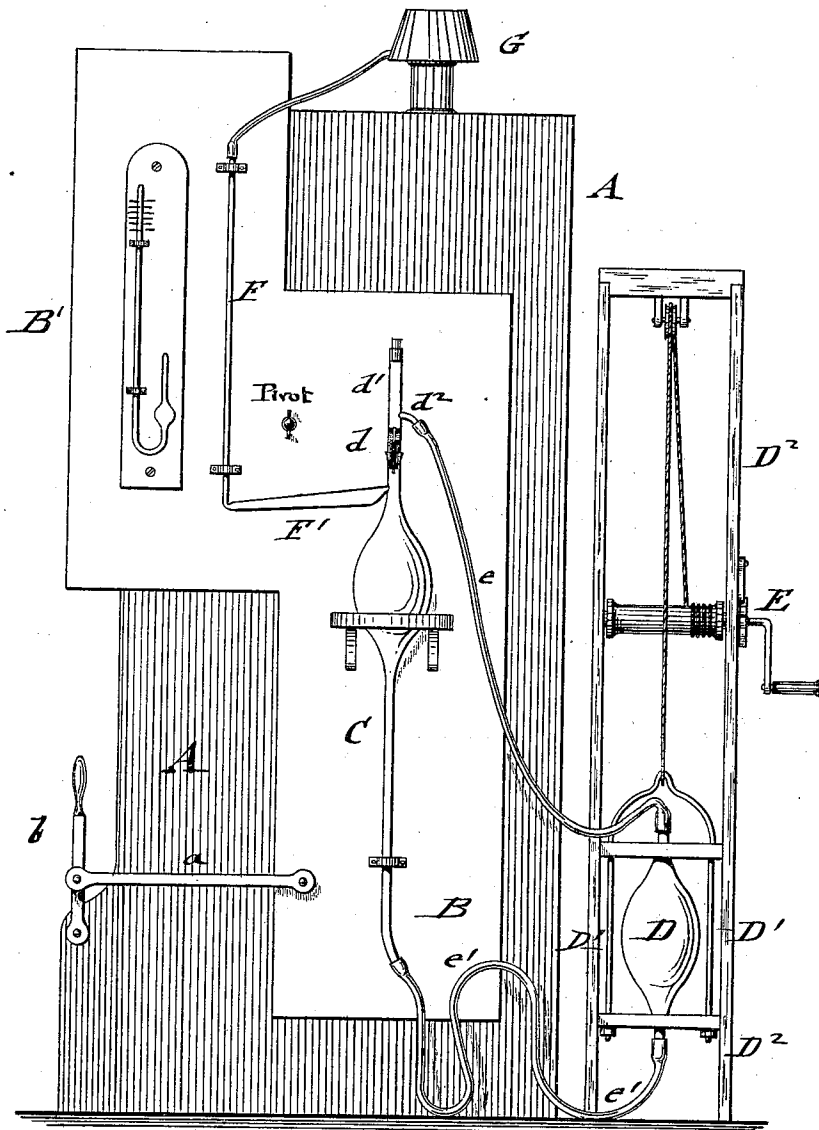


(No Model.)

H. GOEBEL.
VACUUM PUMP.

No. 252,658.

Patented Jan. 24, 1882.



WITNESSES:

Carl Kern
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UNITED STATES PATENT OFFICE.

HENRY GOEBEL, OF NEW YORK, N. Y.

VACUUM-PUMP.

SPECIFICATION forming part of Letters Patent No. 252,658, dated January 24, 1882.

Application filed August 5, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY GOEBEL, of the city, county, and State of New York, have invented certain new and useful Improvements in Vacuum-Pumps, of which the following is a specification.

This invention has reference to an improved vacuum-pump based on the well-known Geissler system of vacuum-pumps, but adapted to render the operation of the same mechanical, so that unskilled hands may operate the pump and evacuate electric lamps and other vessels in a rapid and reliable manner; and the invention consists of a Geissler pump provided with an air-discharge valve at its upper end, the whole pump being supported on a pivoted frame, which is oscillated by means of a hand-lever, so as to throw a body of mercury into a trough-shaped horizontal portion of the evacuating-tube and form therein a mercurial seal. The mercury-receptacle connected with the pump is adapted to be raised to the proper height by a suitable hoisting mechanism until the surplus mercury passes through the discharge-valve at the top of the pump and back again by a connecting-tube to the vertically-guided mercury-receptacle. Upon the lowering of the mercury-receptacle the pump is returned into normal position and ready for evacuation.

