(No Model.) 2 Sheets—Sheet 1.

H. J. SMALL & J. McNAUGHTON.

LIQUID PRESSURE GENERATOR.

No. 347,897. Patented Aug. 24, 1886.

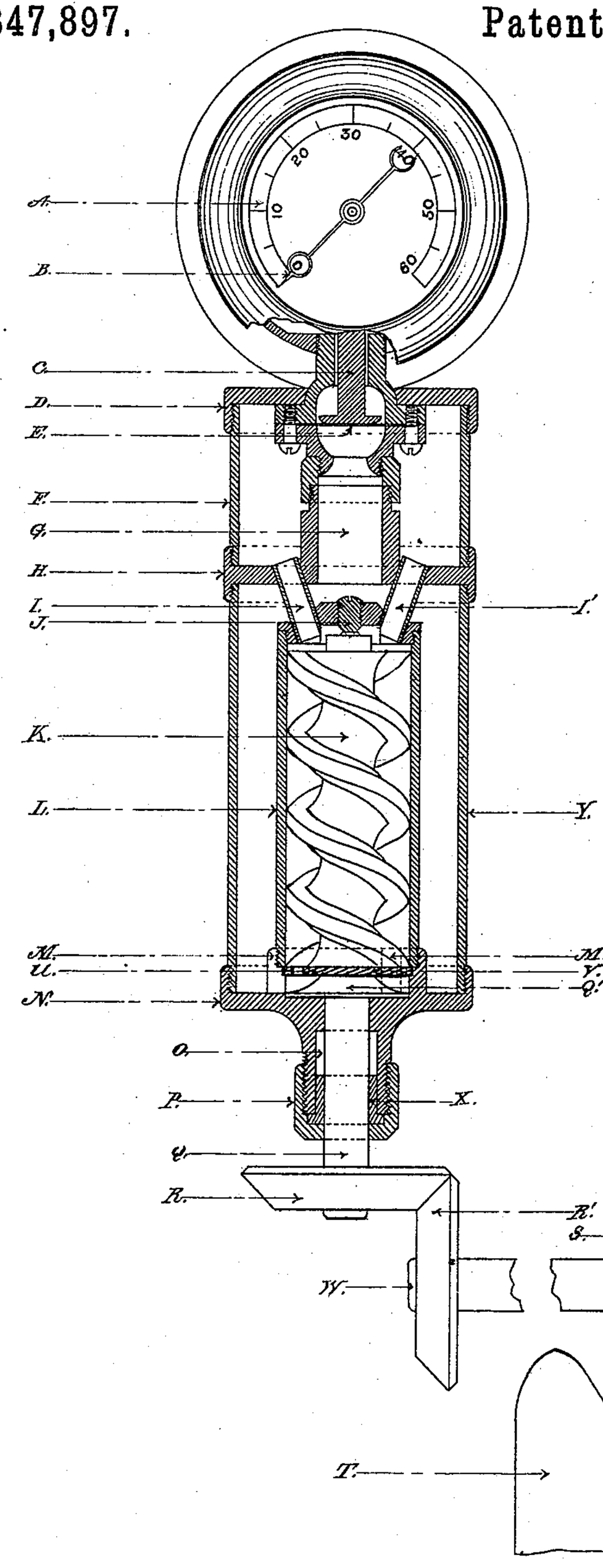
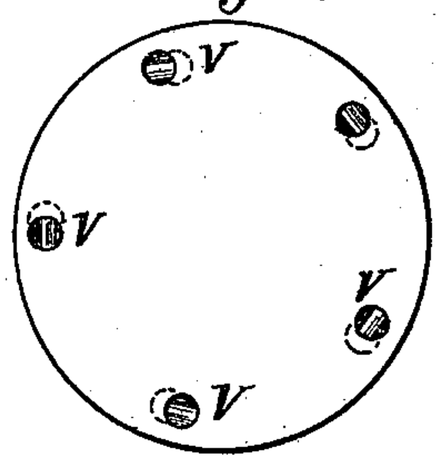


