

No. 641,409.

Patented Jan. 16, 1900.

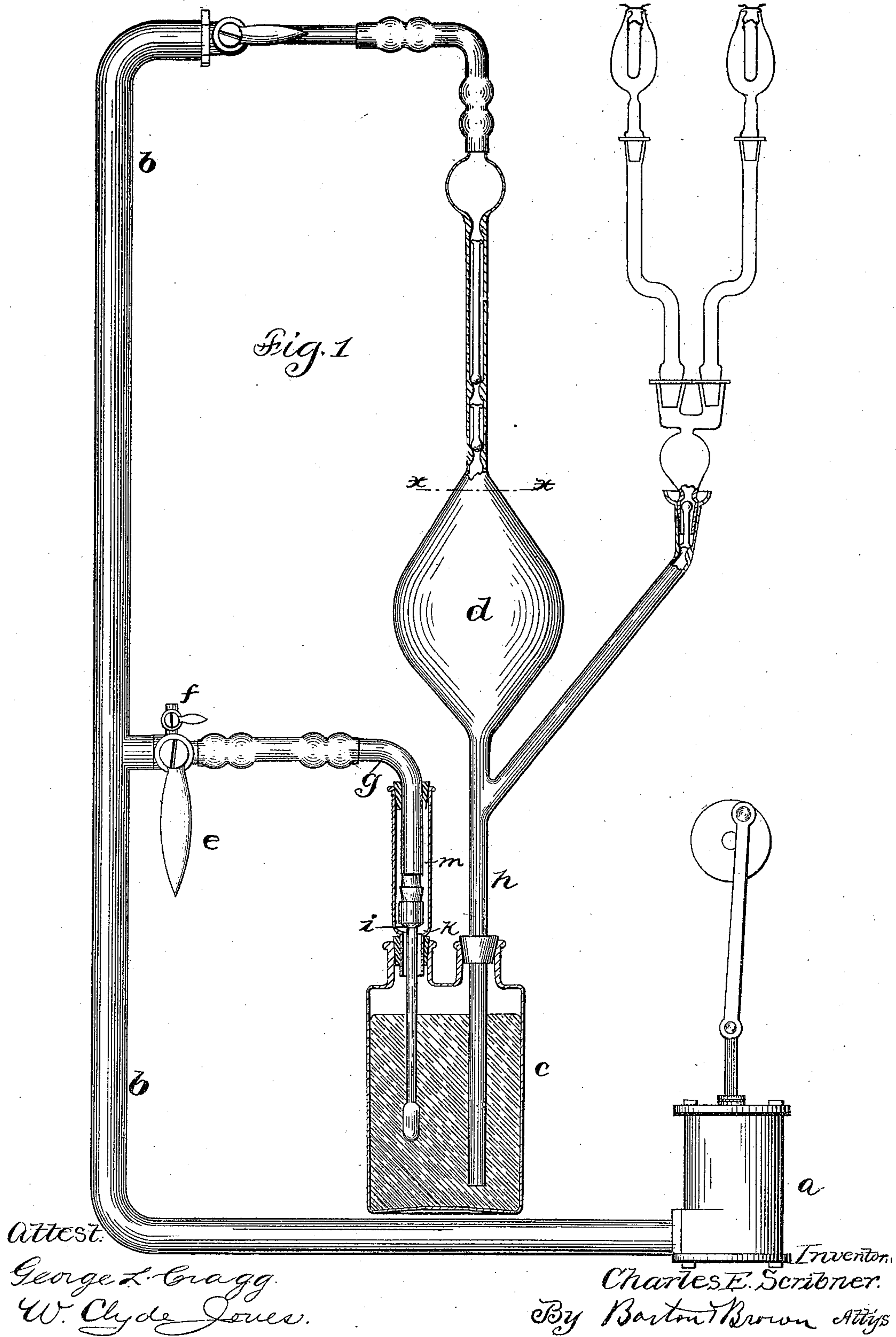
C. E. SCRIBNER.

AIR PUMP.

(Application filed June 13, 1893.)

(No Model.)

