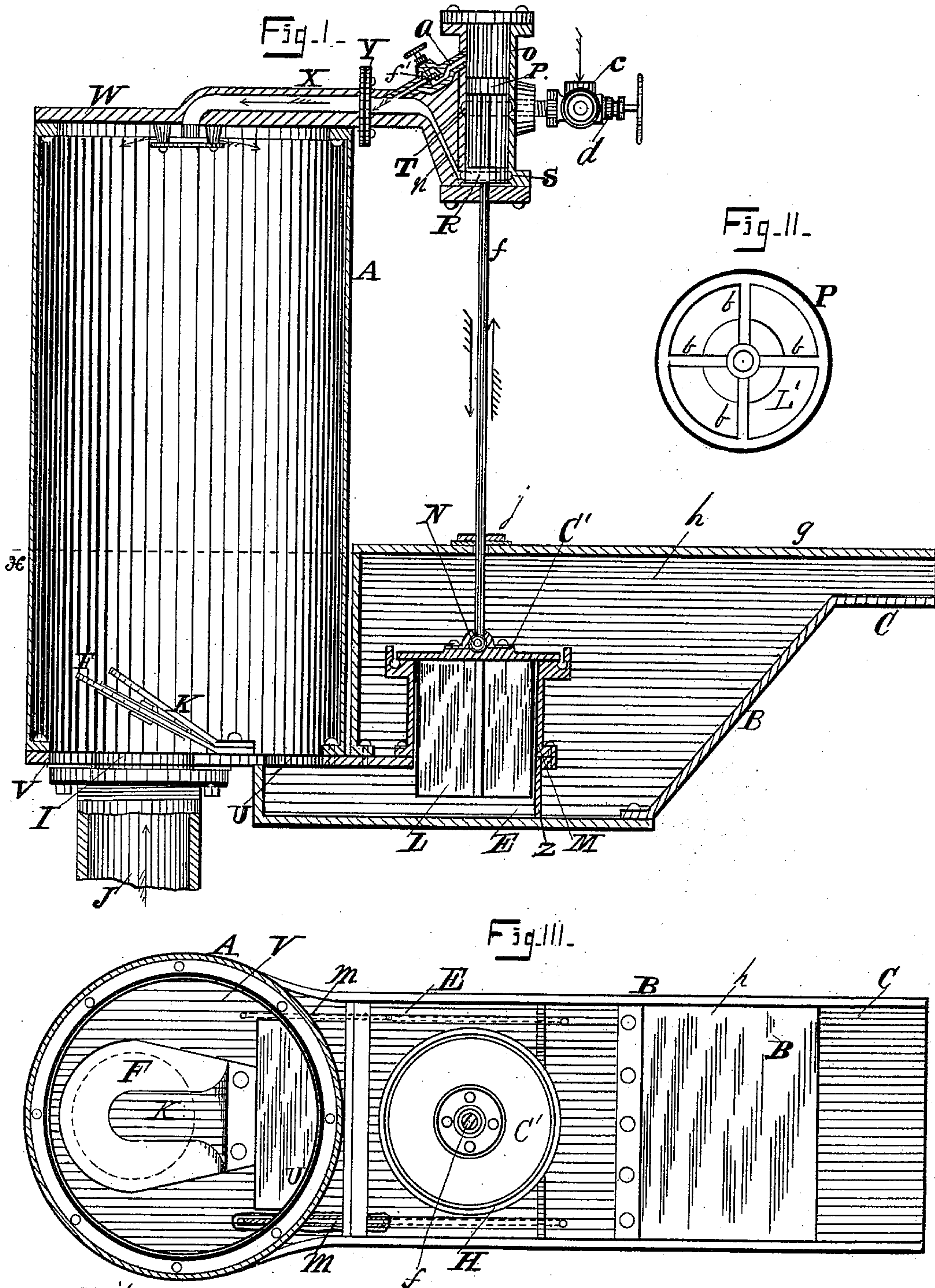


(No Model.)

G. H. NYE.  
STEAM VACUUM PUMP.

No. 464,037.

Patented Dec. 1, 1891.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

GEORGE H. NYE, OF CHICAGO, ILLINOIS.

## STEAM VACUUM-PUMP.

SPECIFICATION forming part of Letters Patent No. 464,037, dated December 1, 1891.

Application filed April 22, 1891. Serial No. 389,893. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE H. NYE, a citizen of the United States, residing at 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, illustrating the invention.

10 In this my improved steam vacuum-pump only one cylinder is employed in contradistinction to the double-cylinder pump patented to me on November 5, 1872, No. 132,731. Therefore the principle on which it operates  
15 and the mechanism employed are essentially different. It is my purpose to elevate water for irrigation and other purposes at a minimum cost, and to this end each cylinder with its attachments composes a complete working  
20 pump, and where more water is to be elevated than one cylinder has a capacity for other cylinders or larger ones are to be employed. In providing water for irrigation it is often desirable to have it well distributed—that is, have  
25 the water brought onto the ground at certain places in specific quantities—as better adapted for producing crops than when larger streams are employed at greater intervals. For this purpose the single-cylinder pump is especially  
30 a matter of economy, both in the construction and the cost of operation. To attain this end, the pump is constructed to take water by means of a vacuum and atmosphere pressure, as is the custom, but to discharge it mostly by  
35 the weight of the column raised, whereby there is a material saving of steam, all of which will be fully comprehended by the following detail description.

