

(No Model.)

G. H. NYE.

STEAM VACUUM PUMP.

No. 332,738.

Patented Dec. 22, 1885.

FIG. 1.

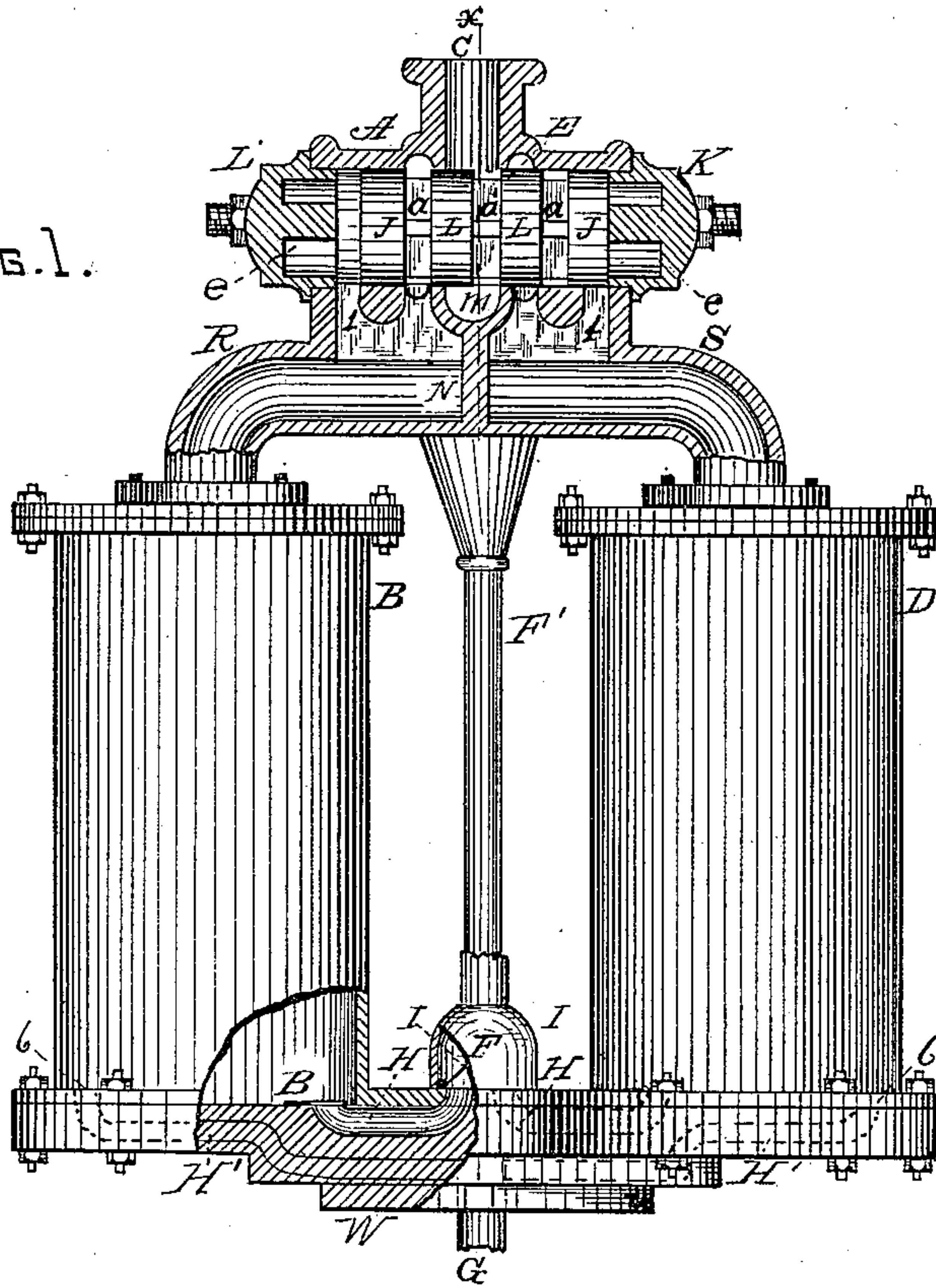


FIG. 3.