2 Sheets—Sheet 1.



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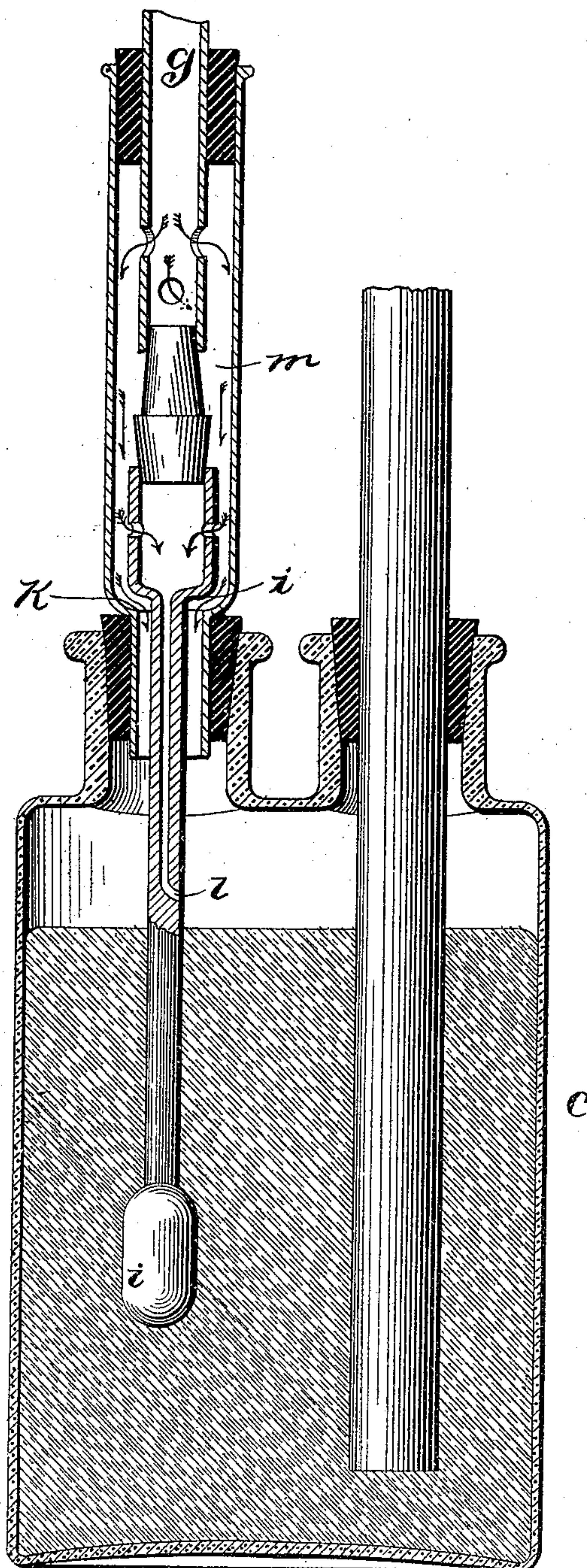


Fig. 2

Attest:

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UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN
ELECTRIC COMPANY, OF SAME PLACE.

AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 641,409, dated January 16, 1900.

Application filed June 13, 1893. Serial No. 477,477. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Air-Pumps, (Case No. 339,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention is designed to increase the speed of the flow of mercury into the exhaust-chamber until the same is nearly filled and then automatically retard its flow at the time when the greater speed or rapidity of flow would be liable to cause injury to the apparatus. Heretofore the flow of the mercury has been at a uniform speed and at no time greater than the slow rate required to avoid liability of injury at the time the exhaust-chamber is nearly filled. By my invention I increase the speed at first and provide automatic means for retarding the flow when the chamber is nearly filled.

The application of my device to air-pumps of this class thus very materially increases their capacity for doing work. In fact, very nearly doubles their capacity.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a mercury air-pump provided with my improvement. Fig. 2 is an enlarged sectional view showing my retardation-valve in detail.

Like parts are indicated by similar letters of reference throughout the different figures.

