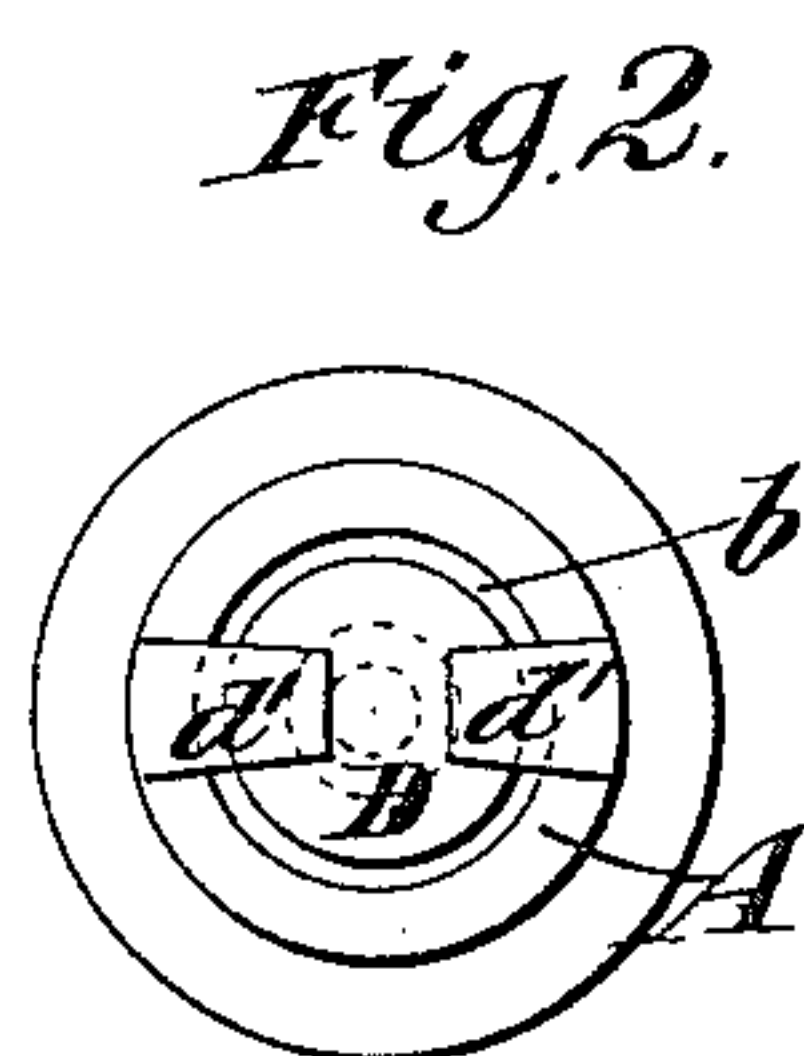
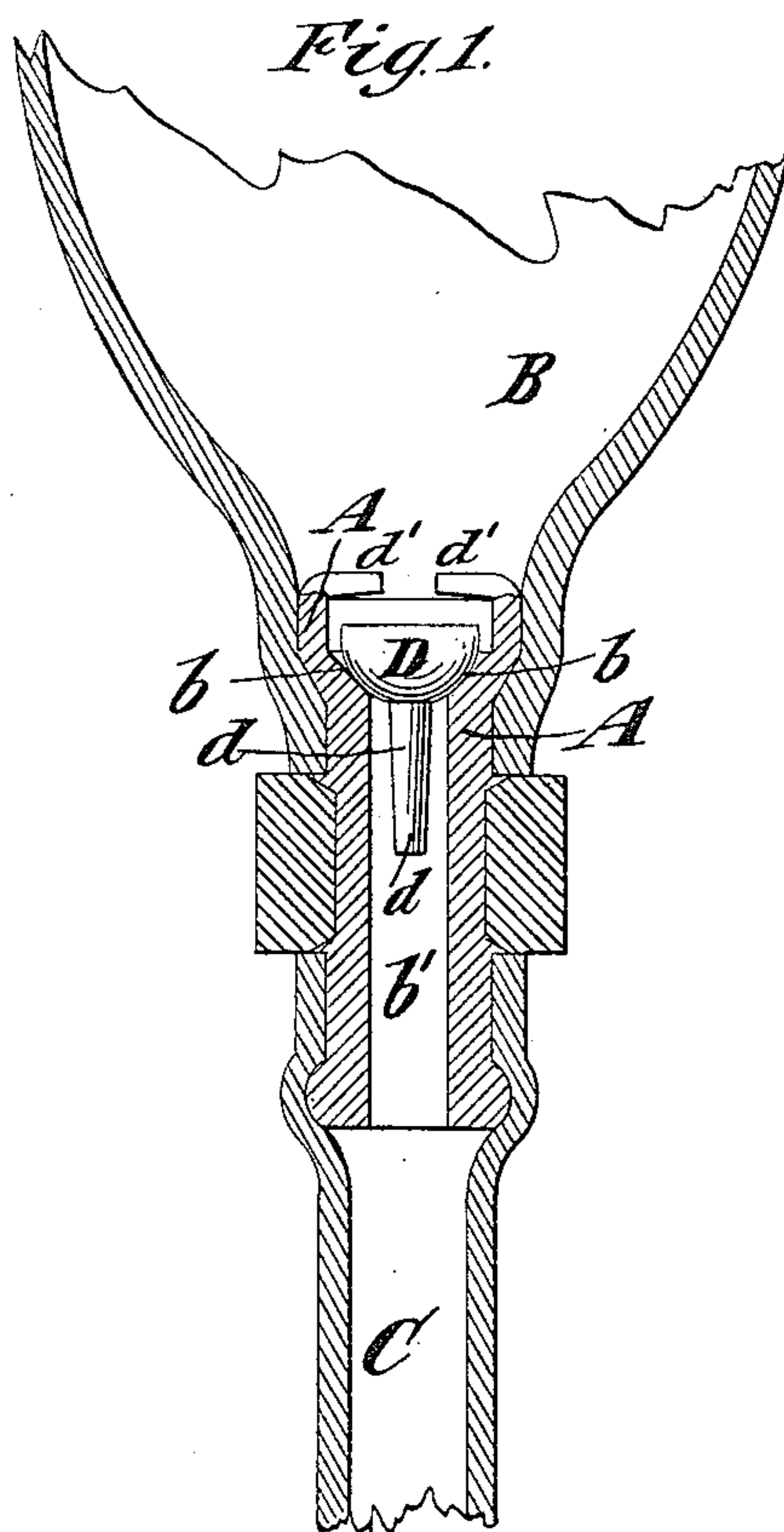


