

No. 698,400.

Patented Apr. 22, 1902.

W. F. GARRISON.  
VACUUM PUMP.

(Application filed Aug. 1, 1901.)

(No Model.)

Fig. 3.

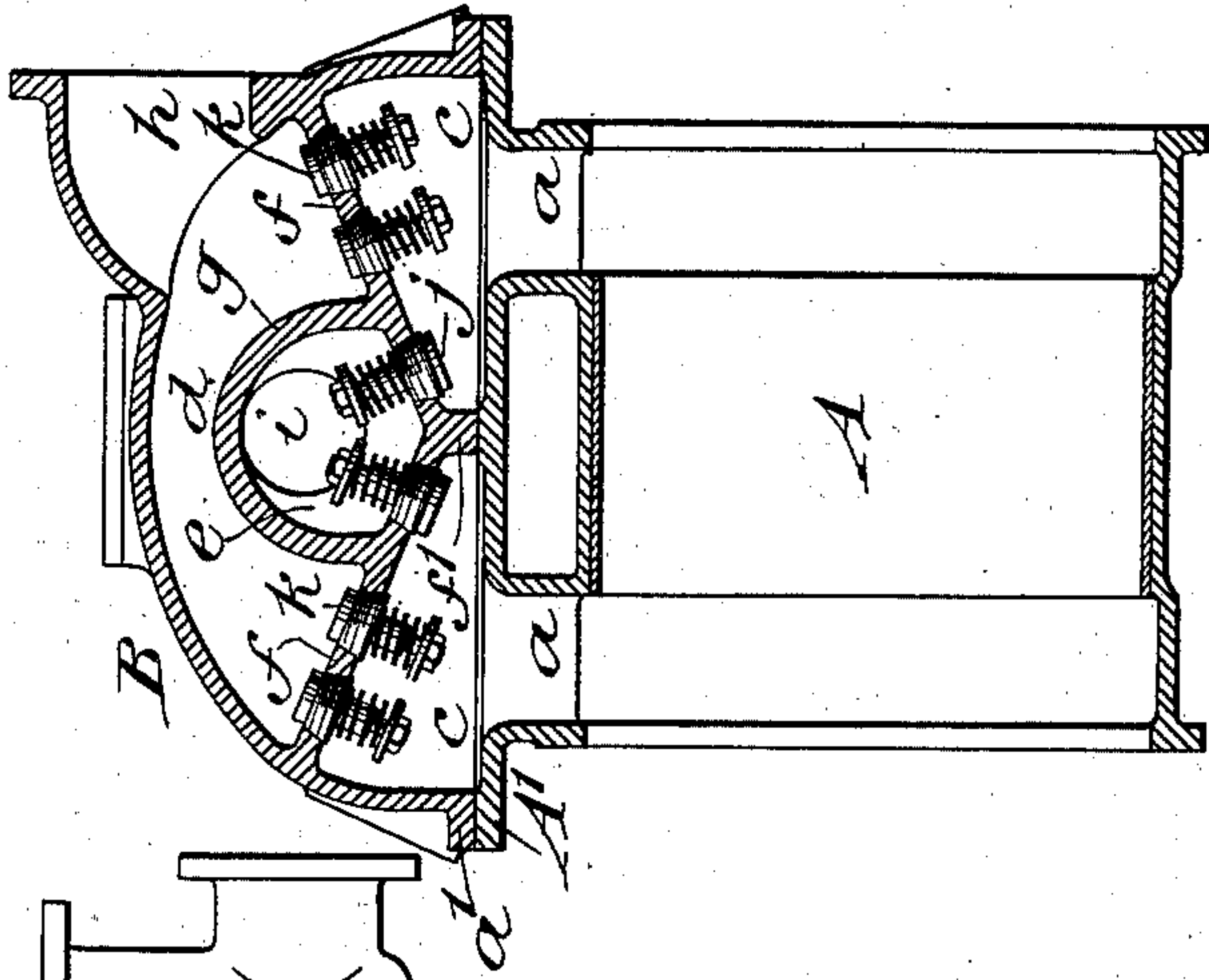


Fig. 1.