The pump illustrated in Fig. 1 is of the well-known class in which mercury is forced by atmospheric pressure from the vessel below into a partially-exhausted chamber, the mercury acting to seal the tube above the chamber, when on removing the atmospheric pressure from below the mercury returns by gravity. The articles, as incandescent lamps, being connected with this chamber are thus exhausted into the vacuum formed when the mercury goes out therefrom.

As shown in the drawings, an ordinary mechanical air-pump *a* is kept in action to exhaust the air from the pipe *b*, which pipe is

connected, as shown, with the vessel *c*, containing the mercury, and with the upper portion of the exhaust-chamber *d*. The air having been exhausted by the mechanical air-pump from the chamber *d*, the cock *e* is turned to open the inlet *f*, and the air flowing in through the pipe *g* forces the mercury up through tube *h* into the chamber *d*.

My improvement in the mechanism consists more particularly in the float-valve *i*, which is so adjusted and arranged that as the mercury in the vessel *c* is lowered the float-valve *i* will descend, so as to partially close at *k* the inlet for the air, and the inlet being thus restricted the speed of the flow of the mercury up through the tube *h* into the chamber *d* will be lessened accordingly. This float *i* is so balanced that the flow of the mercury will be retarded, preferably at about the time when the mercury in the chamber *d* has reached the height of line *x x*, for at about that point, if the high speed of flow should continue, there would be danger of breaking the apparatus. The float-valve *i* which I have shown may consist of glass or any other suitable material. The details of construction are, however, not important as long as the arrangement is such that the air rushing in at tube *g* will be checked or lessened in quantity at the right moment, so as to prevent a too-rapid flow of the mercury into chamber *d* when said chamber is nearly filled, and thus avoid undue pressure from the mercury at that time. It will be seen that the air at first entering tube *g* flows, as indicated by the single-barbed arrows, freely until the mercury, which sustains the float *i*, is lowered sufficiently, when the valve *i* is lowered, closing up the annular space about the valve at *k*. The main path for the air being thus closed, the flow will be through the small inlet *l*, as indicated by the double-barbed arrows, this inlet *l* forming the connection between the upper portion of the vessel *c* and the chamber *m* above the valve. Thus it will be seen that the capacity of the pump is greatly increased, while at the same time the apparatus is protected from injury.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with the exhausting-chamber of a vacuum-pump, a chamber connected therewith, a body of mercury in said last-mentioned chamber, and means for alternately forcing the mercury into the exhausting-chamber and withdrawing it therefrom, of a valve or equivalent device controlling the application of pressure to the mercury to force it into the exhausting-chamber, and a float adapted to dip into the mercury controlling the said valve, said float being placed to close the valve to restrict the flow of pressure fluid and thereby of mercury when the exhausting-chamber is nearly full of mercury, substantially as described.

2. The combination with the exhausting-chamber of a vacuum-pump, a mercury-chamber, a tube connecting the mercury-chamber with the exhausting-chamber, and an inlet to the mercury-chamber adapted to admit air to force the mercury into the vacuum-chamber, a valve controlling the air-inlet and thereby the rate of flow of the mercury, and a float in the mercury adapted to close the said valve to restrict the flow of mercury when the mercury has nearly filled the exhausting-chamber, whereby the mercury is permitted to flow rapidly into the exhausting-chamber until the

same is nearly filled and its flow is thereafter retarded, as described.

3. The combination with the inlet for the air to the vessel for the mercury of an air-pump, of a float-valve in said inlet supported by the mercury so that as the mercury is lowered within the vessel the valve partially closes the inlet for the air and thereby retards the flow, substantially as and for the purpose specified.

4. The combination with a mercury vacuum-pump, of a vessel of mercury connected with the exhausting-chamber thereof, an air-passage leading into said chamber, and a valve controlled by a float in the said vessel of mercury and constructed when seated to restrict the flow of air through said passage and thereby to reduce the rate of flow of the mercury into the chamber, whereby the flow of mercury into the chamber is retarded after a predetermined point, substantially as described.

In witness whereof I hereunto subscribe my name this 2d day of June, A. D, 1893.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,
LUCILE RUSSELL.