IMPROVED FIRE PLUG.

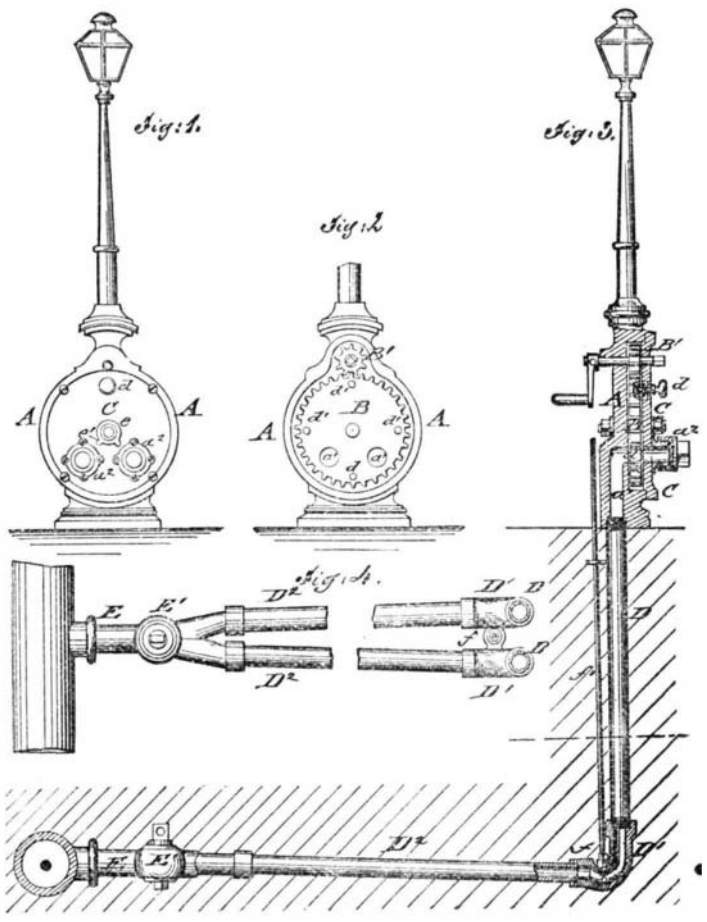
Mr. Christian Rapp, of Cincinnati, Ohio, has recently invented a new form of fire plug, which, for convenience sake, he prefers to locate in the base of a street lamp, as shown in Figs. 1 and 3 of our engraving. Fig. 1 represents a front elevation; Fig. 2, a front view of the interior, with face plate detached; Fig 3, a vertical transverse section of the same, showing connection with the main; and Fig 4, the connection of the main with the branch supply pipes of the plug.

The plug is constructed of a casing, an interior disk, and a front plate, with adjustable openings to establish connection with the supply pipes of the casing and the nozzles of the closing front plate, to open or close the plug, a spring stop locking the disk into position. A waste cock at the elbow of the supply pipes serves to drain any water from the same.

In the engraving, A represents the main casing, B the interior revolving wheel or disk, and C the outer face plate, secured to the casing by suitable fastening screws. The casing, A, is cast at the back with two supply openings, a, and turn at right angles toward two corresponding openings, a^1, of the disk, B, and the nozzles, a^2, of the front plate, C. The disk, B, turns on a central shaft, that passes through perforations of casing and front plate, and is provided with screw nuts at the ends to tighten the parts closely to prevent leaking. The contact parts of casing, disk, and face plate are lined with soft metal to allow the tight packing of the same. The wheel, B, is turned by means of a pinion, B^1, at the upper part of the casing, the pinion being revolved by a crank applied to its projecting shaft. A spring stop device, d, of the front plate locks into recesses, d^1, of the disk, to secure the same either in closed position or with one or both holes open. The spring stop has to be released before the disk can be turned by the crank. A washer, e, with indicators, e^1, is keyed to the shaft of the disk in such a manner that the indicators follow the motion of the disk, and show the position of the exit holes of the same. The nozzles of the front plate are closed by screw caps, which are taken off when the hose is to be screwed on.

When the fire plug is constructed in connection with a lamp post, suitable arrangements for the gas pipes have to be made.

For the purpose of protecting the fire plug against frost in winter, after use in supplying fire engines with water, the stopcock is closed, so that by a few strokes of the engine the water in the supply pipes may be entirely pumped out. During the warm season the plug may be closed directly by the disk, as there is no danger of the plug being frozen.



RAPP'S FIRE PLUG.

THE RIDER COMPRESSION ENGINE.