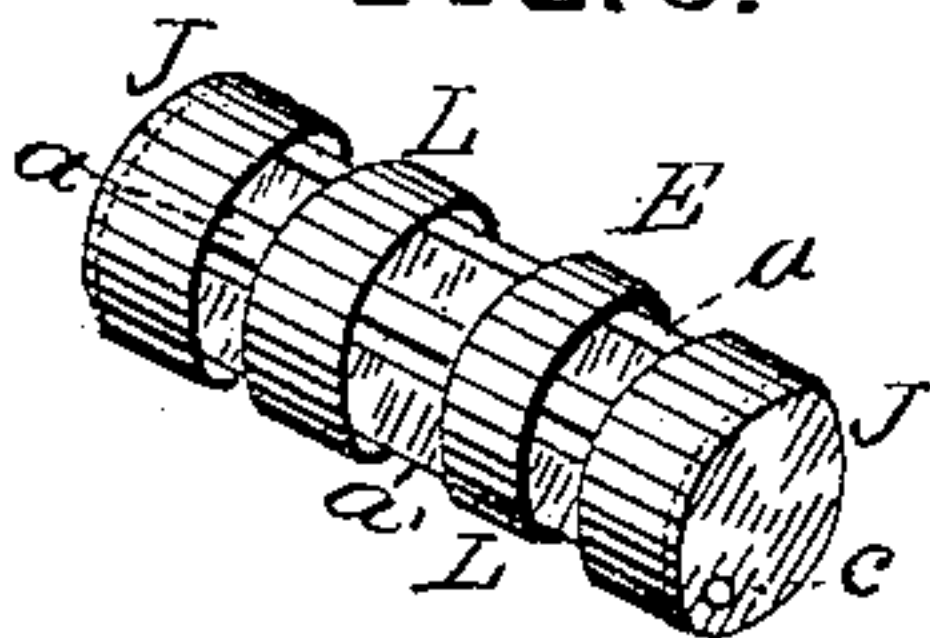


FIG. 2.

