(No Model.)

2 Sheets—Sheet 1.

G. E. NYE.

STEAM VACUUM PUMP.

No. 452,080. Patented May 12, 1891.

Fig. I.

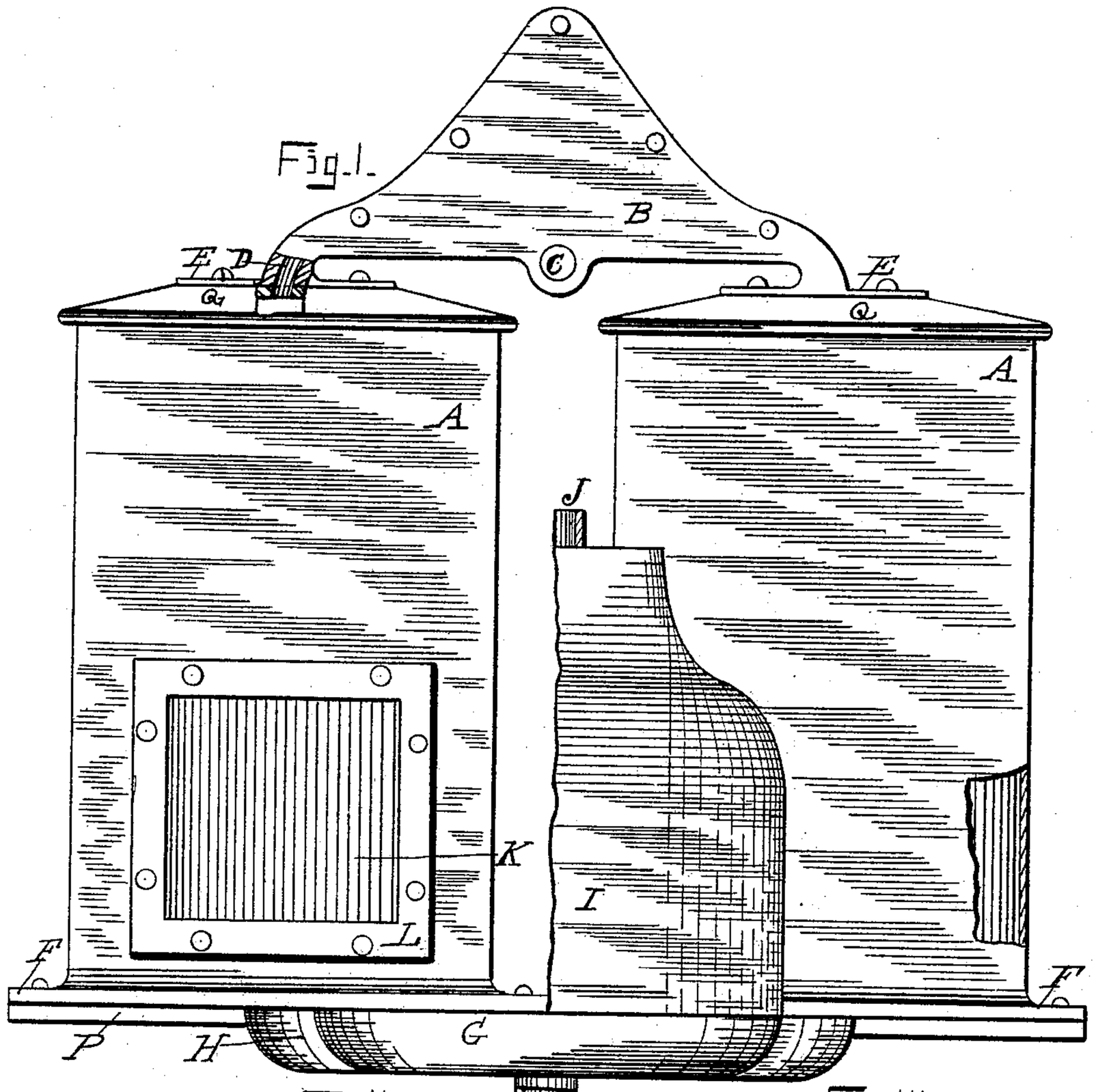

Fig. II.

