C. A FENN & R. GROENINGER.

GAS-REGULATORS.

No. 195,596. Patented Sept. 25, 1877.

FIG. 1.

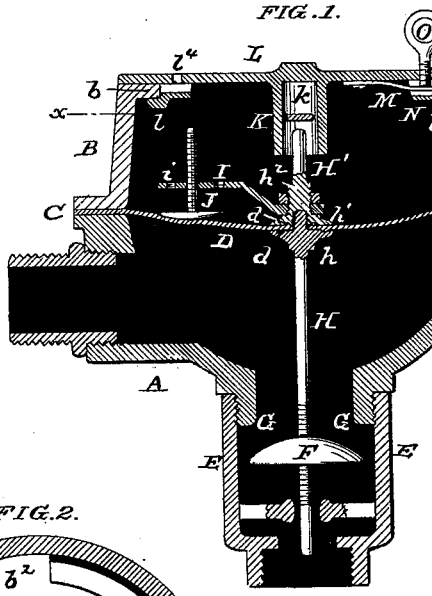


FIG. 5.

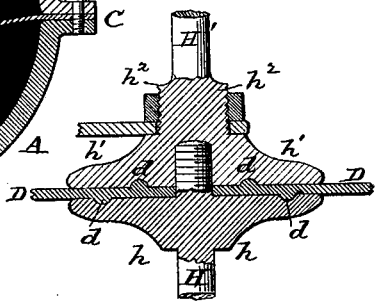


FIG. 2.

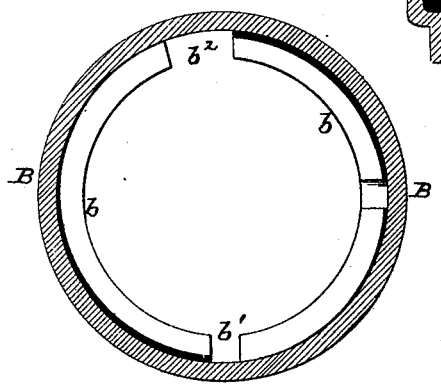


FIG. 3.

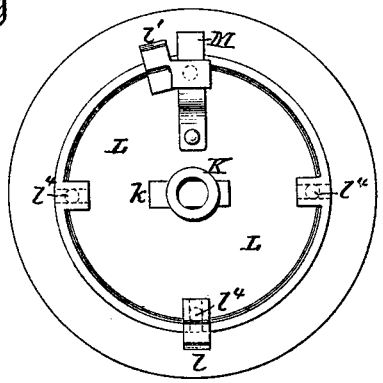
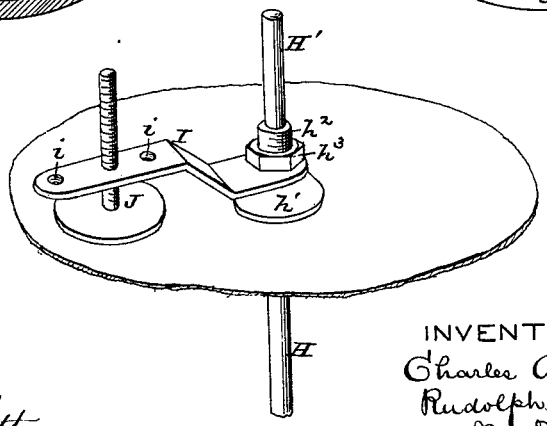


FIG. 4.



ATTEST:

Chas. Hall

E. G. Lond Burdett

INVENTORS:

Charles A. Fenn

Rudolph Groeninger

By Knight Bros

Attys

UNITED STATES PATENT OFFICE.

CHARLES A. FENN AND RUDOLPH GROENINGER, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **195,596**, dated September 25, 1877; application filed July 27, 1877.

To all whom it may concern:

Be it known that we, CHARLES A. FENN and RUDOLPH GROENINGER, both of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Gas-Regulators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

This is an improvement on our Patent No. 185,736, dated December 26, 1876.

The first part of our improvement consists in the provision of an adjustable button, which is supported on an arm extending from the valve-stem above the diaphragm, and resting lightly on the diaphragm, to prevent the oscillation of the stem.