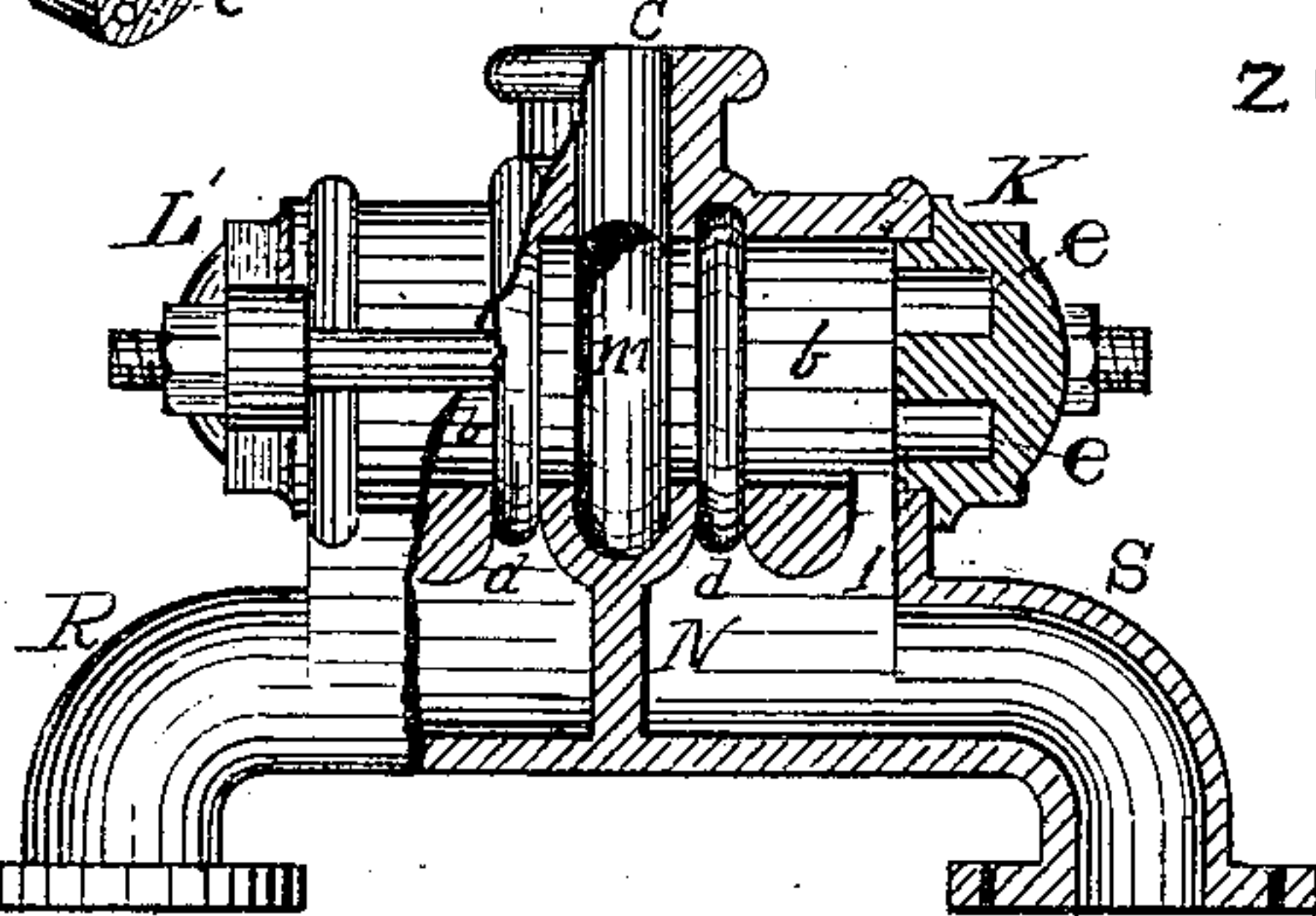
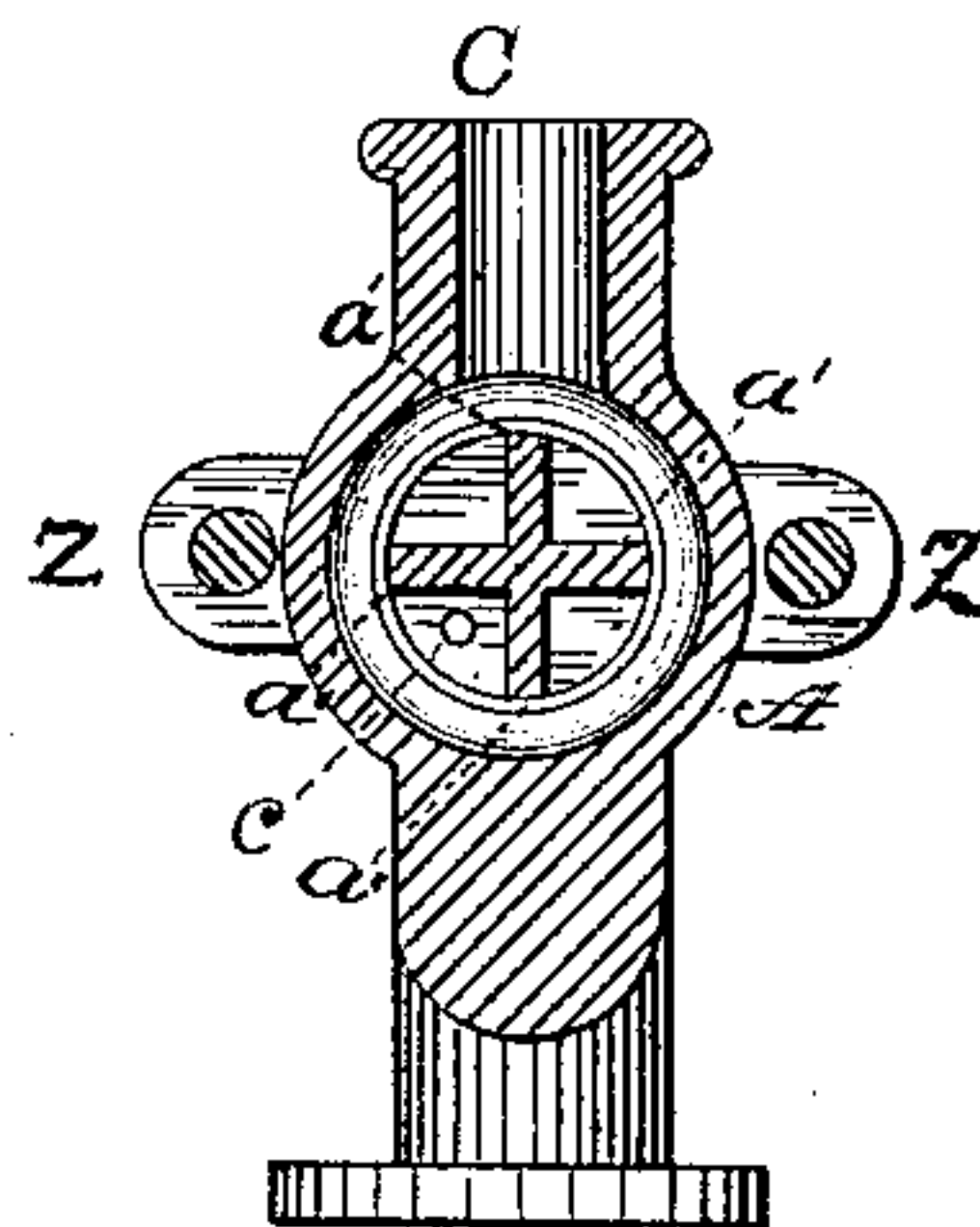


