No. 847,413. PATENTED MAR. 19, 1907.

P. KELLER.

GAS PRESSURE REGULATOR.

APPLICATION FILED APR. 4, 1906.

Fig. 1

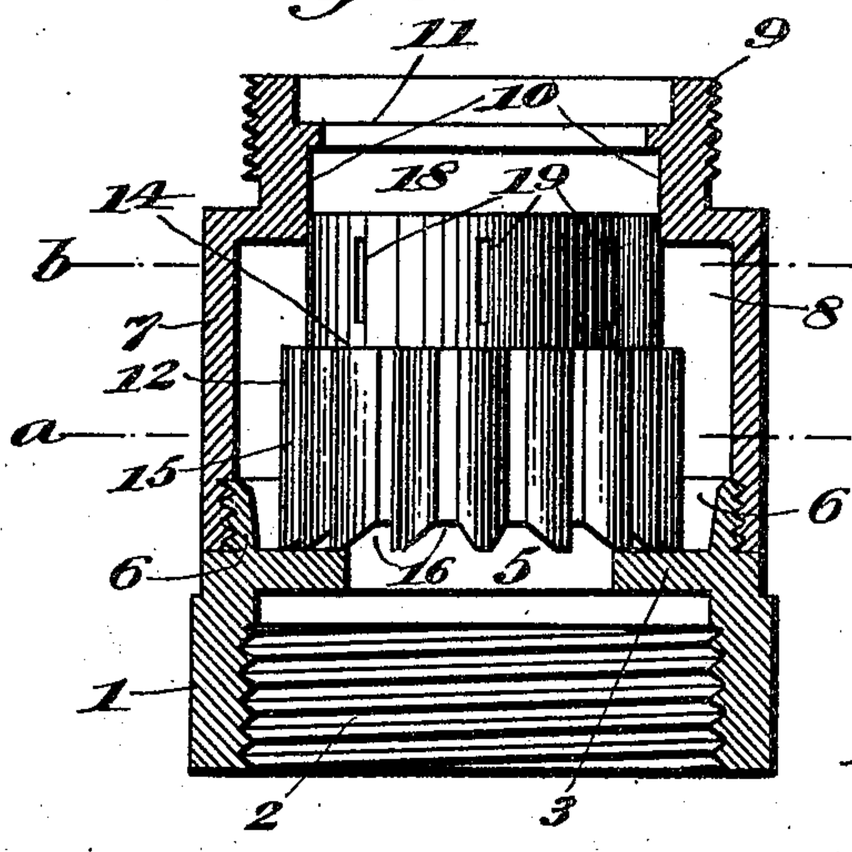


Fig. 2

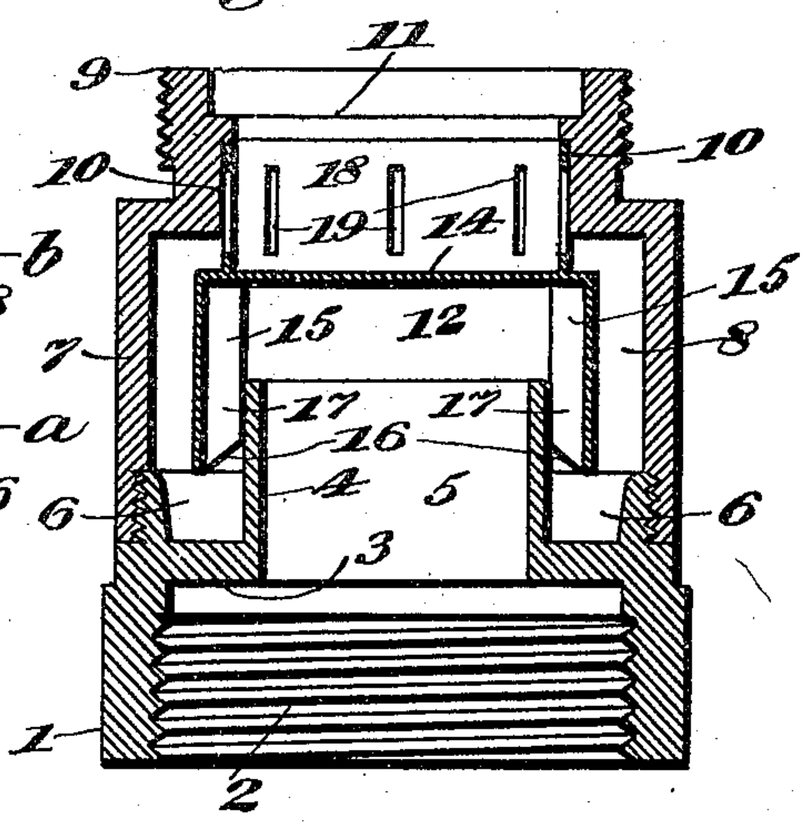


Fig. 3

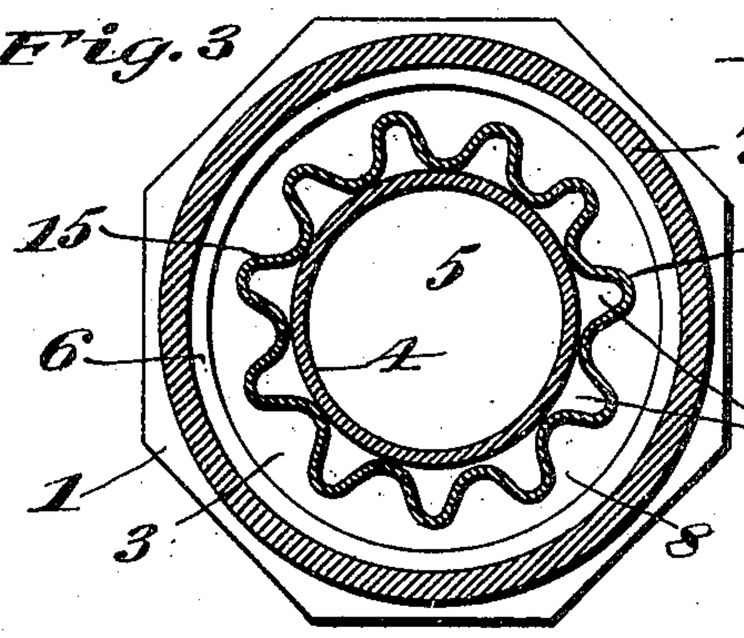


Fig. 4

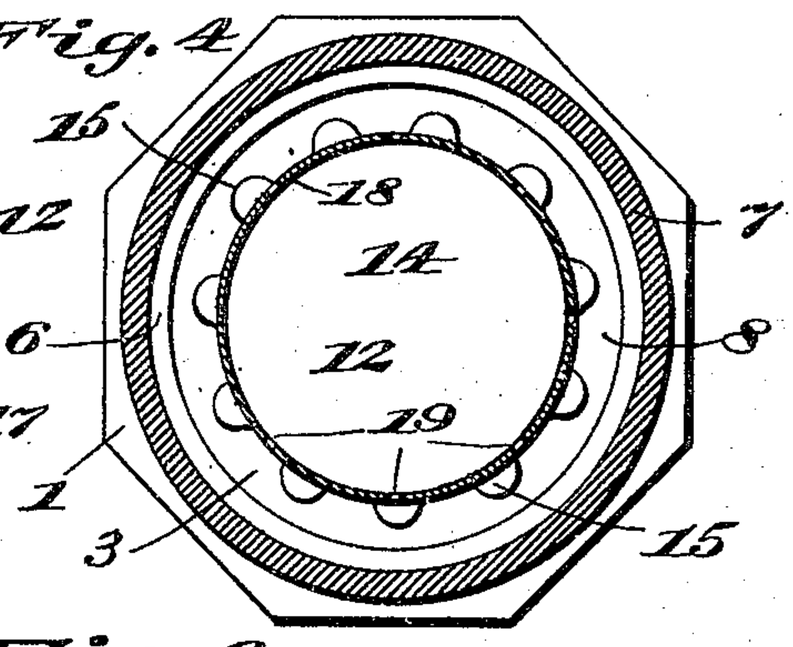


Fig. 5

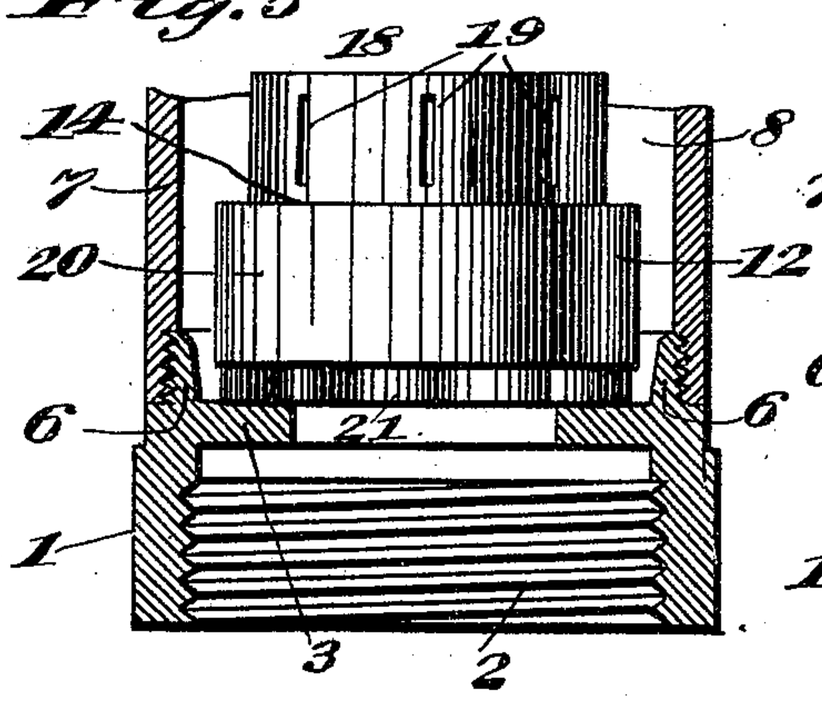
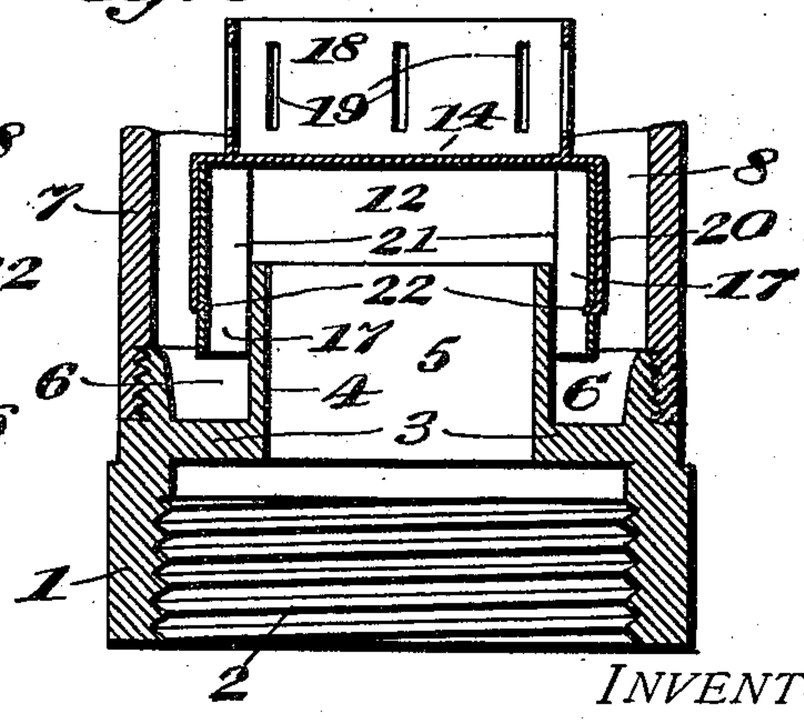


Fig. 6



WITNESSES:

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UNITED STATES PATENT OFFICE.

PETER KELLER, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO JOHN M. TIERNEY, OF CHICAGO, ILLINOIS.

GAS-PRESSURE REGULATOR.

No. 847,413. Specification of Letters Patent. Patented March 19, 1907.

Application filed April 4, 1906. Serial No. 309,773.

To all whom it may concern:

Be it known that I, PETER KELLER, a citizen of the United States, and a resident of Chicago, Cook county, Illinois, have invented certain Improvements in Gas-Pressure Regulators, of which the following is a specification.

This invention relates to certain improvements in gas-pressure regulators, such as are especially designed and adapted for employment of regulating the pressure at which gas is supplied from the mains to the house-service pipe; and the object of the invention is to provide a device of this character of a simple and inexpensive nature and of a compact and durable construction, which is not liable to become readily deranged in use, and which shall serve for effectively regulating the pressure, so as to insure a comparatively even and uniform pressure of the gas in the service-pipes despite variations in pressure in the mains.

