No. 669,328. Patented Mar. 5, 1901.

F. STAEDELI & G. VOGT.

STOP COCK.

(Application filed June 18, 1900.)

(No Model.)

Fig. 1.

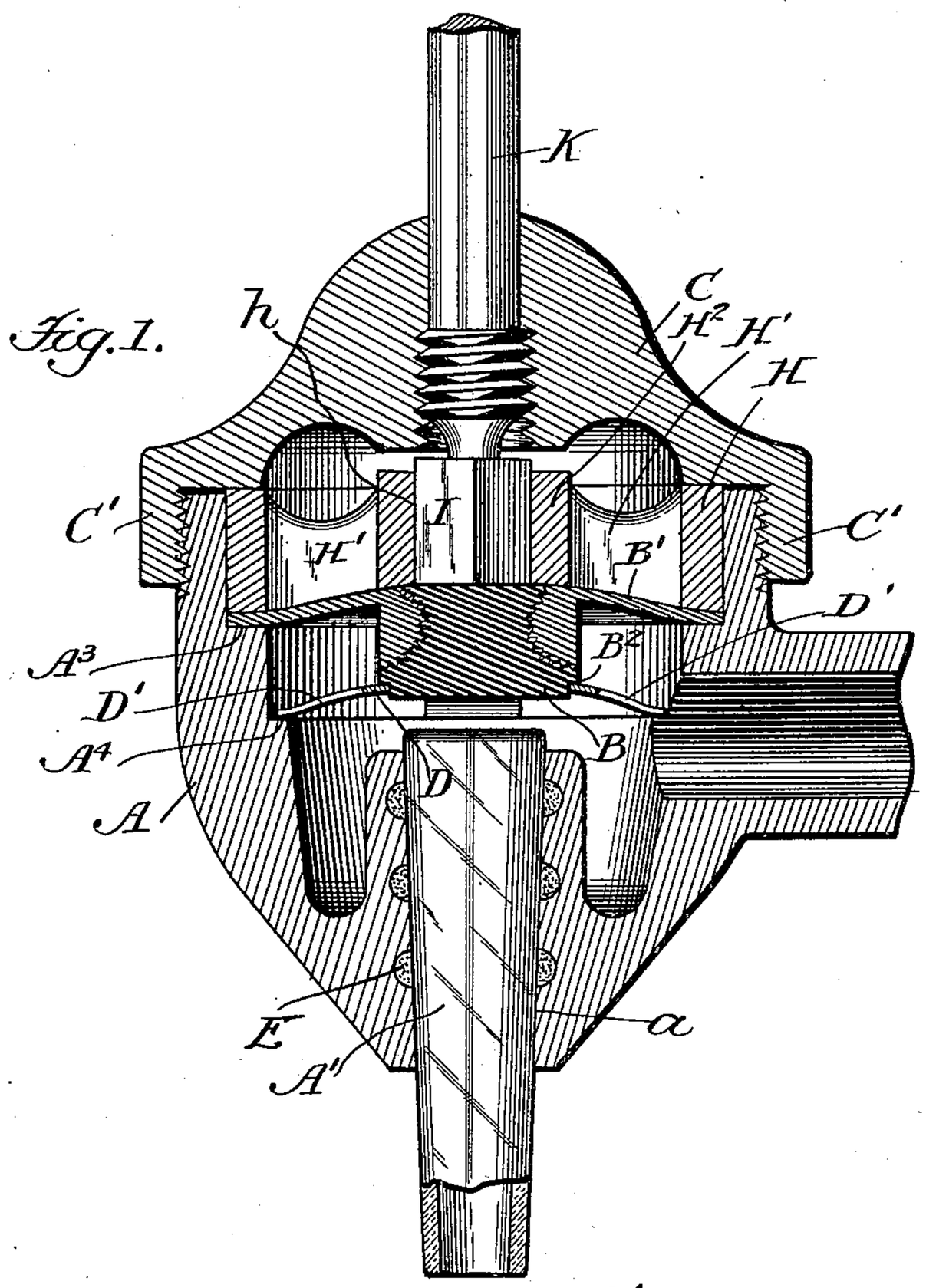
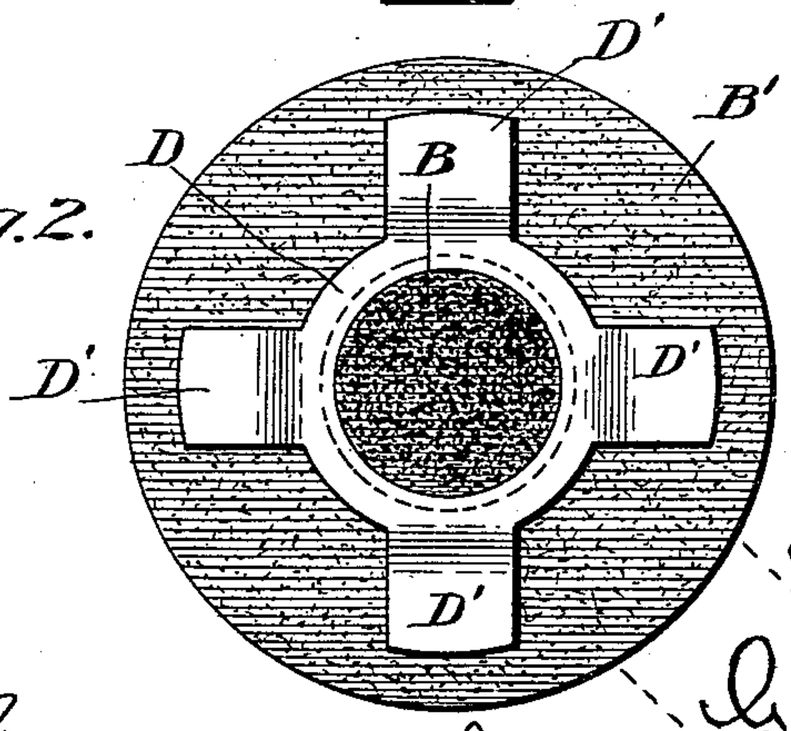


