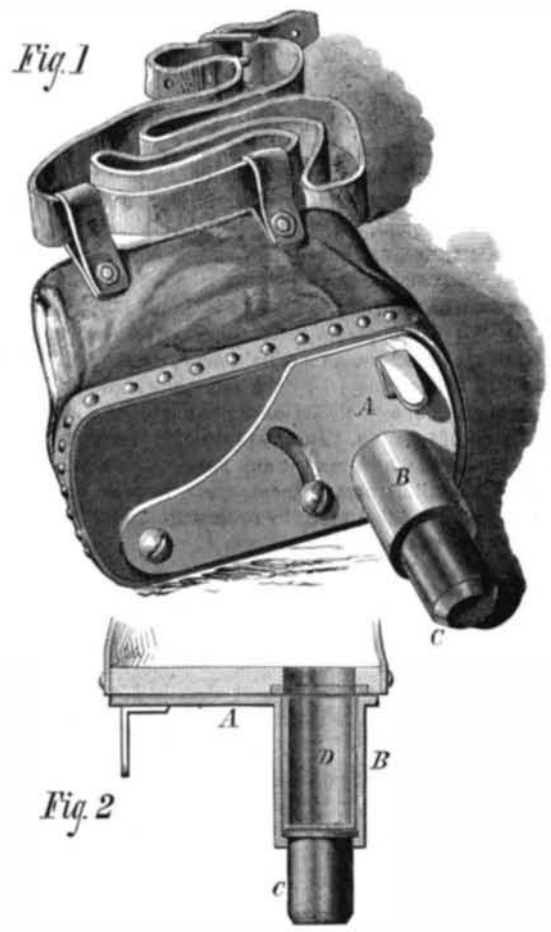
IMPROVED SHOT BAG AND CHARGER.

By means of the device represented in the annexed illustration, any given quantity of shot may be quickly removed from the bag. A charge of exact quantity is portioned out, and no shot is lost in the operation. The bag, which is of leather, has a wooden bottom. The aperture for the escape of the shot in the latter is covered by the plate, A, which is pivoted, and the movement of which is limited by the pin entering the curved slot, as shown. Attached to said plate



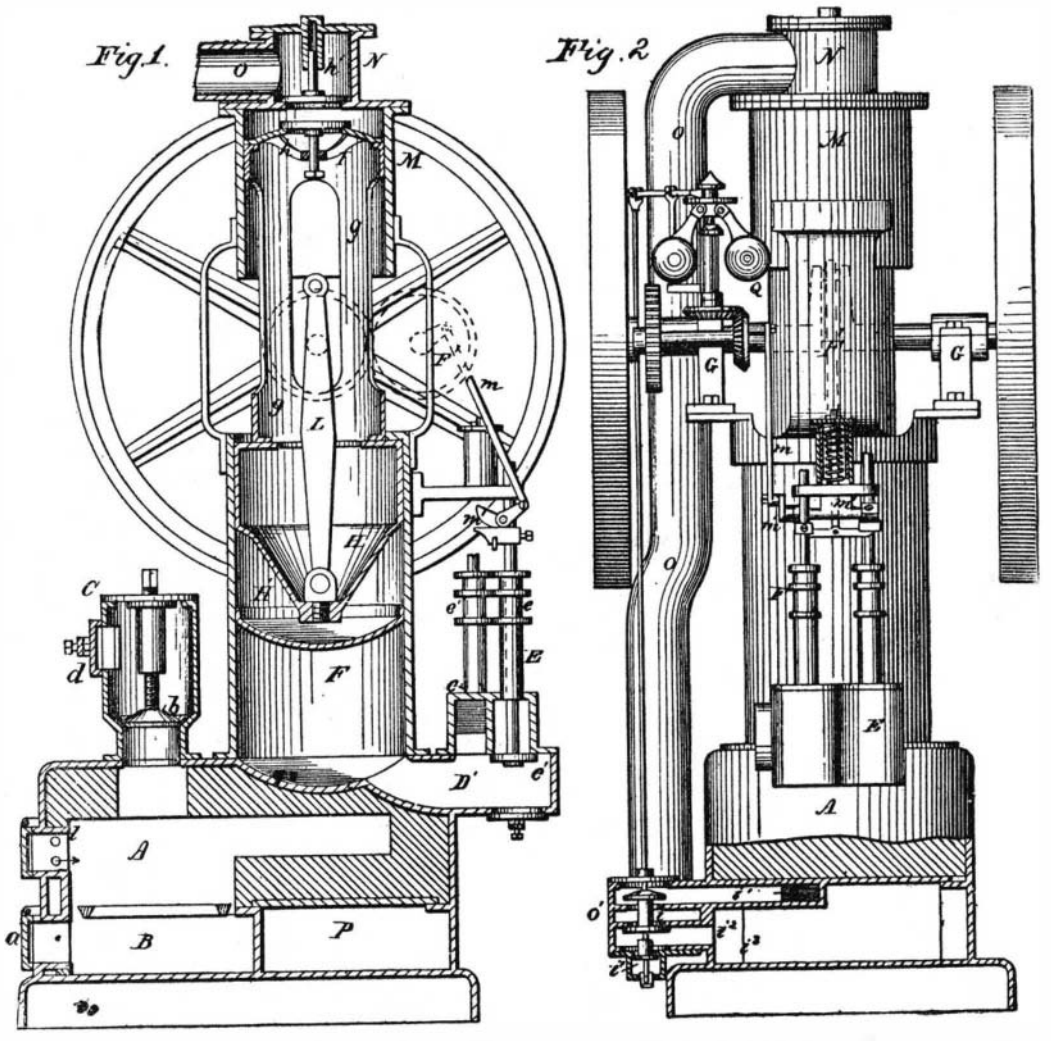
is a tube, B, inside of which, at the outer end, is a flange. This tube, when the plate, A, is placed as shown in Fig. 1, registers with the aperture in the bag bottom. In the tube is inserted a plug, C, the flanged head of which, catching on the interior and flange of the tube, prevents its falling out. Above said plug, C, is inserted a cylindrical charging vessel, D. When this is in place, its mouth comes flush with the inner side of plate, A.