The invention consists in certain novel features of the construction, combination, and arrangement of the several parts of the improved gas-pressure regulator whereby certain important advantages are attained and the device is rendered simpler and cheaper and is otherwise better adapted and made more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings, which serve to illustrate my invention, Figure 1 is a sectional view taken vertically and axially through the shell or casing of the improved regulator, the internal operating-shell and valve being, however, seen in side elevation. Fig. 2 is a view similar to Fig. 1, but showing the internal operating-shell and valve also in axial section. Fig. 3 is a transverse section taken horizontally through the improved regulator in the plane indicated by line *a a* in Fig. 1. Fig. 4 is a sectional view somewhat similar to Fig. 3, but taken through the regulator in the plane indicated by line *b b* in Fig. 1. Fig. 5 is a partial section somewhat similar to Fig. 1, but illustrating a modified form of the internal shell and valve of the improved regulator; and Fig. 6 is a partial section taken through the modified regulator and showing the sectional construction of the internal shell and valve thereof.

Referring first to Figs. 1 to 4, inclusive, 1 indicates the base member of the improved regulator having a polygonal exterior contour to be conveniently engaged by a wrench or other tool and having a screw-threaded bore 2 at its under side for engagement with the meter connection.

3 indicates a diaphragm extended transversely across the shell or member 1 and having a central raised flange 4 concentric with the external shell 7 of the device and hollowed out, as seen at 5, to form a gas-passage, affording communication from the screw-threaded bore 2 at the base of the device to the hollow or chamber 8 within the shell or casing 7.

6 is an annular raised flange produced upon the upper side of the diaphragm 3 concentric with the central flange 4 thereof, and said flange 6 has external screw-threads wherewith is engaged the screw-threaded lower part of the external shell or casing 7 of the device, which latter is in cylindrical form and is of such dimensions that the annular space or chamber 8 is afforded, surrounding the central flange 4 of the lower member and adapted to receive gas supplied through the passage 5, as above explained.

The upper part of the shell or casing 7 is formed with a reduced externally-screw-threaded part 9, adapted for connection with the house-service pipe in a well-known way, and in said reduced nipple or portion 9 of the shell or casing is produced a cylindrical valve seat or surface 10, at the upper end of which is produced an annular flange or stop 11, integral with the wall of the shell or casing.

12 indicates as a whole the internal operating-shell and valve of the improved regulator, and this member is formed with a horizontal or flattened top or roof 14, extended across above the central flange 4 of the lower member 1. The shell 12 also comprises an annular skirt or flange 15, pendent from said flat top or roof 14 and of a diameter adapted to extend down outside of the flange 4, so as to completely surround the same

The pendent wall of flange 15 of the shell or member 12 is imperforate and is made from corrugated sheet metal or other corrugated material, as shown in Figs. 1 and 3, the inwardly-extended corrugated portions abutting upon the outer surface of flange 4, so as to be adapted for sliding engagement

therewith in the up-and-down movement of the shell under influence of the gas-pressure within the regulator, whereby said shell 12 and the valve carried thereon are effectively guided in movement within the casing 7 of the device.

The spaces 17 intervening between the outwardly-bent corrugated portions of the wall or skirt 15 and the outer surface of flange 4 afford passages for the flow of gas under all pressures, the lower edge portions of the skirt or wall 15 being notched out, as shown at 16, so as to afford escape of gas from such passages into the space or chamber 8 in casing 7 when the internal shell is in extreme lowered position and rests upon the diaphragm 3 of the lower member 1, as seen in Fig. 1.

Upon the flattened top or roof 14 of the internal operating-shell 12 of the regulator is carried a valve 18, which is in the form of a cylindrical flange of thin metal of a diameter adapted to snugly fit and play vertically within the cylindrical valve seat or surface 10 at the reduced upper part 9 of the outer shell or casing 7 of the device, and at suitable intervals said cylindrical valve 18 is provided with vertically-extended slitted apertures or ports 19, adapted for communication from the hollow or chamber 8 to the bore or passage of the reduced upper part 9 of the outer casing wherewith the house-service pipe has connection. The stop or flange 11 is adapted to limit upward movement of the valve 18 in such a way that when the said valve is in its extreme elevated position, as shown in Fig. 2, and its upper edge comes into engagement with said stop the lower ends of the ports 19 will still be opened to afford communication from the chamber 8 to the house-service pipe.