Fig. 2.



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UNITED STATES PATENT OFFICE.

FELIX STAEDELI AND GUSTAV VOGT, OF NEW YORK, N. Y.

STOP-COCK.

SPECIFICATION forming part of Letters Patent No. 669,328, dated March 5, 1901.

Application filed June 18, 1900. Serial No. 20,674. (No model.)

To all whom it may concern:

Be it known that we, FELIX STAEDELI and GUSTAV VOGT, citizens of the United States, residing in the borough of Bronx, in the city and State of New York, have invented a certain new and useful Improvement in Stop-Cocks, of which the following is a specification.

The improvement is intended more especially for serving what are known as "soft drinks," the acids of which are liable to induce corrosion of the ordinary cocks. We do not, however, confine the invention to that use. The improved cock may serve for a great variety of purposes. We employ a diaphragm tightly joined to the casing around its edge and carrying a thickened portion of the same or a different material made integral with the diaphragm and kept always adjacent to a smooth circular seat.

We will show and describe the invention as discharging through a passage from the interior of the seat; but the conditions may be reversed, if preferred in any case, so that the liquid is received in the center and flows outward between the valve and the seat when the valve opens. The opening of the valve is effected by allowing the diaphragm, with its thickened central portion, to move away from the seat. The closing is effected by suitable mechanism arranged to force the thickened portion into tight contact with the seat. We aid the movement by a spring, which serves, in addition to the force of the liquid, in urging the diaphragm away from the seat. We avoid any tendency of the screw action to revolve the valve by interposing a piece which is not permitted to turn. We guard the diaphragm against being forced too far by backing it with a metal piece. We prefer that this shall be made with radial arms.

The accompanying drawings form a portion of this specification and represent what we consider the best means of carrying out the invention.

Figure 1 is a central vertical section with the valve open, and Fig. 2 is a plan view of certain portions detached, seen from below. This latter figure is revolved on eighth of a revolution relatively to the view in Fig. 1. The inclined dotted lines in Fig. 2 show the relation of the induction-passage to the wings of the spring.

Similar letters of reference indicate like parts in both figures where they appear.

A is a body or casing.

A′ is a slightly-tapering tube or nozzle of proper thickness. It is set in a circular grooved orifice *a* in the lower portion of the casing A, the joint being made with cement E. The upper rim of this nozzle A′ is accurately finished.

B is the thick center of our diaphragm. It is made of hard rubber, with its upper and main portion deeply roughened or screw-threaded, as shown. Upon this previously-molded center of hard rubber is formed an addition of soft rubber, which is extended outward, much reduced in thickness, as indicated by B′, and forms a strong and durable but yielding diaphragm.

It is important that the soft annular diaphragm shall be very efficiently joined to the hard-rubber center. We manufacture the soft rubber in place upon the previously-molded hard-rubber center. To effect this, we provide the proper molds, with provisions for strongly closing them, capable of holding the entire piece B B′, and provide naphtha or rubber cement which contains a large proportion of naphtha. Apply this solvent in a sufficient quantity and for sufficient times to the screw-threaded or otherwise roughened surface of the part B to make those surfaces soft and ready to "weld" with the soft-rubber composition when it is subsequently applied to it. When all is ready, the hard-rubber center is held in position in the mold and the soft-rubber composition is applied in sufficient quantity, and the mold is closed and secured. The excess is forced out and may be saved, if desired. The treatment of the mass thus conditioned in the mold for a sufficient time to effect the proper vulcanization of the soft rubber makes a valve and diaphragm exactly adapted for our purpose. When this is put in place in the casing, the outer edge of the soft-rubber diaphragm rests on a shoulder A^3, which extends around the interior of the casing A.

C is a cap which engages by screw-threads in a hanging lip C′, with corresponding screw-threads on the exterior of the casing A.

