(No Model.)

# W. B. WRIGHT.

## INJECTOR FOR HYDROCARBON FURNACES.

No. 371,157. Patented Oct. 4, 1887.

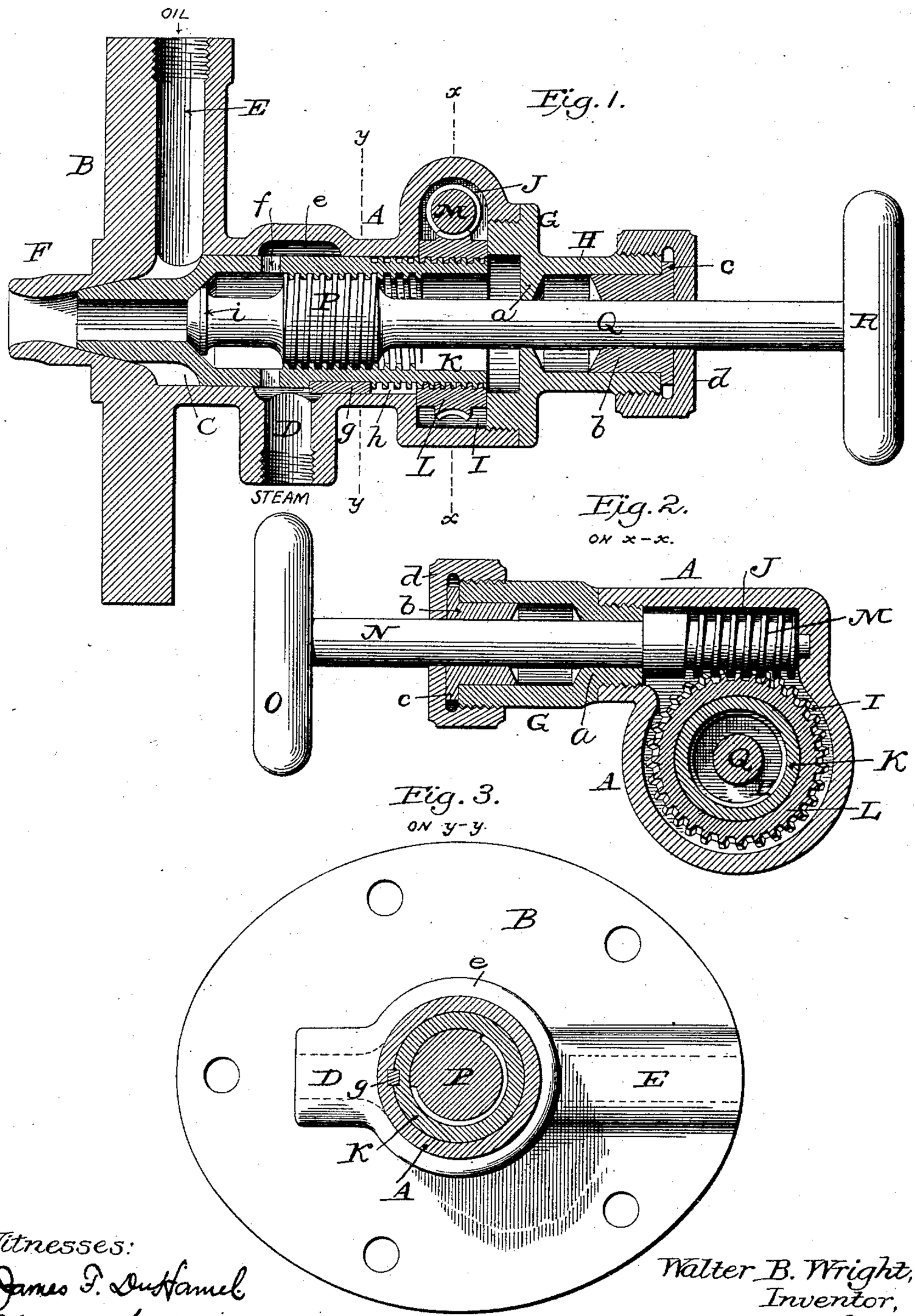


Fig. 1.

Fig. 2.
ON x-x.

Fig. 3.
ON y-y.

Witnesses:
James F. DuHamel
Walter S. Dodge

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Inventor,
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# UNITED STATES PATENT OFFICE.

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## INJECTOR FOR HYDROCARBON-FURNACES.

SPECIFICATION forming part of Letters Patent No. 371,157, dated October 4, 1887.

Application filed March 3, 1887. Serial No. 229,599. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER B. WRIGHT, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Injectors for Hydrocarbon-Furnaces, of which the following is a specification.

My invention relates to injectors designed for use in connection with hydrocarbon-furnaces; and it consists in various features and details, hereinafter fully set forth and claimed.

In the drawings, Figure 1 is a longitudinal central sectional view through my improved injector; Fig. 2, a section on the line *x x*, and Fig. 3 a sectional view on the line *y y*.

