

J. GARDNER.
 VACUUM LIFTING DEVICE.
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1,178,147.

Patented Apr. 4, 1916.

Fig. 1

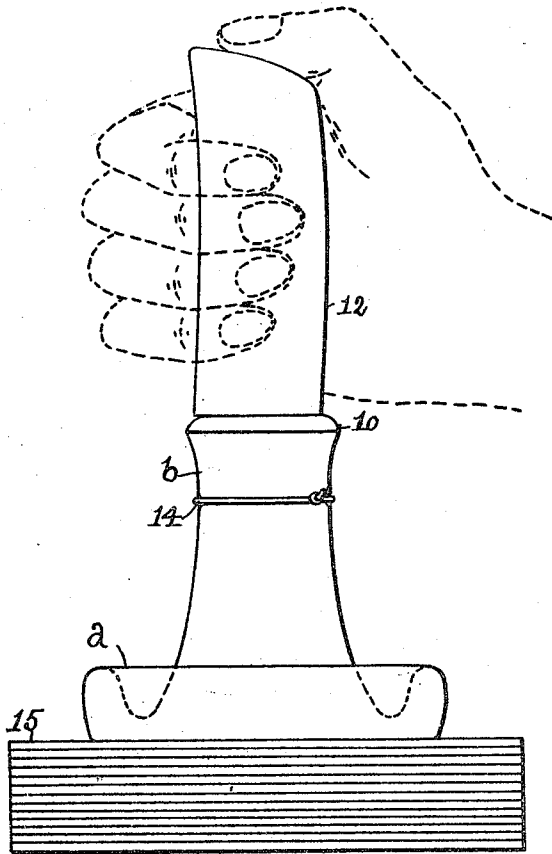


Fig. 2

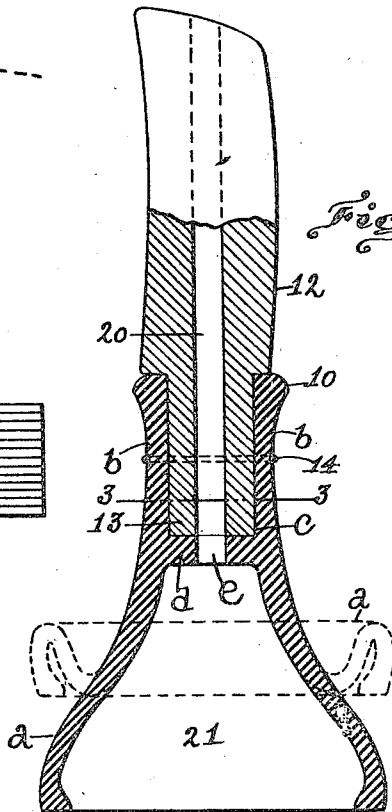
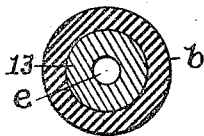


Fig. 3



Witnesses:
 Ernest A. Telfer
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UNITED STATES PATENT OFFICE.

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VACUUM LIFTING DEVICE.

1,178,147.

Specification of Letters Patent.

Patented Apr. 4, 1916.

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To all whom it may concern:

Be it known that I, JAMES GARDNER, a citizen of the United States, residing in the borough of College Hill, in the county of Beaver and State of Pennsylvania, have invented an Improvement in Vacuum Lifting Devices, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a vacuum lifting device, which is especially adapted among other uses, to be employed for lifting heavy sheets of metal or like material, and has for its object to provide a simple, inexpensive and highly efficient device for the purpose specified. To this end, I employ a hollow and preferably bell-shaped cup of rubber or like flexible material, which is provided with a neck portion having in it a socket for the reception of a hollow handle of wood or other material, said socket having a bottom wall against which the lower end of the hollow handle abuts, and which is provided with a port or opening through it, with which the air passage in the handle registers. The handle is preferably made larger in diameter than the socket in the neck portion of the cup and has a reduced portion to enter the socket, said reduced portion of the handle forming an annular shoulder which engages the outer end of the neck portion. The rubber cup may and preferably will be mechanically secured air tight to the handle by a wire or other fastening means, as will be described. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is an elevation of a vacuum lifting device embodying this invention, and shown in operative relation to a pile of metal sheets. Fig. 2, a partial vertical section and elevation of the lifting device shown in Fig. 1, and Fig. 3, a cross section on the line 3-3, Fig. 2.

