(No Model.)

J. L. DIBBLE.

STOP COCK.

No. 262,935. Patented Aug. 22, 1882.

Fig: 1.

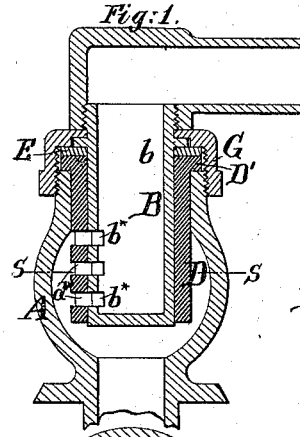


Fig: 4.

Fig: 3.

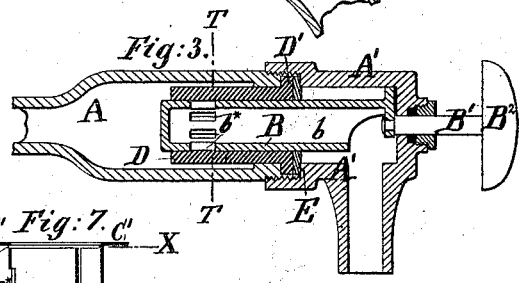


Fig: 2.

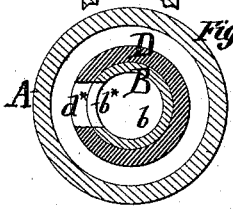


Fig: 7.

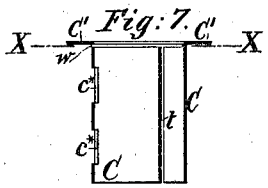


Fig: 8.

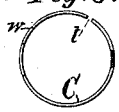


Fig: 5.

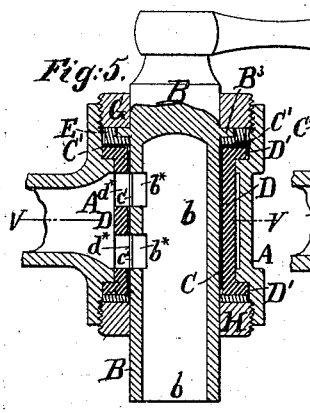


Fig: 11.

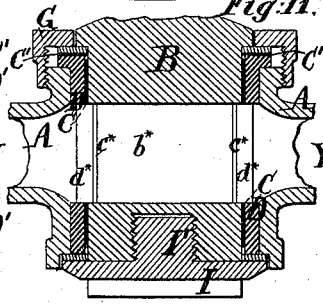


Fig: 9.

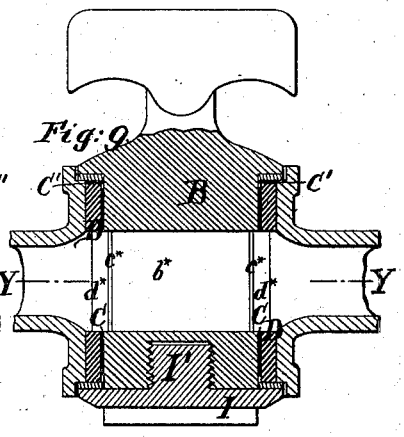


Fig: 6.

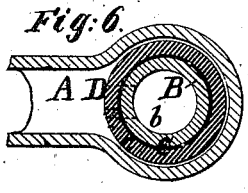
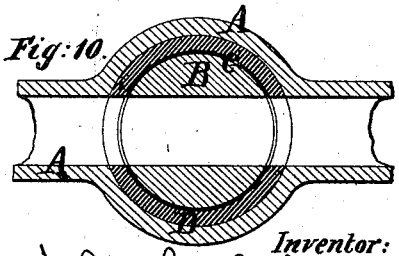


Fig: 10.



Witnesses:

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Inventor:

John L. Dibble

by his attorney

W. D. Stetson

UNITED STATES PATENT OFFICE.

JOHN L. DIBBLE, OF BROOKLYN, NEW YORK.

STOP-COCK.

SPECIFICATION forming part of Letters Patent No. 262,935, dated August 22, 1882.

Application filed October 27, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. DIBBLE, of Brooklyn, in the county of Kings, in the State of New York, have invented certain new and useful Improvements relating to Stop-Cocks, of which the following is a specification.

I render available the tendency of an elastic material, like india-rubber, to form a tight joint, when pressed against another surface, by its own elasticity or the force of the fluid, or both.

My invention may be carried out in several forms, adapted for several different situations. I will describe what I consider the best.

The accompanying drawings form a part of this specification. All are sectional views.

Figure 1 is a longitudinal section through a stop-cock or faucet of the style commonly applied on stationary wash-stands to let on and shut off the water. Fig. 2 is a cross-section on the line S S in Fig. 1. Fig. 3 is a central longitudinal section through a form of a self-closing cock. Fig. 4 is a cross-section through the same on the line T T in Fig. 3. Fig. 5 is a longitudinal section through another form, adapted for what is generally termed a "bib-cock" for sinks, tanks, and analogous uses. Fig. 6 is a section on the line V V in Fig. 5. Figs. 7 and 8 represent certain portions detached. Fig. 7 is a central longitudinal section, and Fig. 8 a cross-section on the line X X in Fig. 7. Fig. 9 is a longitudinal section through a straight-way cock. Fig. 10 is a section on the line Y Y in Fig. 9. Fig. 11 is a longitudinal section, showing a modification of Fig. 9.

