

(No Model.)

J. D. BOWMAN.
PLUG COCK.

No. 545,769.

Patented Sept. 3, 1895.

Fig. 1.

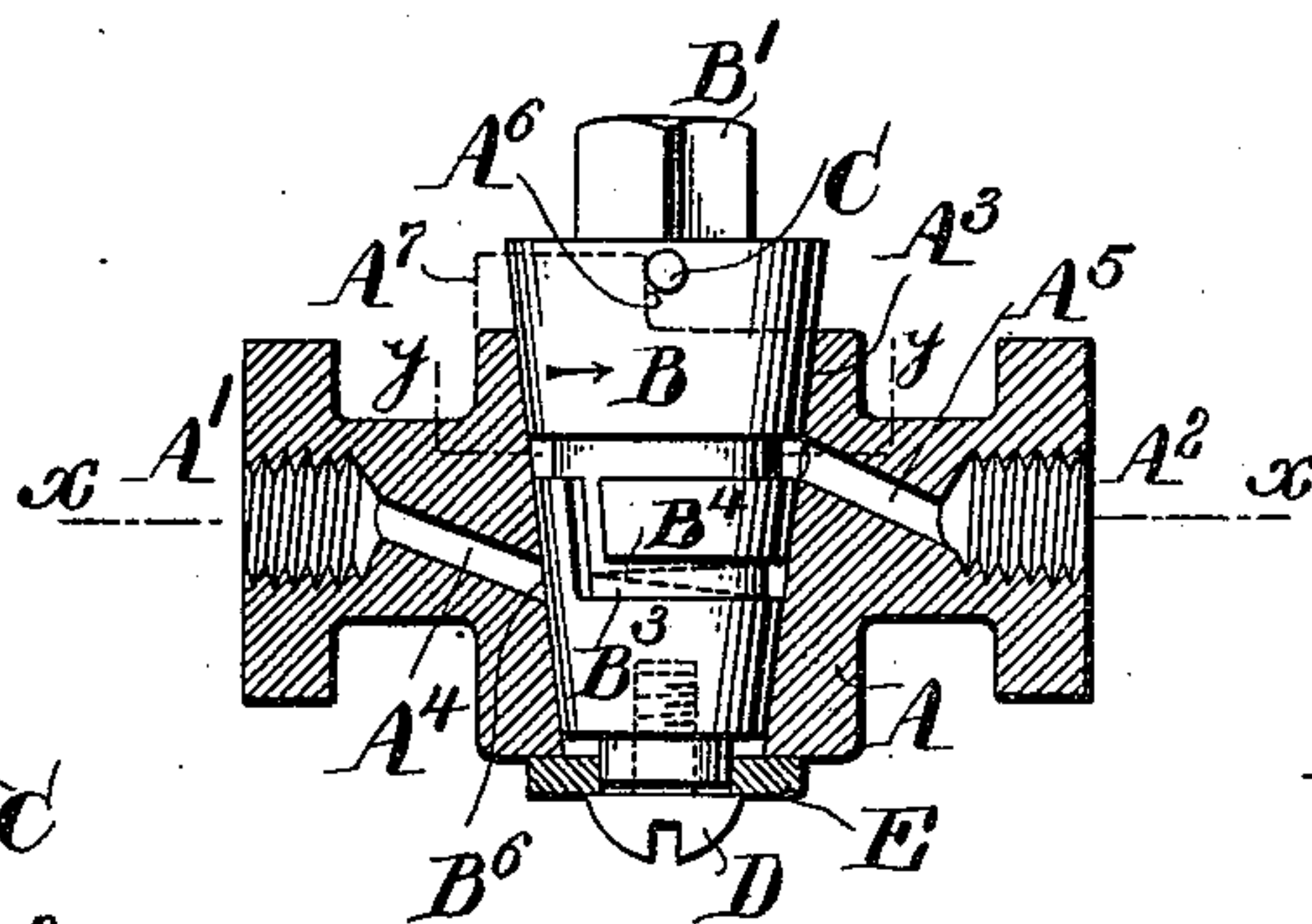


Fig. 2.

