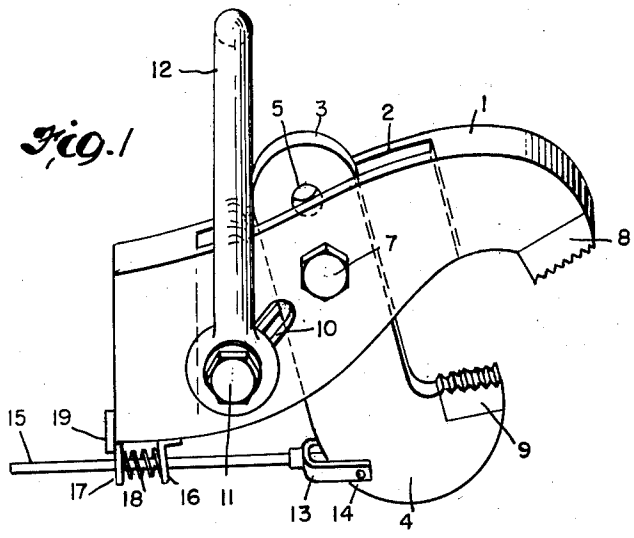
Nov. 18, 1952 P. W. PENN 2,618,504

LIFTING DEVICE

Filed May 25, 1949

Fig. 1



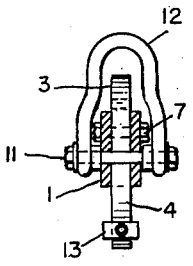


Fig. 3

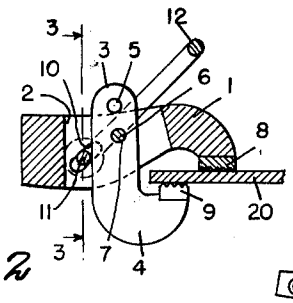


Fig. 2

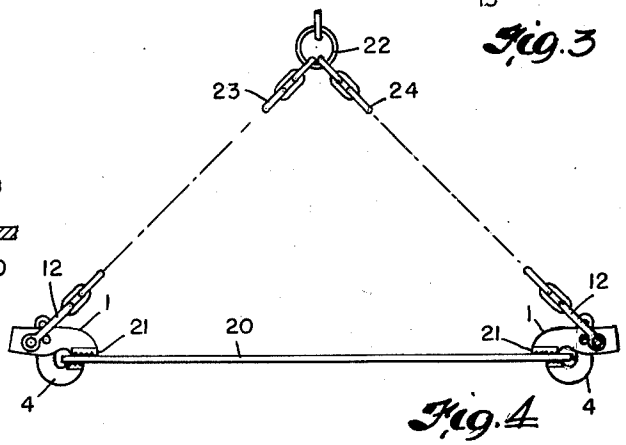


Fig. 4

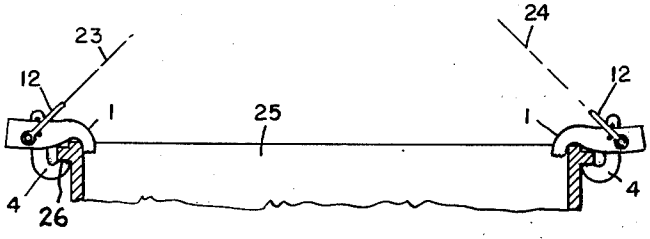


Fig. 5

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Patented Nov. 18, 1952

2,618,504

UNITED STATES PATENT OFFICE

2,618,504

LIFTING DEVICE

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Application May 25, 1949, Serial No. 95,195

9 Claims. (Cl. 294—104)

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This invention relates as indicated to a lifting device and, more particularly, to a lifting tool adapted securely to grip various types of large unwieldy objects not provided with any means suitable for the attachment of the usual hooks or the like.

