G. E. NYE.

STEAM VACUUM PUMP.

APPLICATION FILED APR. 5, 1909.

944,984.

Patented Dec. 28, 1909.

Fig. 1

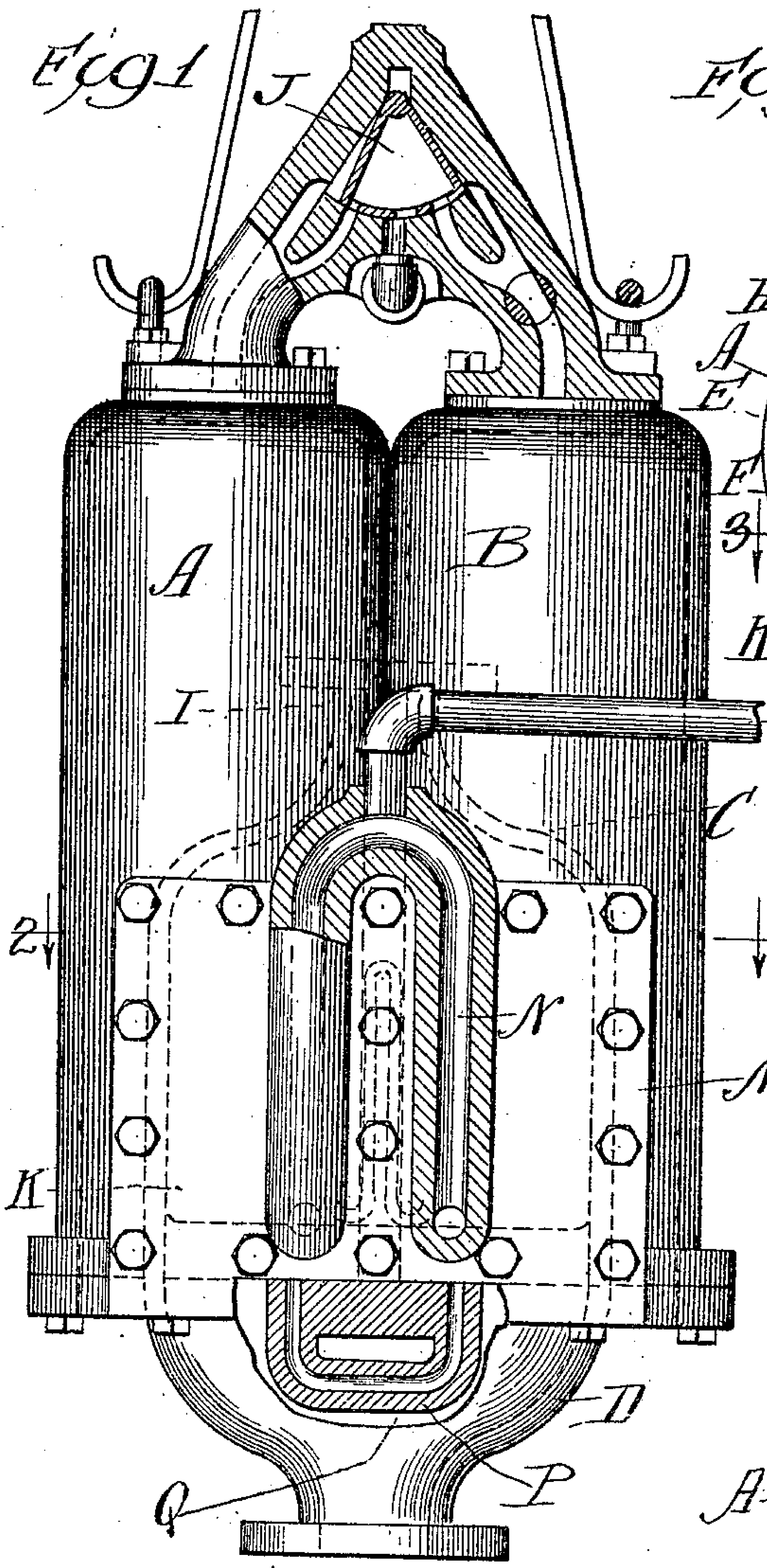