Similar letters of reference indicate corresponding parts in all the figures.

Figs. 5, 6, 7, and 8 show the invention most fully carried out, and I will first describe that form.

A is the body of the construction, the end (not shown) being adapted to be driven into a barrel or to be soldered upon a water-pipe, or otherwise attached to any vessel or pipe, as convenience may require.

B is a plug, made without taper, and of considerably-smaller diameter than the vertical passage through the casing A. It has a hollow interior opening at the lower end, as indicated by *b*. Two liberal apertures, *b**, open laterally from the hollow *b*, and the turning of the plug B by the handle B′ opens and closes these apertures by bringing them into or out of coincidence with corresponding apertures, *d**, in a hollow cylinder of rubber, D, which fills the space around the plug B, and is formed with a flange, D′, at each end, by the aid of which it is held fast in the casing without liberty to turn.

C is a tube, of spring-brass or other suitable material, flanged outward at one end, as indicated by C′, and cut open longitudinally along one side at *t*, so as to allow it to open and close. It is finished smoothly on its inner face. Its outer face may be left rough, as it has simply to receive the compressive action of the rubber without appreciable motion relatively thereto. The rubber is molded or otherwise produced of a little less internal diameter than the exterior of the thin elastic metal C. It follows that the rubber, and consequently the metal C, is pressed with gentle force against the entire exterior of the plug independent of the pressure of the water. I provide a sufficient space within the casing A exterior to the rubber envelope D to allow the water or other fluid which fills the casing A to flow quite around and to press forcibly on all sides of the plug and its envelope. The thin metal C is formed with holes *c* c**, which correspond with the holes *b** in the plug B. The rubber D is also provided with holes *d**. The parts C and D are applied together, so that their holes *c* d** coincide. The brass C and rubber D are held against turning by means of their flanges C′ D′, which are compressed by a ring, E, formed as shown, applied above the flanges and forced down by a threaded ring, G, screwed forcibly from above to form a tight contact. An annular space is left in the ring E for the play of a pin, B³, which is set in the plug B and serves to hold the latter against end movement.

H is a threaded ring surrounding the lower end of the plug B and screwed up forcibly against the flange at the lower end of the soft cylinder D. The flange C′ is continued quite around. In other words, the longitudinal cut or split *t* in the body of the sheet-metal tube C does not extend quite to the flange. A partial cross-cut or division, *w*, is made between

the body C of the metal tube and the flange C′; but care must be taken to leave sufficient connection between the flange and the body to insure a strong hold, so that so long as the flange C′ is firmly confined by the compression of the ring E the body C shall not turn around with the motion of the plug B. In turning the plug the friction occurs between its exterior and the inner surface of the elastic ring C. The latter is held in reliably close contact with the plug by the rubber D outside.

In applying the parts together the rubber D D′ is collapsed slightly and thrust into the casing A from either end of the vertical passage and allowed to expand. Care must be taken not only that the holes d^* are presented fairly to receive the water or other fluid coming through a liberal passage in the casing A, but also that the flanges D′ at each end fit properly in their respective places. Then the brass or other metal C is collapsed slightly and thrust down firmly into place, care being taken that the holes c^* coincide exactly with the holes in the rubber D. Then the ring E is applied, the plug B inserted, preceded, if necessary, by a smooth conical plug, to properly hold out the brass C and its elastic inclosure to allow the insertion of the plug B, which latter is preferably made with little or no taper. Care must be taken to bring the pin B^3 to the correct position. This insures that the holes b^* are at the same level as the corresponding holes c^* and d^*. Whether they coincide or not will depend upon how the plug is turned. Then the ring G is screwed down with gentle force upon the ring E. A corresponding threaded ring H being applied below and screwed up in a similar manner to compress the lower flange, D′, of the rubber, the cock is complete.

In the operation of the cock, when there is no pressure on the fluid the joint between the plug and the metal C is held tight simply by the perfect fitting of the parts and the gentle pressure due to the contraction of the rubber D. When there is an appreciable pressure of the fluid in the case A, this, by flowing all around and pressing on all sides of the rubber, and consequently of the inclosed metal C, insures a still tighter contact.

When it is desired to separate the parts for examination or repairs the rings G and H are unscrewed and the plug withdrawn. Then the ring E can be taken off and the metal C drawn out, and then the rubber collapsed and similarly removed.

Among other advantages due to my invention is the availability of iron as the material for the body A and plug B. There is no contact of these parts. They cannot rust together.

I propose to cover the iron plug with a thin tubing of brass, which shall be permanently connected thereto and turn therewith as a part of the same. The union may be effected by simply shrinking a drawn tube of brass upon the previously-cleaned surface of the iron plug, or the parts may be tinned and "sweated" together. Such construction will allow the screw-rings G H to be also made of iron.