In foundries, steel mills, tire molding plants and the like, it is often necessary to elevate and transport very large and heavy articles such as steel molding flasks, forms, steel plate and the like which are exceedingly difficult to secure to any conventional lifting means. It is common practice to encircle such articles with chains for the purpose of hoisting the same, but it is often very difficult to pass a chain beneath the same unless the article has first been raised from the floor on blocks. In some cases large C-clamps are employed but with any of these expedients there is danger of slippage and accident. In fact, the handling of such large heavy objects which may weigh several tons is one of the more dangerous operations in a modern plant.

It is therefore a primary object of my invention to provide an improved lifting tool adapted actively and positively to grip an edge portion of the work during the lifting operation, yet easily and quickly releasable therefrom when the work has again been deposited upon a suitable support.

It is a further object of my invention to so form such device that a plurality of the same may be employed in conjunction with each other so that the pull exerted on one will balance the pull exerted on another to maintain the same in gripping engagement with the work.

A further object is to provide manually operable locking means for such devices to maintain the same in desired gripping engagement with the work-piece until a lifting pull is exerted thereon operative automatically to apply the desired strong gripping action.

Other objects of my invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a perspective view of one embodiment of my new lifting tool;

Fig. 2 is a side elevational view of such tool

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partly cut away to show the internal construction thereof;

Fig. 3 is a vertical sectional view taken along the line 3—3 on Fig. 2;

Fig. 4 is an elevational view of a modified form of such tool showing the manner in which the same may be employed to lift a steel plate or the like; and

Fig. 5 is a view similar to Fig. 4 showing the manner in which the Fig. 1 embodiment of my new lifting tool may be employed to grip and lift a large mold flask or the like.

Referring now more particularly to said drawing and especially Figs. 1–3 thereof, the embodiment of my invention there illustrated may comprise an upper jaw member 1 having a vertical slot 2 therethrough adapted to receive an upwardly extending portion 3 of lower jaw member 4. Such upwardly extending portion is provided with a plurality of holes such as 5 and 6 therethrough to permit such portion to be adjustably pivotally secured in jaw member 1 by means of a heavy bolt 7. Jaw members 1 and 4 may be provided with generally opposed serrated jaws 8 and 9 respectively.

In use, my new lifting tool will ordinarily be employed in such fashion that the serrated work-engaging face of lower jaw 9 will lie in a generally horizontal plane and the disposition of the several parts of such device will be described with this in mind. (See Fig. 2.) A pair of inclined slots 10 is provided in the body portion of upper jaw member 1 directed generally toward such pivot 7 and to the opposite side of such pivot from jaws 8 and 9. As shown in Figs. 1 and 2, such slot will lie at an upward angle of about 45° toward such pivot when the tool is in work-engaging position. A clevis pin 11 passes through such slots and is engaged by lifting clevis 12.

As shown in Fig. 1, an auxiliary jaw locking device may desirably be employed to hold the clamp in place on the work prior to application of a lifting force on clevis 12. Such auxiliary device may comprise a small clevis 13 pivotally secured at 14 to lower jaw member 4 and carrying a small straight rod 15 extending therefrom. Such rod passes through a hole in angle bracket 16 and a hole in free plate member 17, a compression spring 18 being interposed between such plate and bracket. A stop 19 projects from the end of jaw member 1 to engage an edge portion of plate 17, thereby maintaining such spring compressed. It will be seen that lower jaw member 4 may be moved in a counterclockwise direction about pivot 7 when the tool is to be preliminarily

manually secured to a work-piece. Jaw member 4 is, however, prevented from swinging in a clockwise direction due to the fact that plate 17 will be turned slightly askew by engagement with stop 19 and will thereby be caused to grip rod 15. The hole in plate 17 through which rod 15 passes should, of course, be slightly oversize. When it is desired to release lower jaw 4, this is readily accomplished simply by squeezing the projecting portion of plate 17 toward bracket 16. While a jew locking device adapted to be employed as above described is very convenient, it is not, of course, absolutely essential to the functioning of the lifting tool of my invention.

As shown in Fig. 4, when a flat steel plate 20, for example, is to be lifted, the upper jaw 21 (corresponding to jaw 8) may directly oppose lower jaw 9 to avoid danger of bending the edge portion of the plate. In the case of relatively heavy plate, however, the jaws will function satisfactorily when offset as shown in Fig. 2.

