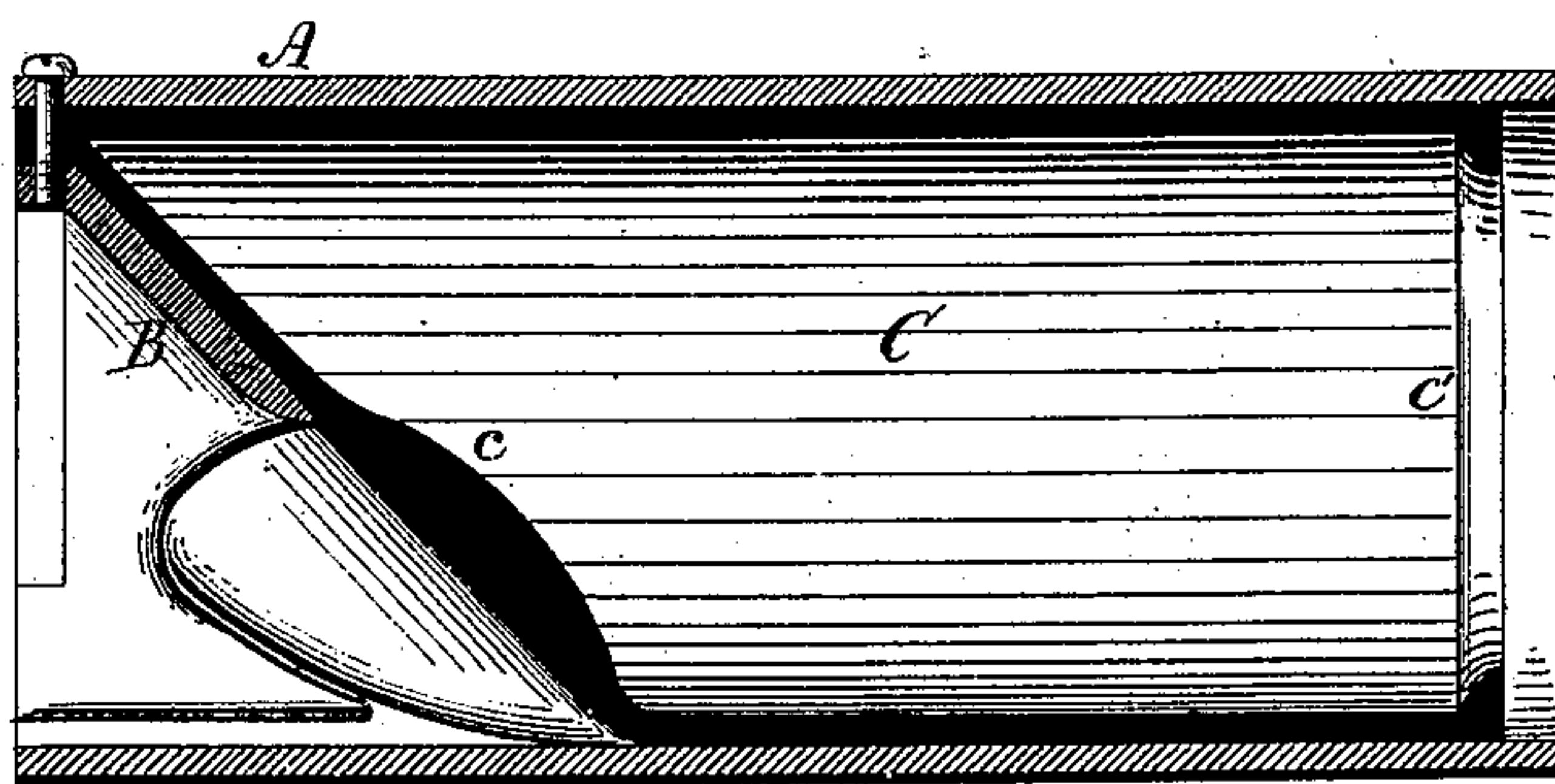