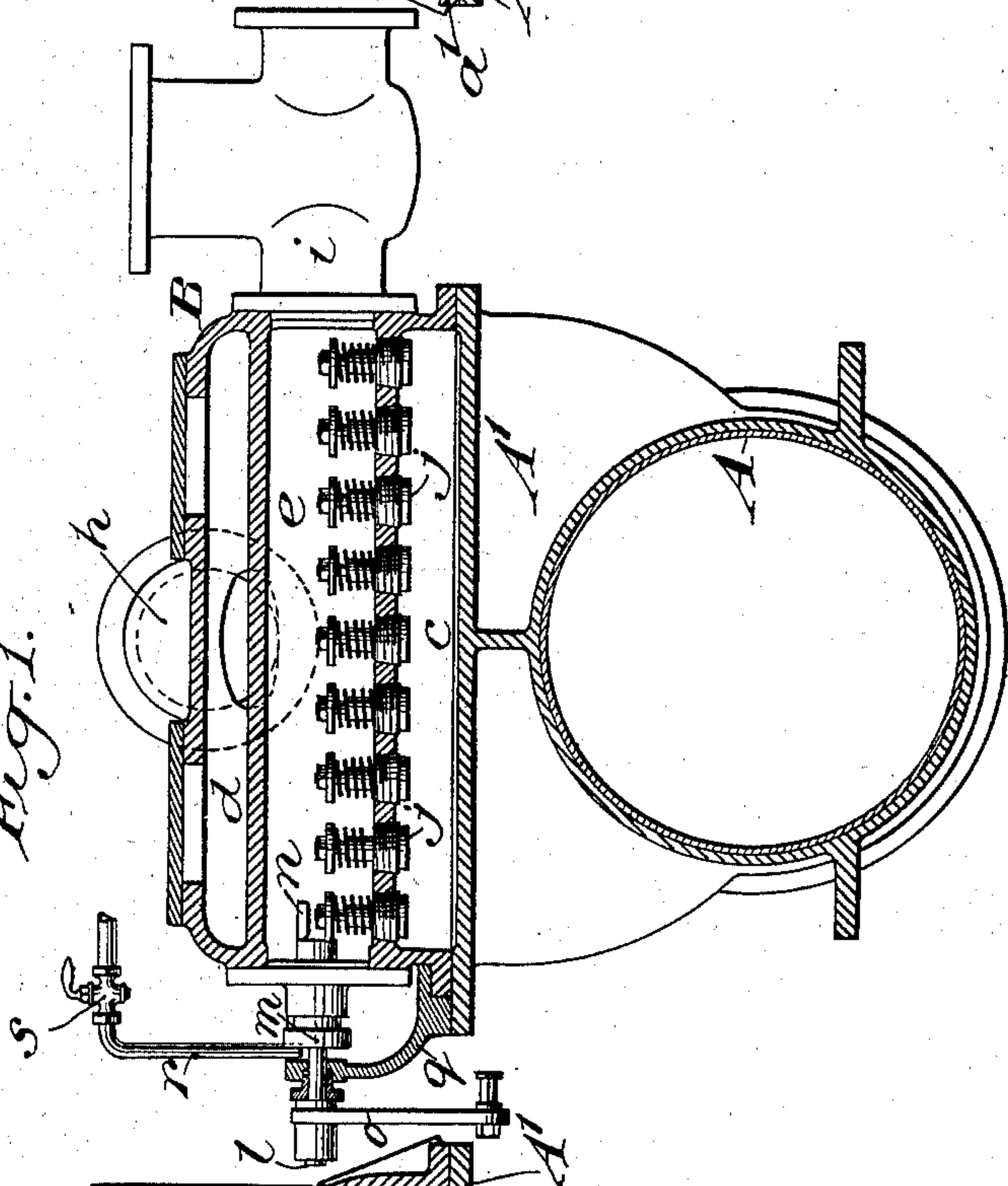
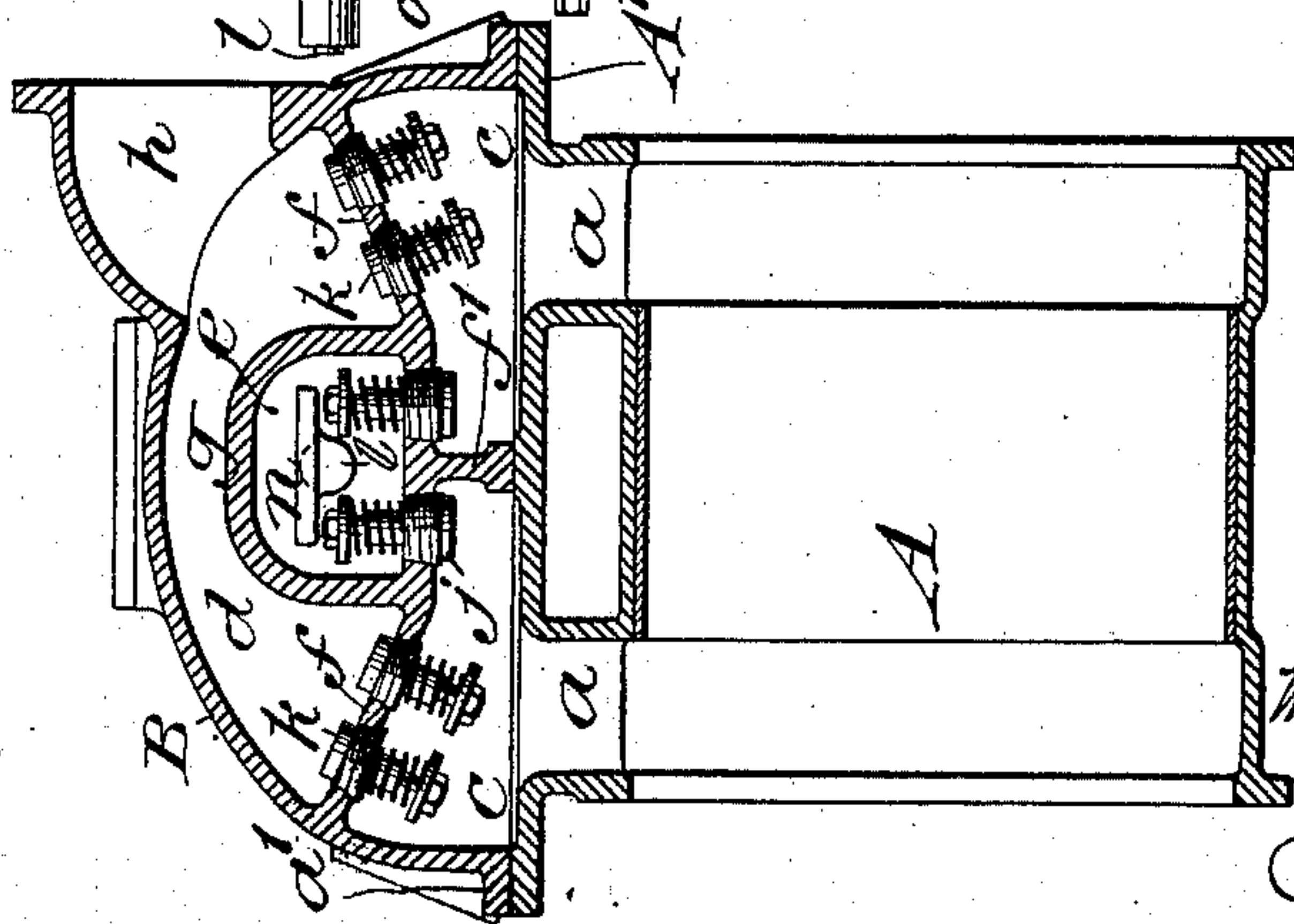