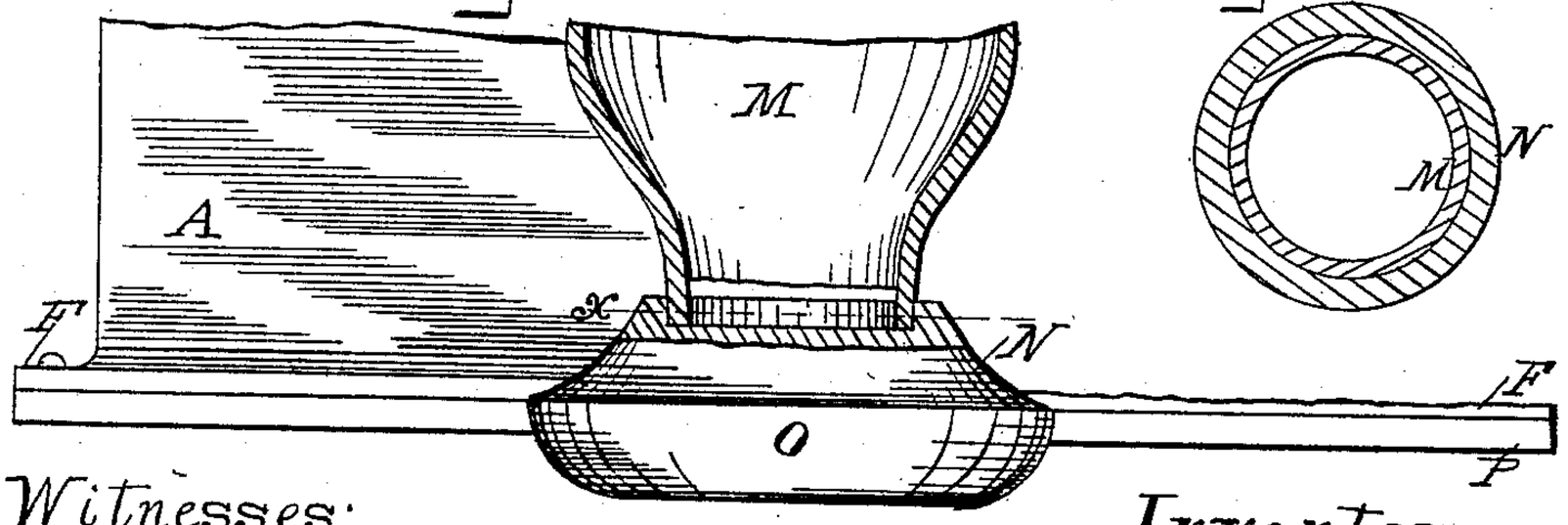

Fig. III.

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James Dunn

Inventor.
George E. Nye.
By S. L. Chapin.
Atty.

(No Model.) 2 Sheets—Sheet 2.

