

(No Model.)

E. WESTON.

APPARATUS FOR PRODUCING VACUUMS.

No. 283,549.

Patented Aug. 21, 1883.

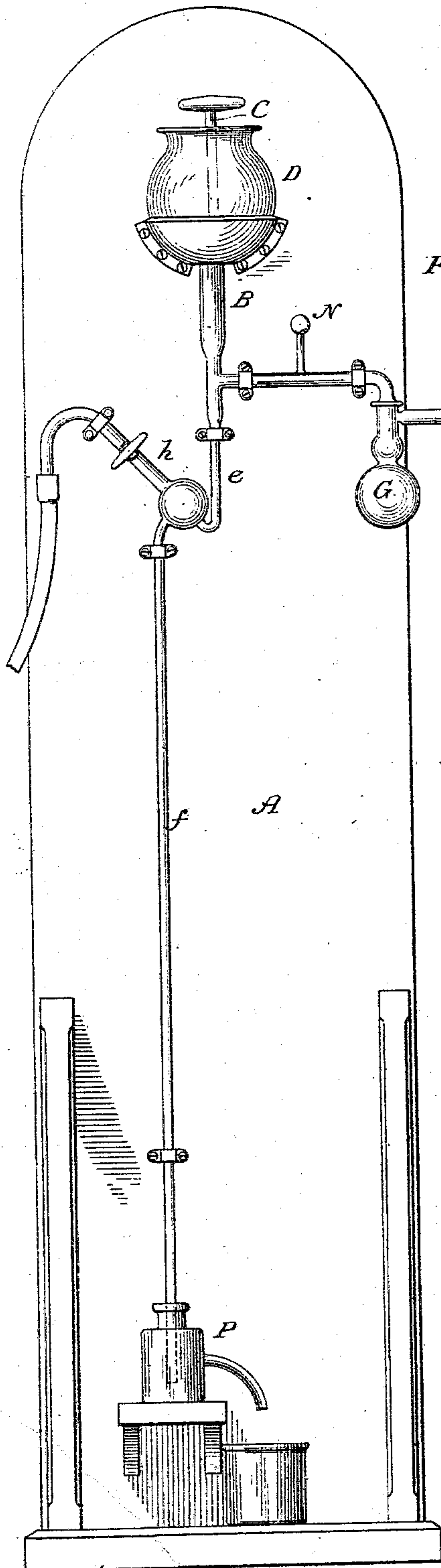


Fig. 1.

Fig. 2.