Fig. 1

Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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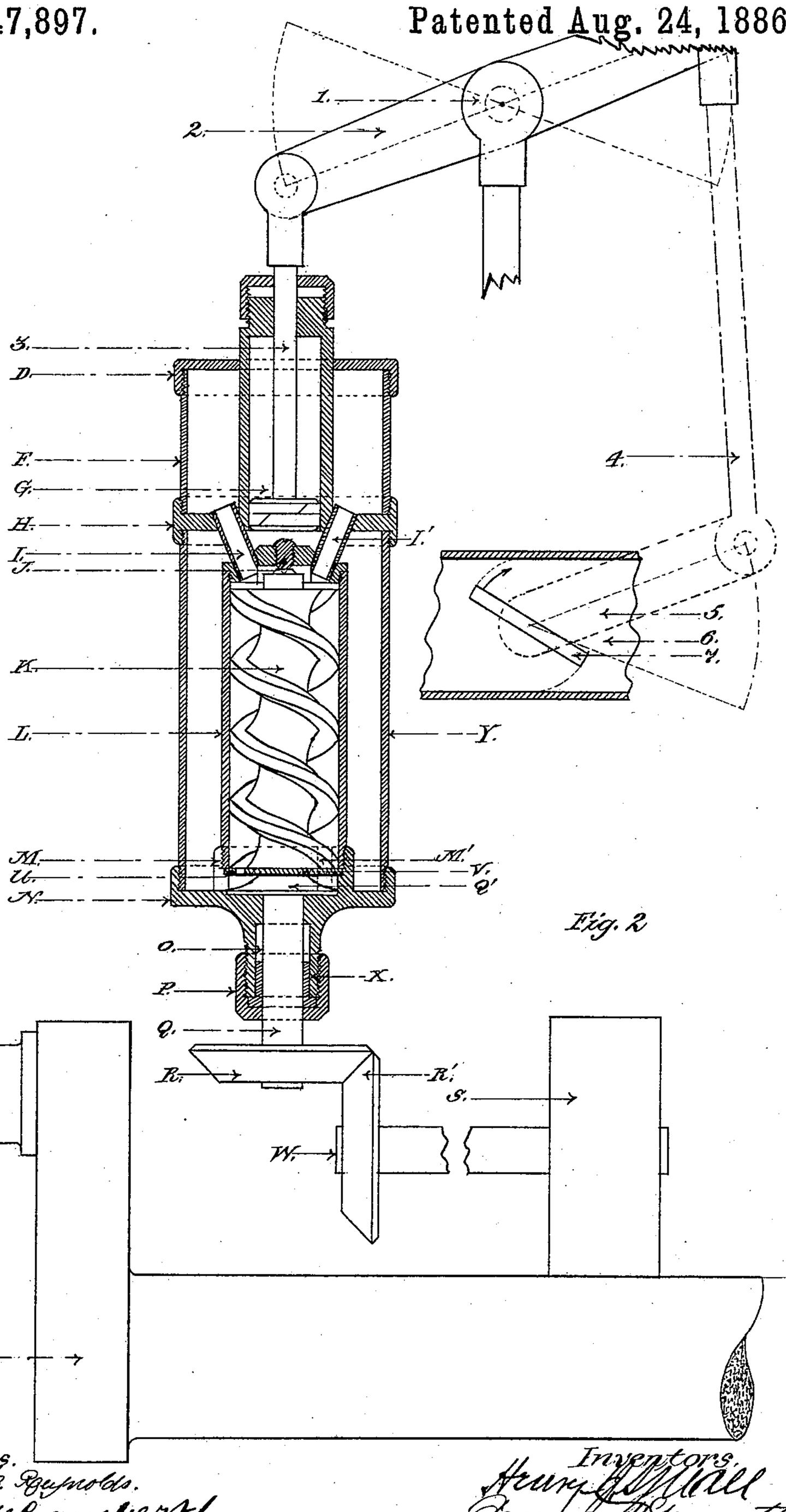

Fig. 2

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UNITED STATES PATENT OFFICE.

HENRY J. SMALL AND JAMES McNAUGHTON, OF BRAINERD, MINNESOTA.

LIQUID-PRESSURE GENERATOR.

SPECIFICATION forming part of Letters Patent No. 347,897, dated August 24, 1886.

Application filed October 26, 1885. Serial No. 180,919. (No model.)

To all whom it may concern:

Be it known that we, HENRY J. SMALL and JAMES MCNAUGHTON, citizens of the United States, and residents of Brainerd, in the county of Crow Wing and State of Minnesota, have invented certain Improvements in Liquid-Pressure Generators, of which the following is a specification.

Our invention relates to a device designed to generate a liquid-pressure, and by such pressure to operate an instrument, such as a speed-indicator or a steam-governor.

Our invention consists, generally, in the construction and combination hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a vertical section of one of our devices applied to a speed-indicator. Fig. 2 is a similar view of the same device applied as a steam-governor. Fig. 3 is a detail view of the plate U.

In the drawings, L represents a suitable cylinder, which is here shown arranged vertically; but it may be placed horizontally or in any other suitable position. One end of the cylinder—as here shown the upper—is closed by suitable means, as a screw-cap. Within this cylinder is a worm, K, upon a shaft, Q, that at one end is centered and revolved upon a bearing, J. The worm fits closely the inside of the cylinder, and its shaft extends through a base-plate, N, stuffing-box O, gland X, and nut P, and is connected by gears R R′ and shaft W, or other suitable gearing, with a suitable friction-wheel, S.

