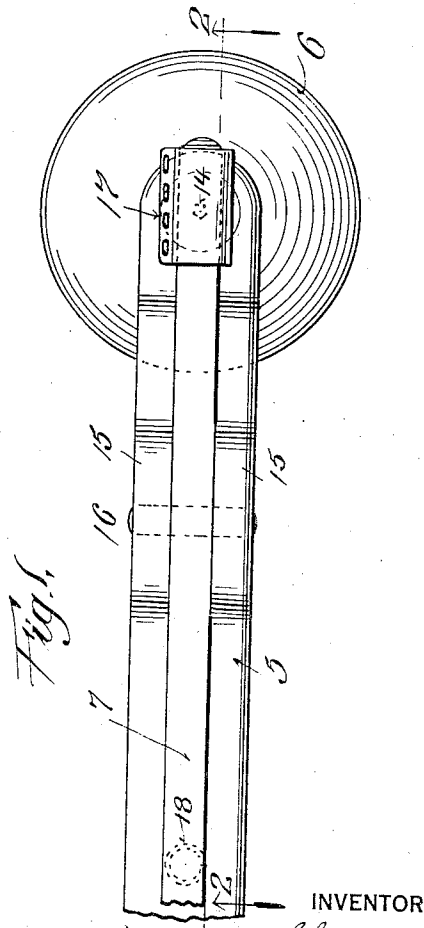
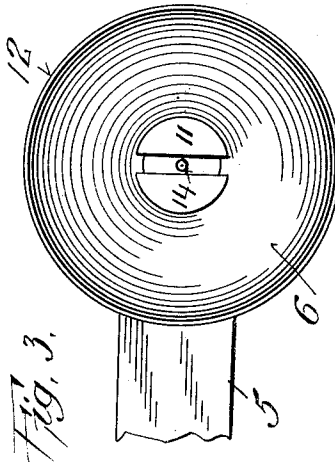
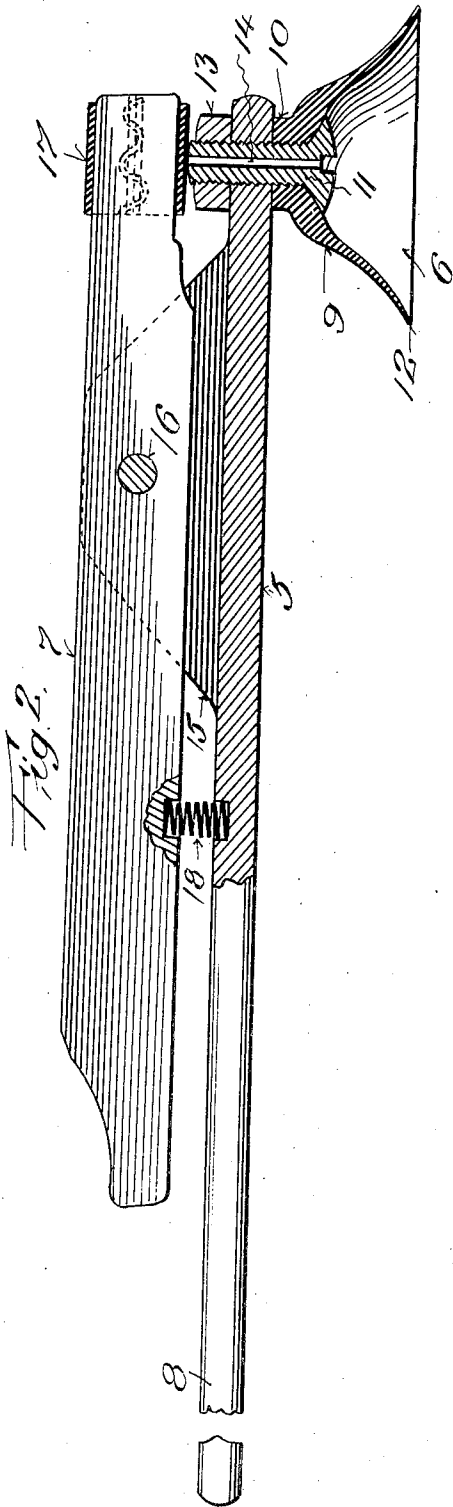


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 SUCTION LIFTING IMPLEMENT.
 APPLICATION FILED JAN. 6, 1921.

