ductility of the metal and the size of the wire regulate the rapidity of drawing. Zinc is the least ductile of the metals used, then brass, next iron, steel, copper, silver, platinum and gold. As the wire becomes attenuated the speed may be increased. Iron and brass, according to size may be drawn from twelve inches per second to forty-five inches per second and the finer sizes of silver and copper are drawn at the rate of sixty or seventy inches per second.

WIRES OF REMARKABLE LENGTH.

Silver wire has been run through plates of rubies to the length of one hundred and seventy miles, in which the most delicate test could detect no difference in diameter in any part. Gold and platinum have been drawn to a "spider line" for the field of a telescope, by coating the metal with silver, drawing it down to the finest number, and then removing the coating by acid, leaving the almost imperceptible interior wire, which, in an experiment made in London, was so attenuated that a mile's length weighed only a grain.



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