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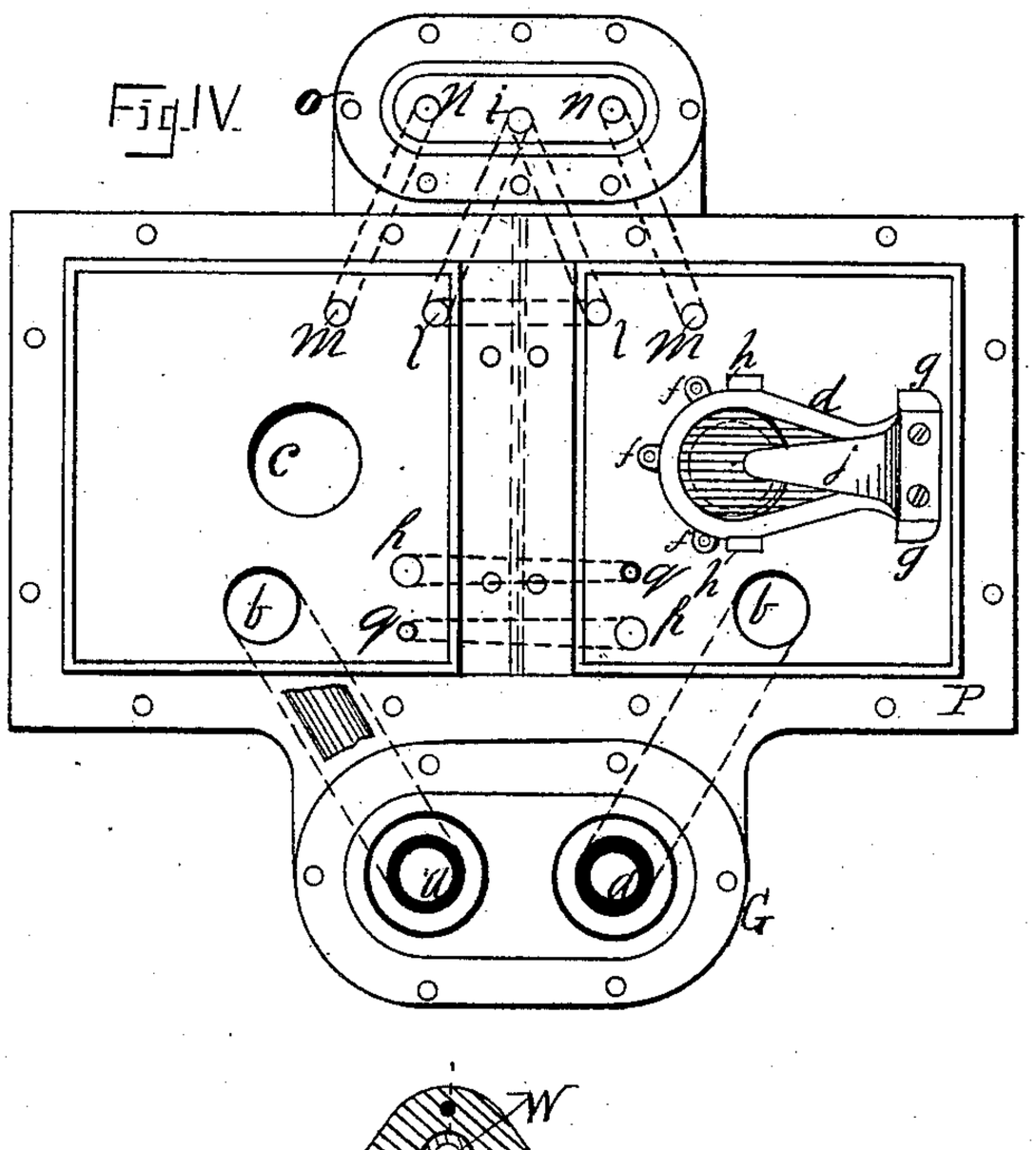
Fig. IV.



Witnesses:
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James Dunn

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UNITED STATES PATENT OFFICE.

GEORGE E. NYE, OF CHICAGO, ILLINOIS.

STEAM VACUUM-PUMP.

SPECIFICATION forming part of Letters Patent No. 452,080, dated May 12, 1891.

Application filed September 29, 1890. Serial No. 366,602. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. 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 annexed drawings, (two sheets,) illustrating the invention, in which—

Figure 1, Sheet 1, is a side elevation of a steam vacuum-pump in which my invention and improvements are embodied, one-half of the discharge-chamber being shown in elevation. Fig. 2 is an elevation of the lower portion of that side of the pump on which the air-chamber is placed. The lower portion of said chamber is shown in vertical sectional elevation and in section clearly to show its connection with the other portions. Fig. 3 is a horizontal section of Fig. 2 on line *x*. Fig. 4, Sheet 2, is a plan view of the base of the pump with the water-chamber, condensers, and air-chamber removed, on a scale about one-third less than Fig. 1. Fig. 5 is an enlarged longitudinal sectional elevation of the steam-valve pipes and case removed from the condensers; Fig. 6, a vertical section of Fig. 5 on line *z;* Fig. 7, a perspective representation of the check-valve to one condenser removed and enlarged from where the same is shown at Fig. 4.

This invention relates to an improvement in that class of steam vacuum-pumps in which the steam forces the water out of one condenser while the water is entering the other condenser; and the particular improvements consist in the novel and useful construction of the steam-valve and case connecting the condensers, the construction of the inside check-valves, and certain improvements in the air-pipes communicating with the condensers. Inasmuch as these pumps are to operate automatically, it is very desirable that the steam-valve should be subject only to a minimum of friction in order to insure durability and proper uniform action, all of which will be fully comprehended by the following detail specification.