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Patented Dec. 20, 1921.



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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM STADER, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Suction Lifting Implements, of which the following is a specification.

This invention relates to suction lifting implements and particularly to implements designed for lifting, feeding, and positioning sheet metal blanks in stamping machines, die presses, or the like.

The object of the invention is to provide a suction lifting device of the character referred to which is simple in structure, economical to manufacture, and efficient in operation.

A further object of the invention is to provide an implement or tool of the character referred to which can be easily applied to a sheet or blank and which is readily and easily releasable from such blank or sheet.

A further object of the invention is to provide a tool or implement of the nature referred to which may be grasped at random by the handle and applied in lifting relation to a sheet or plate and the sheet or plate lifted, transported, or positioned by the tool, without requiring any special action or operation of the hand or fingers of the operator and which may be readily, easily, and conveniently released from the sheet or plate when the latter has been transferred to or positioned in the desired place by the operation of the thumb of the operator.

Further objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing and finally pointed out in the appended claims.

Referring to the accompanying drawing and to the various signs and reference numerals appearing thereon.

Figure 1 is a view in top plan of a suction lifting implement embodying the principles of my invention, the ends of the handle and of the releasing member being broken off.

Fig. 2 is a view in longitudinal central

section on the line 2—2 Fig. 1 looking in the direction of the arrows.

Fig. 3 is a bottom plan view of the suction cup.

In lifting, transferring, positioning, or otherwise handling sheet metal blanks, sheets, plates, and the like, difficulty and danger have heretofore been experienced, by reason of the difficulty in picking up a thin sheet metal blank or plate, for instance from a table or bench surface or from the top of a pile or stack of such sheets or plates, as well as in positioning the same in place in a stamping machine or die press. Frequently the surfaces of such blanks are oily and hence difficult to grasp in the fingers. In handling and positioning such plates in presses it is a common expedient to employ gages to determine the proper positioning of the blank with reference to the dies. This is done sometimes by the hands of the operator and sometimes by pincers or nipping tools and in either case it frequently happens that when the blank is released after being positioned against the gage stops the act of releasing the blank, causing it to become displaced. Moreover, particularly in the case of automatic presses, when the blanks are positioned in place in the press the operator may be delayed in withdrawing his hands, with the result that the descending die mashes or injures the hand or fingers and painful occurrences of this nature are frequent in large factories where such automatic machines are employed.

It has been proposed to employ suction tools for moving and handling sheet metal plates, which tools have been connected to an exhaust pump for instance, but many factories are not equipped with exhaust pumps, and consequently the use of such tools is limited and usually such tools require a particular disposition of the hand of the operator in order to control the connection between the suction device and the source of air exhaust. This is undesirable as it requires concise effort on the part of the operator in positioning his hand and the maintenance of his grip upon the implement in one position during the handling of the sheet metal blank.

It is among the special purposes of my present invention to avoid the objections and defects above noted to provide a suction

lifting implement which may be grasped by the handle at random and without predetermined position of the hand in grasping the same, which may be applied to the sheet or blank to be handled, merely by the act of striking the implement upon the blank or the mouth of the suction cup of the implement upon the blank with a sharp smart blow and in which the implement may be readily released from its suction grip upon the blank or plate by manipulation of the thumb of the operator of a release member.

In its essential features the suction lifting implement of my invention includes a handle 5, a suction cup 6, and a suction release member 7. The suction cup 6 is applied to one end of the handle 5, the other end of said handle forming a grasping portion indicated at 8 (Fig. 2) to be grasped at random by the hand of an operator. The suction cup is constructed preferably of rubber or other flexible resilient material and I have found that the best results are obtained when said cup is constructed with a flaring bell-shaped mouth and when the wall portion 9 thereof (see Fig. 2) is of tapering thickness from the hub portion of the cup to the rim or edge 12 of the flaring mouth. The hub portion 10 of the cup is secured flatwise against the under surface of the handle 5 at one extremity of the latter. This may be accomplished in any suitable or convenient manner. I have shown a simple arrangement wherein a threaded screw member 11 is inserted through the open or bell mouth of the cup and through a bore in the hub portion 10 of the cup and is screwed into a threaded opening in the end of the handle 5. A lock nut 13 applied to the extending end of the screw at the upper side of the handle 5 serves to clamp and retain the parts in position. The head of the screw 11 engages against the inner wall of the hub of the cup. The screw 11 is formed with a duct or passage 14 longitudinally there-through.