Fig. 2.



Witnesses:  
George Barry Jr.,  
Henry Thome.

Inventor:  
William F. Garrison  
By attorneys  
Brown & Leonard.



# UNITED STATES PATENT OFFICE.

WILLIAM F. GARRISON, OF BROOKLYN, NEW YORK, ASSIGNOR TO GUILD & GARRISON, OF BROOKLYN, NEW YORK, A FIRM.

## VACUUM-PUMP.

SPECIFICATION forming part of Letters Patent No. 698,400, dated April 22, 1902.

Application filed August 1, 1901. Serial No. 70,464. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM F. GARRISON, a citizen of the United States, and a resident of the borough of Brooklyn, in the city and State of New York, have invented a new and useful Improvement in Vacuum-Pumps, of which the following is a specification.

This invention relates principally to that class of vacuum-pumps in which water is employed in the cylinder to fill or nearly fill the spaces between the piston and the valves when the piston is at the end of the stroke, and relates especially to pumps of that class in which the diaphragm or diaphragms which contain the valves and their seats are arranged at an inclination for the purpose of obviating objectionable violent concussion of the water against said diaphragm or diaphragms.

One object of the improvement is to so present the said inclined diaphragms as to reduce the variation in the distance from the cylinder of those of the valves in such diaphragms as are nearest and those which are farthest from the cylinder; and the invention consists in a certain construction and certain combinations, hereinafter described and claimed, with the above object in view.

Figure 1 represents a transverse vertical section of a pump-cylinder and valve-chest embodying my invention; Fig. 2, a central longitudinal section of the same; Fig. 3, a central longitudinal section illustrating a modification of the valve-seat.

