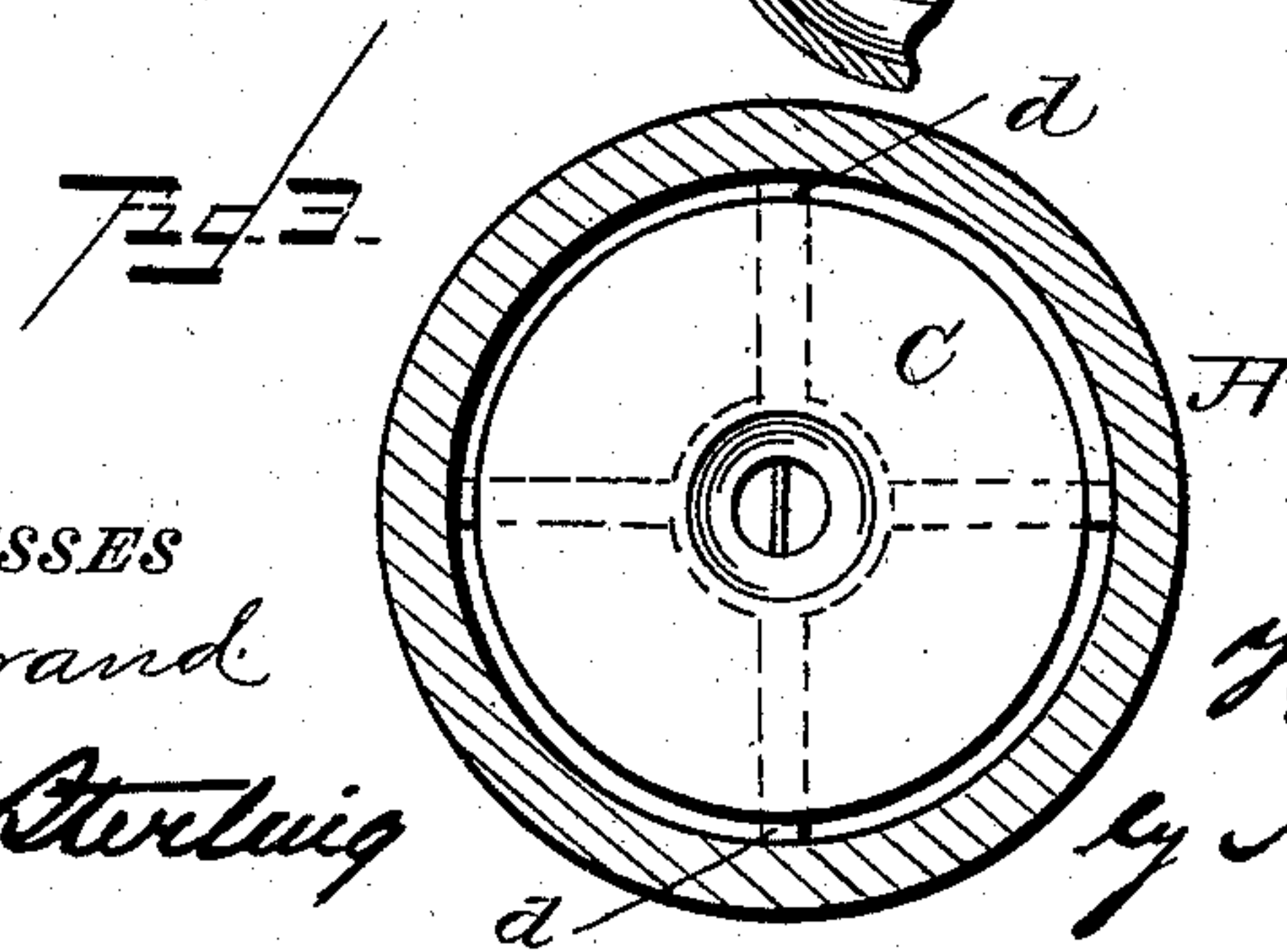
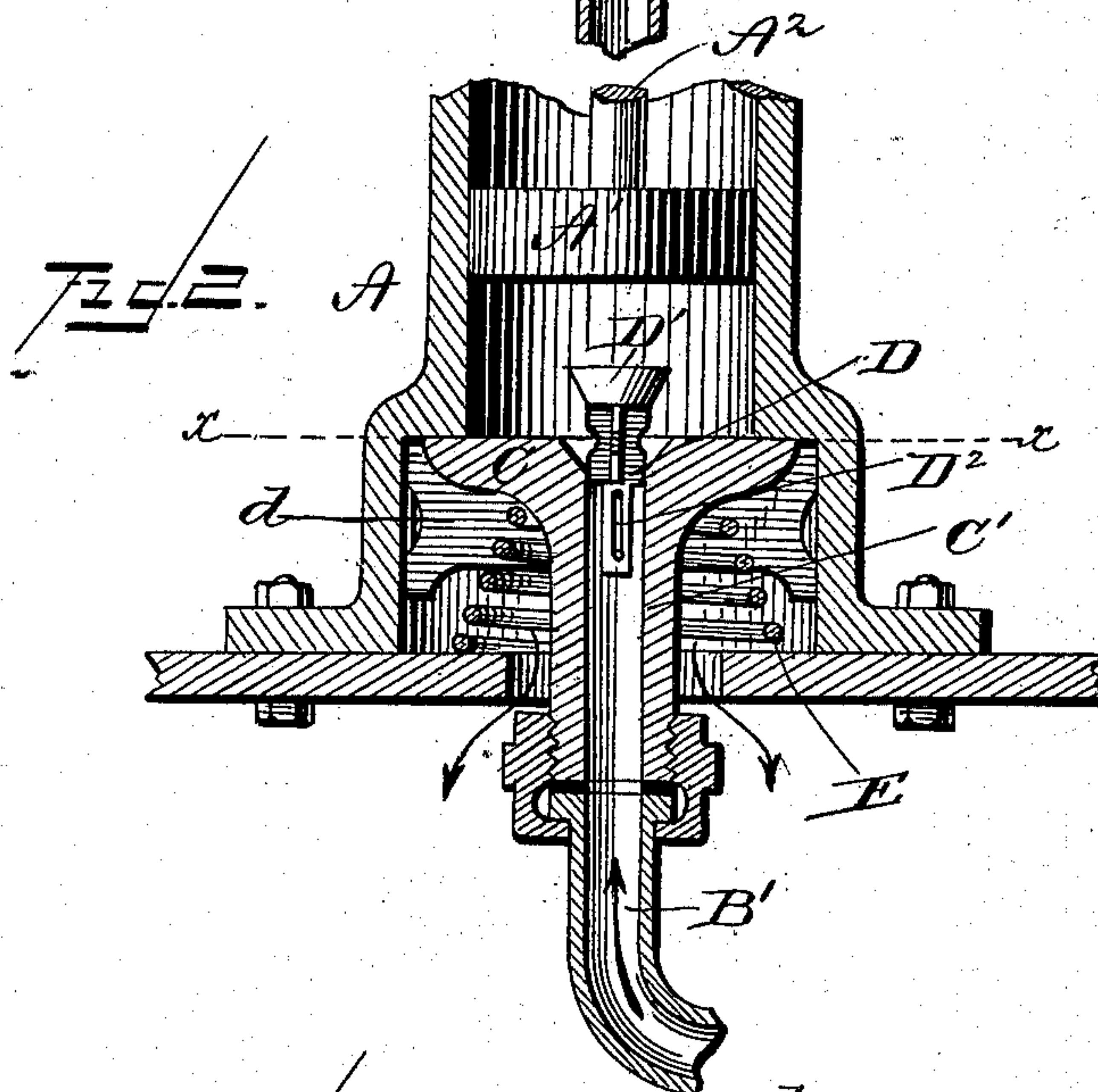