M is a flange projecting from the base-plate N, and receiving the end of the cylinder L. Beneath the end of the cylinder, within the flange M, is a plate, U, which closes the end of the cylinder, and has holes V through it, to permit the liquid to pass through. These holes are preferably formed diagonally through the plate, as shown, for a purpose hereinafter stated.

Y is an outer casing surrounding the cylinder L and secured to the base N. In the flange M are a number of holes, M′, through which the liquid passes into the outer casing, Y. Secured to or formed upon the shaft Q, beneath the plate U, is a conical disk, Q′, which prevents leakage of the liquid around the shaft Q, and by its conical shape directs the liquid out through the holes M′ with the least possible resistance from friction. The diagonal direction of the holes V also aids in directing the liquid through the openings M′. The upper end of the casing Y is closed by a plate, H, which is preferably formed with a tube or chamber, G, having therein a movable plate, E.

As shown in Fig. 1, the plate E is formed as a flexible diaphragm; but as an equivalent therefor we propose to use other devices, as a piston or sliding plate or disk, that will move within the chamber without permitting the liquid to pass. Above the diaphragm is an ordinary indicator, A B, whose operating-rod C is in connection with the diaphragm. We prefer to provide also a surplus liquid reservoir, D F, which may be located above the casing Y, surrounding the chamber G, and connected with the upper end of the cylinder by suitable tubes, I I′.

When used to operate a speed-indicator, the device is preferably arranged, as shown in Fig. 1, with the friction-wheel bearing upon the tire of a locomotive, car, or other vehicle wheel, T. The cylinder, the surplus-liquid reservoir, when used, and the casing and chamber G, up to the movable plate or diaphragm, are filled with liquid. The rotation of the worm in the cylinder tends to move the liquid out of the cylinder, and thereby creates a pressure that is transmitted to and moves the diaphragm or plate in the chamber G. The greater the speed of the wheel against which the friction-wheel bears the faster the worm-shaft will revolve and the greater the pressure of the liquid on the movable part. The indicator, being properly spaced and marked, will show at a glance the speed at which the train or vehicle is running.

The surplus-liquid reservoir is not essential to the operation of the device, but is used to make up for any leakage of liquid that may occur.

The casing Y is used principally to protect the cylinder, and it is obvious that any other suitable connection may be made between the cylinder and diaphragm.

The surplus-liquid reservoir and the diaphragm and indicator may be located at some distance from the cylinder, with suitable pipes for connection between them and the cylinder.

The surplus-liquid reservoir and the outer casing may be both omitted, if desired.

In Fig. 2 we have shown the same device applied to control a steam-valve. As here shown, the movable part in the chamber G is connected through a lever, 2, pivoted at 1, and levers 4 and 5 with a steam-valve, 7, in a pipe, 6. The friction-wheel is applied to a shaft, 8. The valve will be controlled by the speed of the worm-shaft. It is obvious that the device may also be applied to other tools or mechanisms, and other applications of the same will suggest themselves to skilled mechanics.

We prefer oil as the liquid to be used in this device; but other suitable liquid may be used instead.

We claim as our invention—

1. The combination, in a liquid-pressure generator, with a cylinder, a worm-shaft fitting therein, and means for revolving said shaft, of a casing, Y, surrounding said cylinder, openings for connecting said cylinder with said casing, a chamber, a movable plate within said chamber, and an opening connecting said casing Y with said chamber below the movable plate, all substantially as described.

2. The combination, with the cylinder L, worm-shaft K, fitting therein, and means for revolving said shaft, of the chamber G, a movable plate therein, means connecting said chamber with said cylinder, the surplus-liquid reservoir F, and the tubes I I′, extending from said reservoir into said cylinder, all substantially as described.

3. The combination, with the cylinder L, worm-shaft K, and means for revolving said shaft, of the chamber G, the movable plate therein, casing Y, plate U, having diagonal holes V, and the conical disk Q′, all substantially as and for the purpose set forth.

4. The combination, with the cylinder L and revolving worm-shaft K, of the plate U, having the diagonal holes V, the outer casing, Y, conical disk Q′, surplus-liquid reservoir F, the tube G, and diaphragm E, all substantially as described, and for the purpose set forth.

In testimony whereof we have hereunto set our hands this 21st day of October, A. D. 1885.

HENRY J. SMALL.
JAMES McNAUGHTON.

Witnesses:
R. M. DE RAMBERT,
A. MAHLUM.