A is the cylinder, at the ends of which are passages *a a*, leading to the valve-chest B, said passages terminating in a flat plate A', forming part of the same casing with the cylinder. The chest B is represented as consisting of a single casting with an open bottom around which is a flange *a'*, by which it is attached to the cylinder-plate A'. The said chest is divided into four compartments or chambers *c c d e* by means of two diaphragms *f f*, with a partition *f'* between them and an arched partition *g* over them. The two chambers *c c* below the diaphragms *f* communicate each with one end of the cylinder through one of the passages *a*. The outer chamber *d*, which is the discharge-chamber for both ends of the cylinder, communicates with the dis-

charge-pipe *h*. The intermediate chamber *e*, which is the inlet-chamber common to both ends of the cylinder, communicates with the inlet-pipe *i*. The diaphragms *f* have in them the openings for and contain the seats of the inlet-valves *j* and the discharge-valves *k*. These valves may be of any suitable kind, but are represented as puppet-valves. The valve-chest thus constructed and applied to the cylinder and having the valves thus applied within it, so that all are separate from the cylinder, is more easily machined and fitted up than when the said chest is constructed integral with the cylinder and affords better provision for the renewal of such parts as may require renewal.

An important feature of this invention is in the arrangement of the two valve-diaphragms *f*, inclined upward in opposite directions from the partition *f'*, which is opposite the middle of the length of the cylinder. I am enabled to get the same angle of inclination for these diaphragms as is obtained in cases where a valve-diaphragm has only one inclination, as in Patents No. 280,600 and No. 491,912, for example, with less difference between the distances of some of the valves from the cylinder, or, in other words, I am enabled to keep at least half of the valves nearer to the cylinder, and thus have them more uniformly water-sealed.

It may be here mentioned that the only difference between the two examples of my invention illustrated by Figs. 2 and 3, respectively, is that in Fig. 3 the inclination of the valve-diaphragms *f* is continued to the partition *f'* and includes the inlet-valves, and in Fig. 2 the inclination is only continued downward far enough to include the discharge-valves and thence under the inlet-chamber *e*. The part which contains the inlet-valve *j* is horizontal.

In Figs. 1 and 2 are shown means to be used when necessary for starting the opening of the inlet-valves *j*. These means consist of a rocking spindle *l*, working through a stuffing-box *m* in one end of the inlet-chamber *e* and provided inside of said chamber with tappets *n* for operating on the stems of as many of said valves *j* as may be desirable. Only two such tappets are shown, as it may be suffi-



cient to apply this means of opening to only two of said valves—viz., one for each end of the cylinder. The said spindle *l* is represented as furnished outside of the valve-chest with an arm *o*, to be connected with the pump-piston, so that at each stroke of the latter the rock-shaft will be so moved that one of its tappets will act to open the proper inlet-valve at the commencement of each stroke of the piston. For the stuffing-box *m* a water seal is represented in Fig. 1, the said seal consisting of a water-box *q*, supplied with water from any suitable source through a pipe *r*, fitted with a faucet *s*.

What I claim as my invention is—

1. In a vacuum-pump, two chambers communicating respectively one with each end of the cylinder, an inlet-chamber and a discharge-chamber each common to both ends of the cylinder, and oppositely-inclined valve-containing diaphragms situated one between one of said two chambers and the inlet and outlet chambers and the other between the other of said chambers and the inlet and outlet chambers, substantially as herein described.

2. In a vacuum-pump, two chambers communicating respectively one with each end of the cylinder, an inlet-chamber and a discharge-chamber each common to both ends of the cylinder and two valve-containing diaphragms situated one between one of said two chambers and the inlet and outlet chambers and the other between the other of said two chambers and the inlet and outlet chambers, said diaphragms having inclinations commencing approximately at the middle of

the length of the cylinder and running outwardly therefrom in opposite directions, substantially as herein described.

3. In a vacuum-pump, a valve-chest in which are two chambers communicating respectively one with each end of the cylinder, a discharge-chamber common to both of said two chambers, and two valve-containing diaphragms arranged one between said discharge-chamber and one of the two first-mentioned chambers and the other between said discharge-chamber and the other of said first-mentioned chambers and having inclinations in opposite directions, substantially as herein described.

4. In a vacuum-pump, a valve-chest in which are two chambers communicating respectively one with each end of the cylinder, an inlet-chamber common to both of said two chambers, a discharge-chamber common to both of said two chambers, and two oppositely-inclined valve-containing diaphragms one of said diaphragms separating one of said two chambers from both the inlet and discharge chambers and the other of said diaphragms separating the other of said two chambers from both the inlet and discharge chambers, substantially as herein described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 14th day of June, 1901.

WILLIAM F. GARRISON.

Witnesses:

FREDK. HAYNES,  
GEORGE BARRY, Jr.