In the operation of the improved regulator, as above described, when the gas-pressure rises in the mains the shell 12 is lifted and carries with it the valve 18, and in the upward movement of the valve the ports 19 thereof are gradually closed, so that an effective regulation and reduction of pressure of the gas supplied to the house-service pipe is attained, whereby the pressure in said pipe is rendered substantially uniform and is not liable to sudden and excessive fluctuation. When the gas-pressure in the mains falls, the shell 12 will also fall by gravity, but in its extreme lowered position gas still will escape at the ports 16 and through passages 17, so that there is no liability of the burners being extinguished, and as valve 18 descends a greater area of ports 19 is opened for the flow of gas to the house-service pipe.

From the above description it will be evident that the improved regulator is of an extremely simple and inexpensive nature and is especially well adapted for use, by reason of the automatic control afforded by which the pressure of gas within the house-service pipe is rendered substantially uniform despite considerable variations in pressure of the mains, and it will also be obvious from the above description that the device is capable of considerable modification without material departure from the principles and spirit of the invention, and for this reason I do not desire to be understood as limiting myself to the precise form and arrangement of the several parts of the device as herein set forth in carrying out my invention in practice. For example, in Figs. 4 and 5 I have shown a modified form of the improved regulator wherein the internal shell or operating member 12 is varied in details of construction. In this form of the regulator said shell has a pendent cylindrical skirt 20, which may be integral with its top or roof 14 and which has an inturned flange or projection 22 at its lower edge. Inside said cylindrical skirt or flange 20 is held a corrugated metal strip 21 similar in construction to the flange or skirt 15 of the construction above described, and said strip 21 has its lower edge pendent below the lower edge of said cylindrical skirt or flange 20 and is held in place by engagement with the inturned lower edge flange 22 of said cylindrical skirt. The corrugated strip 21 serves to effectively guide the shell 12 in its vertical movement by engagement on the outer sides of the central flange 4 of the lower member 1.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A gas-pressure regulator comprising an outer casing having means for connection with a service-pipe and having a gas-passage extended through it, a diaphragm extended across said passage within the casing and having a raised flange formed with a passage for the flow of gas, a cylindrical valve-seat carried by the casing above said flange, a shell having an imperforate top and pendent edge flange surrounding and covering said flange and adapted to be elevated by rise of gas-pressure, means carried by said shell for engagement with the walls of the flange to guide the shell in its movement and a cylindrical valve carried by the shell and engaged for sliding movement along said cylindrical valve-seat and provided with longitudinally-extended slitted ports for the flow of gas adapted to be gradually closed by the valve-seat in the sliding movement of the valve along the same.

2. A gas-pressure regulator comprising an outer casing having a diaphragm provided with a central raised flange having a passage for the flow of gas, a shell comprising an imperforate top and a longitudinally-corrugated flange pendent around the edges of the top, and surrounding the flange of the diaphragm with inwardly-directed portions of its cor-

rugations engaged longitudinally for sliding movement on said last-named flange to guide the shell in its movements, the spaces within said corrugated flange between its inwardly-directed portions being adapted for the flow of gas outwardly and downwardly from the passage within the flange of the diaphragm and a valve carried by the shell and movable in unison therewith for controlling the flow of gas through the casing.

3. A gas-pressure regulator comprising a casing having a diaphragm provided with a central raised flange having a passage for the flow of gas, a shell comprising an imperforate top and a corrugated flange pendent around the edges of the top and surrounding the flange of the diaphragm with inwardly-directed portions spaced apart and contacting on the flange of the diaphragm to guide the shell in its movements, the wall of said flange of the shell being provided with spaced notches at its lower edge portion to afford passages for the outward flow of gas and a valve carried by the shell and movable in unison therewith and adapted to control the flow of gas through the casing.

In testimony whereof I have hereunto signed my name, at Chicago, Illinois, this 1st day of March, 1906, in the presence of two subscribing witnesses.

PETER KELLER.

Witnesses:
J. L. CAPLINGER,
C. B. STODDARD.