(No Model.)

B. F. SUTTON.
VALVE FOR SYRINGES.

No. 362,678.

Patented May 10, 1887.



Witnesses
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UNITED STATES PATENT OFFICE.

BENJAMIN F. SUTTON, OF BROOKLYN, ASSIGNOR TO PARKER, STEARNS
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VALVE FOR SYRINGES.

SPECIFICATION forming part of Letters Patent No. 362,678, dated May 10, 1887.

Application filed September 20, 1886. Serial No. 214,077. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN FRANKLIN SUTTON, of Brooklyn, in the county of Kings and State of New York, have invented a
5 new and useful Improvement in Valves for Syringes, of which the following is a specification.

My invention more particularly relates to valves such as are employed in syringes, which
10 comprise severally an elastic and compressible bulb and suction and discharge tubes extending in opposite directions therefrom.

In syringes the valve-chambers are commonly made of metal, each having a valve-seat
15 and a passage leading thereto, and the valves have been usually made of loose pieces of metal, which were adapted to close on the seats and which were provided with guiding projections or stems entering the passages below the seats
20 in the valve-chambers and serving to guide the valves. The valve-chambers have also been provided with guards, consisting of prongs or spurs bent inward to overlap the valves, and whereby the valves are held in place in the
25 chambers and prevented from undue movement in opening. Such valves, which have been made of metal, have been comparatively expensive by reason of the necessity of turning or finishing them, in order that they may close
30 tightly on their seats; and whenever it becomes necessary to clean the valves and seats, the guards have had to be bent outward in order to provide for the removal and replacement of the hard unyielding valves. By so bending
35 the guards they soon become broken off.

The object of my invention is to provide a valve for the purpose above described which may be made complete and entirely finished in the operation of molding, and which will require no turning or machine work for completing it, and which may be removed to provide for cleaning and replaced without bending or changing the position of the guards.

