(No Model.)

V. A. HLASKO.

REVOLVING AIR PUMP.

No. 543,245. Patented July 23, 1895.

Fig: 3.

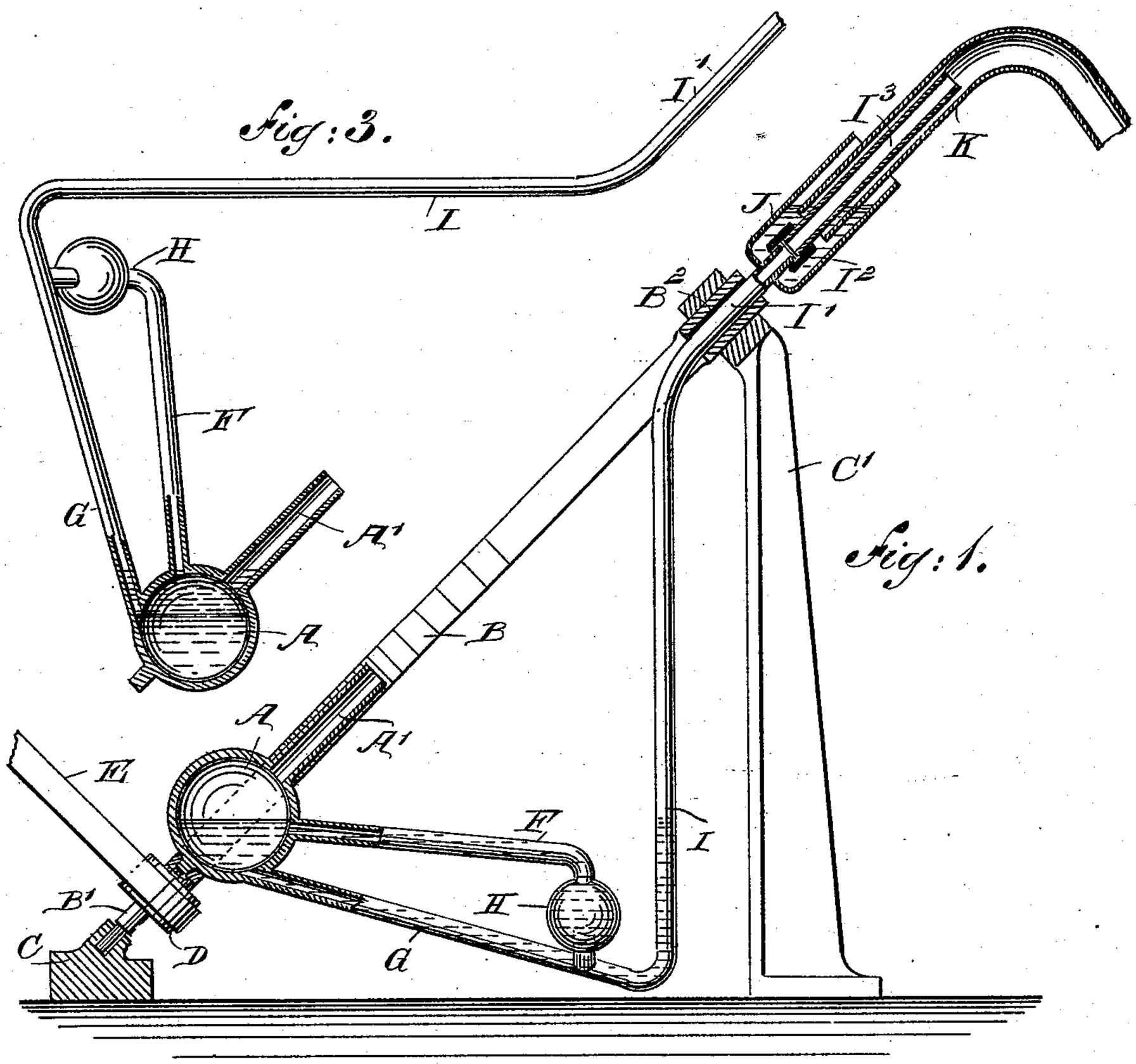
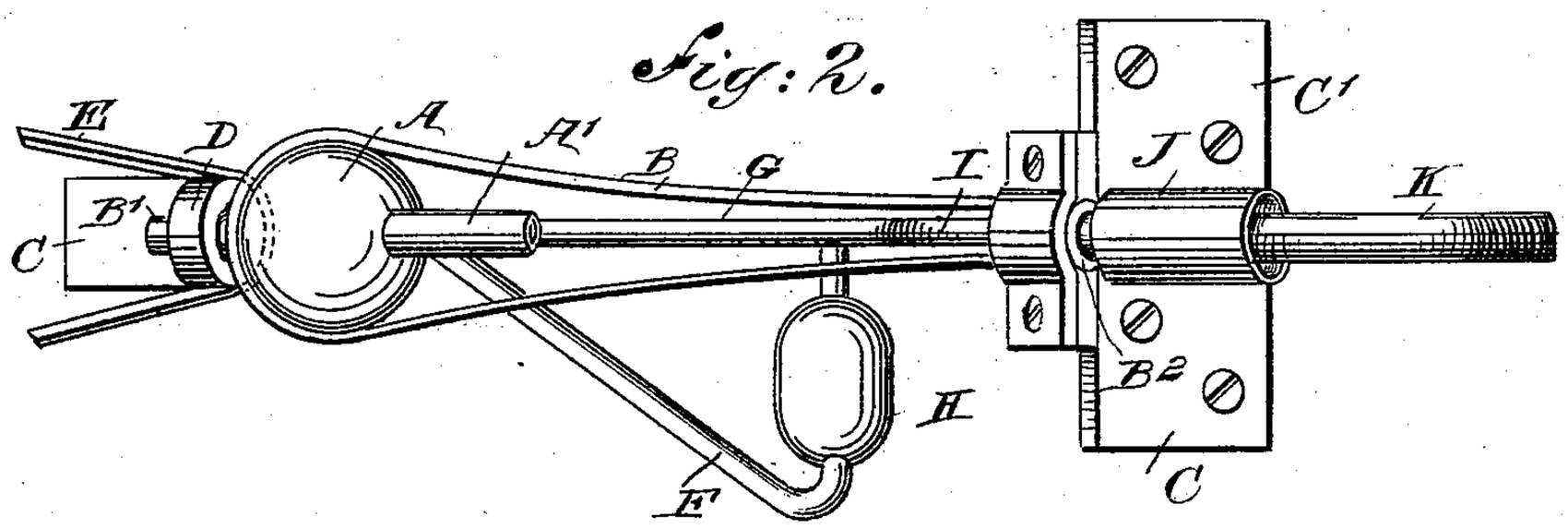