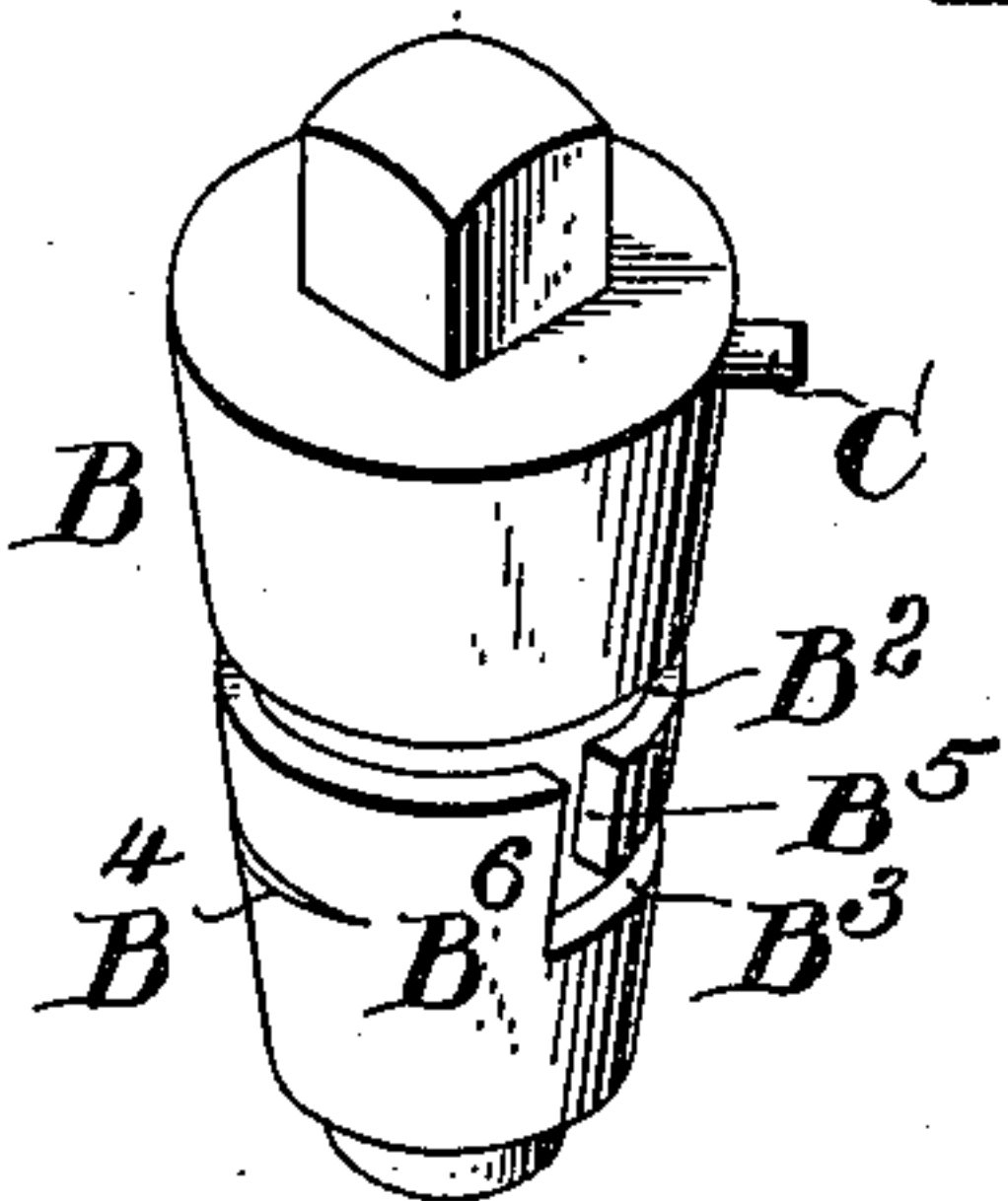


Fig. 4.

