

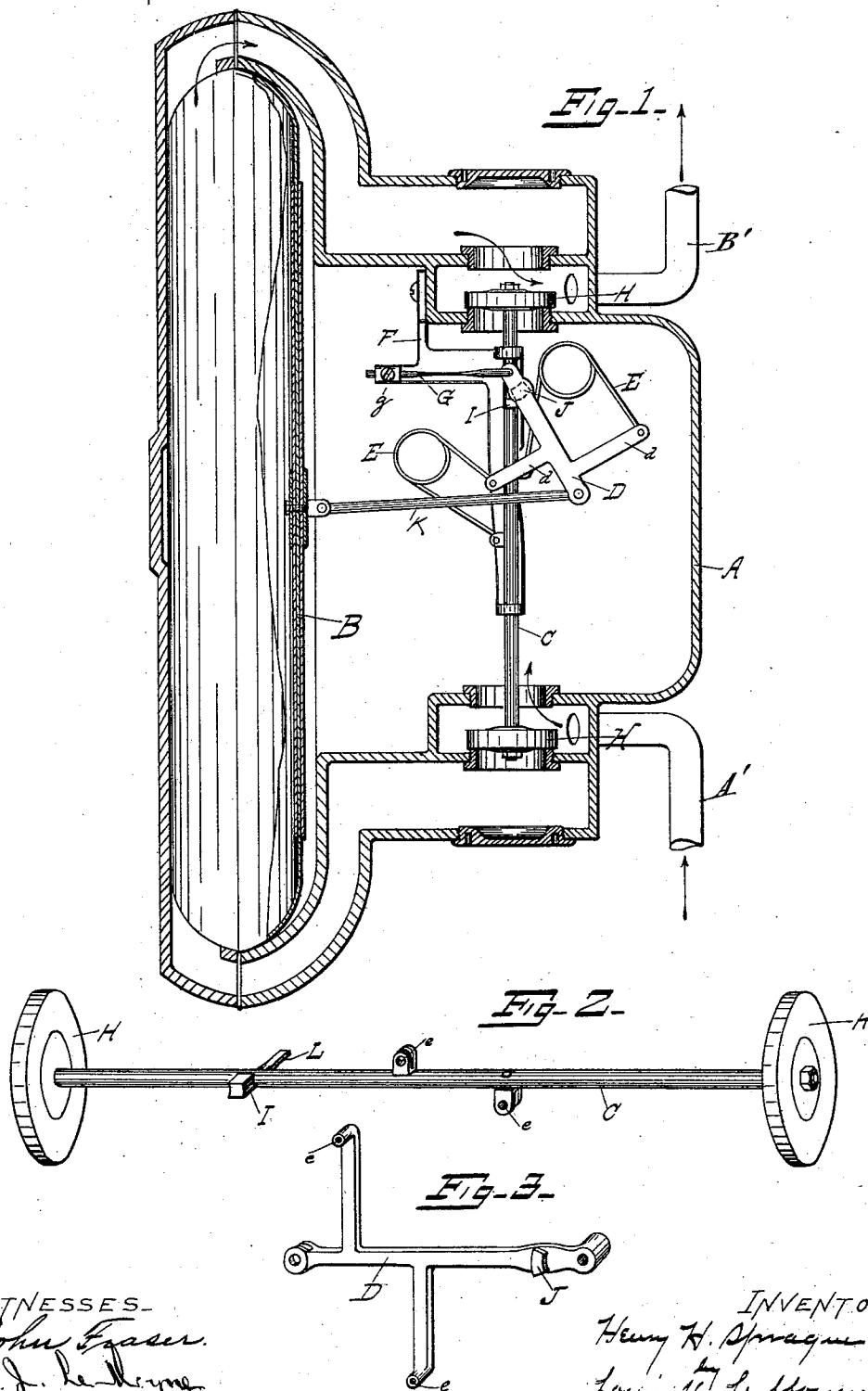
(No Model.)

2 Sheets—Sheet 1.

H. H. SPRAGUE.
GAS METER.

No. 537,080.

Patented Apr. 9, 1895.



WITNESSES.
John Fraser.
W. J. LeMayne

INVENTOR.
Henry H. Sprague
Wm. V. LeMayne
his Att.