Fig. 2

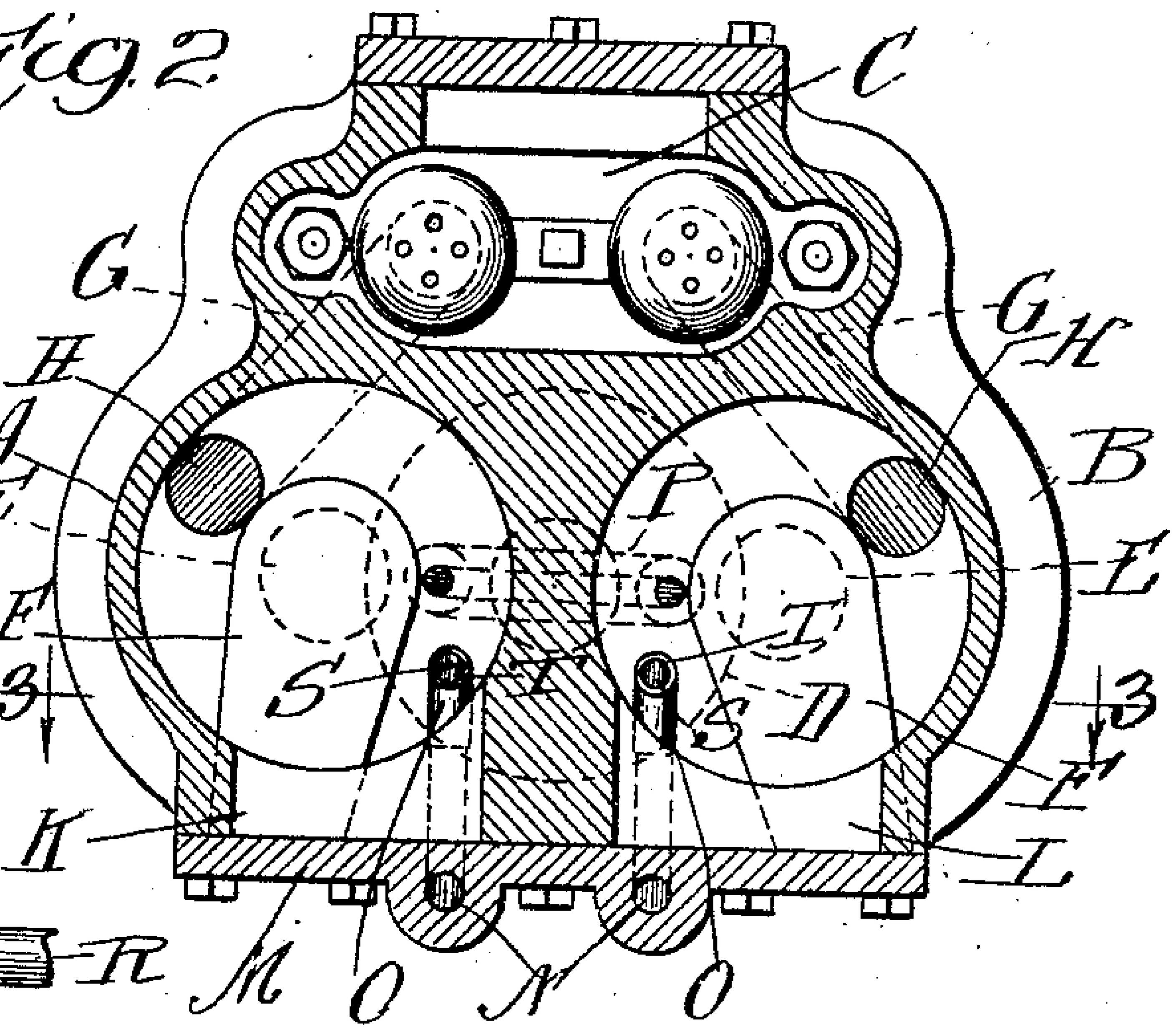


Fig. 3