FIG. 4.



WITNESSES:

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GEORGE H. NYE, OF CHICAGO, ILLINOIS.

STEAM VACUUM-PUMP.

SPECIFICATION forming part of Letters Patent No. 332,738, dated December 22, 1885.

Application filed April 20, 1885. Serial No. 162,859. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. NYE, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Steam Vacuum-Pumps, of which the following is a specification, reference being had to the accompanying drawings, illustrating the invention, in which—

Figure 1 is a broken elevation of the lower portion of the pump and a sectional elevation of the valve, valve-case, and pipe-connection with the cylinders; Fig. 2, a broken elevation of the valve-case and connecting-pipes with the valve removed; Fig. 3, a perspective representation of the valve removed from the case; Fig. 4, a transverse section of the valve and case on line X, Fig. 2.

The present invention relates to an improvement in that class of pumps by which water is elevated by the production of vacuums in the cylinders by means of steam.

The difficulties heretofore encountered with this kind of pump has been in the tardy movement of water into and out of the cylinders, in consequence of the time required for producing a vacuum, resulting in an intermittent flow of water and uncertainty of action. I have overcome these objections by a valve-and-pipe connection between the cylinders of novel construction, wherefore I do not have to wait for all the water to be driven from a cylinder before the valve will shift, for the reason that the discharge-pipe is above the bottom of the cylinder, so that steam comes under the water in the pipe, and then suddenly commingles with it and relieves the cylinder of so much pressure and the end of the valve over it that the more active steam at the other end of the valve will make the shift.

Heretofore the construction has been such that the steam so impinged on the water being discharged that a largely decreased vacuum was the result.

