No. 897,060. PATENTED AUG. 25, 1908.

R. W. CASH.

LIFTING DEVICE.

APPLICATION FILED DEC. 10, 1907.

Fig. 4.

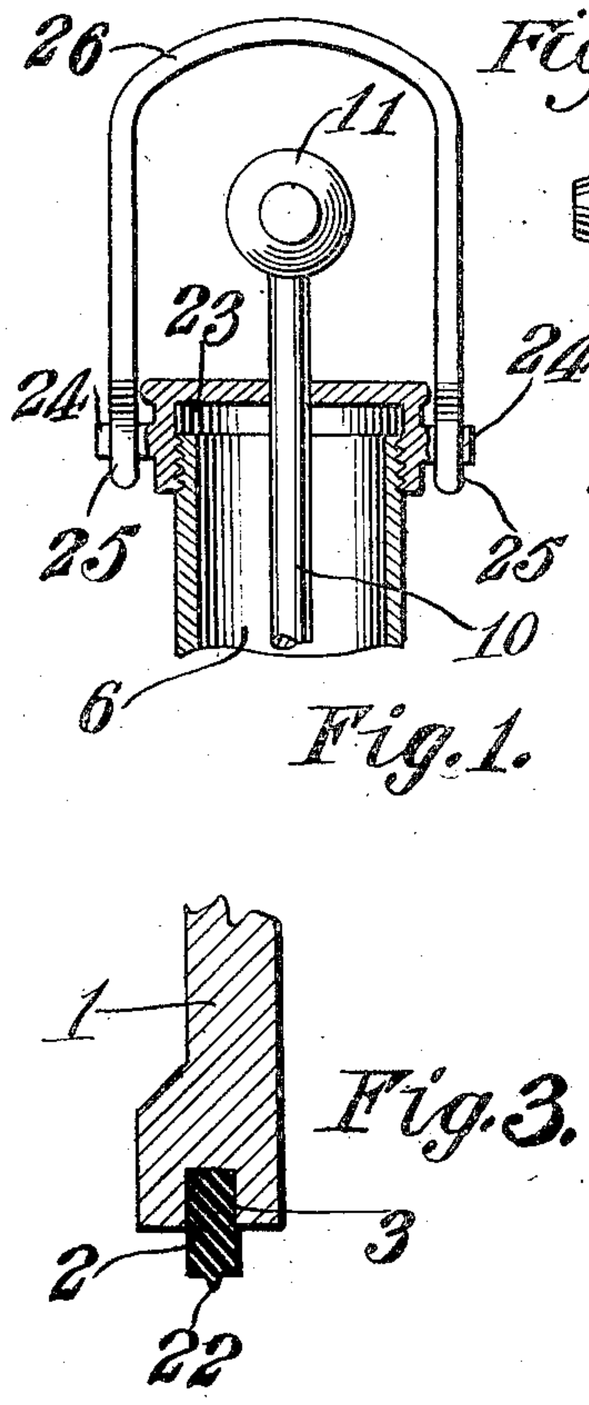

Fig. 1.