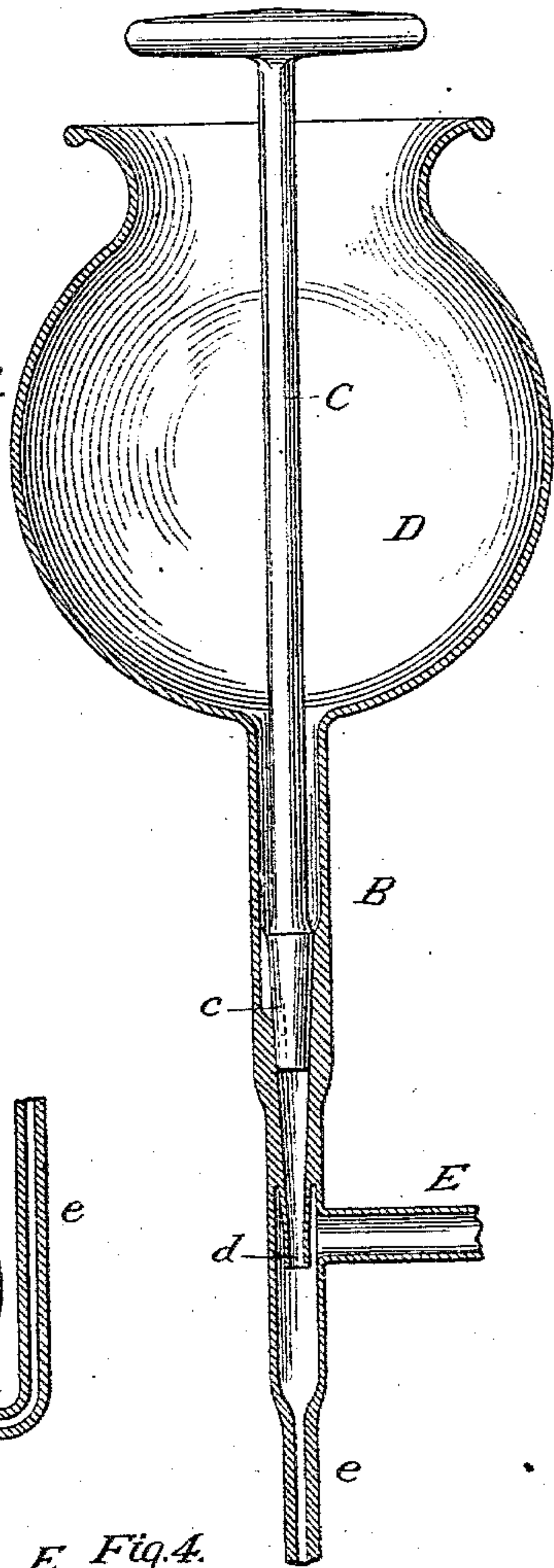


Fig. 3.

