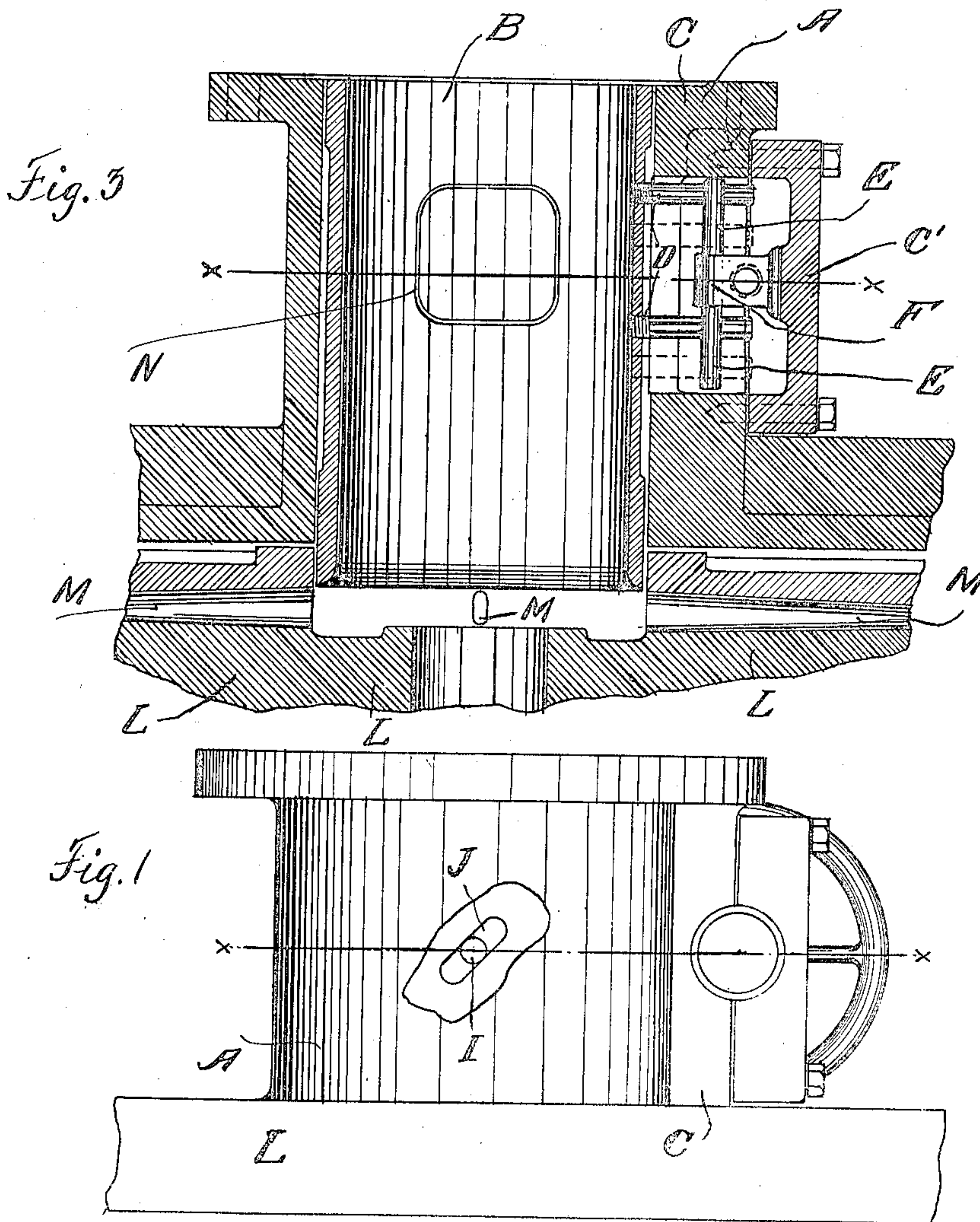


S. V. TRENT.
CUT-OFF VALVE FOR CENTRIFUGAL PUMPS.
APPLICATION FILED JAN. 6, 1908.

921,916.

Patented May 18, 1909.
2 SHEETS—SHEET 1.



WITNESSES:

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Otto Will

Simon V. Trent

INVENTOR.