The second part of our improvement relates to the cover-fastening. In our former patent the cover was held down by a fixed projection at one side and a spring at the other, the spring being forced down by a pin introduced into a hole in the cover, to allow the turning of the cover into a position for removal. We find that the springs are liable to become broken in two ways: First, violence used to lift the lid at the spring side when it is not in a position for removal; and, second, violence used in depressing the spring too far in disengaging it from the catch. To overcome the first of these we introduce beside the spring a fixed lug, which relieves the spring of all strain; and to overcome the second we place beneath the spring a staple, that prevents its depression in so great a degree as to break it.

In the drawings, Figure 1 is a sectional elevation. Fig. 2 is a horizontal section at line *x x*. Fig. 3 is a bottom plan of cover. Fig. 4 is a detail perspective view, enlarged; Fig. 5, enlarged view of the coupling between the valve-stem and the diaphragm.

The regulator has a case, A B, similar to that of our former patent, (No. 185,736,) the parts A B being secured together by a flange-joint, C, with screws *c*.

The margin of the diaphragm D forms the gasket of the flange-joint, as in our former patent.

E is a coupler, which forms the valve-chamber, and serves to connect the regulator to the gas-pipe. The valve is shown at F, and its seat at G.

The valve-stem is made in two parts, H H, which screw together as in our former patent; but the disks h and h^1, between which the inner edge of the diaphragm is held, are differently formed in their holding-faces, both faces having concentric grooves d d, but at different distances from the center, so that the leather is not, at these grooves, pressed so hard as to overcome its natural elasticity, and consequently makes a tighter joint than when compressed to the consistence of wood. As the disks are sewed together upon the diaphragm the leather is forced into these grooves from each side, forming a flexible cushion, that makes a perfectly gas-tight joint at all temperatures.

Above the coupling h h^1 the stem has a screw-threaded portion, h^2, upon which screws a nut, h^3; and between the nut and the disk h^1 is an arm, I, extending outward horizontally, and having screw-threaded vertical holes i, to receive the screw-stem of a button, J, which may be screwed down so as to rest upon the diaphragm and prevent the oscillation of the valve-stem. We have found a single button, J, sufficient for this purpose. Two or three arms, I, with a button to each, may be used.

The upper end H′ of the valve-stem plays in a cup, K, dependent from the cover L, and its upward movement may be limited, to prevent the valve coming in contact with the seat, by a piece of metal, *k*, placed in horizontal slits of the cup.

The cover L, and the manner of fastening it to the case, are very similar to those of our former patent, aforesaid.

The top of the case has an inturned rim, *b*, which is slotted through at b^1 b^2, the former to allow the downward passage of a lug, *l*, of the cover, and the latter to allow the passage of the lug l^1 and spring M, which are side by side.

When the lid is being put in place the lugs l l^1 and spring pass through the slots b^1 b^2; then, by turning the lid, the lugs follow along the inclined under side of the rim *b*, and draw down the lid close to the top of the case. When it attains this position the spring snaps

into a notch in the under side of the rib *b*, and prevents the lid from being turned in either direction. Immediately above the spring is a hole, l^3, which is screw-threaded to admit a screw-key, O, that may be screwed in to force the spring from the notch and unlock the lid. Beneath this part of the spring is a stirrup, N, to prevent the spring being sprung down so far as to break it.

The lug l^2, beside the spring, prevents any upward strain being brought upon the spring.

At l^4 are seen air-holes, for the entrance and exit of air to and from the part of the case above the diaphragm, and each of these holes has a rectangular turn, to prevent injury to the diaphragm by the introduction of any instrument.

We claim as our invention—

1. One or more buttons, J, on arm or arms I, extending from the valve-stem, said button arranged to rest on the diaphragm, as and for the purpose set forth.

2. The combination of the spring-catch M and lug l^1, as and for the purpose set forth.

3. The combination of the spring-catch M and screw-key O, substantially as and for the purpose set forth.

CHAS. A. FENN.
RUDOLPH GROENINGER.

In presence of—
SAML. KNIGHT,
CHAS. HALL.