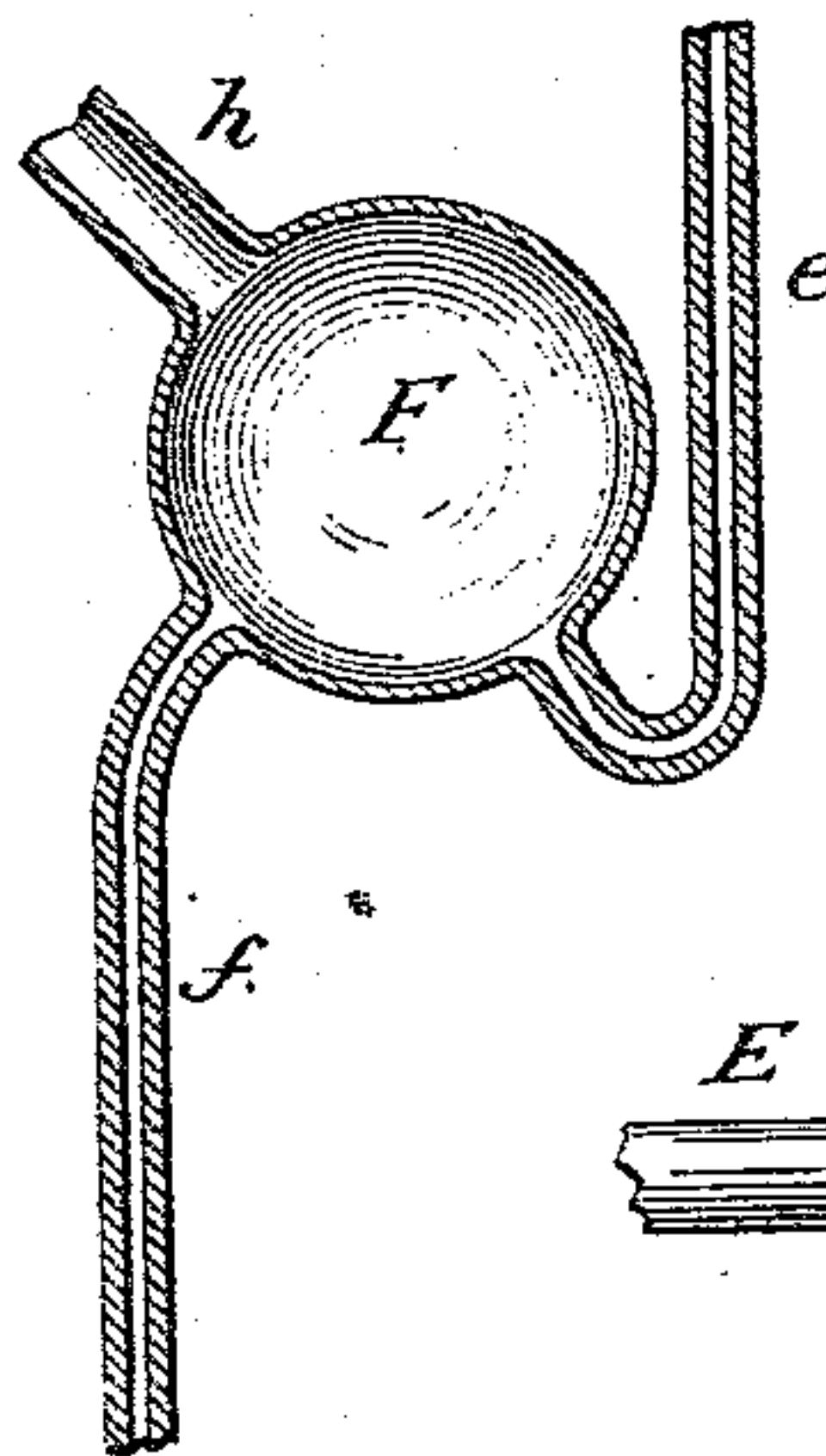
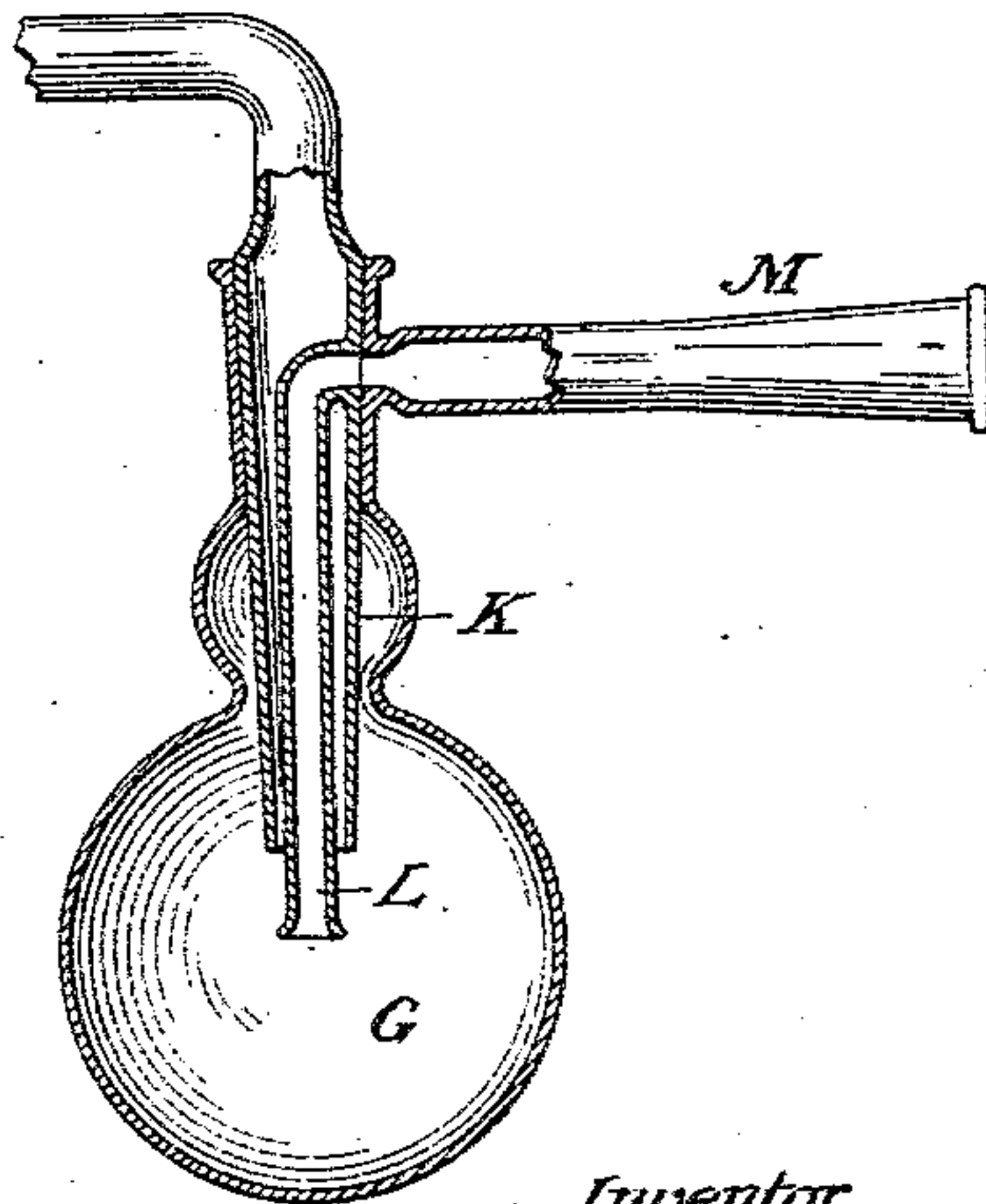