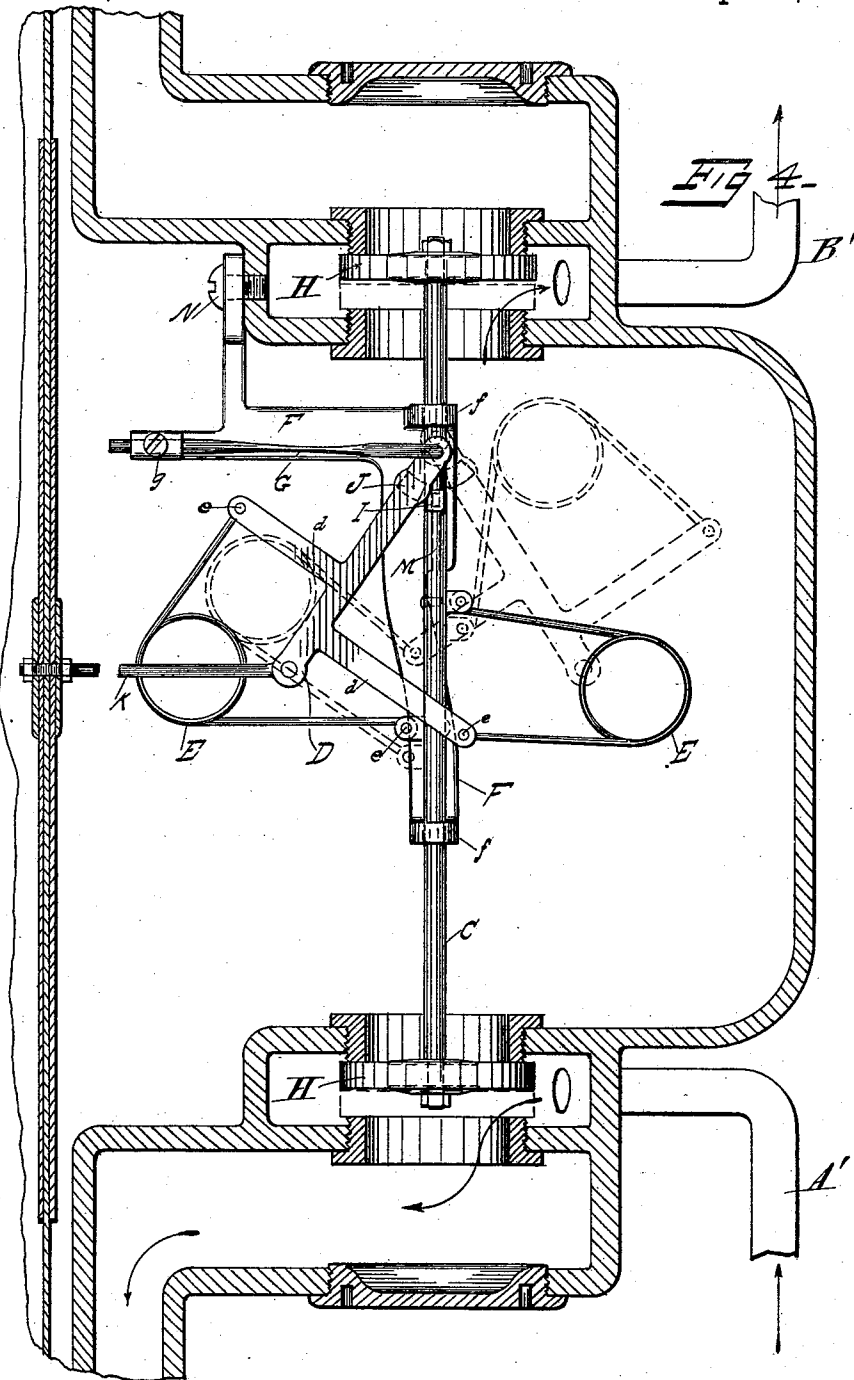
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UNITED STATES PATENT OFFICE.

HENRY H. SPRAGUE, OF CHICAGO, ILLINOIS.

GAS-METER.

SPECIFICATION forming part of Letters Patent No. 537,080, dated April 9, 1895.

Application filed June 16, 1894. Serial No. 514,764. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. SPRAGUE, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Gas-Meters, of which the following is a specification.

My invention relates to that class of meters in which a flexible diaphragm is employed to actuate the mechanism which controls the movement of the valves. In my patent of March 27, 1894, No. 517,368, I have described a meter of this kind.

My present invention aims at simplifying and improving that invention, by substituting for the reciprocating frame in it, which runs upon rollers and carries the springs, and which I find is apt to become clogged, a swinging frame hinged upon the supporting bracket; and substituting for the lugs or stops under unyielding contact, which controls the movement of the valve stem, lugs or stops under yielding or spring contact, which are more easily adjusted, and take up wear between them; and in hanging the valve stem and its actuating mechanism from a single supporting bracket so that the whole may be readily removed from the casing and conveniently adjusted or repaired.

My invention consists of details of construction and operation hereinafter more fully described and particularly pointed out in the claims.

Figure 1 is a side elevation of my meter the casing and diaphragm being shown in section. Fig. 2 is an enlarged detail view of the valve disks and stem in perspective. Fig. 3 is a similar view of the hinged frame which carries the springs. Fig. 4 is an enlarged view of Fig. 1 showing different positions of the parts in dotted lines.