BY

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Fig. 4

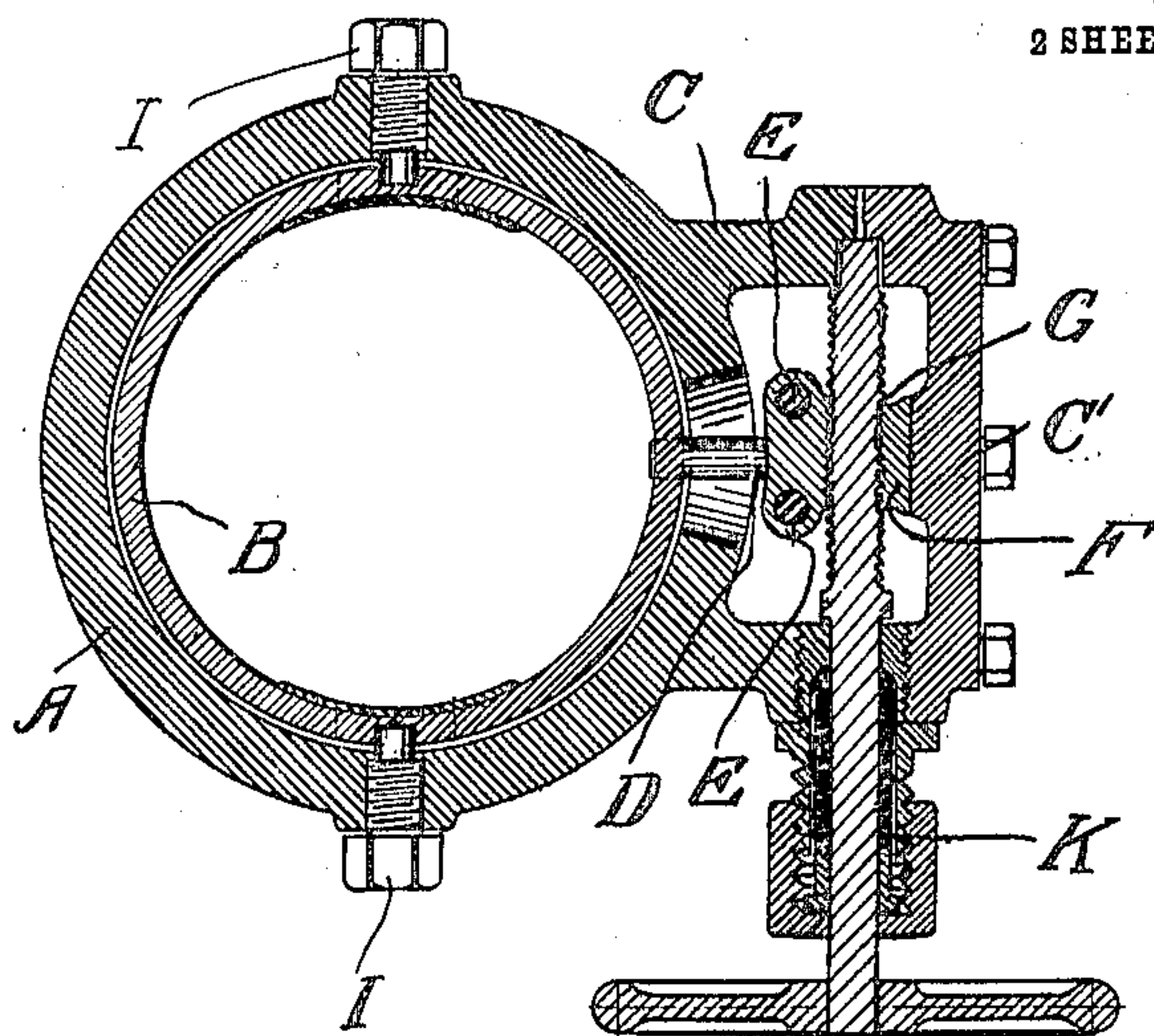
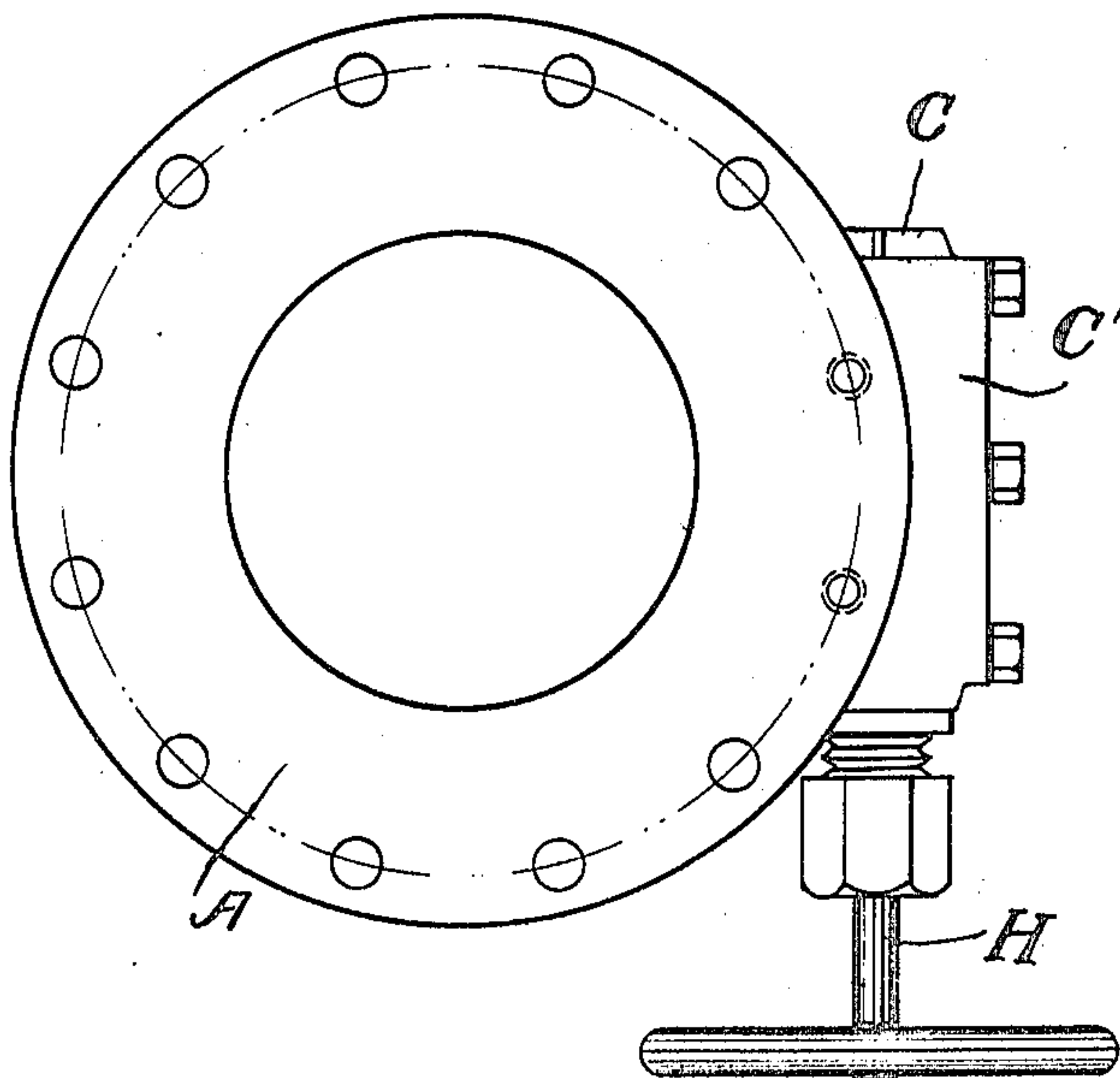