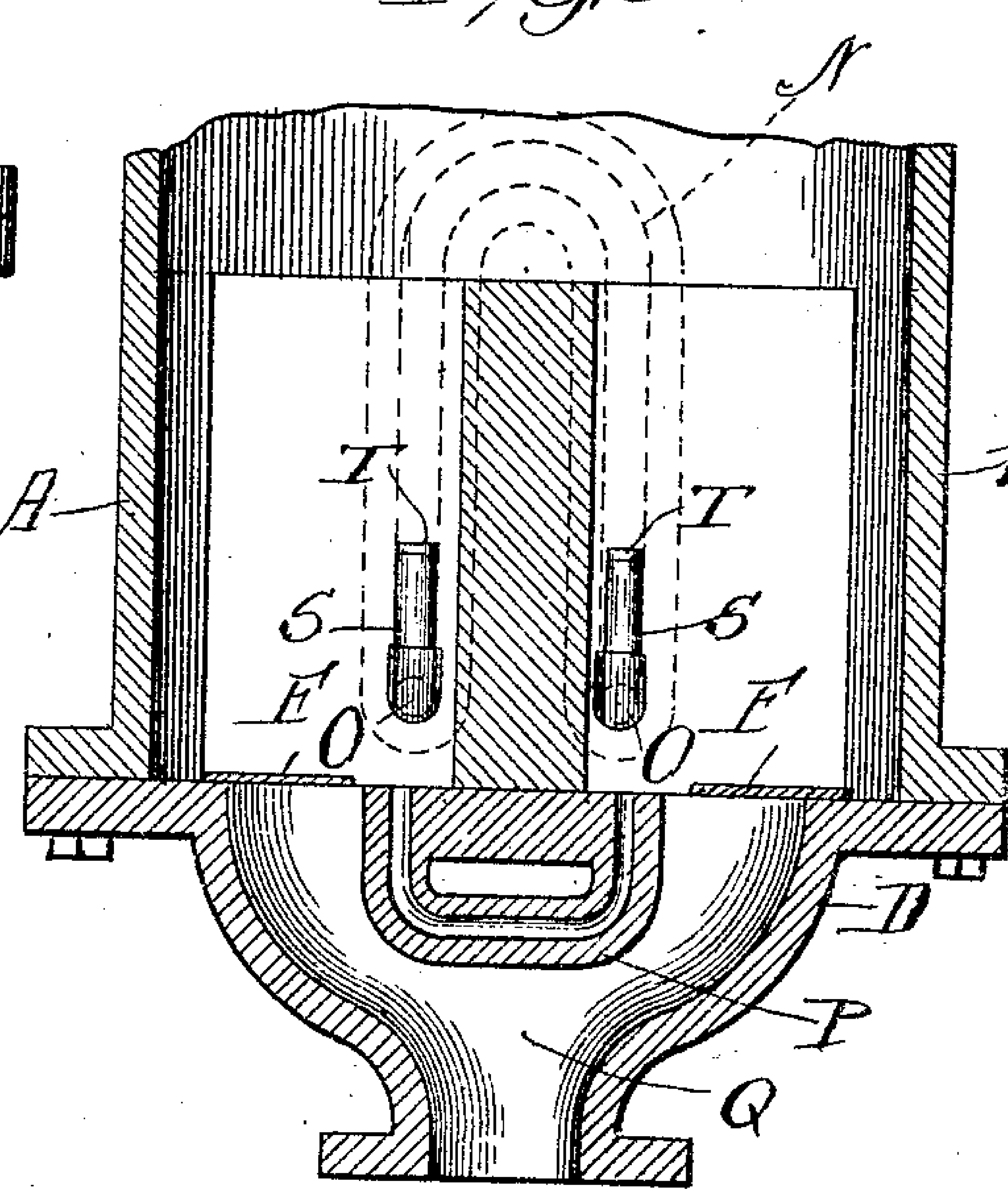
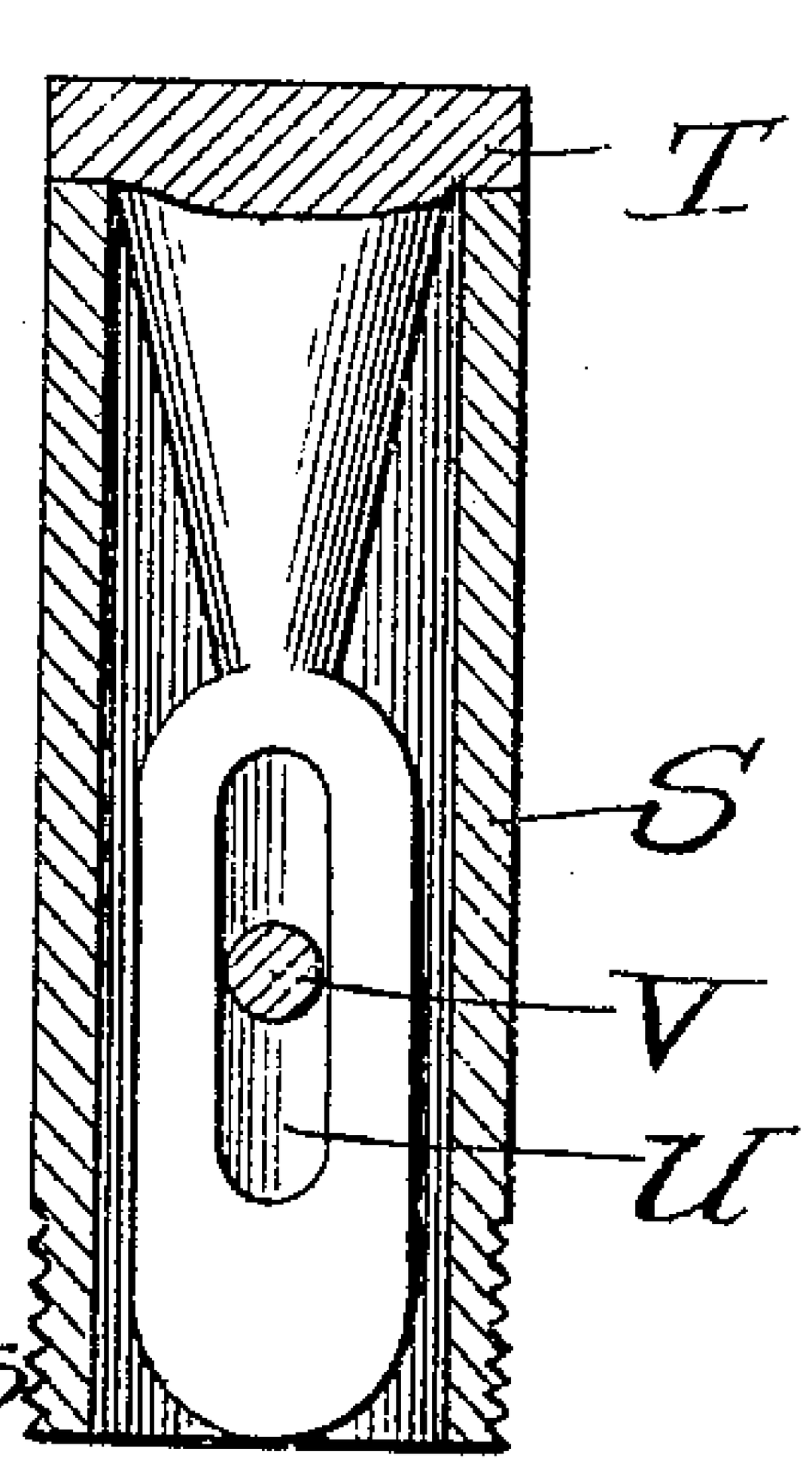