Referring to the drawings, *a* represents a hollow cup of rubber or like flexible material, which is preferably bell-shaped and provided with a neck portion *b*, having a socket *c* provided with a bottom wall *d*, having an opening or passage *e* through it. The walls of the socket *c* may and preferably will be thickened at their outer end as at

10. The socket *c* has inserted into it a handle 12 of wood or other material, which is provided as herein shown with a reduced portion 13 of substantially the diameter of the socket *c* to fit tight therein, and an air-tight joint between the handle and the neck portion *b*, may be obtained by mechanical means, such as a wire 14, which encircles the rubber neck *b* and binds it firmly upon the hollow handle.

The handle 12 is provided with a longitudinally extended bore or passage 20, which registers at its lower end with the opening *e* in the wall *d*, and which extends to the upper end of the handle and is adapted to be closed by the thumb of the operator, when the handle is grasped by the hand of the operator, as represented in Fig. 1.

The lower or bell portion of the rubber cup is capable of being collapsed as represented in Fig. 1 and by dotted lines in Fig. 2, when the operator applies the cup to the metal sheet 15 or other article to be lifted. In Fig. 1, a plurality of sheets 15 are represented in a pile.

In operation with the device herein shown, the operator grasps the handle 12 and applies the lip of the cup to the metal sheet 15 or other article, and by exerting a downward pressure forces the neck portion of the cup toward the sheet, so as to diminish the size of the air chamber 21 above the sheet and thus cause a material quantity of air to be expelled from the cup up through the hollow handle, and when the neck portion of the cup has been thus forced toward the sheet 15, the operator closes the bore or passage 20 in the handle, and lifts upon the latter so as to restore the cup to its original position or condition, which action creates a vacuum in the cup, and this vacuum causes the metal sheet 15 to adhere to the lip of the cup and form an air-tight joint therewith, and on the continued upward movement of the handle, the metal sheet is lifted with the cup and can be moved into the position desired, and when brought into the desired position, it can be released from the cup by merely removing the thumb from the opening 20 in the handle, which allows the air to enter the cup and break the vacuum. A device of substantially small size is capable of lifting large metal sheets or other substantially heavy objects.

It will be observed that the hollow handle extends in the direction of the length of the neck of the cup and is substantially at right angles to the circumferential lip of the cup and to the object to be lifted, which enables the mouth of the cup to be applied to the object to be lifted, with a pressure which is evenly distributed at all points in the circumference of the lip of the cup, thereby insuring proper airtight contact of the cup with the metal sheet or other object to be lifted. Furthermore, the hand of the operator is removed from the metal sheet and is free to be moved in any direction to carry the metal sheet to the place where it is to be deposited without tilting the cup with relation to the metal sheet to such extent as would be liable to cause a leak between the lip of the cup and the sheet and thus destroy the vacuum and cause the sheet to be dropped in transit.

I have herein shown one construction of device embodying this invention, but it is not desired to limit the invention to the particular construction shown.

Claims.

1. In a vacuum lifting device, in combination, a flexible cup provided with a substantially central neck portion having a socket provided with a bottom wall having an opening through it, and a handle inserted into said socket and extended axially therefrom to enable it to be grasped by the hand

above the cup, and provided with a longitudinally extended bore which registers at one end with the opening in said bottom wall and has its other end communicating with the atmosphere, substantially as described.

2. In a vacuum lifting device, in combination, a flexible cup provided with a hollow handle, which communicates at its lower end with the cup and at its upper end with the atmosphere and is extended away from the cup substantially at right angles to the circumferential lip of the cup to enable it to be grasped by the hand above the cup, substantially as described.

3. In a vacuum lifting device, in combination, a flexible cup provided with a circumferential lip and with an opening in its body portion, of a device secured to said cup and extended therefrom substantially at right angles to the plane of said lip to enable it to be grasped by the hand above the said cup and provided with a passage which communicates with the atmosphere and with the said cup through said opening, substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES GARDNER.

Witnesses:

H. F. HAWKINS,
JOSEPH MYSHRALL.