No. 762,499. PATENTED JUNE 14, 1904.

J. H. SPRAGUE.

VACUUM LIFTER.

APPLICATION FILED FEB. 16, 1904.

NO MODEL.

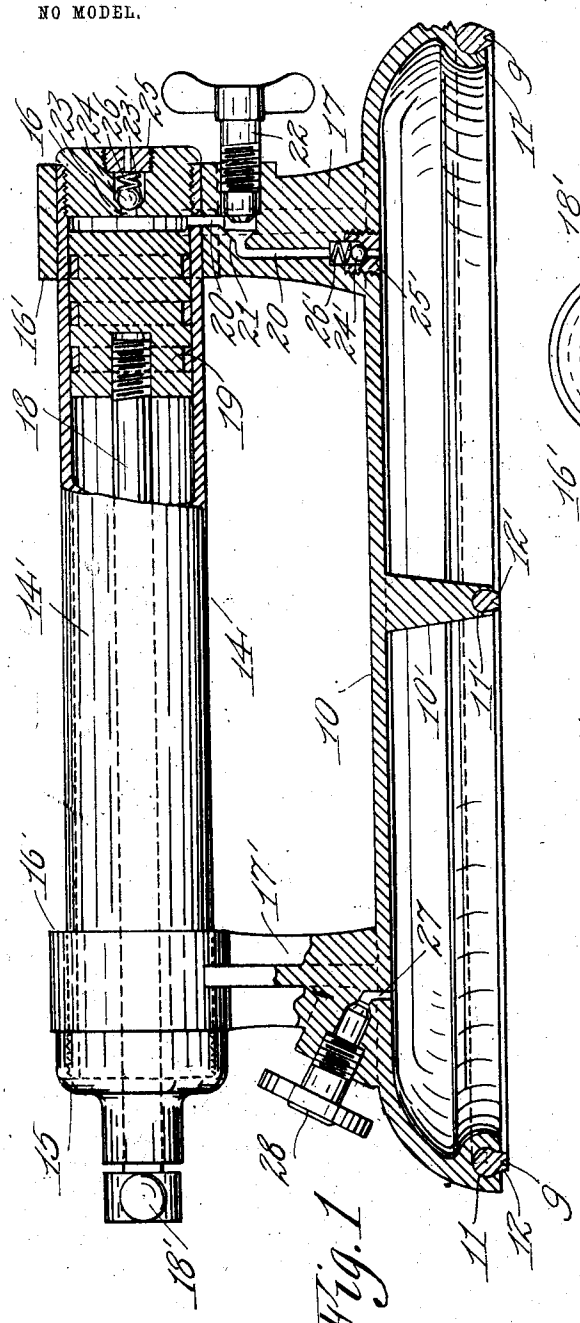


Fig. 1

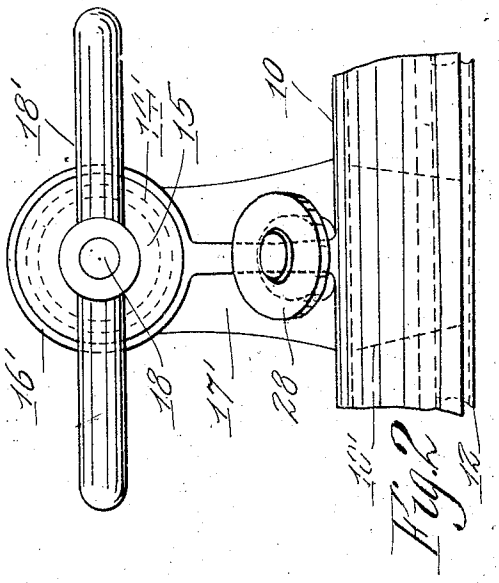


Fig. 2

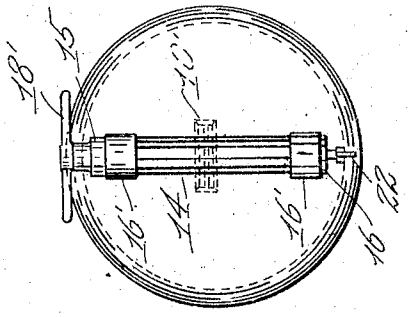


Fig. 3

WITNESSES:

Paul B. Talbot

Russell Hazzard

INVENTOR

John H. Sprague

BY Frank E. Adams.

ATTORNEY

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UNITED STATES PATENT OFFICE.

JOHN HOWARD SPRAGUE, OF SEATTLE, WASHINGTON.

VACUUM-LIFTER.