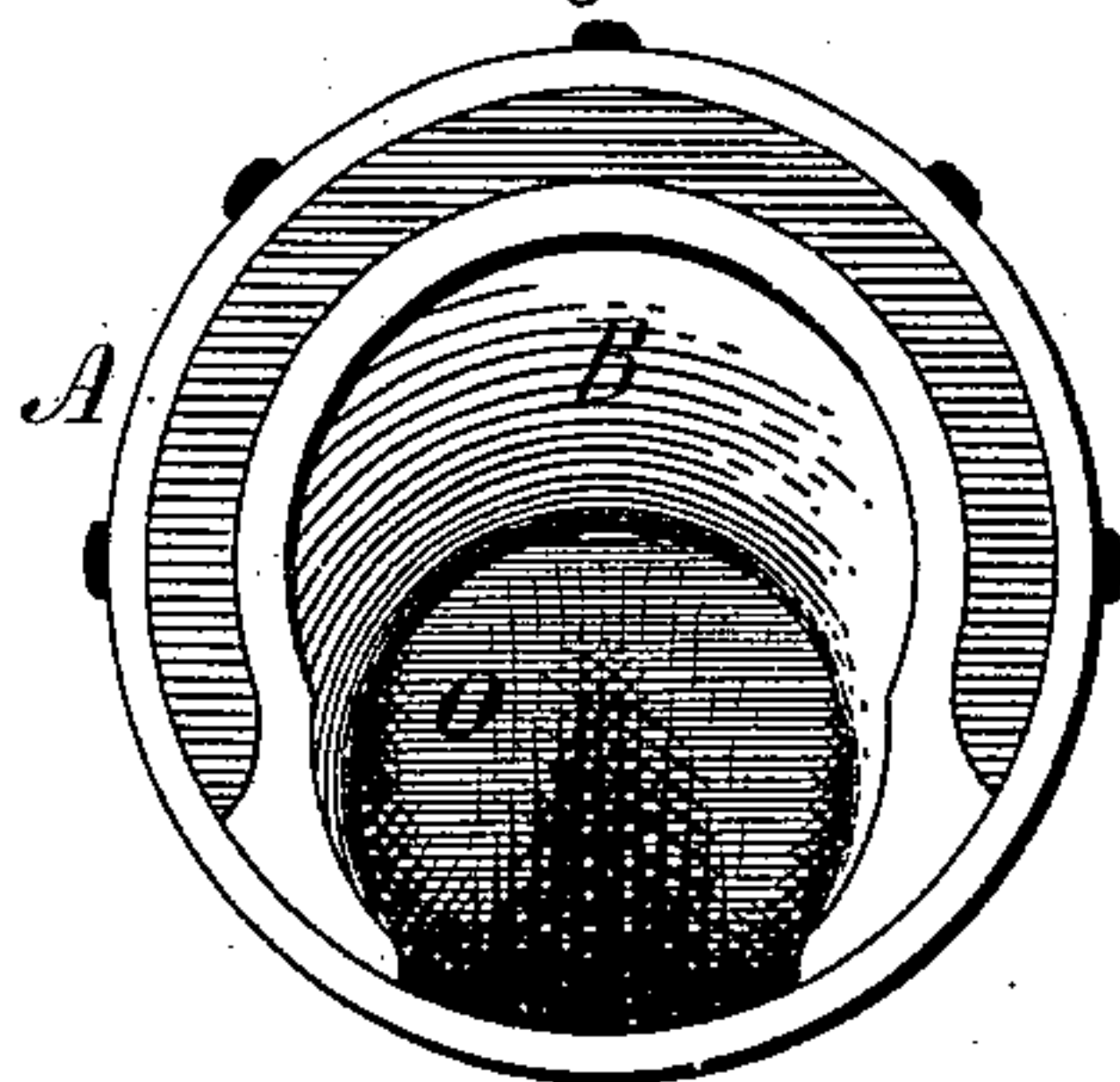