Fig. 2



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UNITED STATES PATENT OFFICE.

SIMEON V. TRENT, OF SALT LAKE CITY, UTAH.

CUT-OFF VALVE FOR CENTRIFUGAL PUMPS.

No. 921,916.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed January 6, 1908. Serial No. 409,563.

To all whom it may concern:

Be it known that I, SIMEON V. TRENT, a resident of Salt Lake City, Salt Lake county, State of Utah, have invented a new and useful Improvement in Centrifugal Pumps Used for Pumping Liquids, of which the following is a specification.

My invention is an adjustable cut-off valve, for controlling the volume of water delivered by a centrifugal or turbine pump, and can be adjusted either when the pump is at rest or in operation.

The intention of the drawings is to show a partial view of a centrifugal pump and to bring out more particularly the portion of the pump called its suction passage, which is the passage connecting the usual vertical suction pipe with the intake or suction connection to the pump itself.

Figure #1 is an outside elevation with a portion cutaway to show a portion of the means for operating the valve. Fig. #2 is an outside end view (of the same portion of the pump showing a flange by means of which the usual suction pipe or elbow is connected to the suction passage of pump, this flange connection showing 12 bolts. The top portion of the view represents the end view of the valve chest.) Fig. #3 is a longitudinal section and a portion of the pump impeller. Fig. #4 is a vertical transverse section on the line X X of Fig. #3, and Fig. 1.

This invention is based upon the well-demonstrated principle that the capacity of any turbine or centrifugal pump is determined in the first instance by the cross-section or area of the intake passage or passages formed by or in the pump impeller, consequently a method devised which successfully enlarges or restricts the area of those passages must vary accordingly the volume of water which the pump will deliver. This, of course, is quite apart from consideration of the speed, which is the second factor in determining the volume of water delivered.