It will be clear from Fig. 2 that, in the position shown of the parts, the shot will descend through the aperture in the bottom and fill the charger. The pivot plate, A, is then moved so as to bring the tube clear of the bag; and at the same time it keeps the bottom aperture closed. By pushing upon the plug, C, the charger, D, filled with shot, is readily lifted out, so that the shot may be placed in the gun. The bag may be slung around the neck by straps, and is easily operated with one hand.

Patented through the Scientific American Patent Agency, May 15, 1877. For further particulars relative to sale of patent, royalties, etc., address the inventor, Mr. Thomas J. Jolly, Etna, Scotland county, Mo.

A NEW HOT-AIR ENGINE.

In the novel hot-air engine illustrated herewith, the atmospheric air is forced, by means of an air pump, into an hermetically closed furnace, where it is heated, and then conducted into the cylinder for use. The new feature is an improved mechanical distribution of air above and below the grate by means of the governor before the same opens a regulating cold-air discharge valve.

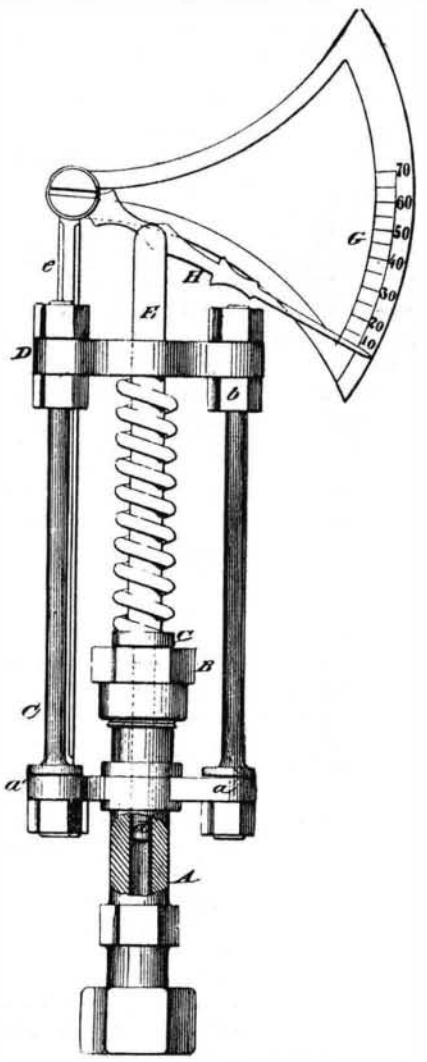


HOCK AND MARTIN'S HOT-AIR ENGINE.