Fig. 4



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE E. NYE, OF CHICAGO, ILLINOIS, ASSIGNOR TO NYE STEAM PUMP & MACHINERY CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

STEAM VACUUM-PUMP.

944,984. Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed April 5, 1909. Serial No. 488,030.

To all whom it may concern:

Be it known that I, GEORGE E. NYE, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam Vacuum-Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a novel construction in a steam vacuum pump particularly adapted for pumping water admixed with phosphate and for the pumping of similar relatively course solid matter, the object being to provide a simple and efficient device of this character in which a very high degree of vacuum is produced and which operates with great rapidity and efficiency and consists in the features of construction and combinations of parts hereinafter fully described and claimed.

In the accompanying drawings illustrating this invention: Figure 1 is a view in side elevation partially in vertical section of a pump constructed in accordance with my invention. Fig. 2 is a plan section of the same on the line 2—2 of Fig. 1. Fig. 3 is a fragmentary detail vertical section on the line 3—3 of Fig. 2. Fig. 4 is a detail longitudinal section of a check valve employed.

The present invention relates to certain improvements over the construction shown and described in my application for Letters Patent filed February 24, 1909, Serial No. 479,777, the pump forming subject of the said application being more particularly adapted for pumping water admixed with sand and gravel and similar relatively fine particles.

My present invention has for its particular object to provide a pump which is suitable for pumping water if desired but, is more particularly adapted and intended for use for pumping coarse materials such as phosphates by means of water as a vehicle.

In this class of work the coarse particles or lumps carried by the water are very apt to cause the cross-ports for throwing the condensing streams into the water chambers to become clogged and thus prevent the further operation of the pump.

In my said prior application I have shown and described the manner of introducing the condensing jets into the water chamber immediately after exhaust of the contents thereof, and in the present application said means are substantially identical except for changes in construction which will be hereinafter fully described.

In my said prior application I made mention of prior patents Nos. 452,080 and 454,062 as being improved by the construction shown and described in the said application and I make mention of said patents herein as showing the type and particularly describing the operation of this type of pump.

My present pump comprises two cylindrical condensing chambers A and B preferably contained in a single casting in which the water chamber C is also formed. In the base D of the pump is a Y-shaped passage constituting the water inlet, the ports E of said passage being controlled by suitable check-valves F. Passages G in said base connect the delivery ports H of the condensing chambers A—B with the water chamber C, the admission ports into the latter being likewise controlled by suitable check valves. From the said water chamber C the water is delivered into the stand pipe I.

The valve J controlling the supply of steam to the condensing chambers is identical in construction and operation with the valve described and shown in the aforesaid patents, and is too well-known to render description thereof necessary.

Hand-holes K and L permit of access to the chambers A and B and both said holes are closed by the single plate M. In the latter there is cored an inverted U-shaped passage N both legs of which open into the inner face of said plate and into said ends are tapped the L-shaped nozzles O. The chambers A and B communicate with each other through the said passage N and also through a passage P cored into the base of the pump and projecting between its ends into the water inlet Q in the base D communicating with both chambers A and B, said passage P being thus maintained always immersed in and surrounded by cold water and being thus maintained cool. This serves to prevent the passage of any steam therethrough which might follow the water forced out of either chamber and insures a jet of water of minimum temperature being introduced at

proper intervals into the steam filled chamber to produce a vacuum therein.

The passage E is connected between its ends with a source of supply of cold water under pressure by means of the pipe R and upon the mouths of the nozzles O check valves S are mounted which serve to automatically cause a condensing jet into the last exhausted chamber A or B to produce a vacuum therein. The said check-valves S are of a peculiar construction particularly adapted for the purpose, each consisting of a tube terminating at one end in a valve-seat on which the flat valve T seats. The stem of the latter is provided with a longitudinal slot U through which a pin V passes, the latter being mounted at its ends in the wall of the tube and serving to limit the opening movement of the valve. The said check-valves serve to prevent admission to the passage E of any particles or lumps of material which might clog the same as would be apt to happen in pumping such materials as phosphate or any other coarse or gunning material.

The passage P is intended for use only when the pump is used under ordinary conditions as in pumping water carrying only fine particles such as sand and fine gravel in which case the connection with a source of supply of water under pressure is not required nor are the said check-valves S.

By means of the above described arrangement I obtain a very high degree of vacuum and accordingly the pump is extraordinarily efficient and adapted for the pumping of relatively coarse matter carried by water as a vehicle without danger of clogging any part of the pump and thus interfering with its operation.

I claim as my invention:

In a steam vacuum pump, two chambers having valve-controlled inlet and exhaust ports, there being a manhole in each of said chambers, a cover common to both, said manholes having formed therein an inverted U-shaped passage, nozzles connected with the free ends of the arms of said passage and projecting into the respective chambers adjacent the lower ends thereof, the free end portions of said nozzles being vertically disposed, check-valves disposed upon the mouths of said nozzles and covering the same, connection between said passage at a point between its ends and a source of supply of cold water under pressure other than the water delivered from said chambers, an auxiliary U-shaped passage connecting the bottom of one chamber with that of the other, the walls of said last-named chamber extending into and immersed in the water contained in the suction chamber of the pump.

In testimony whereof, I have signed my name in the presence of two subscribing witnesses.

GEORGE E. NYE.

Witnesses:

E. H. MacDowell,

Rudolph Wm. Lotz,