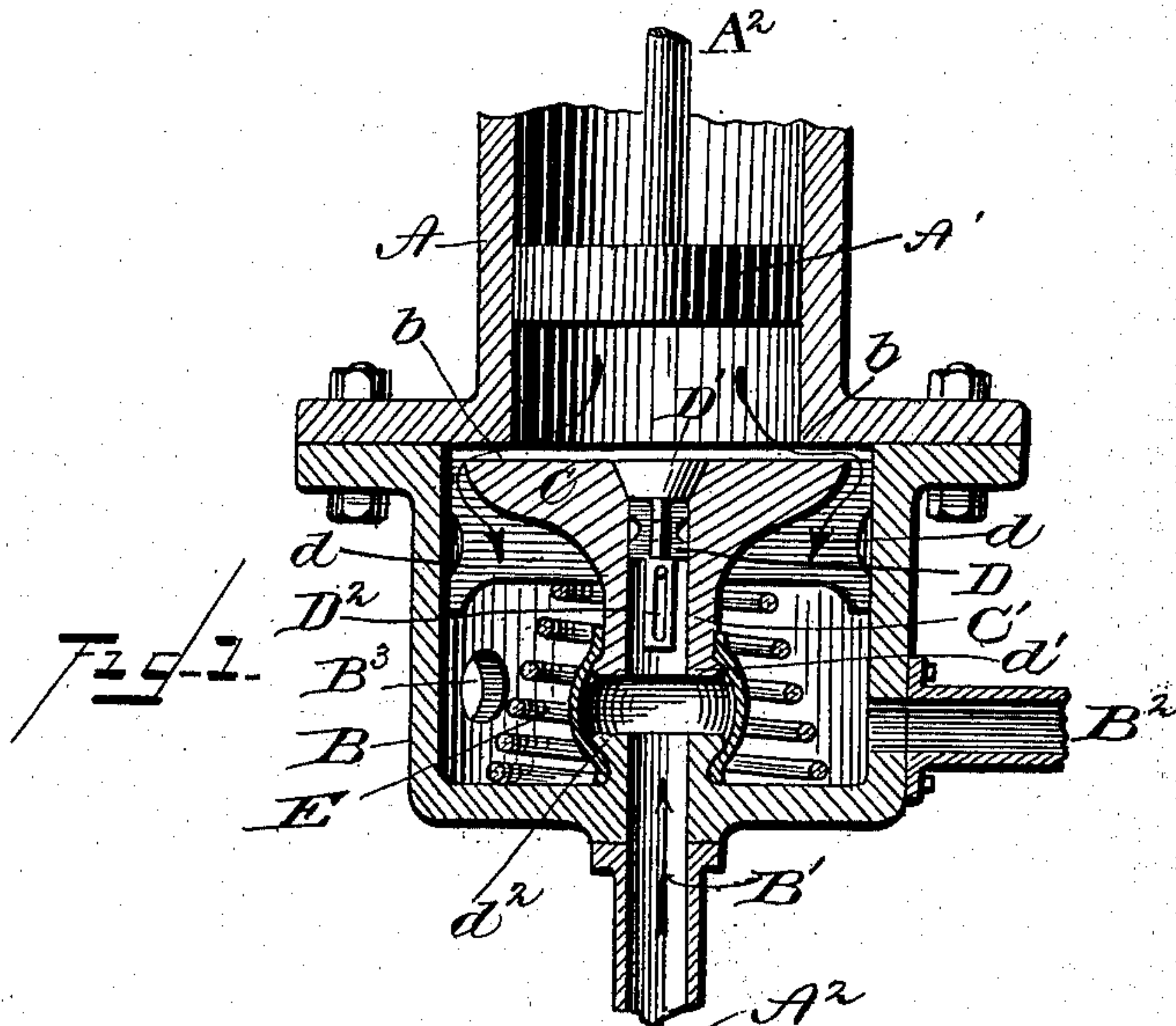