The releasing member 7 is pivotally mounted in any suitable or convenient manner upon the handle member 5. In the arrangement shown the handle member 5 is formed with ears 15 between which the releasing member 7 is positioned and pivoted upon a stud 16, the releasing member 7 being disposed in parallel relation with respect to the handle member 5. One end of the releasing member extends over the end of the screw 11 which extends through the handle member 5 and this end of the releasing member serves as a closure for the end of the duct or passage 14 longitudinally through the screw 11. In order to provide an efficient closure for the duct or channel 14, the end of the releasing member 7 may be faced or covered with rubber or other material indicated at 17 applied thereto and

which, seating against the end of the screw 11 constitutes in effect a releasable valve closure for the duct or channel passage 14. By tilting the releasing lever 7, however, the valve closure is lifted from the end of the screw 11, thereby opening the channel or passage 14 to the outer air. In practice the closure end of the releasing lever 7 is yieldingly maintained in seating contact with the end of the screw 11. This may be accomplished in any suitable or convenient manner, as, for instance, by means of a spring 18 interposed between the handle member 5 and the releasing member 7. The other extremity of the releasing member 7 extends into convenient relation with respect to the hand grip portion 8 of the handle member 5 so that the releasing lever 7 may be rocked by the application of the thumb of the operator to said end of the releasing lever to release the opposite end of said releasing lever from seating engagement against the end of the screw 11 and hence from closure relation with respect to the channel or passage 14 through said screw.

The operation of a suction lifting implement embodying my invention and the use thereof is exceedingly simple. An operator grasps the handle member 5 by the hand grip portion 8 and brings the open mouth of the cup by a sharp stroke or blow down upon the surface of the sheet metal blank or plate to be lifted or handled, or the open mouth of the suction cup may be otherwise firmly pressed down upon the surface of such sheet metal blank or plate to be lifted or handled, or the open mouth of the suction cup may be otherwise firmly pressed down upon the surface of such sheet metal blank or plate, thereby creating more or less of a vacuum within the cup and hence causing the cup to become attached to the sheet or plate. The implement is then lifted and with it the plate or sheet to be transferred, handled or positioned, and, where the tool is employed as a feeder for a press machine, for instance, the plate carried by the cup is placed accurately in position with reference to the press gages or stops and then the operator depresses the releasing lever 7 with his thumb, thereby unseating the valve or closure from the end of the screw 11 and hence opening the duct or passage 14 and breaking the vacuum within the cup.

In practice and in order to avoid the danger of spoiling, marring or injuring or otherwise impairing the die of a press, for example, when the tool is employed as a press feeder, I prefer to make the screw 11 of suitable soft metal. My invention, however, is not to be limited or restricted in respect to this detail. I have found in the actual practical and successful use of tools embodying my invention, that sheet metal blanks, plates and other non-porous materials, can be easily

and quickly picked up from the surface of the bench or table or from the top of a stack or pile of such blanks or plates and removed, handled, or positioned in place in a die press
 5 and accurately positioned in such press, without danger of disturbance when released and when so placed or positioned such plate or blank may be readily, easily and quickly released. The tool is not confined in its use
 10 to blanks having planed surfaces but is also well adapted for picking up, handling, and positioning blanks of curved contour. Moreover, the hands or fingers of the press operator are removed from the danger of being
 15 accidentally cut by the dies and injured or maimed since the operator may position a blank in the die press by the use of the tool when his hands are removed from the line of operation of the dies. I have also found
 20 that plates having dampened, oily or greasy surfaces may be lifted, handled or positioned without trouble and just as readily, if not more readily, than dry blanks or plates, since the suction action of the cup is in-
 25 creased when the surface of the plate or sheet is coated with oil or grease.