We illustrate herewith a new motor, the operation of which is produced by the use of highly compressed cold air. This is heated thoroughly without change of volume, and its efficient expansion to a point at or below the pressure of the atmosphere utilizes all the force or mechanical effect possible. All these changes are consecutively and rapidly effected in this motor without the use of valves, springs, levers, or, in fact, any delicate parts whatever, the moving parts being reduced to the lowest possible number, namely, the pistons, shaft, and connections. As may be seen by the annexed sectional engraving, Fig. 2, the engine consists essentially of a compression cylinder, A, and a power cylinder, B, with their respective pistons, C D, and connections, and a regenerator, H. The lower portion of the compression cylinder, A, is kept cold by a current of water which circulates through the cooler, E, which surrounds the lower portion of the cylinder, while the lower portion of the power cylinder is kept hot by the action of the fire below the heater, F. The heating and also the cooling of the air is instantaneously effected by its alternate presentation to the surfaces of the heater and cooler in a thin annular sheet.

The compression piston, C, extends downward to the base of the engine, and is a trifle smaller than the interior of the cooler, E, thus leaving a thin space on all sides for the air to pass downward and become thoroughly cooled on its way to the bottom, and through which space it flows on its way back to the heater. The power piston, D, likewise extends downward into the heater, F, which presents to the action of the fire a narrow annulus all round the bottom. Within this heater is the telescope, G, which is a thin iron cylinder about one fourth of an inch less in diameter than the interior of the heater. It is fitted to the interior of the power cylinder, and extends nearly to the bottom of the heater. Its office is to cause the air which flows from the compression cylinder to be presented in a thin sheet all round the interior surface of the heater, and particularly at the lower and hotter portion. By this means the air is thoroughly and rapidly heated.

The same air is used continuously, as there is neither influx nor escape, the air being merely shifted from one cylinder to the other. Between the compression and power cylinders is situated the regenerator, H, composed of a number of thin plates slightly thickened at their edges, which, while affording a free passage to the air, sub-divides it into thin sheets. It is so placed between the cylinders as to be traversed by the air in its passage each way between the hot and cold cylinders.

The other portions of the engine are readily understood on inspection of the engraving. The two pistons are attached directly to the cranks, I I, by simple connecting rods, J J, and all the movements of the various parts are uniform, being solely derived from regular, circular, and rectilinear motion; and as there is an entire absence of all complicated parts and the irregular intermittent impulses which characterize caloric engines, a high rate of speed and smooth action may be safely and easily obtained. K K are the packings, which are in duplicate for each cylinder. The lower one has its lap downward to resist the escape of air below the piston, while the upper one has its lap upward to prevent the lubricating material from entering too freely into the cylinder. Between them is a patent relief ring to relieve the friction of the packings. L is a simple check valve which supplies any light leakage of air which may occur.