Fig: 1.

Fig: 2.



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VATSLAV A. HLASKO, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO PAUL HANSLICK, OF SAME PLACE.

REVOLVING AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 543,245, dated July 23, 1895.

Application filed March 31, 1894. Serial No. 505,845. (No model.)

To all whom it may concern:

Be it known that I, VATSLAV A. HLASKO, a Russian subject, at present residing in the city, county, and State of New York, have invented a new and Improved Revolving Air-Pump, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved revolving air-pump which is comparatively simple and durable in construction, very effective in operation, and designed for forming a vacuum in electric-light globes and other articles and apparatus.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a plan view of the same, and Fig. 3 is a sectional side elevation of the bulb and connected pipes in an uppermost position.

The improved revolving air-pump is provided with a bulb A, secured in a suitably-constructed frame B, extending preferably at an angle of forty-five degrees and provided at its lower end with a trunnion B′, journaled in a stud C, and at its upper end with a hollow bearing B^2, journaled in suitable bearings in a standard C′, as plainly illustrated in Fig. 1.

On the lower end of the frame B is held a pulley D, over which passes a belt E, connected with suitable machinery to impart a rotary motion to the said frame B and the bulb A supported therein, it being understood that the axis of the bulb lies at an angle of forty-five degrees and coincides with the axis of the trunnion B′ and that of the bearing B^2.

The bulb A is provided with an air-outlet pipe A′, extending in the axis of the bulb. The latter is filled with a pumping liquid, preferably mercury, and is provided with two pipes F and G, extending at angles from the bulb, as illustrated in Fig. 1, the pipe F extending—say at an angle of ten degrees—in an outward and downward direction from about the middle of the bulb, while the other pipe G extends at an angle of fifteen degrees outward and downward from the bottom of the bulb, as indicated in the said Fig. 1. The two pipes F and G slightly diverge and are connected with each other at their outer ends by a bulb H, the pipe F, with the bulb H, forming the air-trapping pipe, while the pipe G is the liquid-return pipe, as hereinafter more fully explained.

From the junction of the bulb H with the pipe G extends a pipe I at an angle to the pipes F and G, and bent at its upper end I′ in alignment with the axis of the bulb A, so that when the several parts are in the position shown in Fig. 1 the main portion of the pipe I extends vertically, while its end I′ is at an angle of forty-five degrees to the said main portion. This end I′ of the pipe I extends through the hollow bearing B^2 and revolves with the same as the frame B is revolved.

On the extreme upper end I′ of the pipe I is secured or formed a vessel J containing a sealing liquid, into which extends the pipe K connected with the vessel to be exhausted. Into the pipe K passes the extension I^3 connected by a suitable coupling I^2 with the pipe end I′ within the receptacle J, as plainly shown in Fig. 1.