A pair of my new lifting tools may be suspended from a lifting ring 22 by means of chains 23 and 24 secured to the lifting clevis 12 of the respective tools. Bolt 7 will be passed through the hole in upstanding portion 3 of lower jaw member 4 best suited to the thickness of the work-piece. As shown in Fig. 4, the two tools will preferably engage steel plate 20 at points diametrically opposite each other. In many instances, of course, it will be desirable to use three or more lifting tols suspended from a single lifting ring and the tools will then engage the work-piece at spaced points selected to insure lifting of the latter without tipping. When the crane or hoist now elevates lifting ring 22, the lifting pull will be imparted through chains 23 and 24 to the clevis 12 causing clevis pin 11 to ride up in slots 10 and engage upstanding portion 3 of lower jaw member 4 at a point horizontally below the level of pivot bolt 7. The work may now be lifted and transported without any danger of the same escaping from the lifting tools. Referring particularly to Fig. 2 of the drawing, it will be noted that the pull on clevis 12 strongly resists any movement of lower jaw member 4 in a clockwise direction or of upper jaw member 1 in a counterclockwise direction about pivot 7. The pull on such clevis 12 must, however, be at an angle to the vertical and toward the jaws to obtain such effect. Consequently, the greater the weight to be lifted and therefore tending to move lower jaw member 4 in a clockwise direction, the greater will be the pull on clevis 12 resisting such movement.

The parrot beak embodiment illustrated in Fig. 1 is particularly adapted for the lifting of mold flasks or the like 25 having a laterally outwardly extending rim or flange 26. The lower jaw 9 will engage the under surface of such flange or rim and the upper jaw 8 will hook over the upper edge of the flask as shown. A particularly secure grip is obtained on the flask in this manner.

It will be seen from the foregoing that I have provided a novel type of lifting tool comprising two jaw members having jaws adapted to lie in a substantially horizontal plane when in work-engaging position, one of such jaw members having an upwardly inclined slot therein to the other side of the point of pivotal connection from such jaws and through which passes the pin to which the lifting clevis is secured. When in use, the direction of pull on such lifting clevis, with clevis pin 11 in engagement with

upstanding portion 3 of lower jaw member 4, should preferably be at an angle between the vertical and a line drawn between such pin 11 and pivot 7. Since pin 11 will be below the level of pivot bolt 7, a pull on the clevis in the direction indicated will necessarily operate to force the jaws toward one another.

The slot 10 is disposed to the other side of pivot 7 from the jaws 8 and 9 and it will be apparent that a pull generally upwardly and toward such pivot or jaws will have the desired camming action. It is desirable that such slot be fairly steeply inclined, on the order of 45° or more, while still permitting sufficient opening movement of the jaws when pin 11 is in its low position. The operation is generally similar whether the embodiment including the downturned beak on the upper jaw member is employed or the simpler form having directly opposed jaws.

The tool above described has been found to be very useful in the lifting and handling of a large variety of unwieldy objects in perfect safety yet, while there is no danger of the work-piece being inadvertently released, it is nevertheless obvious that the lifting tool may be quickly disengaged therefrom when the work-piece has been lowered upon a secure supporting surface.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A lifting tool comprising an upper jaw member having a downturned projecting beak portion, a lower jaw member having an upwardly extending portion inserted in a vertical slot through said upper jaw member, means adjustably pivotally mounting said upwardly extending portion in a vertically selected position in said slotted upper jaw member, a work gripping jaw on said downturned portion of said upper jaw member, a work gripping jaw on such upwardly extending portion of said lower jaw member generally opposed to said first jaw but spaced inwardly toward such pivot therefrom, a clevis pin passing through a transverse slot in said upper jaw member on the other side of such pivot from said jaws, such transverse slot being upwardly inclined toward such pivot but terminating below the level of the latter, a lifting clevis secured to the respective ends of said clevis pin, whereby a lifting pull on said clevis at an angle to the vertical and toward such pivot will cause said clevis pin to ride up such transverse slot into engagement with said upwardly extending portion of said lower jaw member to actively urge said jaws into work clamping position, a small clevis pivotally secured to the lower portion of said lever jaw member, a rod carried thereby and extending therefrom in a direction away from said jaws, and manually releasable gripping means on said upper jaw member adapted to grip said rod to prevent opening movement of said jaw members but permitting closing movement thereof.