SPECIFICATION forming part of Letters Patent No. 762,499, dated June 14, 1904.

Application filed February 16, 1904. Serial No. 193,887. (No model.)

To all whom it may concern:

Be it known that I, JOHN HOWARD SPRAGUE, a citizen of the United States of America, and a resident of the city of Seattle, county of King, State of Washington, have invented certain new and useful Improvements in Vacuum-Lifters, of which the following is a specification.

My invention relates to improvements in vacuum-lifters, and has special reference to a device of this class which is especially useful in handling plate-glass.

Among numerous objects attained by this invention and readily understood from the following specification and accompanying drawings, included as a part thereof, is the production of a simplified and efficient vacuum lifting device embodying essential features of adaptability, utility, and general efficiency which facilitate the application of the device for lifting and sustaining plates of glass and insure a positive exhaust of the air from the cup and a secure hold of the lifter on the glass.

The above-mentioned and other desirable objects are attained by the constructions, combinations, and arrangements of parts, as disclosed on the drawings, set forth in this specification, and succinctly pointed out in the appended claims.

With reference to the drawings filed herewith and bearing like reference characters for corresponding parts throughout, Figure 1 is a view of the lifter shown in partial vertical section. Fig. 2 is a fragmentary view of the lifter viewed from the left of Fig. 1, and Fig. 3 is a plan view of the lifter on reduced scale.

This invention includes a vacuum-cup, as 10, which is composed of plate metal and preferably formed substantially dish-shaped and comparatively shallow, and at the open side of this cup the rim thereof is thickened at the edge, and a continuous groove 11 is formed in this edge as the seat for a packing 12, consisting of an endless strip of flexible material of somewhat resilient nature, as leather, rubber, or the like. This groove 11 is somewhat restricted in width at the mouth, so as to better retain the packing-strip when seated therein, and this strip is formed somewhat thicker than the depth of the groove, so as to project beyond the edge of the rim of the cup, and in the outer surface or face of this packing-strip is a continuous groove 9, which insures a more perfect air-tight seating of the packing on the glass plate. At the center of the cup is a distance-piece 10′, which is adapted to support the glass plate against exterior air-pressure when the lifter is applied. This distance-piece consists of a lug equal in height to the depth of the cup and formed on the head thereof, and along the edge of the end of this lug a groove 11′ is formed of the same shape as groove 11, and seated in this groove is a section of packing 12′, similar in form to packing 12.

Mounted on cup 10, substantially parallel with the face thereof, is a hollow handle, through which the air is exhausted from the cup and which conveniently consists of a cylinder 14, comprising a tubular barrel portion 14′ of suitable length to provide a handhold and suitable heads, as 15 and 16, conveniently secured to opposite ends of the barrel. This cylinder is mounted on suitable opposite stands, as 17 and 17′, which are preferably formed integral with the head of the cup 10 and have corresponding eyes 16′ at the outer ends of suitable diameter of bore to receive the end portions of the cylinder-barrel 14′ snugly, and these stands are of suitable height to support said cylinder clear of the head of the cup, so that it can be grasped in the hand between said stands and used as a handle to manipulate the lifter.

Fitting in cylinder 14 is a plunger 19, to which a suitable rod 18 is attached, and this rod projects through a suitable aperture in head 15 and has a cross-bar 18′, conveniently mounted thereon at the outer end as a handle for operating the plunger to exhaust the air from the cup through the cylinder. The cup and cylinder are conveniently connected by an exhaust-passage, as 20, preferably formed in the stand 17 and leading to the cylinder adjacent head 16, and this passage is made with a lateral offset to conveniently provide a seat, as 21, at one end of the lateral portion of the passage for a stop-valve 22, by means of which this passage is positively closed after the air is exhausted from the cup. This stop-valve consists of a thumb-screw tapered at the point

and fitting in a screw-threaded aperture formed in stand 17 at right angles to passage 20 and intersecting same at the point of offset, so that the screw can be manipulated to bring the point against seat 21, and thereby close the passage.

Leading from the bore of cylinder 14 is an air-discharge passage 23, preferably formed in the head 16, and in this passage is located a suitable outwardly-opening check-valve conveniently consisting of a seat 23′, formed by counterboring the outer end of said passage, a ball 24, fitting in said counterbore, a bushing 25, secured in the counterbore, and an open coil-spring 26, confined by said bushing and yieldingly pressing said ball against said seat. In the exhaust-passage 20 a suitable check-valve is preferably located which opens responsive to suction in the cylinder and conveniently consists of a bushing 25′, secured in a counterbore formed at the cup end of said passage, a ball 24′ at the inner end of said bushing, and an open coil-spring 26′ between said ball and the inner end of said counterbore and yieldingly pressing said ball against said bushing.