P represents the base, which is cast in one piece of metal, with the ordinary hollow portions G and H to form water-passages leading from the ports *b b* within the condensers to the ports *a a* within the base of the water-chamber. (Shown more clearly at Fig. 4.) *c*, same figure, represents one water-induction port with the check-valve removed. The other induction-port is supplied with the ordinary flap-valve *k*, secured to a plate *d*, which is bolted in the ordinary manner by means of lugs *f f*, &c., to the base-plate P.

j is the ordinary stop, of metal, placed above the flap *k* and secured to the plate *d* with the flap between them. Inasmuch as rubber is employed to make the flap, the bolts or screws which clamp the flap between the plate *d* and check spread the rubber laterally, and in a little time it becomes so weak and thin that its action becomes uncertain. I remedy this defect by means of lugs *g g*, secured to the opposite edges of the plate *d* and made to extend up about as high as the rear end of the stop *j*. These lugs not only prevent the lateral spread of the secured portion of the flap, but the stop is held from turning to one side. It is evident that if the lugs *g* be cast solid to the opposite edges of the rear portion of the stop *j* and projected closely down on the edges of the plate *d* the same end would be attained. The flap *k* being flexible, as stated, it is liable to be thrust laterally by sand, gravel, and other extraneous matter forced past it by atmospheric pressure, and consequently is liable to become torn at its attached portion. I remedy this by means of supports or guides *h*, placed on opposite sides of the flap and secured to the plate *d* by being cast solid with it or otherwise, as desirable.

O represents the base of the ordinary air-chamber, in which are ports *n i n*, communicating with pipes within the base, which have ports *m l m l*, communicating with the condensers, as indicated by dotted lines. The air-chamber, part in sectional elevation, is shown at M, Fig. 2, connected with the base *o* by means of a tapering casting N, whereby the air-chamber is round in cross-section, as shown at Fig. 3.

I do not claim anything novel in the air-chamber or air-pipes leading thereto; but I find the construction detailed to be the best means to attain the best results at the least cost.

b a a b are the ports of the pipes by which water from the condensers passes into the

water-chamber I, a semi-elevation of which is shown at Fig. 1, and the discharge-pipe at J, and the main induction-pipe at *z*. In practice valves are to be placed over the air-ports *n i n* and over the water-ports *a a*, Fig. 4, in the ordinary manner of constructing similar pumps. Such valves being kept in stock need no description.

p p and *q q* represent small and large ports in the alternate condensers, each large port communicating with a small one in the other condenser, whereby a small quantity of water is forced from each condenser into the other to condense the steam which has driven out the column of water.

It is found in practice that a tapering pipe leading from each condenser to the other serves a much better purpose than one straight pipe connecting the condensers. The condensers are rectangular in cross-section and cast each in a single piece of metal with a flange surrounding the bottom portion, as shown at F, for the purpose of uniting them with the base P by means of bolts in the ordinary manner of similar mechanism. Each condenser at the side is to be provided with a hand-hole covered with a door K, Fig. 1, for reaching the inside for the removal of extraneous matter for repairs, &c. The doors may be held by flanges L, bolted to the condensers.

The valve-case is shown at B, and it is preferably made of a single casting with a solid back and a removable face-plate at one side. The upper portion is quite nearly V-shaped, and has formed therein two branch pipes starting each at the valve and leading into the respective condensers at their top portions. The branches T lead up against the exterior edges of the valve and the branches R into the valve through its under edge. The face of the valve has the form of a segment with a rounded top portion coinciding, substantially, with a seat at the inside of the crown of the case to which it is pivoted at W. The segment bounded by the inside lines of the crown of the case has greater longitude than the segment-valve, whereby the latter may be swung to open or close either of the ports S, and thereby allows steam to pass out of either pipe R D and enter either condenser A A. The steam enters the case at C, Figs. 1 and 5, and passes into the valve V U by means of the port X in its under edge, and from thence it can pass out either port S, depending on which condenser contains the water to be driven out. At Fig. 5 the valve is shipped to admit steam into the left-hand condenser, and as the position of the valve is there is a continuation of pipe T up the entire edge at the left hand of the valve which bears against the inside of the right-hand part of the V-shaped crown to the case. After condensation of steam takes place in the left-hand condenser there is a vacuum at the left of the valve, and the valve ships automatically to the left, so that while water is entering the left-hand condenser water in the right-hand condenser is being forced out by steam-pressure.

I have described the construction of several portions of the pump best calculated to be operated in connection with my valve for supplying steam to the cylinders; but I confine myself to the claim annexed.

I claim and desire to secure by Letters Patent—

In an improvement in steam vacuum-pumps, the combination, with the condensers, air-chamber, and water-chamber, of a steam-valve which in face elevation is the segment of a circle and hollow, with steam-ports for receiving steam through a central port at its under edge and discharging it laterally into the two condensers, and the valve pivoted to the case, the V-shaped portion of which has a greater longitude than that of the valve and provided with branch pipes leading to the condensers, substantially as specified.

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Witnesses:
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