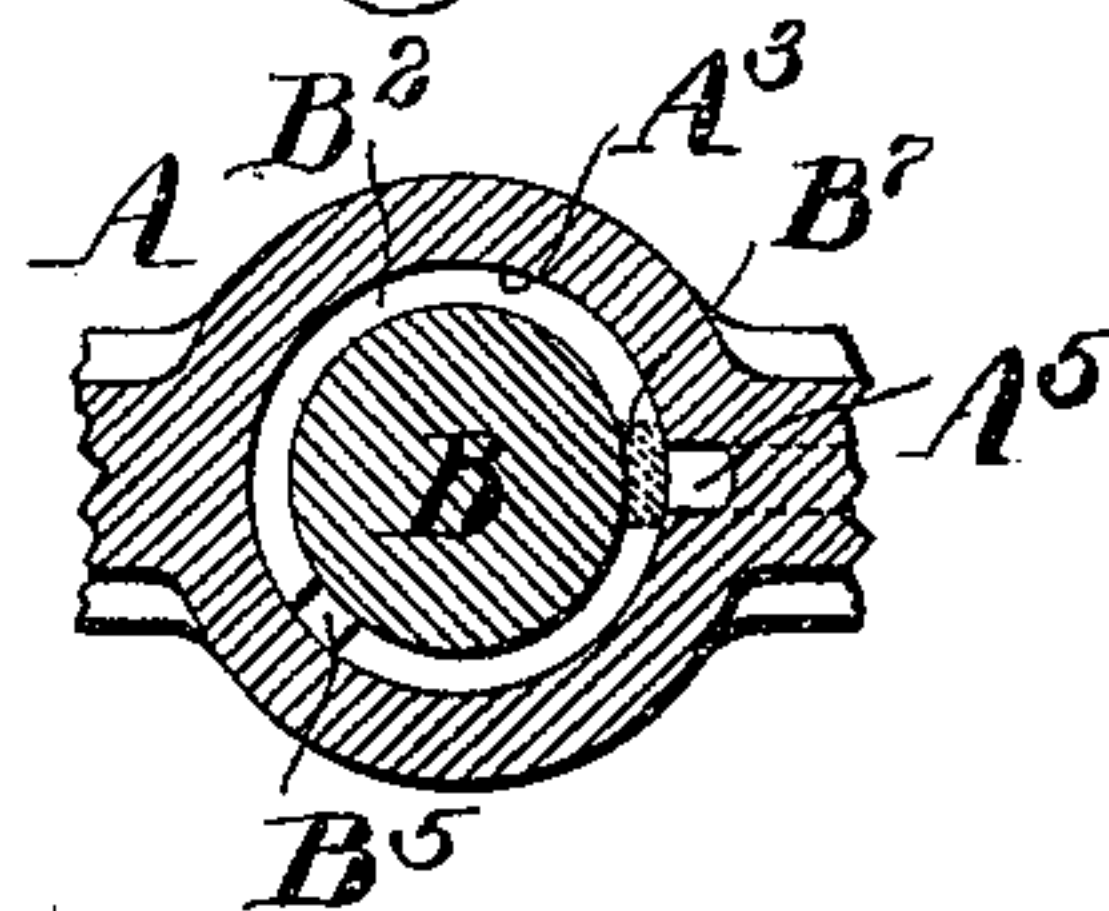


Fig. 3.