Leading to cup 10 is an air-induction passage 27, preferably formed in the base end of stand 17′, and this passage is controlled by a suitable stop-valve 28, conveniently consisting of a thumb-screw tapered at the point and fitting in a screw-threaded counterbore formed at the outer end of said passage and tapered at the inner end to correspond to said screw-point, so that the said screw can be manipulated to seat the point thereof against said tapered portion of the counterbore, and thereby positively close the induction-passage.

These lifters are especially useful for setting plates of glass in window-frames or the like, as they can be readily applied in any desired multiplicity to the plate as handholds at the desired points, it being simply necessary to apply each lifter by holding it with the open side of the cup opposed to the plate and the packing-strip 12 pressing against same and then operating the plunger of the pump to exhaust the air from the cup through passage 20, after which the stop-valve 22 is closed to prevent any chance of leakage of air to the cup through passage 20. When desired to release the lifter from the plate, it is simply necessary to open the induction-valve 28 to allow air to enter the chamber of the cup through passage 27.

This lifter is simple of construction and operation and positive in action, and by arranging the pump-cylinder parallel with the face of the cup as a handle the grip of the hand is brought close to the object to be lifted, and the chances of wrenching the lifter loose are thereby reduced to a minimum, while the packing-strip about the rim of the cup prevents ingress of air, and the distance-piece insures the plate of glass from being broken by exterior air-pressure when the lifter is applied.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is—

1. In a vacuum-lifter; the combination of a cup and a packing-strip arranged along the edge of the rim of said cup and having a groove in the face.

2. In a vacuum-lifter, a cup, a hollow lifting-handle attached to said cup substantially parallel with the face thereof and connected with an exhaust-passage leading therefrom, a valve for said passage, and means to create a suction in said handle.

3. In a vacuum-lifter, a cup, a hollow lifting-handle attached thereto and connected with an exhaust-passage leading therefrom, a check-valve in said passage, a stop-valve for said passage, and means to create a suction in said handle.

4. In a vacuum-lifter, a cup, a lifting-handle attached thereto and comprising a pump-cylinder connected with an exhaust-passage leading therefrom, a check-valve in said passage, a stop-valve for said passage, and a plunger fitting in said cylinder.

5. In a vacuum-lifter, a cup, a lifting-handle attached thereto and comprising a pump-cylinder having a discharge-passage and arranged substantially parallel with the face of said cup and connected with an exhaust-passage leading therefrom, a check-valve in said discharge-passage, a valve controlling said exhaust-passage, and a plunger fitting in said cylinder.

6. In a vacuum-lifter, a cup having an induction-passage, a valve therefor, a lifting-handle attached to said cup and comprising a pump-cylinder having a discharge-passage and connected with an exhaust-passage leading from said cup, check-valves in said discharge and exhaust passages, a stop-valve for the exhaust-passage, and a plunger fitting in said cylinder.

7. In a vacuum-lifter, a cup having an induction-passage, a valve therefor, opposite stands on the head of said cup, a lifting-handle comprising a pump-cylinder mounted on said stands and having a discharge-passage and connected with an exhaust-passage leading from said cup, check-valves in said discharge and exhaust passages, a stop-valve for the exhaust-passage, and a plunger fitting in said cylinder.

8. In a vacuum-lifter, a cup having an induction-passage a valve therefor, a hollow lifting-handle attached to said cup and connected with an exhaust-passage leading therefrom, a valve in said exhaust-passage, and a means to create a suction in said handle.

9. In a vacuum-lifter, a cup having an induction-passage, a valve therefor, opposite stands attached to said cup and one of said

stands provided with an exhaust-passage leading from the chamber of said cup, a lifting-handle comprising a pump-cylinder mounted on said stands and having a discharge-passage and connected with said exhaust-passage, check-valves in said discharge and exhaust-passages, a stop-valve for the exhaust-passage, and a plunger fitting in said cylinder.

10. In a vacuum-lifter, the combination with a cup, of a distance-piece located within the cup and adapted to support the object lifted against exterior pressure.

11. In a vacuum-lifter, the combination with a cup, of a distance-piece within said cup comprising a lug attached to the head of said cup and having one surface flush with the edge of the rim of said cup.

Signed at Seattle, Washington, this 9th day of February, 1904.

JOHN HOWARD SPRAGUE.

Witnesses:
ERNEST B. HERALD,
ROBERT U. CULBERSON.