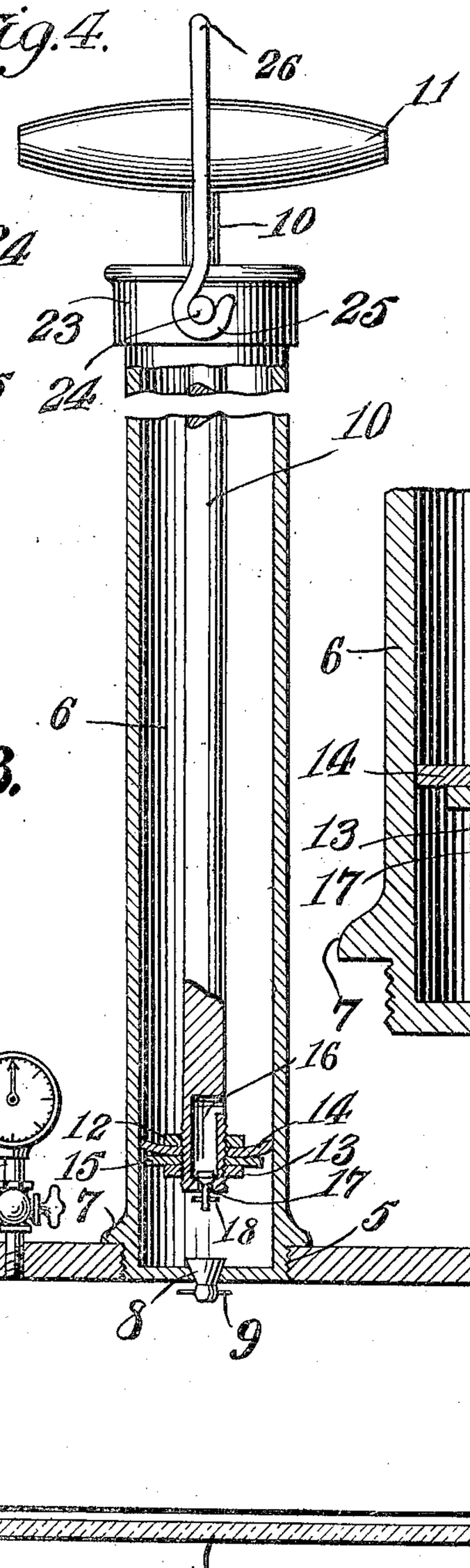

Fig. 2.

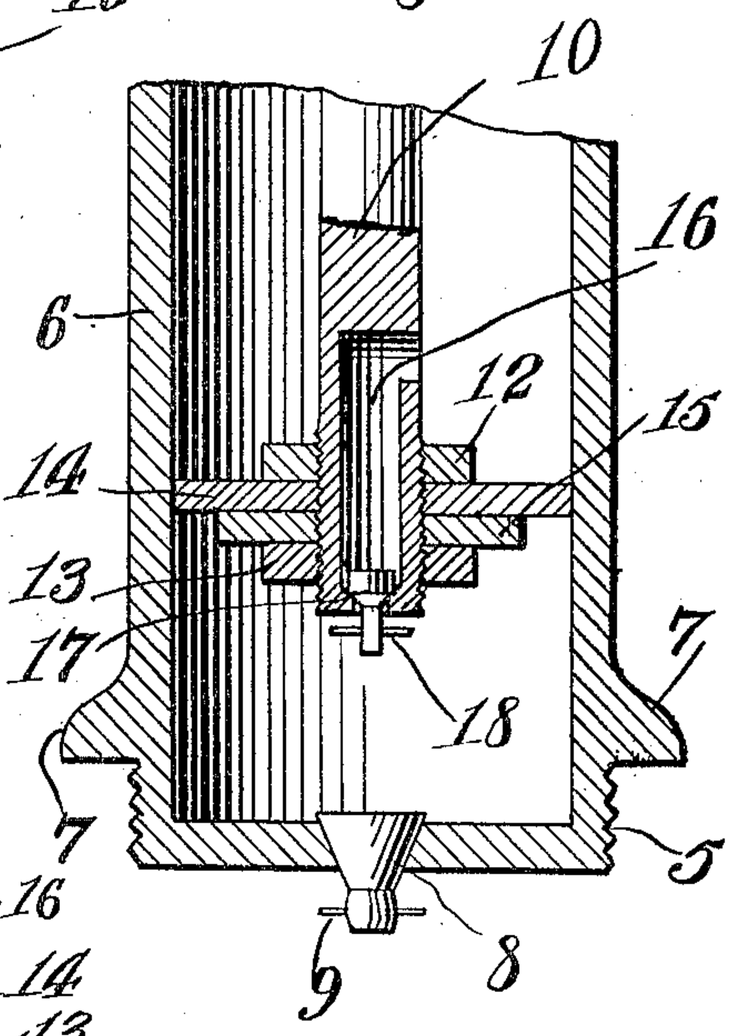

Fig. 3.

Witnesses:-

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UNITED STATES PATENT OFFICE.

ROBERT W. CASH, OF HANNIBAL, MISSOURI.

LIFTING DEVICE.

No. 897,060. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed December 10, 1907. Serial No. 405,976.

To all whom it may concern:

Be it known that I, ROBERT W. CASH, a citizen of the United States, residing at Hannibal, in the county of Marion and State of Missouri, have invented new and useful Improvements in Lifting Devices, of which the following is a specification.