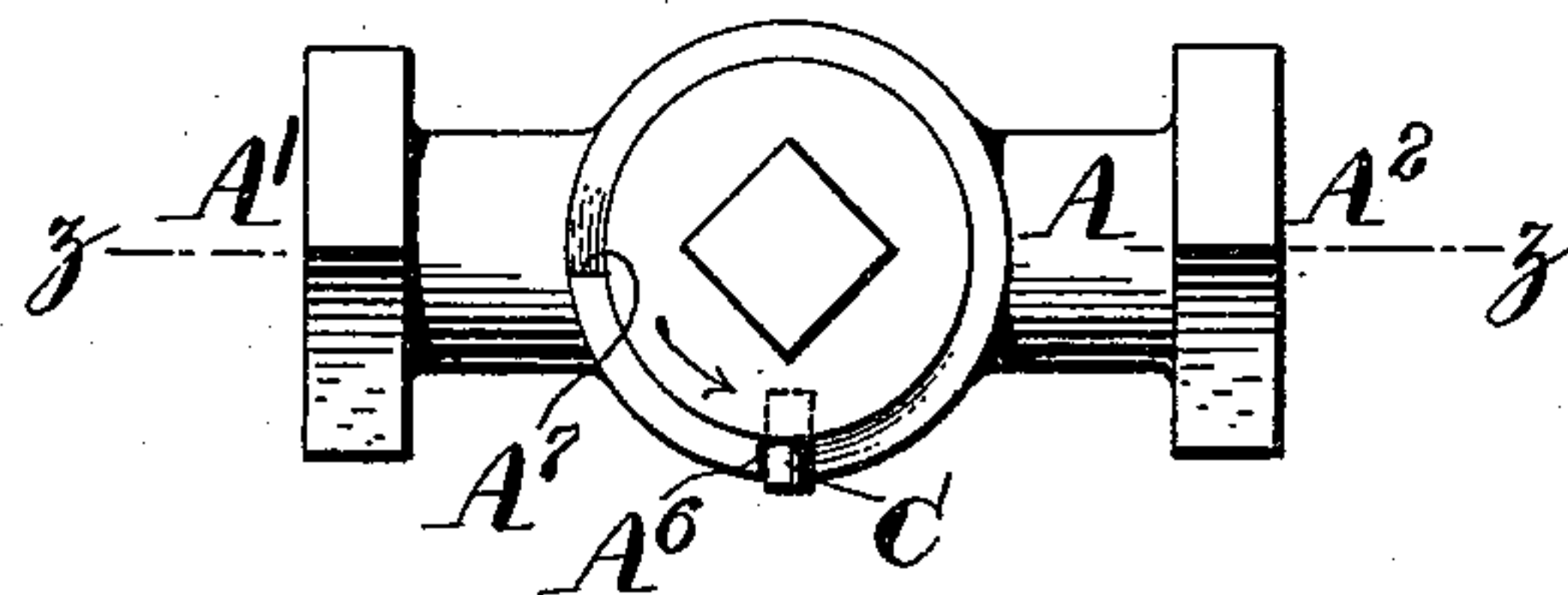


Fig. 5.