A. W. JOHNSON.  
Compressible Pump and Check Valves.  
No. 201,880.                      Patented April 2, 1878.

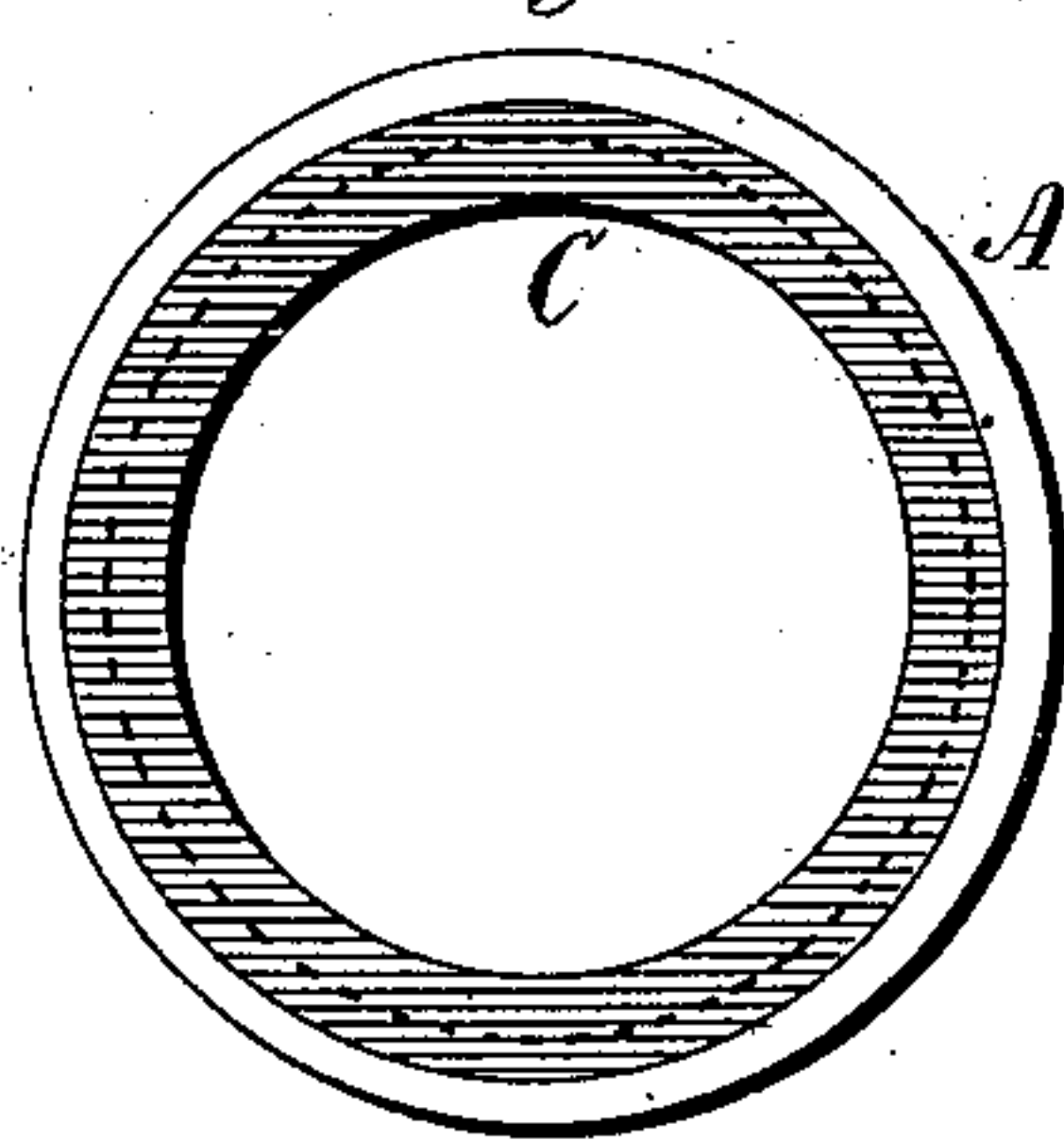
*Fig. 1*



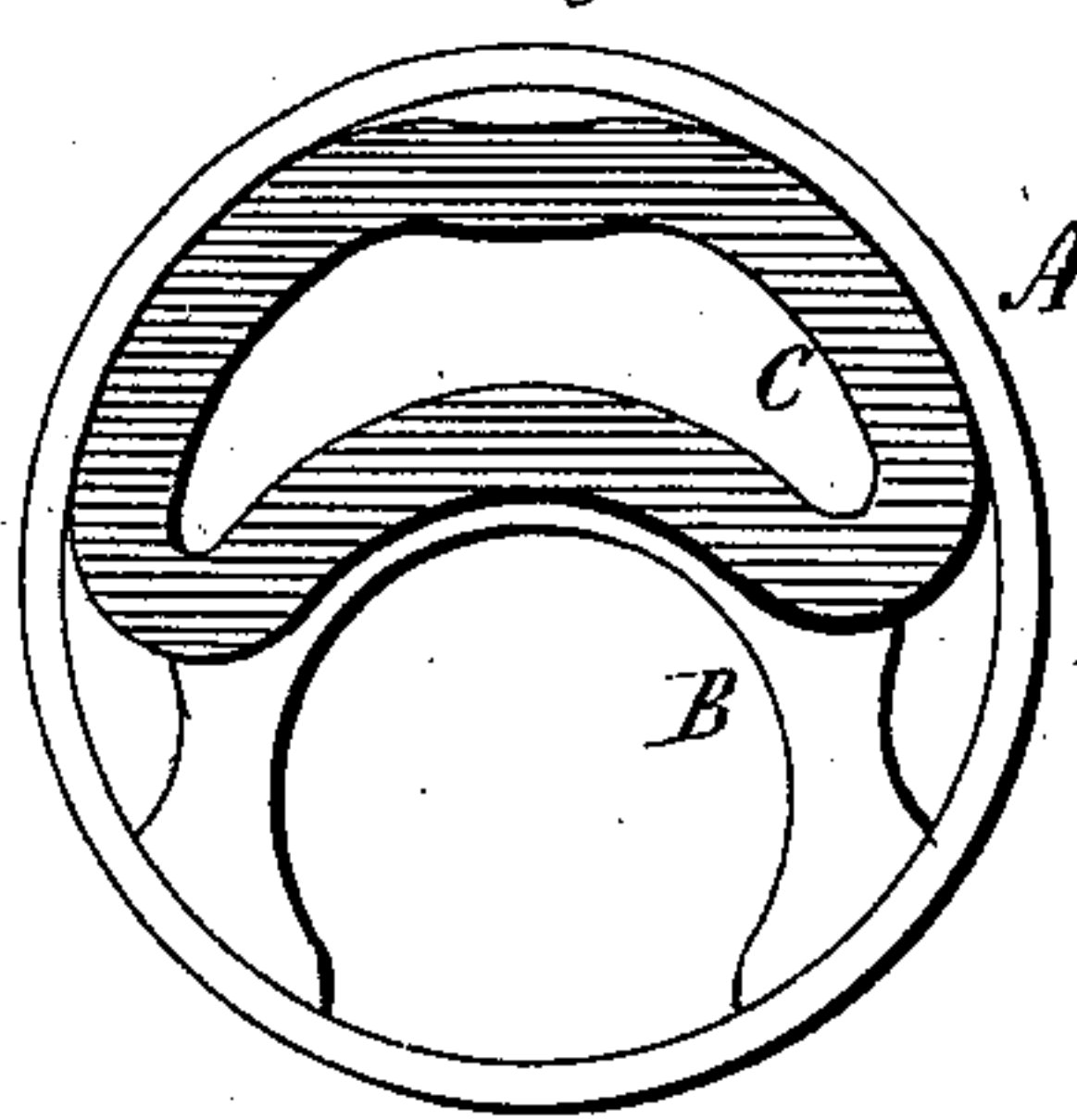
*Fig. 2*



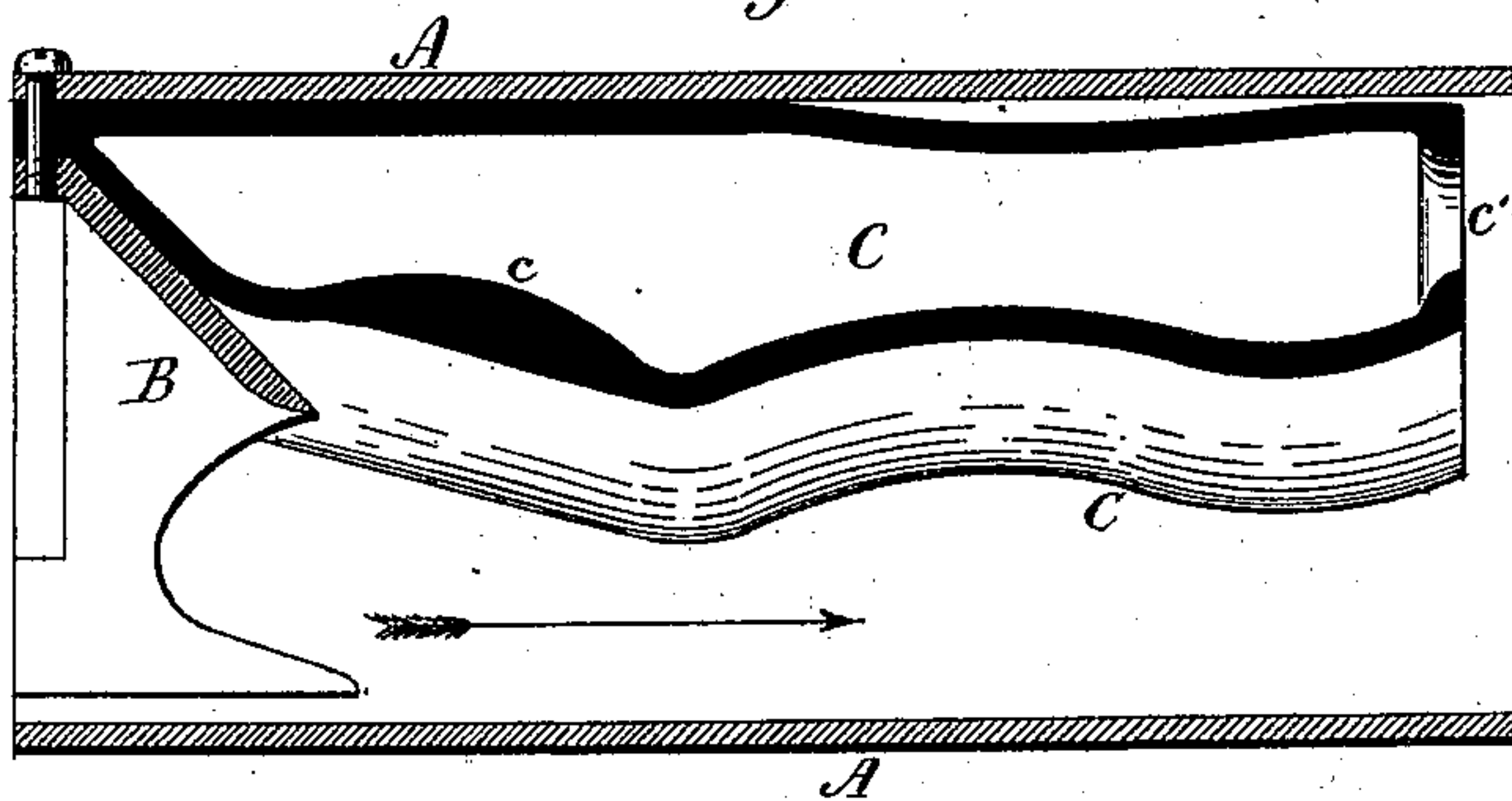
*Fig. 3*



*Fig. 5*



*Fig. 4*



*Witnesses.*  
*Joseph R. Johnson.*  
*Shaler W. Hedge.*

*Inventor.*  
*Albert W. Johnson.*



# UNITED STATES PATENT OFFICE.

ALBERT W. JOHNSON, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO EDWIN F. MERSICK, HOBART B. BIGELOW, AND FREDERIC IVES, OF SAME PLACE.

## IMPROVEMENT IN COMPRESSIBLE PUMP AND CHECK VALVES.

Specification forming part of Letters Patent No. 201,880, dated April 2, 1878; application filed October 6, 1877.