A indicates the shell or case, which will advisedly be made in a single casting, the shell being provided with an elliptical end plate, B, by which it may be bolted to the end of the retort, and is also turned or bored to form a central cylindrical chamber, C. The shell is further provided with steam and oil passages D and E, and with a discharge-nozzle, F, axially in line with the chamber C, as shown in Fig. 1. The other end of chamber C is closed by means of a cap, G, which latter is in turn formed with a neck or extension, H, as shown in Fig. 1. At the base of the neck the cap is provided with an inwardly-projecting flange, *a*, provided with a central opening to permit the valve-stem to pass therethrough, and made concave on its outer face. Fitting within the neck and upon the valve-stem is a block, *b*, made concave on its inner face, and provided with a lateral flange, *c*, to rest upon the upper edge of the neck, the block being held in place by a cap, *d*, screwing onto the neck. The outer end of the shell or casing proper is enlarged in diameter, as shown in Fig. 1, to form a chamber, I, the front and rear walls of said chamber being formed, respectively, by the inner end of cap G and the offset *h* in the shell or case. At the upper side this chamber communicates with a second chamber, J, semicircular in cross-section and extending at right angles to the axis of the case A, as shown in Figs. 1 and 2. This chamber is closed at its outer end by means of a cap, G, having a flange, *a*, and a neck or extension, H, and a block, *b*, and cap *d*, substantially the same in construction as the devices applied to the end of the shell or case and hereinbefore referred to. It is of course to be understood that the space between the flange *a* and the block *b* will be filled with a suitable packing to insure a tight joint and prevent the escape of steam. Where the steam-passage communicates with the chamber C the latter is formed with an annular enlargement, *e*, as shown in Fig. 1, in order that the steam may pass upon and enter from all sides of the hollow valve, hereinafter described.

Having now set forth the general construction of the shell or casing, I will describe the construction of the valves and their operating mechanism.

Fitting snugly within the main chamber C is a valve, K, which, as shown in all the figures, is hollow from end to end. At its forward or inner end it is reduced in diameter and beveled or tapered to fit accurately within the discharge-nozzle, and where it works in the annular enlargement *e* of chamber C it is provided with a number, advisably six, of lateral openings *f*, through which steam may pass into the interior of the valve.

A spline or feather, *g*, is set into the outer lower face of valve K, as shown in Figs. 1 and 3, which works in a slot or groove in the inner face of the shell A, thereby preventing said valve K from turning or rotating, but allowing it to slide back and forth longitudinally. The outer end of the valve K is threaded externally, as shown in Fig. 1, and upon this threaded portion is an internally-threaded worm-nut, L. (Shown in Figs. 1 and 2.) This worm-nut is of the exact width of the chamber I, and fits between the flange or offset *h*, formed in the walls of the shell A and the inner end of the cap G. Of course as the worm-nut is prevented from moving laterally any rotation thereof will cause the valve K to reciprocate or slide back and forth within the shell or case, according to the direction of rotation of the worm-nut.

In order to give the desired rotation to the worm-nut, I provide a worm, M. (Shown in Figs. 1 and 2.) This worm is journaled at its

inner end in the rear wall of chamber J, and is provided with a stem, N, and a hand-wheel, O, the stem passing outward through the cap G, secured onto the outer end of chamber J. From this construction it will be seen that by turning the worm M in one or the other direction the worm-nut will also be caused to rotate, and the valve K adjusted longitudinally to regulate with the utmost nicety the amount of oil discharged.

The valve K is threaded, as shown in Fig. 1, to receive a threaded hub or enlargement, P, of the valve-stem Q, one end of said stem projecting out through the cap G, secured to the end of the shell, and provided with a hand-wheel, R, while the inner end is provided with a beveled head, *i*, to fit the valve-seat in the interior of the hollow valve.

Upon reference to Fig. 1 it will be seen that the valve-seat formed within the hollow valve is of about the same size as the valve-seat formed in the discharge-nozzle, and it will also be observed that by reducing the diameter of the nose of the hollow valve I am enabled to obtain a larger opening with less movement of said valve than is possible while the larger valves have been employed. In other words, where the area of the opening is the same in both the smaller valve permits an opening of such form to be made as will not readily clog up.

It is obvious that instead of using the spline or feather to prevent rotation of the hollow valve K, the latter and the chamber C, in which it slides, may, if desired, be made angular in cross section throughout a portion of their length, and it is likewise apparent that the arrangement of the sliding valve and worm-nut and worm may be varied and adapted to valves of other forms and styles without departing from the spirit of my invention.

I do not claim herein anything shown or described in my application No. 222,657, filed December 27, 1886.

In an application filed by me, Serial No. 239,478, I have shown, described, and claimed the worm-wheel and worm for operating a hollow valve; and I hereby reserve to myself the right to claim in said application all features which are not herein specifically claimed.

Having thus described my invention, what I claim is—

1. In combination with shell A, provided with an offset, as *h*, and with a cap, G, a valve, as K, mounted and free to slide in the shell and provided with an external screw-thread, a worm-nut encircling the valve K and clamped between the cap-plate and the offset, and a worm, M, meshing with the worm-nut, substantially as shown and described.

2. In combination with shell A, hollow valve K, threaded internally and externally, a stem, Q, screwing into the valve K, a worm-nut encircling the valve, a worm meshing with the worm-nut, and a guiding-rib or feather, *g*, all substantially as shown.

3. In combination with shell A, provided with a central chamber and with steam and oil inlets, a discharge-nozzle, a hollow valve provided with lateral openings, a conical nose, internal and external screw-threads, and an internal valve-seat, a stem, Q, screwing into the hollow valve, a worm-nut encircling the latter, and a worm meshing with the worm-nut.

4. In combination with shell A, having the central chamber, C, enlarged chamber I, and the transverse chamber J, a hollow valve, K, free to slide back and forth in chamber C, a worm-nut mounted in chamber I and encircling the valve, and a stem, N, having worm M, mounted in chamber J and meshing with the worm-nut.

In witness whereof I hereunto set my hand in the presence of two witnesses.

WALTER B. WRIGHT.

Witnesses:
WM. SHAW,
H. D. BAILEY.