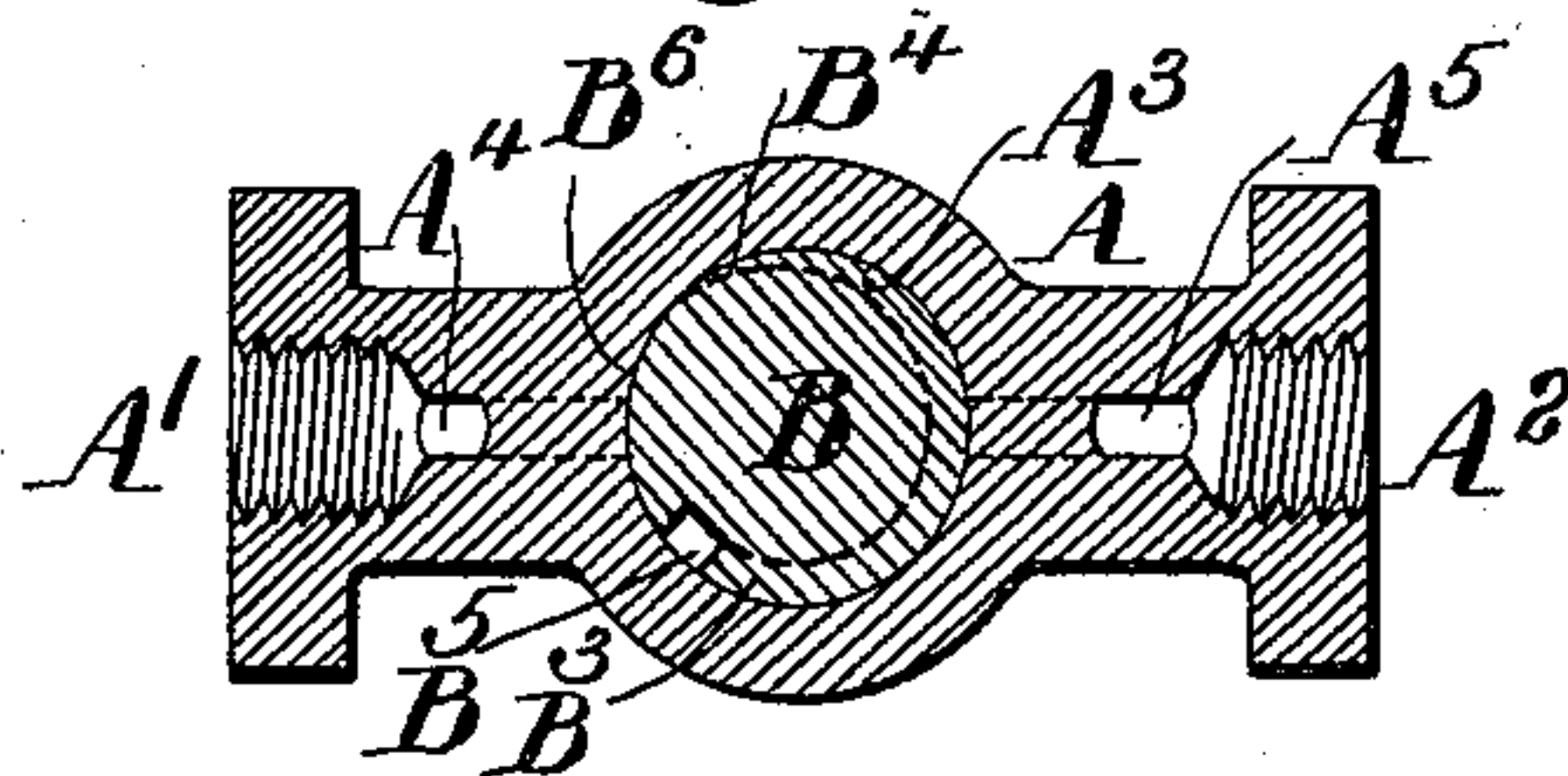
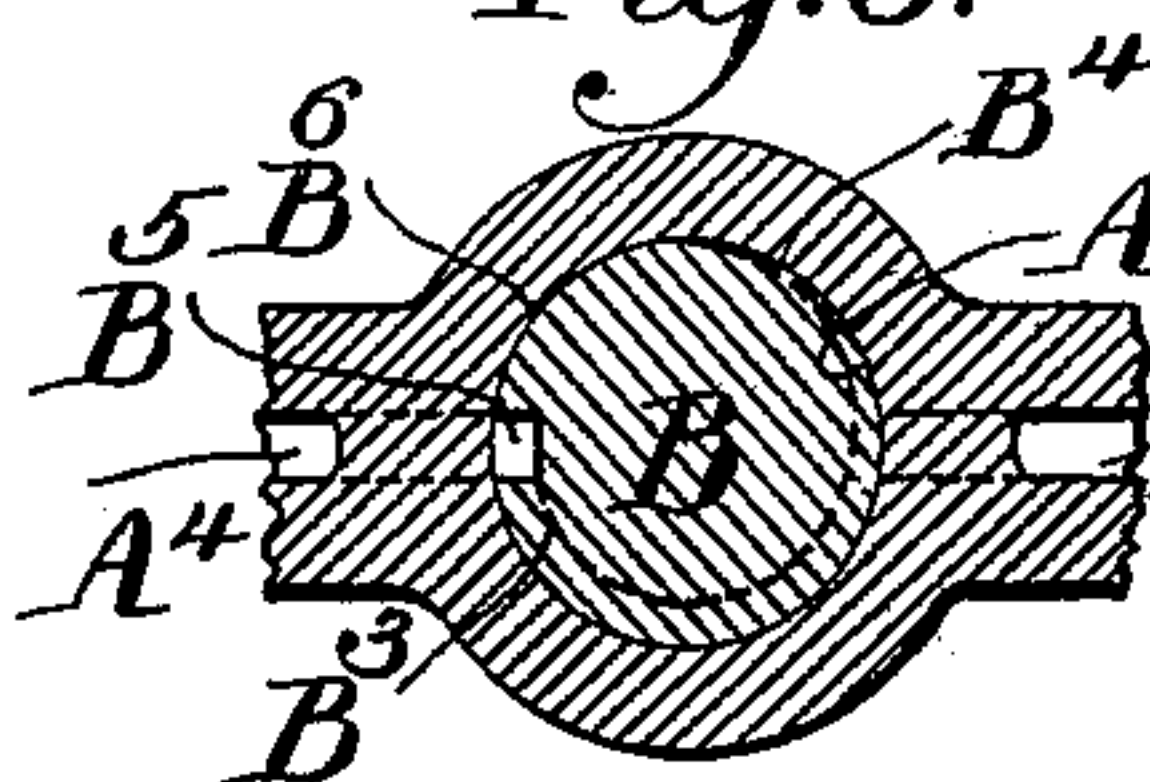