H is a ring of metal provided with arms H′, extending inward and united in a hub H^2.

We shall refer to this entire piece H H′ H² as a "hubbed ring." The ring is of such depth that on screwing the cap C forcibly down it presses the ring H down tightly upon the rim of the diaphragm and makes a tight junction between the latter and the offset A³.

D D′ represent a spring of hard brass or other suitable material. The ring D engages under a circular annular bearing B². When the parts are put together, the wings or arms D′ rest on offsets A⁴, provided in the interior of the casing A. The device serves as a spring to lift the valve B, with the diaphragm B′, which is formed in one with it. The hub H′ of this hubbed ring is provided with a square hole *h*. In this hole is fitted a block I, which is free to move up and down, but cannot revolve.

K K′ represent a screw-threaded stem carrying an ordinary hand-wheel. (Not shown.) When this stem is turned in the direction to raise it, the diaphragm B′, with its thick center B, rises and the valve opens. When this stem is turned in the opposite direction to depress it, the square piece transmits the pressure to the yielding parts below without allowing the turning force to be felt and depresses the thickened central portion B against the force of the spring D D′ and of the liquid, and by pressing the lower face of the part B directly upon the nicely-finished upper rim of the glass tube or nozzle A′ holds the valve tightly closed.

We attach importance to the fact that the center of the diaphragm is thick and that the main portion of this thickness projects below the annular margin, for the reason, among others, that this construction allows much space for the water to approach the center in one arrangement of the flow and to retreat or flow away from the center in the other arrangement.

We attach importance to the fact that while the entire piece B B′, constituting the valve and diaphragm, is elastic, the central portion is harder than the margin, for the reason, among others, that it receives the force of the operating-stem, communicated through the piece I, stiffly and transmits it directly to the bearing-surface below, while the soft margin allows a liberal movement up and down.

We attach importance to the grooves in the interior of the passage *a*, because they allow the cement to take a firm hold of the iron or other material of the casing. We employ a cement which adheres strongly to the glass. If it does not adhere so strongly to the metal, the parts will be retained by the aid of the grooves, which become filled with the cement and lock the nozzle.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. We can make the entire portion B B′ of soft rubber at a single molding operation. By giving increased diameter to the casing of the diaphragm we can make the whole of hard rubber at a single molding. To fully carry out our invention, two materials of differing hardness must be used, the harder constituting the thickened portion at the center and the softer constituting the thin extension at and near the periphery, permanently united by means analogous to welding, so as to constitute a single piece. The material of the other parts may be varied. Porcelain will serve well for the tube or nozzle A′. It is well, but not absolutely essential, to have the exterior of the nozzle ground so as to be true throughout. It may be short, as to not project appreciably below the bottom of the casing A.

The casing A may be of hard or soft brass or white-metal. We propose to use hard rubber in some cases for the casing. The cock may be used in various positions, inclined or vertical instead of horizontal.

Parts of the invention may be used without the whole. We can dispense with the cement E by making the nozzle A′ with a true surface and making the hole in which it sets to exactly correspond.

Instead of molding the soft rubber B′ upon the previously-molded hard rubber B and vulcanizing it in place, some good effect may be obtained by molding it separately and complete, making the inner surface of the soft rubber screw-threaded or of the form required to present surfaces which match fairly to the exterior of the hard-rubber piece and taking care before putting them together to partially dissolve the contacting surfaces by applications of naphtha. Thus conditioned, the parts being applied forcibly together and held together for a sufficient time will serve satisfactorily in many cases; but we prefer molding the soft rubber upon the hard and vulcanizing it in place, as first described.

We claim—

1. In a faucet having an elastic diaphragm and means for operating such to control the flow, the hubbed ring H H′ H² adapted to perform the triple functions of transmitting pressure from the top C for tightly holding the periphery of the diaphragm, guiding an inclosed piece I for transmitting the force of the operating-stem K, and supporting the whole surface of the diaphragm when it has yielded to a certain extent, all combined and arranged to serve substantially as herein specified.

2. In a faucet having an elastic diaphragm and means for operating such to control the flow, the non-corrodible tube or nozzle A′ adapted to serve as specified, a diaphragm formed in one piece, having a thick center and a thin annular extension, the movable piece I transmitting the operating force thereto, and the hubbed ring H H′ H² performing the triple duty of tightly holding and releasing the edge of the diaphragm, guiding the piece I and supporting the diaphragm when the valve is opened, all combined and arranged to serve substantially as herein specified.

3. In a faucet having an elastic diaphragm

and means for operating such to control the flow, the diaphragm constructed with a thick center B and a thin annulus B′ formed in one piece therewith, both parts of elastic material, the central part harder than the margin, all substantially as herein specified.

In testimony that we claim the invention above set forth we affix our signatures in presence of two witnesses.

FELIX STAEDELI.
GUSTAV VOGT.

Witnesses:
JOHN SCHULZE,
GOTTLIEB STAEDELI.