B D represent the two vacuum-cylinders, of ordinary construction, and W is the base connecting their bottom ends; and F is the discharge-pipe, which is made large enough at the place of connection with the base W to provide room for the two exit-valves I over the inner ends of the pipes H H, which connect the cylinders with the discharge-pipe F.

G is the supply-pipe, which communicates with the cylinders B D by means of pipes H' H', which have valves 6 placed over their ends, which enter the cylinders.

This construction, including the condenser F', so far is substantially the same as the pump patented to me on December 15, 1874, No. 157,863, except there is a change in the pipes H H and valves I I.

I have retained this former construction of mine to show that my present improvement can be applied to most of the vacuum-pumps now in use, the condenser F' not being a necessary part of this structure; but its removal is not required. In the construction of new pumps this condenser will be omitted.

S R represent two pipes which respectively connect the cylinders B D with the valve-case A L' K. This case, with its valve, has a novel construction, as follows: The four-part valve is shown at J J L L E, the core between the four parts being shown at *a a'*. The seat for the valve is longer than the valve, as shown at Fig. 1, that the valve may have a longitudinal movement; and formed in the lower part of the case are two openings, 1 and 4, which communicate with the valve-chamber and pipes R S, and formed annularly around the valve-seat and inside of the case are three grooves, *d m d*, the grooves *d d* communicating with the valve-chamber, and respectively with the pipes R S; but the groove *m* only communicates with the interior of the valve and with the steam-pipe C. A partition, N, placed below the groove *m*, prevents any communication of the pipes R S, except by way of the valve.

That part of the valve-case shown at A, with the pipes R S, by means of suitable cores, is cast in one piece; but the heads L' K are cast separate, with lugs *z z*, that they may be, by suitable bolts put in them, secured to the part A.

The valve consists of a four-part core, *a a'*, with rings L L and capped heads J cast solid thereto, as more clearly shown at Fig. 3. Through the heads of the parts J J are in each formed a small hole, *c*, for the passage of steam into the chambers *e e* in the heads L' K. This I consider an improvement over and above the action of the steam against a solid head from the holes *c*, inasmuch as there is more surface for the steam to act on and more elasticity is util-

ized in the action of steam, and the steam does not condense so quickly, because there is a greater body at the ends of the valve. The valve, however, will shift by the action of steam from the holes *c* against a solid head; but I do not find such action quite so prompt. The openings 1 4 are to admit steam to the chambers *e e* at the ends of the valve-case, the annular grooves *d d* to the spaces between the parts J L, and the groove *m* to the space between the parts L L.

The material is mostly cast-iron, but the cylinders B D may be made of boiler-iron, with cast heads and flanges.

The water is alternately taken into the cylinders by means of the pipes G H' H', and is discharged through pipes H F, and the action of the valve and steam is as follows: By means of a suitable connection steam from a boiler is taken in at the pipe C, and taking the valve to be in the position shown at Fig. 1—that is, the valve butts against the head K of the valve-case—the steam passes into the space *a'* between the ports L, thence through the left-hand port L, and into the space *a* to the left of it, and from thence onto the top of the water in cylinder B, and into the chamber *e* in the head L', and between the end of the valve and

the said head. The pressure of steam forces the water out of cylinder B, and when it gets to the lowest part of the pipe H it suddenly commingles with the water, rushes up through it, and causes a partial vacuum at the left-hand end of the valve, while the steam in the chamber *e* in the head K is the more active and lifts the valve to the left and puts steam into the cylinder D, in which the steam operates in the same manner as in cylinder B. The pump will continue to work automatically so long as steam and water are applied.

I claim and desire to secure by Letters Patent of the United States—

In steam vacuum-pumps for elevating water, the valve case A L' K, constructed with the pipe attachment R S, openings 1 4 communicating with the valve-chamber and pipes R S, the annular grooves *d d m*, steam-pipe C, and partition N, in combination with the valve having the four cut-offs J L L J, spaces *a a'* between them, and holes *c* through the heads J J for alternately directing steam into the cylinders B D, as specified.

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Witnesses:

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