Fig. 4.



Attest:  
Henry Hill  
W. H. Doggett

Inventor.  
Edward Weston  
By Parker W. Page  
Atty.



# UNITED STATES PATENT OFFICE.

EDWARD WESTON, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE UNITED STATES ELECTRIC LIGHTING COMPANY, OF NEW YORK, N. Y.

## APPARATUS FOR PRODUCING VACUUMS.

SPECIFICATION forming part of Letters Patent No. 283,549, dated August 21, 1883.

Application filed May 8, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD WESTON, a subject of the Queen of Great Britain, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Producing Vacuums, of which the following, taken in connection with the accompanying drawings, is a specification.

My present invention relates to apparatus commonly called "vacuum-pumps," designed particularly for exhausting the globes of incandescent electric lamps of air.

The invention consists in improvements in the construction and mode of operation of pumps formed on the well-known Sprengel principle, the said improvements being directed, mainly, to the construction of the drop or fall tube and other appliances of novel character, and to details of construction of the parts for containing anhydrous or absorptive substances.

In the accompanying drawings, Figure 1 is a view in elevation of a pump embodying my improvements. Fig. 2 is an enlarged sectional view of the chamber for containing the mercury and the drop-tube; Fig. 3, a sectional view of the exhaust-chamber and passages communicating therewith, and Fig. 4 a view partly in section of the part for containing the absorptive substances.

Similar letters of reference indicate corresponding parts in all the figures.

The apparatus is to be mounted on an upright support, A, the several parts being held in the usual way by metal clamps and bands.

The chamber from which the mercury is supplied to the drop-tube is designated by D, and consists of an open globe extended at the bottom in a tube, B. The lower interior portion of tube B is conical, and is ground to form a seat for a valve, the stem C of which extends up through chamber D. This valve may be formed, as shown, by a conical plug, of glass or steel, with a channel or duct, *e*, which registers with a duct in the tube B; or, instead of the registering-ducts, the stem may be combined with proper supports, and constructed so that it may be raised from its seat, whether by means of a screw-thread or otherwise.

Below the valve, in a continuation of tube B, is the nozzle *d*, which discharges the mercury from chamber D through the enlarged bore of tube B to the contracted drop-tube *e*. This latter is extended to a proper length, and bent upward and joined to a globe, F, at a point near the bottom.

A barometer-tube, *f*, of very small bore, to prevent the introduction of air-bubbles into the pump, is joined to the globe F at a point slightly above the opening of the drop-tube *e*, and dips in a vessel, P, provided with an overflow.