The invention consists in the combination,
45 with a valve-chamber for a syringe, constructed with a valve-seat and a passage leading thereto, of a loose valve provided with an integral guiding-stem entering the passage, the valve and its stem being formed integral of yielding or
50 elastic material.

In the accompanying drawings, Figure 1 is

an axial section of a portion of the bulb of a syringe with its suction-tube and the valve-chamber through which the bulb communicates with the suction-tube, and which embodies my
55 invention, and Fig. 2 is a plan of the valve and valve-chamber independent of the other parts.

Similar letters of reference designate corresponding parts in both figures.

A designates the valve-chamber proper, 60 which may be made, by casting, of soft metal, and the soft metal which is commonly employed comprises as an ingredient tin, and will melt at such a degree of temperature that it may be readily cast in iron or other metal molds. 65 The valve-chamber has sprung over it at one end the compressible and elastic bulb B, which is held in place on the end portion of the valve-chamber by its contractile elasticity, and the suction-tube C is held in place by its contractile
70 elasticity upon the other end of the valve-chamber A.

It is of course obvious that tubes or tubular portions with which the valve-chamber is used may be connected therewith in any suitable
75 manner.

The valve-chamber A has formed within it a valve-seat, *b*, and a passage, *b'*, which leads to the valve seat and through which the tube C is in communication with the bulb B. 80

D designates the valve which controls the opening through the passage *b'* and valve-seat *b*, and which is provided with an integral stem or projection, *d*, entering within the passage *b'*, and by which the valve is guided in its
85 opening and closing movements. The valve D is flat or disk-like or of puppet shape, and it and its guiding stem or projection *d* are formed in one integral piece of yielding or elastic material—such, for example, as soft flexible india- 90 rubber; and an important advantage of making the valve of such material is that after being molded in proper shape it may be removed from the mold and used in a valve-chamber to perform its proper functions without any ex- 95 pense of labor in finishing the valve and fitting it for use. The valve being made of such soft and yielding or elastic material, it is not important that the valve-seat *b* should be finely finished, and the valve when made of the material described will close properly and tightly
100 upon the valve-seat, even though the valve-

seat may have imperfections and be not truly and smoothly finished.

In order to prevent too great rising movement of the valve D in opening, I have represented guards for holding the valve in place, and in this example of the invention the guards *d'* consist of projections which are formed integral with the valve-chamber A above the valve-seat *b*, and which, after the valve is inserted in place, may be bent over the valve so as to overlap the same, as shown in Fig. 1, and prevent any such opening or rising movement of the valve as would carry it entirely beyond and out of the way of its seat.

It is frequently necessary to remove the valve from the valve-chamber for cleaning the valve and its seat and the passage *b'*. When the valve is of hard and unyielding material, or even if it consists of a ball of india-rubber, it is necessary to bend outward the guards *d'*, in order to remove the valve, and to bend them back into the position shown after the valve is replaced. Such bending of the guards soon weakens them and they become broken off. When the valve D is of soft and yielding india-rubber, it may be readily changed in shape so that it may be crowded past the guards *d'* in removing and replacing it, and may be therefore so removed and replaced without bending the guards *d'*.

I am aware that a pump-valve has been made of india-rubber and has been provided with a metal stem shouldered and passing through the valve and a top plate thereon and secured in

the valve by a nut, the valve being held in place by a flexible strap connected at the ends to the piece on which the valve seats and at the middle of its length to the valve.

I am also aware that a solid ball-valve of india-rubber has been confined by guards; but, being solid, it could not be so changed in form as to pass the guards. My valve D and its stem *d* are both made in one integral piece of elastic or yielding material, and consequently the valve and the stem are capable individually of yielding, and the stem has a yielding connection with the valve. The guards *d'* are rigid; but the valve, being of flat disk-like or puppet form, may be so bent and changed in shape as to pass the guards, and may thus be removed from and replaced in a working position without bending the guards or changing their position.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination, with a valve-chamber, A, for a syringe, constructed with a valve-seat, *b*, and a passage, *b'*, leading thereto, of a loose valve, D, provided with an integral guiding-stem, *d*, entering the passage, the valve and its stem being formed integral of yielding or elastic material, substantially as and for the purpose herein described.

BENJAMIN F. SUTTON.

Witnesses:

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