(No Model.)

H. VON BAYER.
AIR OR VAPOR PUMP.

No. 410,052.

Patented Aug. 27, 1889.



WITNESSES
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UNITED STATES PATENT OFFICE.

HECTOR VON BAYER, OF WASHINGTON, DISTRICT OF COLUMBIA.

AIR OR VAPOR PUMP.

SPECIFICATION forming part of Letters Patent No. 410,052, dated August 27, 1889.

Application filed March 19, 1889. Serial No. 303,845. (No model.)

To all whom it may concern:

Be it known that I, HECTOR VON BAYER, of Washington, in the District of Columbia, have invented new and useful Improvements in Air or Vapor Pumps, of which the following is a full and exact description, reference being had to the accompanying drawings, making part of this specification.

The invention relates to improved valves for air and vapor pumps in which the combined inlet and delivery valves cover the whole area of the end of the pump-cylinder and are inclosed within a chamber, and in which the inlet-valve is seated within the delivery-valve, and the delivery-valve provided with a hollow stem, through which and the inlet-valve the air or vapor enters the pump-cylinder. These pumps as heretofore constructed and arranged to prevent the compressed air or vapor in the chamber from re-entering the pump-cylinder through the hollow stem of the delivery-valve have had the stem mounted to move in a cylinder or sleeve, with the cylinder or sleeve to project into or beyond the chamber, but in these a packing was necessary, and this packing caused more or less friction and rendered the working of the valve under low pressure ineffective.

To remedy this defect or overcome the difficulty heretofore experienced is the object of my invention; and to this end the invention consists in the construction hereinafter described and claimed, embodying a yielding elastic or flexible connection between the suction-pipe and delivery-valve, whereby the packing may be dispensed with and a free movement of the valve obtained.

