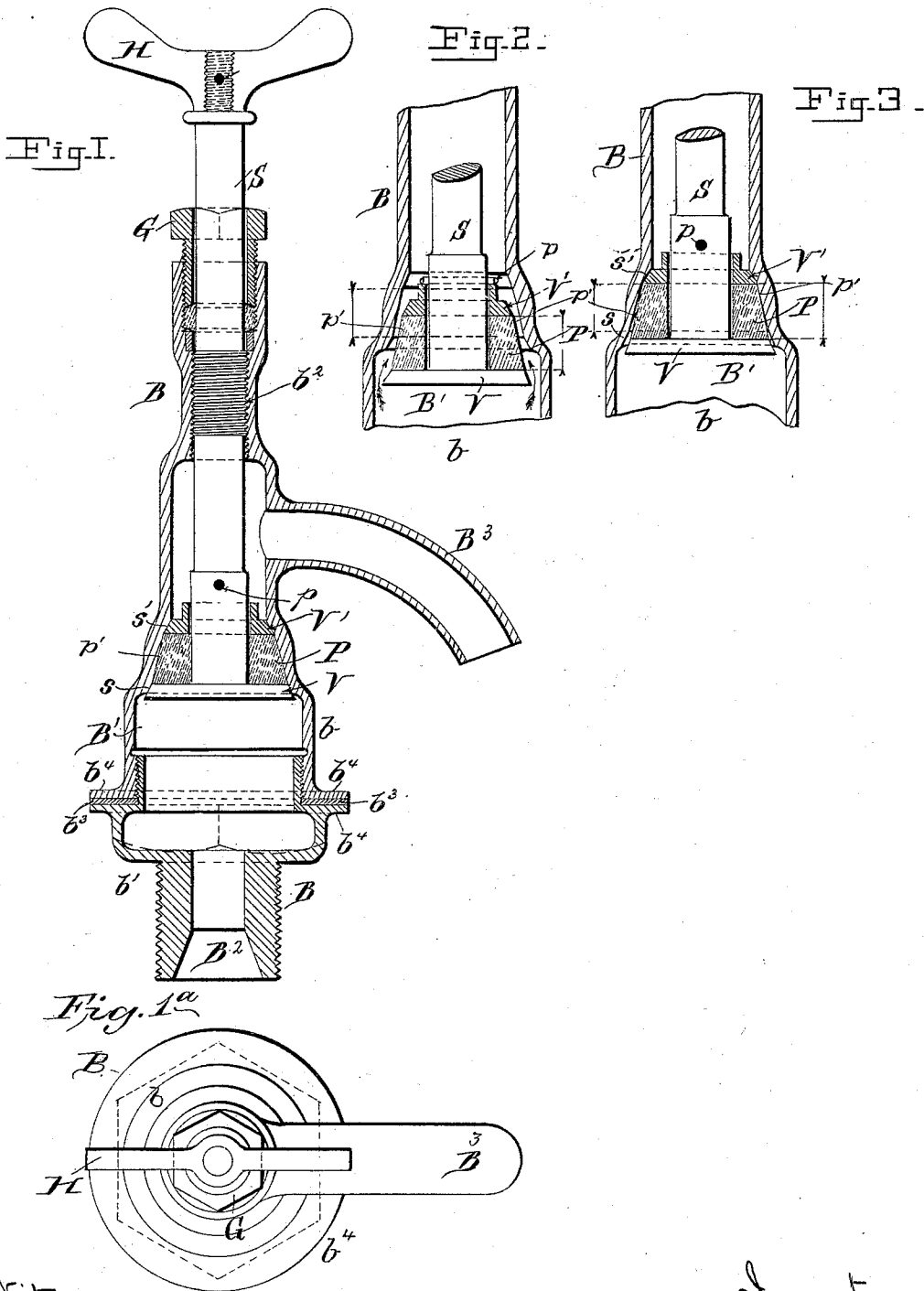


(No Model.)

M. M. FORESTIER.
STOP COCK.

No. 405,404.

Patented June 18, 1889.



Witnesses:
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UNITED STATES PATENT OFFICE.

MARIA MOULON FORESTIER, OF BRUSSELS, BELGIUM.