Fig. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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PLUG-COCK.

SPECIFICATION forming part of Letters Patent No. 545,769, dated September 3, 1895.

Application filed May 24, 1895. Serial No. 550,501. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. BOWMAN, a citizen of the United States, residing in the city of Altoona, county of Blair, State of Pennsylvania, have invented a certain new and useful Improvement in Plug-Cocks, of which the following specification is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the construction of plug-cocks such as are used for many purposes, notably in water-pipes and in connection with gas fixtures. Such cocks as heretofore constructed perform their function in opening and closing the ports through the casing in which they work during a very short movement of the plug. A very slight movement will materially vary the supply of fluid which is permitted to pass. Consequently a nice regulation of the flow of fluid is somewhat difficult to obtain, and the supply is often entirely cut off by a movement intended merely to diminish it.

The object of my invention is to overcome this defect of the ordinary plug-cock, and to make its action in regulating the flow of fluid gradual, so that a very considerable movement of the plug is permissible and required between the position in which the full supply of fluid is permitted to pass and the position in which the flow of fluid is entirely cut off. In short, I wish to impart to a plug-cock practically the capacity of a needle-valve with respect to the nice adjustment of the flow of fluid.

The nature of my improvements will be best understood as described in connection with the drawings in which they are illustrated, and in which—

Figure 1 is a side elevation of a casing and plug working therein, the casing being shown on the section-line $z z$ of Fig. 3. Fig. 2 is a perspective view of the plug-cock embodying my improvements. Fig. 3 is a plan view of the plug in its casing. Fig. 4 is a section through the plug and casing on the line $y y$ of Fig. 1. Fig. 5 is a section through the plug and casing on the line $x x$ of Fig. 1, and Fig. 6 is a similar sectional view showing the plug

turned to the position in which the port is opened to its fullest extent.

A indicates the casing, which is provided with threaded recesses A^1 and A^2 to receive the conduit pipe ends, and from each of these recesses extends a channel or port A^4 and A^5 , running into the cavity A^3 of the casing at different levels.