In Fig. #3 is shown a vertical section view of the suction passage A of a centrifugal pump. The inside of this suction passage is fitted with an independent lining or cylinder B, of corresponding shape. This internal cylinder is provided with means for its partial rotation, the rotation being effected in such a manner that in addition to partly rotating or revolving this cylinder it propels it forward toward the other head or drive head of the pump. In doing this it at

once commences to partly shut off the intake to the passages M through the impeller L and if this motion is continued far enough it will finally close said intake passage completely, thereby causing the pump to cease delivering water. This valve cylinder is made so as to move freely inside of the suction passage and is, of course, concentric with it.

The combined rotary and forward movement of this cylinder is accomplished in the following manner: In the first place, there is a valve chest or chamber C, cast integral with the suction chamber but on top of it and having its own independent and removable cap or cover C'. Screwed into the top side of the valve cylinder B, are two vertical pins D, D. Lying crosswise and each side of these two vertical pins D, D, are disposed two horizontal bars E, E. These two bars are carried in a nut F, which nut is provided with a transverse threaded hole G, and is propelled backward and forward by means of the screw upon the horizontal valve shifter H, engaging the threads in nut F. When so propelled these horizontal bars E, E, throw the vertical pins D, D, backward or forward from their vertical position which produces the revolving action in the valve cylinder B. The lateral motion is produced by means of pins or bolts I, I, one each on opposite sides of the suction passage A, the ends of which project into diagonal slots J, J, in the valve cylinder B. Said slots being so disposed that when the valve cylinder B begins to revolve it is at the same time forced forward toward the center of the impeller L, by means of the slots pressing against the two fixed pins I, I, which project through the walls of the suction passage A. In this way any mechanism or obstruction to the interior of the suction passage is entirely avoided, and the mechanism for actuating the valve is assembled in the valve chest C above the suction chamber and entirely out of the course of the flow of water through the pump.

The horizontal and threaded valve shifter H whose end projects through the valve chest is of course properly fitted with a stuffing box K in order to prevent any possibility of a leakage of air into the valve chest and thence into the suction passage, which, if it occurred, would, of course, interfere with the successful operation of the pump.

The method herein described and illustrated simply shows one method of operating the valve cylinder. Other means may be de-

vised for imparting a similar movement to the cylinder and I do not restrict the application of this valve to any particular form of actuating mechanism but claim, broadly, the application of a valve of this type or form no matter how actuated as applied to all centrifugal pumps.

Having thus described my invention I desire to secure by Letters Patent—

10 1. The combination with a centrifugal pump having a suction passage and a rotary impeller provided with a suction recess communicating with the suction passage, said impeller having discharge passages extend-
15 ing outwardly from said suction recess, of means for enlarging or restricting the area of the receiving ends of the discharge passages of the impeller.

20 2. The combination with a centrifugal pump having a suction passage and a rotary impeller provided with a suction recess communicating with the suction passage and having discharge passages extending out-
25 wardly from said suction recess, of valve mechanism consisting of a valve mounted in the suction passage and movable in the suction recess of the impeller to enlarge or restrict the area of the receiving ends of the discharge passages of the impeller.

30 3. In combination with a centrifugal pump embodying a suction passage and a rotary impeller having a suction recess from which outwardly extend discharge passages, a cylindrical valve arranged in the suction pas-
35 sage and extending into the suction recess, a spiral pin and slot connection between the valve and wall of the suction passage, the suction passage having a slot in a side there-
40 of, a projection on the valve extending through said slot, a bar arranged at an angle to the projection aforesaid, and a screw oper-

atively connected with the bar to move the same in engagement with the projection on the valve, whereby rotary and longitudinal movement of the valve may be effected. 45

4. In combination with a centrifugal pump comprising a suction passage and a rotary impeller, the latter being formed with a suction recess communicating with the suction passage and having outwardly extending dis- 50
charge passages leading from said recess, a casing applied to the outer wall of the suction recess, a valve mounted in the suction pas-
55 sage and having one end extending into the suction recess of the impeller, a spiral pin and slot connection between the valve and the wall of the suction passage, projections ex-
tending from the valve through the wall of the suction passage into the casing above re-
ferred to, spaced bars in the casing and be- 60
tween which the outer ends of the projections are received, a nut carrying said spaced bars, and a screw mounted in the casing and con-
65 nected with the nut to actuate the same and thereby effect turning and longitudinal movement of the valve in the suction pas-
sage.

5. In the class of pumps described, the combination with an inner cylinder located within the suction passage and provided 70
with a slot in its wall inclined to a line parallel with the axis, of a stationary pin extending into the slot, a projection attached to the cylinder, two bars to operate the projection in a direction transverse to the axis, a mem- 75
ber carrying the bars, and a shifter to operate said member.

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Witnesses:

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