STOP-COCK.

SPECIFICATION forming part of Letters Patent No. 405,404, dated June 18, 1889.

Application filed February 4, 1888. Serial No. 263,001. (No model.) Patented in Belgium November 19, 1887, No. 79,616; in Germany November 30, 1887, No. 43,664; in Spain December 9, 1887, No. 7,666; in France May 14, 1888, No. 190,581; in England May 16, 1888, No. 7,284; in Italy May 19, 1888, No. 23,517, and in Austria-Hungary May 23, 1888, No. 21,876 and No. 9,250.

To all whom it may concern:

Be it known that I, MARIA MOULON FORESTIER, a citizen of the Kingdom of Belgium, residing at Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in Stop-Cocks, (for which I have obtained Letters Patent in Belgium dated November 19, 1887, No. 79,616; in France dated May 14, 1888, No. 190,581; in England dated May 16, 1888, No. 7,284; in Germany dated November 30, 1887, No. 43,664; in Austria-Hungary dated May 23, 1888, No. 21,876 and No. 9,250; in Spain dated December 9, 1887, No. 7,666, and in Italy dated May 19, 1888, No. 23,517;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figure 1 is a vertical section of a stop-cock embodying my invention, and Fig. 1^a is a top plan view thereof. Figs. 2 and 3 are vertical sections of a portion of the barrel of the stop-cock, showing the valve-chamber and the valves in their operative positions.

The invention relates to faucets, bibs, or stop-cocks, and has for its object to provide means whereby a more perfect closure of the passage through which the fluid flows is obtained, and whereby the operating parts, and more especially the valves, are rendered more durable.

In the drawings, B indicates the barrel of the stop-cock provided with a suitable bearing, in which works the valve-spindle S. The barrel B is constructed of two parts *b* and *b'*, detachably secured together, said parts being constructed to form between them a valve-chamber B', in which is formed a valve-seat or a plurality of valve-seats for the valve or valves on the spindle. The portion *b'* of the barrel is provided with a tubular extension B², for connection with the vessel, holder, or conduit for the fluid; and the object of mak-

ing the barrel in two sections detachably connected together is to provide means for gaining access to the valve-chambers and valves without interfering with the connection between the stop-cock and the vessel, holder, or conduit. The two sections *b* and *b'* may be bolted together, a washer *b³*, being interposed between their flanges *b⁴*; or they may be screwed together by properly constructing the connecting-flanges, as will be readily understood.

It is obvious that by disconnecting section *b* from section *b'* of the barrel B, then manipulating the valve-spindle S to move it inwardly and removing the operating-handle from the spindle, the latter and the valve may be bodily removed from the barrel B whenever this becomes necessary from any cause.

In the valve-chamber B', between the inlet B² and the discharge or spout B³, are formed one or more valve-seats for one or more valves.

Referring now to Figs. 1, 2, and 3, the valve-chamber B' has formed therein two valve-seats *s* and *s'* for two valves V and V'.

The valve-spindle S, arranged axially in the barrel B, works in a screw-threaded bearing *b²*, formed in said barrel B, the spindle being correspondingly threaded, its upper end passing through a suitable packing-gland G, and carrying the handle H, which latter is detachably connected with said spindle.

The valve V, which is made of an unyielding material, is rigidly secured to the lower end of the valve-spindle, and when said valve is made of metal, it may form an integral part of the spindle S. The valve V', made also of an unyielding material, is, on the contrary, loosely mounted on the spindle S, its motion thereon being limited by its seat *s'* or by a lug or pin *p*, projecting radially from said spindle. The independent motion of the valve V on the spindle S is derived from any suitable elastic or expansible or resilient body or device. In the figures referred to said motion is derived from a conical or tapering rubber plug P, also loosely mounted on the spindle S between the valves V and V', the valve-chamber being constructed with a cor-

respondingly-tapering seat p' for said plug, so that the latter itself performs the function of a third valve.