40 Figure I is a longitudinal central vertical sectional elevation of a complete steam vacuum-pump in which are embodied my invention and improvements; Fig. II, a plan view of the steam-valve enlarged and removed from its case; Fig. III, a horizontal section of the  
45 water-cylinder on line *x*, Fig. I, a plan view of the bottom of the cylinder, showing the induction-valve and exit-port and a plan view of the chamber leading from the cylinder and the exit-port valve therein.

50 A represents the cylinder, which may be made of wrought or cast metal, as most convenient. The lower cylinder-head is shown

at V, and the upper one at W, both being of cast metal. Cast solid with the head W is a steam-pipe X, which communicates with the  
55 cylinder A and also a steam-cylinder O by means of a coupling Y. Cylinder O is closed in the ordinary manner at each end by a suitable head, and formed annularly in its inner portion are depressions S and T to take steam. 60  
The lower depression S is closed by the lower annular rim R of the valve when the cylinder is taking water, as shown by the valve K, Fig. I, and the depression T is taking steam, which  
65 passes through the rim P by means of a space L', Fig. II, and from thence it passes through a pipe *a* into pipe X, and then into the cylinder A, a cock or valve *f'* being placed in the pipe *a* to control the flow of steam, and within the cylinder and secured to the upper head  
70 W is a deflector to diffuse the steam on the surface of the water in the cylinder. The rims P and R to the steam-valve are connected with wings *b b b b*, Fig. II, and therefore both ends are open. The steam, by suitable  
75 connections with a boiler, enters a pipe *c*, Fig. I, and from thence flows to within the valve case or cylinder *o*, and is regulated by a suitable cock *d*. The steam-valve connects with the water-exit valve C' by means of a  
80 rod *f*. The lower attaching portion is a ball or socket N, which always permits the valve C' to shut level or flat on its seat.

Attached to and extending below the valve C' as a part thereof are four wings L, placed  
85 in cross-section in cruciform position to serve simply as a guide to the valve, to which they are rigidly attached.

Extending below the bottom V of the cylinder A and attached thereto is a water-chamber E, which, when the valve C' is closed, is  
90 separate from the exterior chamber B *h* by means of a partition *z*; but when the valve C' is elevated water passes from chamber E into chamber B *h* and out at pipe C. 95

The purpose of a water-chamber above the valve C' is that there shall be at all times the same pressure of air on the valve that there is on the water entering the cylinder, and inasmuch as sand sometimes lodges on the seat  
100 of the valve this would not be the case unless there was a packing of water above the valve. As a result, should the valve not be shut absolutely tight it will take water instead of



air, and no space at the top of cylinder A will be occupied by air to prevent a vacuum by means of air passing through the incoming column of water. Preferably the top of the water-chamber is covered, as at *g*, to prevent water from splashing over, and that water may not pass through the rod-opening the cover around the rod *f* is packed at *j*. In practice the cover *g* may be made removable for reaching the inside of the water-chamber.

The pump operates as follows: A small jet of steam is constantly supplied through pipes *a* X and the chambers *h* E primed with water, which will, in sufficient quantity, pass through small ports *m m*, communicating with the cylinder A and chamber E to cause the condensation of steam, at which time a vacuum is formed in the cylinder and the latter is filled with water rushing in through the induction-pipe J. The incoming cold water condenses the small jet of steam so fast as it enters the cylinder till the cylinder is full, and then the vacuum is full and the water commences to leave the cylinder, closing the valve K, and by virtue of its weight above the water in chamber *h* raises the valve C' and also the steam-valve in the cylinder *o* and brings the rim R above the annular depression *s*, Fig. I, and permits steam in pipe *n* to pass through the pipe X and force the water out of cylinder A against the head of water in the chamber *h*. The steam is again condensed by water passing through pipes *m*, and the operation is repeated.

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

1. In a single-cylinder steam vacuum-pump, a double water-chamber attached to such cylinder, communicating with a water-passage, and the double chamber convertible into a single chamber by the elevation of the exit-valve, in combination with a valve placed within the said water-chamber, a steam-valve placed above the exit-valve and outside of the water-chamber, and steam-pipes communicating with the steam-valve at a point below the upper rim of the valve and at a point opposite the lower annular indentation of the cylinder, and said pipes terminating in one pipe leading into the top of the cylinder and one or more pipes communicating with the cylinder and the lower portion of the water-chamber, as specified and shown.

2. In a single-cylinder steam vacuum-pump, said cylinder combined with a double water-chamber, the lower portion of which lies below the cylinder, and a valve and valve-cylinder to be submerged in water and to communicate with the upper and lower chambers, the lower chamber communicating with the cylinder and the submerged valve acting on the steam-valve which supplies steam to the cylinder, substantially as and for the purpose specified.

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