The operation is as follows: When the several parts are in the position illustrated in Fig. 1, then the pumping-liquid from the bulb A extends into the pipes F G and bulb H and also partly up in the pipe I, as indicated in Fig. 1, the liquid sealing the ends of the pipes F and G in the said bulb. Now, when the devise is rotated, then the pipe G will soon attain a higher position at the junction with the bulb H than the pipe F, so that the liquid recedes from the pipe I in the pipe G and finally in the bulb H and pipe F, the liquid passing back into the bulb A as the pipes G and F rise into their uppermost position, as illustrated in Fig. 3. Now, during this receding of the liquid in the pipes I F G and bulb H air is drawn in at the upper end of the pipe I′ from the pipe K, connected with the vessel to be exhausted; but the inner ends of the pipes F and G are always sealed by the liquid in the bulb A, even at the time the said

pipes are in their uppermost position, as shown in Fig. 3. Now, on the further revolving of the device the pipe G moves downward, so that the liquid again flows from the bulb A into the said pipe to finally pass the junction of the pipe G and the bulb H, so as to trap the air contained in the bulb H and pipe F, the liquid passing from the pipe G into the pipe I and then also from the pipe G into the bulb H to drive the air out of the bulb and through the pipe F in and through the liquid in the bulb A to the outlet-pipe A′ and finally to the outer air. It is understood that at the time the pipes F and G move back into their lower position (shown in Fig. 1) then the liquid has completely filled the bulb H and pipe F, so that all the air previously trapped in the said bulb and pipe F has been forced through the bulb A and outlet-pipe A′ to the outer air. Thus the pipe F and bulb H become a trapping-pipe for the air, while the pipe G serves as a return-pipe for the pumping-liquid flowing from the bulb A through the pipe G to the pipe I. On the further revolving of the device the above-described operation is repeated—that is, the liquid commences to recede in the pipes I and G, then in bulb H and pipe F until the liquid has all flowed back into the bulb A at the time the pipes F and G are in their uppermost position, (indicated in Fig. 3,) and then on the further revolving of the device the liquid flows through the pipe G to trap the air in the bulb H and pipe F, and finally the pumping-liquid passes into the bulb H and pipe F and through the liquid in the bulb through the outlet-pipe A′. Thus on each revolution of the device an amount of air corresponding to the capacity of the bulb H and pipe F is drawn from the vessel to be exhausted, trapped, and discharged, as above described.

I do not limit myself to the particular form of pipes and bulbs as shown and described, as the position of the same may be greatly varied and their form changed without deviating from my invention, it being understood that the angular arrangement of the pipes F I with the return-pipe G operates somewhat like a hollow screw having a return-channel.

It is understood that any number of air-trapping and liquid-return pipes may be employed on one and the same apparatus to increase the capacity of the machine. It is also understood that instead of the pipes as shown a revoluble body provided with channels arranged like the pipes may be used to accomplish the same result.

It will further be seen that an air-pump constructed in the manner described requires no valves whatever, has no parts liable to get out of order, and the same pumping-liquid is used over and over again as it circulates through the pipes or channels, as above described. As the ends of the pipes F and G in the bulb are always sealed, no outer air can get inside the pipes or channels. The bulb H is employed to increase the air-pumping capacity of the machine.

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

1. An air pump, comprising a bulb mounted to turn about an inclined axis passing approximately through the center of the bulb, the latter being adapted to contain a pumping liquid, and a pipe adapted for connection with the article to be exhausted and connected with the bulb to turn therewith, and arranged at an angle to the said inclined axis, so that by turning the bulb with the pipe the liquid will be caused to flow outward from the bulb, or to return into the same, substantially as described.

2. An air pump comprising a bulb mounted to turn about an axis passing approximately through the center of the bulb, the latter being adapted to contain a pumping liquid, and a pipe connected to the bulb to turn therewith, the free or suction end of the said pipe being adapted for connection with the article to be exhausted, the said suction end being located in alignment with the axis about which the bulb is mounted to turn, while the intermediate portion of the pipe deviates from the said axis, substantially as described.

3. A revolving air pump comprising a revoluble fountain bulb adapted to contain a pumping liquid, an air pipe adapted to be connected with the vessel to be exhausted, a liquid return pipe connected with the said air pipe and with the said bulb, and an air trapping pipe connected with the said bulb and with the said liquid return pipe, substantially as shown and described.

4. A revolving air pump comprising a revoluble fountain bulb adapted to contain a pumping liquid, an air pipe adapted to be connected with the vessel to be exhausted, a liquid return pipe connected with the said air pipe and with the said bulb, an air trapping pipe connected with the said bulb and with the said liquid return pipe, and a bulb for connecting the air trapping pipe with the said liquid return pipe, substantially as shown and described.

5. A revolving air pump comprising a revoluble fountain bulb adapted to contain a pumping liquid, an air pipe adapted to be connected with the vessel to be exhausted, a liquid return pipe connected with the said air pipe and with the said bulb, an air trapping pipe connected with the said bulb and with the said liquid return pipe, a bulb for connecting the air trapping pipe with the said liquid return pipe, and a sealing vessel held on the said air pipe to seal the end of the air supply pipe, substantially as shown and described.

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Witnesses:
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