From the upper part of globe F leads a tube, *h*, communicating with an air-pump capable of rapidly exhausting—such, for instance, as may be run by steam or water power.

From the tube B, at a point on a line with or above the nozzle *d*, leads the tube E, with which may be connected the spark-tube N, the cup G, containing an absorptive substance—such as phosphoric anhydride—and the lamps to be exhausted.

An apparatus thus constructed is operated as follows: The vessel P and globe D are filled with mercury, valve-duct *c* closed, and a lamp, L', connected to the tube E. By means of the steam-pump (not shown in the drawings) the interior of the apparatus is exhausted of air as far as can be practically done. Communication with the steam-pump may then be shut off by a valve in tube *h*. The valve *c* is then opened, and the mercury from globe D descends through the nozzle *d* into the drop-tube *e*, carrying with it the air in tubes B and E until a high degree of exhaustion is reached. The mercury, passing through tube E, which, for the best results should, in practice, be of slightly greater length relatively to the other parts than appears by the drawings, enters the globe F, where a comparatively high vacuum exists. To provide against the mercury filling the globe, and the consequent necessity of shutting off the pump for its withdrawal, the barometer-tube *f* is used. The entrance of this tube being somewhat above that of tube *e*, there will always remain a small quantity of mercury in the lower part of globe F, which covers the entrance of the tube *e*, the surplus running off by tube *f* into vessel P, from which the over-



and its appurtenances, it will be seen that a  
10 continuous exhaustion into a vacuum is rendered possible without having to disconnect the globe from the pump to empty the mercury, while the relative position of the two tubes *e f* produces a mercury seal for the former, which shuts off the globe *F* from the other  
15 parts of the pump completely.

In Fig. 4 is shown an arrangement for containing an absorptive substance. It consists of a globe or flask, *G*, which is fitted by a  
20 ground joint over a nozzle, *K*. To the neck of globe *G* is joined a short tube, *M*, to which the lamps to be exhausted are to be united. Within the nozzle *K* is formed a tube, *L*, that extends down below the nozzle, ending in a  
25 flaring mouth. It is joined to the side of the nozzle, as shown. Tube *M* enters the neck of globe *G* at a point which will cause it to register with the tube *L*. By this means the globe is made to serve as a cock for disconnecting  
30 the lamp-tube or any part of the apparatus with which it may be used. The purpose of the flaring tube *L* is to prevent the absorptive powder used in globe *G* from being driven into the pump—an accident likely to occur in many  
35 forms of pump when in the process of sealing off the exhausted lamps, or in other ways, air is suddenly admitted to the pump through the lamp-tube *M*.

Having now described my invention, what I  
40 claim as new, and desire to secure by Letters Patent, is—

1. In a vacuum apparatus of the kind de-

ervoir, a tube connected therewith, and a conical valve-seat within said tube, of a valve resting in said seat, and a stem therefor extending into or through the mercury-reservoir, substantially as above set forth.

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3. In a vacuum apparatus, the combination of a drop-tube, a globe with which the said tube connects, a barometer-tube communicating with the globe slightly above the entrance  
60 of the drop-tube, and an exhaust-tube leading from the upper portion of the globe, as set forth.

4. The combination, with a vacuum apparatus, of a globe or flask for containing absorptive substances, the said flask being connected  
65 to the apparatus by a ground joint, and constructed to operate as a cock for closing communication between two parts of the apparatus, as set forth.

5. The combination, in a vacuum apparatus, 70 of a nozzle, as *K*, a tube, as *L*, having a flaring mouth, and contained within the same, a flask for containing absorptive substances, fitted over said nozzle by a ground joint, and a tube, *M*, joined to the neck of the flask and arranged  
75 to register with the tube *L*, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 3d day of July, 1882.

EDWARD WESTON.

Witnesses:

HENRY A. BECKMEYER,  
JOHN F. KELLY.