It will be observed that by the exceedingly simple manner of attaching the cup to the handle member 5 when the cup by usage
 30 loses its resiliency and flexibility, it may be readily removed and replaced with a new cup by simply unscrewing the screw 11, removing the old cup therefrom and applying such screw to a new cup and screwing the
 35 same again into the threaded opening of the handle member 5. Likewise the facing 17 of the releasing lever, where such a facing is employed, may be readily and easily removed and replaced whenever required.

40 While I have described my invention as a useful implement in connection with feeding sheet metal blanks to die presses, it is to be understood that my invention is not to be limited or restricted in respect to the use to
 45 which it is to be put as it is well adapted for many other uses and in connection with other machinery. It operates, however, more efficiently in connection with the handling of sheet metal and other non-porous
 50 blanks or plates than with porous sheets.

Having now set forth the objects and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention
 55 and desire to secure by Letters Patent is:—

1. A suction lifting implement comprising a handle member, a suction cup applied to one end of said member, a screw member for securing said cup to said handle member,
 60 said screw having a duct or passage longitudinally therethrough, and releasable means for engaging the end of said screw to close said duct or passage.

2. In a suction lifting implement, a handle
 65 having an opening through one end thereof,

a suction cup having a hub portion to fit against one side of said handle, a securing member passing through the hub portion of the cup and through the opening in the handle to secure the cup to the handle, said
 70 securing member having an opening longitudinally therethrough, and releasable means seating against the end of said securing member to form a closure for said duct or passage.
 75

3. In a suction lifting implement, a handle having an opening through one end thereof, a suction cup having a hub portion fitting against one side of said handle, said
 80 cup having a flaring bell-shaped mouth, the wall of said cup being of decreasing thickness from the hub portion to the rim or edge of said mouth, a securing member passing through the hub of said cup and the opening
 85 in the handle for securing the cup to said handle, said securing member having a duct or passage extending longitudinally there-
 90 through, and releasable means seating against the end of said securing member to form a releasable closure for said duct or passage.

4. In a suction lifting implement, a handle having an opening through one end thereof, a suction cup having a hub portion fitting against one side of said handle, said
 95 cup having a flaring bell-shaped mouth, the wall of said cup being of decreasing thickness from the hub portion to the rim or edge of said mouth, a securing member passing through the hub of said cup and the opening
 100 in the handle for securing the cup to said handle, said securing member having a duct or passage extending longitudinally there-
 105 through, and a releasing lever pivotally mounted upon said handle and seating against the end of said securing means to form a releasable closure for said duct or channel.

5. In a suction lifting implement, a handle having an opening through one end
 110 thereof, a suction cup having a hub portion fitting against one side of said handle, said cup having a flaring bell-shaped mouth, the wall of said cup being of decreasing thickness from the hub portion to the rim or edge
 115 of said mouth, a securing member passing through the hub of said cup and the opening in the handle for securing the cup to said handle, said securing member having a duct or passage extending longitudinally there-
 120 through, and a releasing lever pivotally mounted upon said handle and seating against the end of said securing means to form a releasable closure for said duct or channel, and a spring interposed between
 125 said releasing member and handle to normally maintain the former seated against the end of the securing member.

6. In a suction implement, a handle, a suction cup having a flaring bell-shaped mouth
 130

and a hub portion, a securing member extending through the hub portion of the cup and through said handle to secure said cup and handle together, said securing member
5 having a duct or channel extending there-
through, a releasing member pivotally
mounted upon said handle and having one
end thereof extending over and seating upon
the end of said securing member to form a
10 closure for the duct or passage through said
securing member.

7. In a suction implement, a handle, a suction cup having a flaring bell-shaped mouth and a hub portion, a securing member extending through the hub portion of the cup
15 and through said handle to secure said cup

and handle together, said securing member having a duct or channel extending there-
through, a releasing member pivotally
mounted upon said handle and having one 20
end thereof extending over and seating upon
the end of said securing member to form a
closure for the duct or passage through said
securing member, and a spring interposed
between said releasing member and said 25
handle to normally maintain the end of said
releasing member releasably seated against
the end of said securing member.

In testimony whereof I have hereunto set
my hand on this 4th day of January A. D., 30
1921.

WILLIAM STADER.