*To all whom it may concern:*

Be it known that I, ALBERT W. JOHNSON, of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Valves; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention is in the nature of an improvement in tubular elastic valves which collapse to permit the passage of fluid or other matter between the exterior surface of the collapsed valve and the interior surface of the pipe which incloses the valve, and upon or against which it seats when closed. (A valve of this kind is described in Letters Patent of the United States granted to myself and Horace A. Nettleton, and issued on the 15th day of June, 1875.)

The invention consists in a projecting flange, of metal, of suitable form, firmly secured within and to the pipe containing the collapsible tubular valve, in such a position as to form a seat for a portion of its closed end; in strengthening the port-closing portion of the valve by a conoidal protuberance upon its inner surface of the elastic material of which the valve is made; and in strengthening the open end of said tubular valve by a rib or ring of elastic material extending around its inner surface in a plane practically at right angles to the valve-opening.

This valve is designed more particularly for use in pumps for pumping the contents of privy-vaults, cess-pools, and other semi-liquid matter containing solid substances, and is intended to be nearly in a horizontal position when in use, the valve-port being partially bounded by the lower inner surface of the pipe containing the valve, and practically on a line with the suction and discharge pipes. In performing this class of work it is essential that the valve, when open, should afford a straight, clear, and unobstructed passage-way or opening, the diameter of which is not less than that of the suction-pipe through which the material being pumped is drawn; and this requisite is secured in this case by making the

tubular elastic valve considerably larger in diameter than the suction-pipe, while its efficiency for packing closely over and around any solid substance which may temporarily stop between it and its seat is also increased by reason of a greater amount of elasticity thus obtained.

In the accompanying sheet of drawings, Figure 1 represents a longitudinal vertical section of one of my improved valves; Fig. 2, the rear or closed end of same, showing the projecting flange, and also the valve-port; Fig. 3, the front or open end of same. Fig. 4 represents a longitudinal vertical section of one of my improved valves open or collapsed; Fig. 5, a front-end view of same.

Similar letters of reference indicate like parts in the several figures.

A indicates a pipe containing my improved valve: B indicates a projecting metal flange, securely fastened within the pipe A, and forming a seat for a portion of the closed end of the tubular elastic valve C. *c* indicates a conoidal protuberance upon the inner surface of the port-closing portion of the valve C, strengthening that part of the valve against the backward pressure when operating as a check. *c'* indicates an elastic rib formed around the inner surface of the valve at its open end, and which is preferably made of the same material as the valve, and solid therewith, but may be a separate elastic ring inserted therein. Its object is to strengthen the open end of the valve, and cause it to close more promptly by its inherent elasticity than it otherwise would. O indicates the valve-port, bounded in part by the flange B.

The operation of my improved valve, when fitted to and used in a pump, is as follows: The movement of the pump-piston or other exhausting and compressing device in one direction causes the valve to collapse, and the material being pumped to flow through between the outer surface of the collapsed valve and the inner surface of the pipe containing the valve, in the direction indicated by the arrow in Fig. 4, while at the reverse motion of the piston the valve instantly expands by its own inherent elasticity to its first position, as shown in Fig. 1, its outer surface coming in close con-



tact with and seating against the inner surface of the inclosing-pipe A and projecting flange B, thus forming a most effectual check-valve.

It is obvious that the greater the pressure within the tubular elastic valve the more firmly it will be held against the inner wall of the pipe A, and also against the projecting flange B, whose office is to re-enforce that portion of the closed end of the valve covered by said flange.

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

1. In combination with a tubular elastic valve, a fixed projecting metal flange, forming

a seat for a portion of the closed end of said valve, substantially as and for the purpose described.

2. In a tubular elastic valve, a conoidal protuberance of its elastic material upon the inner surface of its port-closing portion, substantially as and for the purpose described.

3. In a tubular elastic valve, an elastic rib extending around the inner surface of the valve at its open end, substantially as shown and described, and for the purpose specified.

ALBERT W. JOHNSON.

Witnesses:

JOSEPH R. JOHNSON,  
SHABE W. HODGES.