Figs. 9 and 10 show a cock for application at any point along a tube where it is desired to have a straight way or straight passage of the fluid through the plug of the cock. The plug is formed in the ordinary manner, except that it is preferably without taper. The elastic metal lining C C′ is formed the same as previously described, except that there are two passages, c^*, at points in the periphery diametrically opposite to each other. They correspond to the slot or water-way formed through the plug. The rubber envelope is formed with two corresponding apertures and without flanges.

Fig. 11 shows a section through a portion corresponding to Fig. 9, but with a flange, C′, on the metal and a threaded ring, G, screwed down thereon. This allows holding the rubber D and the metal lining C with great firmness against being possibly turned with the turning of the plug. I do not esteem this addition generally necessary. In both the forms the plug B may be held reliably in place endwise by the head or disk I on the screw I′, which is tapped into the lower end of B.

Figs. 1 and 2 show my invention applied in a less complete form, but still so as to be highly useful. In this the elastic metal C is omitted. The rubber D is formed with one flange, D′, pressed downward by a ring, E, which is forced down firmly by a screw-cap, G, which engages strongly with the casing A. The hollow plug B in this arrangement opens upward, and has rigidly connected to it the horizontal arm B′, which serves both as a handle for turning and as a tube for conveying the water properly, like the cocks of ordinary basins.

Fig. 3 is also fitted up without the metal lining. The rubber is formed with one flange, which is strongly compressed by the ring E, which latter is held in contact by screwing on the discharge-nozzle A′. In this modification the plug B does not turn, but is moved endwise by a pressure applied on the button B^2 through the stem B′. There is no orifice through the rubber D. To open the cock the plug B is moved forcibly inward, so as to uncover the apertures b^*. When the pressure of the liquid is considerable this cock will be self-closing. When the pressure is gentle it requires simply to be drawn back by force applied to the button B^2.

I have shown a washer below the soft envelope in Figs. 5, 9, and 11. I esteem it well to employ such; but I do not deem it essential.

Further modifications may be made. A spring may be applied under the button B^2 in Fig. 3 to aid in closing the cock promptly. A sheet-metal lining corresponding to C may be introduced in the forms shown in Figs. 1 and 3. The sheet-metal lining may be omitted in the forms shown in Figs. 5 and 9. Cocks of other proportions and forms may be fitted up in a corresponding manner, so that the rubber D shall be correspondingly pressed against the plug by its own elasticity or the force of

the fluid, or both, either with or without the interposition of the metal lining C. It may be practicable to employ other material than rubber for the elastic envelope D. I can use lead, tin, and perhaps various other materials which offer little friction in place of brass for the lining C. The material C avoids the high friction due to the peculiar nature of rubber. It also avoids the forcing of the rubber into the apertures b^* of the plug. The split condition of the part C allows it to readily contract.

The invention allows for wear and for imperfections of workmanship more effectually than the ordinary devices, and will, I believe, last much longer. Care must be taken to employ a good quality of material in the envelope D. The other parts of the invention may be used successfully with metal interposed in the place of the sheet metal C, which may be very differently formed and differently held in place. I propose especially to use a flanged thin cylinder of metal with the proper hole or holes, c^*, exactly as shown in Fig. 7, except that the transverse partial cut *w* shall be omitted and the longitudinal cut *t* shall be carried quite up through the flange C. This will not be as good as the construction shown, because I cannot hold the flange with absolute firmness at all points without interfering with the elastic action of the metal C; but it may be practicable, and will enable me to realize some of the benefits of the invention. I should in such case split the flange C′ at a good many points, but the body C only at one place.

I attach importance to the fact that a chamber for the fluid extends around between the plug and the casing. It allows the fluid to press on all sides of the rubber envelope. The latter is effectually held to its bearing against the inclosed parts by its own elasticity, and also by the pressure of the fluid when in use.

I claim as my improvement in stop-cocks or faucets—

1. The cylindrical casing A and cylindrical plug B, having a chamber extended around between them, in combination with an envelope or incasement of elastic material, D, urged toward the plug by its elasticity and also by the pressure of the fluid, as herein specified.

2. The combination of the body, plug, elastic envelope, and interposed metal C, arranged to serve as herein specified.

3. The soft envelope D, formed with a flange, D′, in combination with the plug B, having the flange B^3 lying above the upper flange of the envelope D, and ring G, adapted for compressing and reliably holding the flanges D′ and B^3, as herein specified.

4. The plug B, with opening b^*, an elastic metallic ring, C, with corresponding opening, c^*, and soft envelope D, with opening d^*, in combination with each other and with means for holding and operating them in a suitable casing, A, as herein specified.

5. The elastic tubular flanged lining C C′, with the body C, divided by a longitudinal split, *t*, and partly separated from the flange by a transverse cut, *w*, in combination with the plug B, soft envelope D, body A, and means G for strongly holding the flange C′, as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, this 26th day of October, 1881, in the presence of two subscribing witnesses.

JNO. L. DIBBLE.

Witnesses:
CHARLES C. STETSON,
CHARLES R. SEARLE.