A represents the casing of the meter; B, the diaphragm; C, the valve stem; D, the swinging frame which carries the springs E E; F, the bracket upon which the moving parts are supported; G, the spring upon which frame D is hinged; H, the valve disk; I, the lug or stop upon the valve stem; J, the lug or stop upon the frame D; K, the link which connects the diaphragm and the frame D; L, (Fig. 2,) the lug upon the valve stem which slides in the slot M in the bracket F and pre-

vents the valve stem from turning, and N the screw by which the bracket is attached to the casing.

A' represents the inlet spud and B' the outlet spud.

The arrows indicate the direction of the flow of the gas through the meter.

The operation of my meter is as follows: The gas entering upon the outer side of the diaphragm B forces it inward and thereby carries the frame D into the position shown in Fig. 1 or in dotted lines Fig. 4. This throws the valve stem downward closing one set of valve ports and opening another, and thus reversing the direction of the flow of the gas. The gas then enters on the inner side of the diaphragm forcing it outward and carrying the frame D into the position shown in Fig. 4, and the direction of flow is again reversed. The valve stem is reciprocated by the swinging of the frame D through the medium of the springs E, E. One end of each of these springs is attached to the valve stem and the other to an arm of the swinging frame. When the frame swings to one side one of the springs is brought into tension and the other one reversed, and as it swings to the other side the second one is brought into tension and the first released. In this manner the valve stem is moved first in one direction and then in the other. If there were no other controlling mechanism the movement of the valve stem from side to side would be slow and even; but in order that the pulsations of the diaphragm be even and uniform it is necessary that the valves be retained upon their seats and the flow continue in one direction until the diaphragm reaches a fixed point, and then instantly reversed and retained in the new position until the opposite limit of its movement is reached. In order to accomplish this I place a lug or stop I upon the valve stem and another one J upon the swinging frame D. These lugs engage one another during the middle portion of the stroke and slide off at each end of it, and in this way the valve is held down upon its seat while the frame is swinging from one side to the other and one spring being released and the other brought into tension. In the position shown in Fig. 1 the valve stem has just been thrown downward, and the under side of the lug J comes

in contact with the upper side of the lug I. As the frame reaches the position shown in full lines Fig. 4 the lugs slide off of one another, and the valves are thrown upward. 5 Then, as the frame D swings back, the upper side of J comes in contact with the under side of I, and the valves are held upon their seats until they slide off at the other side. The size and shape of these lugs is such that the release 10 of the valves will take place at the proper position of the diaphragm. The frame D is mounted upon the spring arm G. This gives a yielding contact between the lugs, which allows them to slide over one another more 15 smoothly and keeps the valve securely upon its seat, requiring a less perfect adjustment of the parts and taking up any slight wear there may be between them.

The bracket F carries the moving parts, the 20 spring arm G being attached to it by the set-screw *g*, and the valve stem C having bearings at *f, f*. It is attached to the casing by the screw N. By removing this screw all of the mechanism may be removed from the casing when necessary to adjust or repair the 25 parts.

The springs E, E, where attached to the frame or valve stem at *e, e*, are hinged so as to swing loosely and prevent throwing tension upon the spring. 30

The arms *d, d*, are so located and of such a length as to give to the outer ends of the springs equal or equivalent motion.

The lever which operates the registering 35 mechanism may be attached to any part of the swinging frame. Preferably it is attached where the link *k* is attached.

The valve disks H are made of solid rubber clamped between metallic disks, and vibrate 40 between the two valve seats striking first on one face and then on the other.

What I claim, and desire to secure by Letters Patent, is—

1. The herein described gas-meter consist-

ing of the combination of the valve stem, the 45 swinging frame actuated by the pulsations of the diaphragm, the springs carried by said frame by which said valve stem is impelled first in one direction and then in the other and the lugs or stops by which the valve is held 50 upon its seat while said frame is swinging from one end of its stroke to the other, and the spring tension is being reversed, all substantially as shown and described.

2. The herein described gas-meter consisting of the combination of the valve stem C, the lug I located thereon, the swinging frame D actuated by the pulsations of the diaphragm, the lug J located thereon, and the 60 springs E, E, carried by said swinging frame, all substantially as shown and described.

3. The herein described gas-meter consisting of the combination of the valve stem C, the lug I located thereon, the swinging frame D, the lug J located thereon, one or both of 65 said lugs having a spring or yielding mounting, and the springs E, E, carried by said swinging frame, all substantially as shown and described.

4. The herein described gas-meter consisting of the combination of the valve stem C, having the lug I thereon, the swinging frame D mounted upon the spring arm G and having the lug J thereon, and the springs E, E, 75 carried by said swinging frame, all substantially as shown and described.

5. The herein described gas-meter consisting of the combination of the valve stem C, the lug I located thereon, the swinging frame D, the lug J located thereon, the springs E, 80 E, one end of each being attached to said swinging frame, and the other end to said valve stem, all substantially as shown and described.

HENRY H. SPRAGUE.

Witnesses:

F. J. LE MOYNE,

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