It will be seen that when the valves are on their seats, as shown in Fig. 1, and the spindle is rotated to move said valves off their seats, the valve V, being rigidly connected with the spindle, will leave its seat first, the valve V' being held to its seat by the expansion of the plug P, as shown in Fig. 3. No fluid can therefore pass from the inlet B² to the discharge B³ until the spindle has moved inward sufficiently to allow of the full expansion of the plug P, when by a farther inward movement of said spindle the pin p will carry the valve V' along and fully open the passage to the fluid around the valves, as shown in Fig. 2. The reverse takes place in cutting off the flow of fluid. The valve V' will first move to its seat, while the valve V will reach its seat only when the plug P is sufficiently compressed to permit this. An imperfect obturation of the passage for the fluid can therefore not occur either inadvertently or by reason of any undue wear in either of the valves or the plug P. In fact, the valve V' may be solely relied on to cut off the flow until such valve, by reason of wear, becomes inoperative. Then the plug P will perform the function of valve, and finally the valve V will come into operation, so that a stop-cock constructed as described will remain serviceable for a longer time than any other stop-cock with which I am acquainted, while the valves and plug may at any time be replaced when worn with great facility.

There is still another advantage derived from the use of the elastic body or plug P, especially when the spindle is free to slide in its bearings, as hereinafter described—namely, the greater the pressure of the fluid the more tightly will the valve V' be held to its seat, since said valve as well as the plug P are free to move on and independently of the spindle within certain limits.

In this connection it is important to notice that the greatest diameter of the rubber valve is less than the greatest diameter of the valve-seat, whereby a very important result is obtained—viz., the gradual contact by expansion of the tapering straight surface of the rubber valve with the tapering straight walls of the barrel in the operation of sealing the passage through which the fluid passes. In this operation that portion of the rubber valve of least diameter makes contact with its wall-seat first, as shown in Fig. 3, and that portion of the rubber valve of greatest diameter makes contact with its wall-seat last. In this operation the seating of the tapering rubber valve along the tapering walls of the barrel commences at the tapering end of the valve and at the tapering end of the valve-seat and continues in re-enforcing steps.

An important feature of my invention is providing the faucet-barrel with a plurality

of tapering wall valve-seats, in combination with a valve composed of a tapering rubber valve part interposed between metallic conic valve parts, each valve part having a corresponding wall-seat and a valve-stem operating to seat the valve parts in succession and to open them in succession. These and other matters will be designated in specific form in the claims concluding this specification.

I claim as my improvement—

1. The combination, in a faucet, of a barrel formed with an interior wall-seat part p' , tapering toward the outflow, supplemented by a bevel wall-seat s' of less seat area, with a valve-operating stem having a tapering rubber plug-valve P, the taper whereof being of a less angle than the angle of taper of the wall-seat part p' , the valve V', corresponding with the valve-seat s' , an abutment V, for confining the said rubber valve and the stem-lug part p , substantially as described.

2. In a faucet, the barrel formed with interior circular wall-seats s s' , of unequal diameter, and an intermediate wall-seat p' , tapering from the seat of greatest to the seat of least diameter and having an area greater than the combined area of the said seats s s' , in combination with a valve-operating stem having a tapering rubber valve whose greatest diameter is less than the wall-seat of greatest diameter, the unyielding valves V V', corresponding to the said wall-seats of unequal diameter, and an abutment p , for the valve of least diameter, substantially as described, for the purpose specified.

3. In a faucet, the valve-stem having a plug-valve composed of a tapering rubber part P, a fixed end part V, and a loose end part V', the two latter having seat-forming faces of greater angle of taper than the angle of taper of the said rubber valve, combined with a barrel having formed on its inner wall joining seats p' , s , and s' , corresponding to the said separate wall-seats, and a stem pin or lug p , co-operating with the loose valve part, substantially as described.

4. In a faucet, the barrel formed with a conical wall part between the inflow and the outflow, the taper standing in the direction of the outflow and forming three separate and distinct joining wall-seats p' , s , and s' , the intermediate one standing at a less angle of taper and having the greatest area, in combination with a valve-stem having three co-operating valve parts P, V, and V', the intermediate part being rubber and having an angle of taper less than the angle of taper of the wall-seat p' , and the part p , for opening the valve parts V' and P, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

MARIA MOULON FORESTIER.

Witnesses:

H. RACLOT,
E. LABASQUE.