This invention relates to lifting devices and the object of the invention is to provide a lifting device which operates by creating a vacuum adjacent to the surface of the article or object to be lifted, the device, in its preferred form comprising a suction or vacuum head and a pump combined therewith so as to produce a vacuum within said head, also means for indicating the degree of vacuum and for relieving the vacuum so as to release the object held by the lifting device.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement of parts hereinafter fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a sectional view of a lifting device embodying the present invention, taken centrally of the vacuum head or pump. Fig. 2 is an enlarged detail section through the lower end of the pump barrel and rod, showing the arrangement of the valves. Fig. 3 is a detail section through the edge of the vacuum head showing a modified form of contact ring. Fig. 4 is a detail vertical section through the upper end of the pump barrel, showing the manner of connecting the cap to the barrel.

The lifting device contemplated in this invention comprises essentially a vacuum head 1 and a pump 6 for creating a vacuum in said head.

In the preferred embodiment of the invention, the vacuum head 1 is circular or cylindrical and is provided in its contact edge with a groove 2 forming an annular seat for a contact ring 3 which preferably consists of a continuous or endless piece of rubber or its equivalent which is set into the groove or seat 2 and which projects beyond the edge of the vacuum head so that it may be brought into firm and air tight contact with the surface of the object to be lifted, which object is indicated at 4 in Fig. 1. Centrally of its top, the vacuum head is provided with a threaded opening 5 into which is screwed the lower threaded extremity of the barrel 6 of the pump which barrel is preferably provided with an annular shoulder 7 which is screwed down tight against the vacuum head 1 to establish a firm or tight connection between the parts. In the bottom of the barrel 6 there is arranged a conical check valve 8 having a stop pin 9 which allows only a limited up and down movement of said valve which closes in its downward movement so as to hold a vacuum in the head 1.

Within the barrel 6 operates a valve rod or plunger 10, the upper end of which passes through an opening in the cap 23 at the upper end of the barrel 6 and is provided with an operating handle 11. The lower end of the rod 10 is screw-threaded and has thereon oppositely arranged nuts 12 and 13 between which is interposed a flexible washer 14 and a supporting metal washer 15, the last named washer being arranged below the flexible washer 14 and both washers being held firmly in place on the rod by means of the nuts 13 and 12. The rod 10 is also provided with an L-shaped air passage 16 which extends from the extremity of the rod inward a suitable distance and then laterally outward at one side of the rod, as shown in Fig. 1. The lower end of the passage 16 terminates in a conical valve seat and coöperating with said seat is a conical valve 17 having a pin 18 for limiting the up and down movement thereof. To one side of the pump is arranged a vacuum gage 19 in communication with the vacuum head 1 by means of a pipe and at a suitable point in the pipe 20 there is arranged a relief cup 21 by means of which air may be admitted to the vacuum head so as to disengage the same from the object which has been lifted.

The contact ring 3 may either have a flat contact edge as shown in Fig. 1, or it may be provided with one or more ribs 22 as shown in Fig. 3 to obtain an air tight joint between the vacuum head and the surface of the object being lifted.

The lifting device hereinabove described is especially designed for lifting glass plates but is also adapted for lifting sheet metal or any article having a flat and comparatively even surface. The vacuum head is pressed into firm engagement with such surface and then by operating the pump the vacuum is established in the head thus giving the device a secure hold upon the surface after which the object may be lifted by means of the pump barrel. The gage 19 will indicate when the desired degree of vacuum has been obtained and the relief cup 21 will enable the

vacuum to be dissipated so as to release the hold of the lifter on the object operated upon.

The cap 23 is preferably threaded on the upper end of the barrel 6 and in order to provide for any heavy lifting, said cap has oppositely projecting studs or pintles 24 to which are connected the opposite hooked extremities 25 of a lifting bail or eye 26. This lifting bail or eye, which may be detached from the studs 24 when not in use, extends up over the pump handle where it may be associated with suitable lifting tackle (not shown). The bail 26 also forms a stop for limiting the upward movement of the handle 11 enabling said handle to be used as a lifting handle.

I claim:—

1. A lifting device comprising a vacuum head having a flexible contact surface, and a vacuum pump in communication with said head and embodying a pump barrel extending perpendicularly upward from the head and an operating pump handle which also constitutes the lifting handle of the whole device.

2. A lifting device comprising a vacuum head having a flexible contact surface, a vacuum pump connected with said head, oppositely projecting studs on the pump barrel, and a bail connected with said studs and extending over the pump operating handle.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT W. CASH.

Witnesses:

S. G. SMITH,

JAMES W. CASH.