A^6 and A^7 , Figs. 1 and 3, indicate shoulders formed by a projection from the top of the casing and serving in connection with the pin C, secured in the plug B, as stops by which the turning motion of the plug-cock in either direction is arranged. These shoulders are arranged in the plan shown, so as to permit a motion of two hundred and seventy degrees to the plug, and I prefer for the best results that the plug should have a motion of substantially this amount. The plug B is fitted in the cavity A^3 of the casing, and is held in place therein, in the design shown, by means of a washer E and screw D, though of course any usual construction is permissible for this purpose. As shown, also, the plug B is provided with a rectangular projection B^1 , adapted for the use of a wrench in turning the plug; but here again, of course, any device for turning the plug may be employed. On the periphery of the plug B, I form two circumferential grooves or channels, one corresponding to each of the ports leading to the cavity A^3 in the casing and registering with its corresponding port. One of these circumferential channels is formed with a gradually-falling cross-section, as shown in the lower one illustrated in the drawings, where the cross-section varies from a very small size (indicated at B^4) to the full area (indicated at B^3). The other circumferential groove or channel (indicated at B^2) may be of full cross-sectional area throughout, as illustrated, or obviously it may be also varied in cross-sectional area without materially affecting the operation of the device. The two circumferential grooves or channels are connected as by a channel B^5 , and at least one of them must be interrupted by a smooth section of the plug's surface situated between its ends, as indicated at B^6 . This smooth surface only registers with the corresponding channel in the casing, serving

to close the channel and cut off the flow of fluid thereby. Preferably this smooth surface of the plug is situated between the small and large section of the graduated channel; but it may be situated in the upper channel B^2 , as indicated in dotted lines at B^7 , Fig. 4; or both channels may be provided with these intervening smooth surfaces so placed as to simultaneously register with the two channels in the casing when the plug is turned to close the ports.

The operation of my improved plug-cock can be easily followed. In the position indicated in Figs. 1 and 3—namely, when the pin C is against the shoulder A^6 —the smooth surface B^6 of the plug will close the port A^4 , and if a smooth surface B^7 is employed in connection with the channel B^2 it will close the port A^5 , as indicated in Fig. 4. If, now, the plug be turned, the tapered end B^4 of the lower channel will register with the port A^4 , and the circumferential channel B^2 will register and pin into the port A^5 . Consequently a small quantity of fluid—namely, that which can pass through the small area of the end B^4 of the lower channel—will be permitted to pass the plug, and as the plug continues to turn in the same direction the port A^4 will register with gradually-increasing sections of the channel $B^4 B^3$ until, when the pin C comes to rest against the shoulder A^7 , it will register with the portion B^3 of the channel, which is of full maximum area. It will be understood, of course, that the cross-sectional area of connecting-channel B^5 is equal to the full maximum cross-sectional area of channel $B^3 B^4$, and that the cross-sectional area of the channel B^2 must either be of the full cross-sectional area of the portion B^3 of the lower channel, or, if tapered, the channel B^2 should always register with the port A^5 at a point where its cross-sectional area is substantially equal to the portion of the lower channel registering with the port A^4 .

It is obvious that my plug-cock constructed as described above will permit of very nice adjustment of the flow of liquid, requiring a considerable movement to materially affect

the flow, and for this reason, also, that it is not likely to be accidentally so turned as to cut off the flow of fluid.

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

1. A plug cock casing having inlet and outlet ports at different levels in combination with a plug fitting therein having circumferential channels, one registering with each port and one or both of varying cross section, a channel connecting the circumferential channels at points where they are of full area, and one or more smooth surfaces in line with the circumferential channel or channels adapted to close the port or ports of the casing.

2. A plug cock casing having inlet and outlet ports at different levels in combination with a plug fitting therein having circumferential channels, one registering with each port and one of varying cross section and the other of substantially full cross sectional area throughout, a channel connecting the circumferential channels at points where they are of full cross sectional area and a smooth surface between the small and large ends of the tapered channel adapted to close the ports of the casing.

3. A plug cock casing having inlet and outlet ports at different levels in combination with a plug fitting therein having circumferential channels, one registering with each port and one of varying cross section and the other of substantially full cross sectional area throughout, a channel connecting the circumferential channels at points where they are of full cross sectional area and a smooth surface between the small and large ends of the tapered channel adapted to close the port of the casing, with which said channel registers and a smooth surface between the ends of the full sized channel arranged to close the port with which said channel registers.

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Witnesses:

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