In the accompanying drawings, Figure 1 is a transverse sectional view showing the improvement applied to a vapor-pump or for compressing air. Fig. 2 is a similar view of the device when applied to air-pumps proper, wherein the device is used to pump air or to produce a vacuum. Fig. 3 is a horizontal section through the line X X, Fig. 2.

In the drawings only the lower end of the pump-cylinder A is shown with the piston-head A' and a portion of the rod A², and which parts may be constructed in any usual or preferred way. To the lower end of this cylinder is connected the closed chamber B,

which chamber is provided with an inlet-opening B' and a delivery pipe or outlet B². This chamber is provided with a hand-hole B³ for affording access to the interior of the same, and which is closed by the usual form of cover. The diameter of the inner circumference of the chamber B is larger than that of the cylinder, as shown at b, to form a seat for the delivery-valve, as hereinafter referred to.

Within the chamber B is mounted the delivery-valve, consisting of the circular head C and the hollow stem C'. The diameter of the head is made sufficiently smaller than the inner diameter of the chamber to permit the escape of the air or vapor when the valve is forced from its seat by the action of the piston, said seat being formed by the projecting portion b of the cylinder B, before referred to: Radial ribs d project from the outer face of the delivery-valve, having their outer edges to engage the inner face of the chamber, and by such engagement to guide and hold the valve in proper working position.

Within the hollow stem of the delivery-valve is mounted the inlet or suction valve, which valve consists of a shank portion composed of radial arms D and a tapering or conical head D', which head fits in a tapering or conical recess, forming the seat for the valve. A pin or rod D², provided with an elongated slotted opening, projects from the lower end of the shank portion, which slot is engaged by a pin passing through the walls of the stem of the delivery-valve and by such engagement to limit the upward movement of the valve, or prevent the same being drawn too far out by the suction. The lower end of the stem of the delivery-valve is provided with an annular flange d', and the portion of the inlet-pipe that extends into the chamber is provided with a similar flange d², and to which flanges are connected the ends of a flexible tube—such as rubber hose—and by means of which connection to form a tight but flexible connection between the said parts, which form of connection permits the delivery-valve to move freely in the chamber, and at the same time form such a connection between the pipes as to prevent the return of any air or vapor back into the pump. The

connection may be of the material and construction above described, or may be in the form of a coiled flexible metal pipe, as shall be found most desirable. A spiral spring E
 5 surrounds the stem and engages the radial ribs *d* and the bottom of the chamber B, the tension of which spring is regulated or adjusted to hold the valve to its seat with sufficient force for the proper action of the valve.
 10 As has before been stated, the end of the cylinder forms the seat for the delivery-valve, and the inlet-valve is seated in the hollow stem, and the parts operate in the following manner: The pipe B' being connected with
 15 the source of supply and the pipe B² with the receiver, the piston-rod is reciprocated. As the same moves away from the valves it produces a vacuum in the cylinder, which causes the air or vapor to flow in and fill the
 20 cylinder, raising the valve D from its seat. Upon a reversal of the piston the air is compressed and forces the valve D to its seat, and by a continued compression of the air acting to overcome the tension of the spring E
 25 and to force the delivery-valve from its seat and allow the escape of the air or vapor into the chamber B, and to pass through the outlet B² to the receiver in a manner that will be readily understood.
 30 In Fig. 2 the device is shown applied where it is used only to pump air or create a vacuum, in which case the chamber B is formed as a part of the pump-cylinder A, and rests or is connected with a suitable base, and in
 35 which case the stem of the delivery-valve ex-

tends through an enlarged opening in said base G, which opening is of sufficient size to provide a passage for the escape of air from the chamber. In this case the stem of the delivery-valve is provided with a suitable
 40 screw-threaded end, and has the supply-pipe connected thereto through an ordinary pipe-coupling, which pipe may be formed of any desired material or in any preferred manner to allow of the movement of the delivery-
 45 valve.

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

1. The combination of the pump-cylinder 50 having the chamber at the end thereof, a delivery-valve provided with the hollow stem in which the inlet-valve is located, and a flexible air-tight pipe to form a connection between the hollow stem of the delivery-valve 55 and the source of supply, substantially as and for the purpose set forth.

2. In an air or vapor pump having the valves located one within the other and arranged at the end of the pump-cylinder with- 60 in a chamber, an elastic or flexible air-tight pipe connecting the hollow stem of the discharge-valve with the suction-pipe, substantially as described.

In testimony whereof I have hereunto set 65 my hand this 18th day of March, A. D. 1889.

H. VON BAYER.

Witnesses:

ALEX. MAHON,
 WARREN C. STONE.