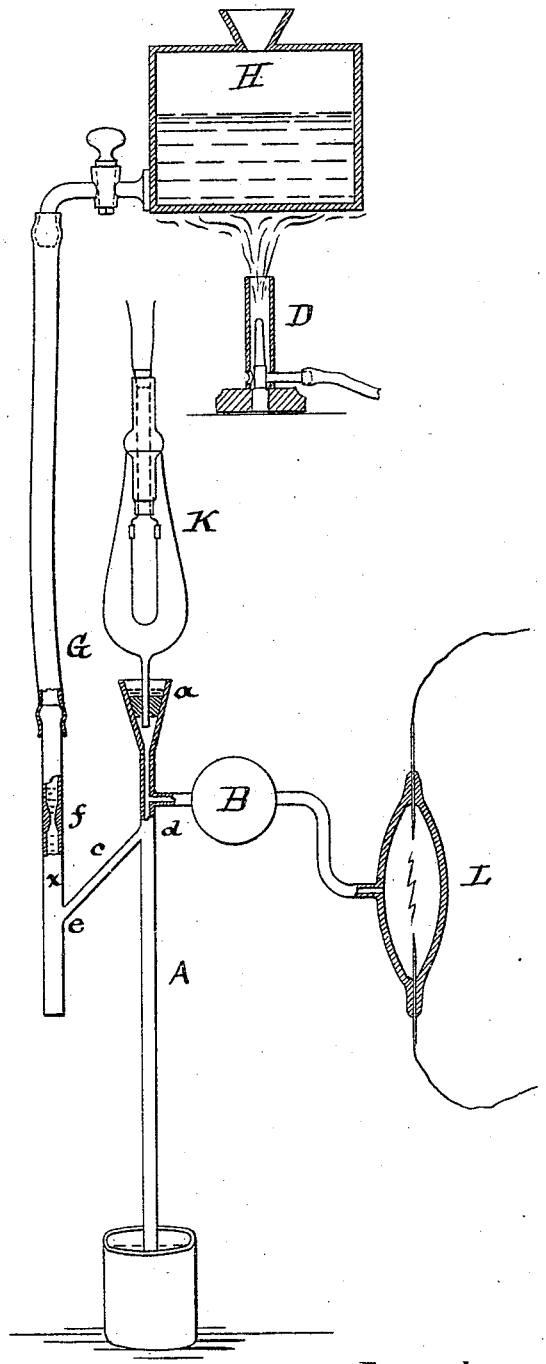
(No Model.)

T. A. EDISON.

VACUUM APPARATUS.

No. 248,433. Patented Oct. 18, 1881.



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UNITED STATES PATENT OFFICE.

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VACUUM APPARATUS.

SPECIFICATION forming part of Letters Patent No. 248,433, dated October 18, 1881.

Application filed January 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Vacuum Apparatus; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to improvements in the vacuum apparatus known as the "Sprengel drop-pump," and to methods and means of treating the mercury employed therein, the object being to increase the efficiency and reliability of the apparatus.

The Sprengel drop, as hitherto made, consisted of a single drop-tube connected to a reservoir of mercury, and having a contraction or strangulation, so that the flow of the mercury was checked, its stream being broken into drops. To this drop-tube was connected the body to be exhausted, and also such testing as was desired. Sometimes, however, from different causes, a globule of air would pass down this drop-tube, the result being the impairment of such vacuum as had already been attained.

The object of this invention, therefore, is to prevent such result; to which end it consists in using two drop-tubes, the first one connected to the reservoir and provided with the contraction or strangulation, the second connected to the body to be exhausted, and to whatever testing devices are used, the two being connected by a tube inclined upwardly from the first to the second, so as to form a trap-seal between the two. The result of this is that two vacuous spaces are formed, separated by a solid column of mercury. Now, if a globule of air enters the vacuum apparatus, it is caught in the first vacuous space, impairing its tension, while the second vacuous space, which, from its inclusion of the body to be exhausted, is the important one, is protected.

In the drawings, Figure 1 is a sectional view of my improved Sprengel pump, and Fig. 2 a sectional view of the mercury-filter.

H is a mercury-reservoir, in which the mercury is to be kept at a minimum temperature of, say, 100° or 110° Fahrenheit, these figures being approximate ones only, as it is evident that a variation of a few degrees either way would accomplish the result arrived at. This heating may be effected in any desired manner—say by a steam or water jacket, heated coils, or by the direct application of fire-heat—the gas-jet D being merely typical, as this subject-matter is set forth and claimed in a separate application.

G is the first drop-tube, connected to the reservoir, and provided with the contraction or strangulation *f*. A is the second drop-tube, to which is connected the body to be exhausted, here represented by the lamp K, secured thereto by its open tube passing through the mercury-sealed stopple in the enlarged end *a* of A. Connected to A is the bulb or other receptacle, B, which may contain a mixture of sodic hydrate and phosphoric anhydride or other drying agent, and the Geissler or spark tube L, for indicating the degree of exhaustion. The drop-tubes A and G are connected by the tube *c*, which inclines upwardly from G to A. The mercury, in passing through G, has its flow checked at *f*, and forms a vacuous space, (marked *x*,) and rising in *c* it trickles over at *d* and falls through the drop-tube A. The connecting-tube *c* is always full of mercury, preventing any access of air from G to A. Hence if air by any means finds its way into G, it simply impairs the vacuum in *x*, that in A and K being preserved and maintained at a higher tension than that in *x*.

What I claim is—

1. The combination, in a Sprengel or drop pump, of two drop-tubes connected by a sealing-tube, substantially as shown and described.

2. In a Sprengel or drop pump, a drop-tube connected to a reservoir and provided with a contraction, and a separate drop-tube connected to the body to be exhausted and to the first drop-tube, substantially as set forth.

This specification signed and witnessed this 19th day of January, 1881.

THOS. A. EDISON.

Witnesses:
H. W. SEELY,
ERNEST J. BERGGREN.