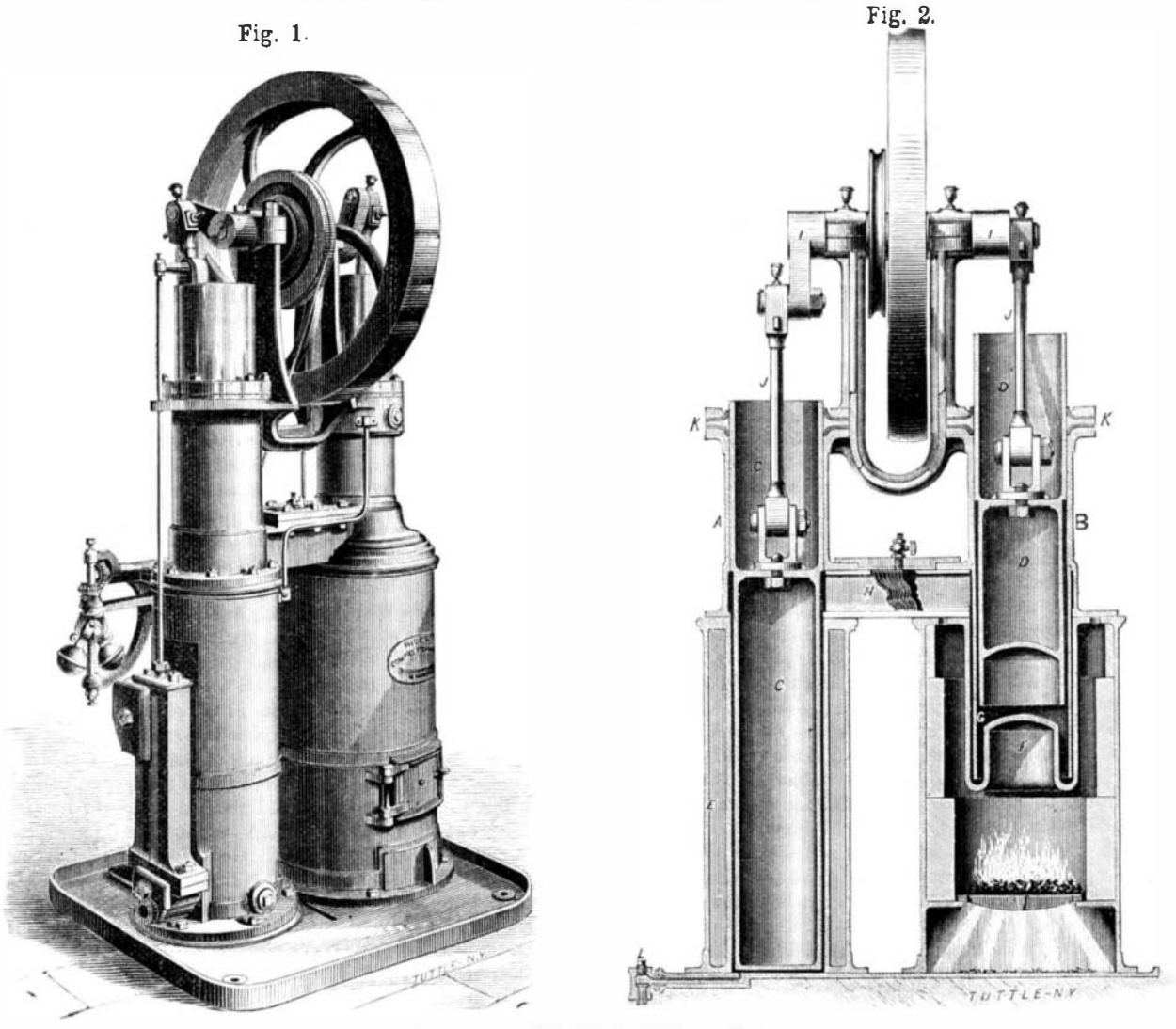
The operation of the engine is briefly as follows: The compression piston, C, first compresses the cold air in the lower part of the compression cylinder, A, into about one third its normal volume, when, by the advancing or upward motion of the power piston, D, and the completion of the down stroke of the compression piston, C, the air is transferred from the compression cylinder, A, through the regenerator, H, and into the heater, F, without appreciable change of volume. The result is a great increase of pressure corresponding to the increase of temperature, and this impels the power piston, D, up to the end of its stroke. The pressure still remaining in the power cylinder, and reacting on the compression piston, C, forces the latter upward till it reaches nearly to the top of its stroke, when, by the cooling of the charge of air, the pressure falls to its minimum, the power piston descends, and the compression again begins. In the meantime the heated air, in passing through the regenerator, has left the greater portion of its heat in the regenerator plates, to be picked up and utilized on the return of the air toward the heater.

These motors are valveless, noiseless, simple, and claimed to be absolutely safe; emit no heated air or unpleasant odor, as is the case with caloric engines; require no steam, cannot explode, do not increase risk of fire or cost of insurance, and can be operated by any one who can manage an ordinary stove.

They are well adapted for running all kinds of light machinery, printing establishments, etc., but are particularly valuable for pumping. One of these little six inch pumping engines (household size) has, we are informed, pumped for 6 months, without intermission or stoppage from derangement, each consecutive day of ten hours, 10,000 gallons of water to a hight of from 70 to 100 feet; and the engine required the services of an attendant less than thirty minutes each day, and consumed only 20 lbs. of coal per day, thus pumping 2,000 gallons of water 100 feet high at a cost of only one cent.

For railroads, city and suburban residences, French flats, hotels, boarding houses, etc., these engines are very desirable. As may be seen by Fig. 1, the pump is placed on the side of the cooler, and worked directly from the compression piston. All the water is passed directly through the cooler on its way to the tank or outlet.

For further information, address the agents, Stafford & Cammeyer, 93 Liberty street, New York city, at which address the engine may be seen in operation.



THE RIDER COMPRESSION ENGINE.

One Man's Work.

The enormous statue of Herrmann, the ancient German warrior, which was inaugurated some months ago by the Emperor of Germany, was entirely made by one man. The figure is of embossed copper, one hundred feet high, and every inch of the immense surface was hammered by hand. A Westphalian nobleman, Herr von Bandel, performed the entire work, from the preliminary modeling to the finishing with the hammer, many years of his life being devoted to the work. The statue stands near Detmold, the capital of the principality of Lippe, and the artist's workshop was located on the spot.