The accompanying drawing represents a front elevation of my improved vacuum-pump.

A in the drawing represents a vertical support or stand, to which is pivoted the supporting-frame B of a Geissler vacuum-pump, C.

To the lower part of the pivoted frame B is applied a connecting-rod, *a*, and hand-lever *b*, by which the frame B may be oscillated to a certain extent, as required by the pump.

The upper part of the Geissler pump C is provided with an upwardly-opening discharge-valve, *d*, and above the same with a cylindrical tube, *d'*, which is open at the top and provided above the valve *d* with a short downwardly-extending tube, *d''*, that is connected by a rubber tube, *e*, with a mercury-reservoir, D, supported in a cage, D'. The reservoir D and cage D' are raised or lowered in vertical guides D² by a suitable hoisting mechanism, E.

The lower end of the Geissler pump C is connected in a similar manner as the upper end

by a flexible tube, *e'*, with the lower end of the mercury-reservoir D, the tube being of sufficient length to provide for the distance required in hoisting the reservoir.

To the upper end of the Geissler pump C, below the valve *d*, is connected the evacuating-tube F by a trough-shaped portion, F', which increases in depth as it approaches the neck of the pump, and which extends nearly at right angles to the main part of the tube F. The connecting portion F' is made widest close to the point of connection with the Geissler pump C, so that the mercury within the bulb-shaped portion F' will be thrown over toward the angular connection with the main tube F and form there a mercury seal, which prevents positively the passage of air to the Geissler pump, while admitting the charging of the same with mercury from the reservoir D preparatory to working the pump.

The charging of the pump is accomplished by raising the mercury-reservoir up to and above a level with the upper part of the pump C until the mercury passes through the valve *d* and communicating-pipe *e* back to the reservoir. The reservoir is then lowered and the pump-frame B thrown toward the left. The play of the pump will then begin in the usual well-known manner, it evacuating the electric lamps or other vessels sealed onto the upper end of the evacuating tube F. The main part of the evacuating-tube F is made somewhat higher than the barometric height of a column of mercury exposed to atmospheric pressure, so that the pressure within the pump may be readily observed by means of a barometer, B', arranged sidewise of the evacuating-tube F on frame A.

I prefer to expose the lamps or vessels before and during evacuation to the heat of a gas-burner, G, arranged at the upper part of the frame A, so as to expel the moisture contained in the air within the lamp-bulbs, which hitherto was allowed to remain in the same.

The main advantage of my improved vacuum-pump is that the pump contains no ground-glass stop-cocks of any kind, which are always a source of leakage, they forming to some extent the weak points of pumps for producing high vacua. Another advantage is that the operation of the pump is entirely mechanical,

and can be attended to by inexperienced hands, which is an important feature when large numbers of electric vacuum-lamps have to be evacuated.

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

1. The combination of a Geissler vacuum-pump having a discharge-valve at the upper part and an evacuating-tube connected thereto
10 below the valve with an oscillating supporting-frame and a vertically-movable mercury-reservoir, substantially as set forth.

2. The combination of a Geissler vacuum-pump applied to an oscillating supporting-frame and having a discharge-valve at the upper
15 end, with a mercury-supply reservoir with pipes for connecting the upper and lower ends of the Geissler pump with the supply-reservoir, and with means for hoisting the latter, sub-
20 stantially as set forth.

3. In a Geissler vacuum-pump, the combination of a Geissler pump, C, having a discharge-valve, *d*, at the upper end, with an evacuating-tube, F, connected thereto below the discharge-valve by a trough-shaped portion, F', which
25 increases in depth toward the pump and extends at right angles, or nearly so, from the main part of the evacuating-tube F, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as
30 my invention I have signed my name, in presence of two witnesses, this 30th day of July, 1881.

HENRY GOEBEL.

Witnesses:

PAUL GOEPEL,
CARL KARP.