Fig. 1 represents a vertical longitudinal section of the motor, and Fig. 2 is an end elevation. A represents the cast iron furnace that forms the base section. Concentrically above the circular grate is arranged a box, C, whose contracted throat is closed by a valve, *b*, that is raised or lowered to open or close the communication for supplying the required quantity of fuel to the furnace during the running of the engine. The fuel is filled into the box through a hermetically sealing door, *d*, which is firmly closed by a fastening screw, so that the fuel box may, by closing the connecting valve, *b*, be filled, and the fuel then supplied after the door is closed and the valve opened to the grate, without any admission of air through the fuel box to the furnace. At the rear end of the furnace casing, opposite the fire door, is arranged a chest, E, with the hot air valves, *e* and *e'*, of which the air-supply valve, *e*, connects by a channel, D, with the cylinder, F, while the exhaust valve, *e'*, forms, by a second channel, D', the communication of the cylinder, F, to the chimney. The cylinder, F, is arranged vertically on the furnace box, and is provided at its upper end with four horizontal flanges, F', of which two opposite flanges carry the journal boxes, G, of the driving shaft, that is placed diametrically across the cylinder, while the other two are extended in upward direction, to support the air pump at the upper part of the engine. The piston, H, of the hot-air cylinder, F, and the piston, I, of the air pump, M, are concentrically connected by a tubular piece, *g*, that is broken out to give play to the crank of the driving shaft. The crank shaft is connected directly by a crank rod, L, with the cylinder piston, H, which is provided with a suitable leather or other packing, and inclosed by a sheet metal casing, H'. The piston, I, of the air pump, M, is also tightly packed with leather, and provided with a central suction valve, *h*, in the upper part of the piston. The suction valve, *h*, is opened during the downward motion of the piston, I, to draw in the required quantity of air, which is forced by the upward stroke of the piston through a second valve, *h'*, into a dome, N, secured to the top part of the air pump. The cold air is then conducted from the dome, N, and through the cold air tube, O, to the air regulator, O', which is arranged at the side of the furnace box, communicating by a valve, *i*, and an upper channel, i^1, directly with the grate, and by a lower opening, i^2, with the heating chamber, P, back of the ash box, and from the same by side channels, i^3, to the front part of the furnace back of the fire door. The partially heated air is forced through openings, *l*, back of the fire door into the furnace, where it is heated to the required degree and conducted to the cylinder, for working the piston of the same. The introduction of the atmospheric air back of the fire door keeps the same cool, while the side channels protect the furnace walls against too rapid deterioration. The governor, Q, is worked by gear wheel connection with the driving crank shaft, and arranged to operate, by a fulcrumed lever and rod, the valve, *i*, of the air regulator, O'. The governor shaft is also connected by a crank pin and rod, *m*, with a cam shaft, *m'*, that bears alternately the spring-acted top plates of the spindles of the air-supply and exhaust valves, *e* and *e'*. When the engine is at rest, the valve, *i*, is shown in raised position by the weight of the governor balls, and admits thereby the direct entrance of the cold air from the conducting tube to the grate, until, by the gradual increase in speed, the governor lowers the valve, *i*, so as to close the upper channel and conduct the air into the heating chamber, P, and to the furnace, in the manner described. If the speed of the engine, and consequently the pressure of the air within the engine, exceeds a certain limit, the governor rod depresses and opens a regulating exit valve, i^4, below the valve, *i*, so as to reduce in this manner, by the escape of cold air, the pressure in the lower part of the engine. This invention was patented through the Scientific American Patent Agency, May 8, 1877, by Messrs. J. Hock and L. P. Martin, of Vienna, Austria.

IMPROVED PRESSURE GAUGE.

The annexed engraving represents a novel gauge for indicating pressure in hydraulic cylinders. It consists of a solid



piston of small area, whose outward motion is opposed by a strong adjustable spiral spring, and whose outer extremity is connected with an index that moves in front of a graduated arc. A is the cylinder, provided at its upper end with a stuffing box, B, and having at its lower end a coupling for connecting it with the hydraulic cylinder in connection with which it is to be used.

Arms, *a a'*, extend laterally from the cylinder A, for receiving the studs, C, which are secured thereto by nuts and extend beyond the stuffing box, B, parallel to the axial line of the cylinder, A. The outer ends of the studs, C, are threaded, and upon them a centrally bored crossbar, D, is placed between nuts, *b*.

A rod, E, passes through the crossbar, D, and extends downward through the stuffing box, B, into the cylinder, A, and is reduced in size, forming a piston, *d*, that fits the said cylinder.

A collar, *c*, is formed upon the rod, E, between which and the crossbar, D, a spiral spring, F, is placed upon the said rod. A standard, *e*, is secured to the bar, D, and supports a graduated arc, G, to which is pivoted an index, H, which is engaged by the upper end of the rod, E. As pressure is exerted on the piston, *d*, it is moved outward against the resistance of the spring, F. This motion is multiplied by the index, H, which indicates on the graduated arc the pressure per square inch in the hydraulic cylinder. The spring, F, is adjusted so as to offer more or less resistance to the pressure by moving the crossbar, D, by means of the adjusting nuts, *b*.

Patented through the Scientific American Patent Agency, May 15, 1877, by Mr. W. T. Snyder, of Catasauqua, Pa.

To TIN ZINC.—Make a bath of distilled water 1 gallon, pyrophosphate of soda 3¼ ozs., fused protochloride of tin ½ oz. A thin coat of tin can be obtained by simply dipping the zinc in the bath, and one of any thickness by the aid of the battery.