2. A lifting tool comprising an upper jaw member extending in a generally horizontal position in use, a lower jaw member having an upwardly extending portion inserted in a vertical slot through said upper jaw member, means pivotally mounting said upwardly extending portion in

said slotted upper jaw member about a transverse axis, generally opposed work gripping jaws carried by said respective jaw members, a clevis pin passing through a transverse slot in said upper jaw member on the other side of such pivot from said jaws, such transverse slot being upwardly inclined generally toward such pivot but terminating below the level of the latter, a lifting clevis secured to the respective ends of said clevis pin, whereby a lifting pull on said clevis at an angle to the vertical and toward such pivot will cause said clevis pin to ride up such transverse slot into engagement with said upwardly extending portion of said lower jaw member at a point below such pivot actively to urge said jaws into work clamping position, and manually releasable means connecting the lower portion of said lower jaw member to the portion of said upper jaw member to the other side of such pivot from said jaws adapted to prevent opening movement of said jaw members but permitting closing movement thereof.

3. A lifting tool comprising an upper jaw member extending in a generally horizontal position in use, a lower jaw member having an upwardly extending portion pivotally secured to said first member on a trasverse axis, generally opposed work gripping jaws carried by said respective jaw members, a clevis pin passing through a transverse slot in said upper jaw member on the other side of such pivot from said jaws, such transverse slot being upwardly inclined generally toward such pivot but terminating below the level of the latter, and a lifting clevis secured to said clevis pin, whereby a lifting pull on said clevis at an angle to the vertical and toward such pivot will cause said clevis pin to ride up such transverse slot in engagement with said upwardly extending portion of said lower jaw member at a point below such pivot actively to urge said jaws into work clamping position.

4. A lifting tool comprising an upper jaw member extending in a generally horizontal position in use and having a downturned projecting beak portion adapted to hook over the upper edge of a mold flask, a lower jaw member having an upwardly extending portion pivotally secured to said first member on a transverse axis, a jaw carried by said latter member spaced inwardly toward such pivot from said downturned beak portion and adapted to engage the underside of the usual laterally projecting peripheral flange about such upper edge of such flask, a clevis pin passing through a transverse slot in said upper jaw member on the other side of such pivot from said beak portion and jaw, such transverse slot lying below such pivot and being upwardly inclined generally toward such pivot, and a lifting clevis secured to said clevis pin, whereby a lifting pull on said clevis at an angle to the vertical and toward such pivot will cause said pin to ride up such transverse slot in engagement with said upwardly extending portion of said lower jaw member at a point below such pivot actively to urge said jaw members into work holding position.

5. A lifting tool for lifting mold flasks and the like comprising an upper jaw member having a downturned projecting beak adapted to hook over the upper edge of a mold flask, a lower jaw member pivotally connected to said upper jaw member and carrying a jaw spaced inwardly toward such pivot from said beak, said jaw being adapted to engage the underside of the usual laterally projecting peripheral flange about such upper edge of such flask, and cam means carried by such jaw members engageable with said lower jaw member at a point below such pivot and operative when subjected to a lifting pull generally toward such pivot to urge said jaw members into work holding position.

6. A lifting tool comprising an upper jaw member, a lower jaw member pivotally secured to said first member, a clevis pin passing through a transverse slot in said upper jaw member on the other side of such pivot from such jaws, such transverse slot lying below such pivot and extending generally theretoward, and a lifting clevis secured to said clevis pin, whereby a lifting pull on said clevis in a direction generally toward such jaws will cause said clevis pin to engage said lower jaw member at a point below such pivot actively to urge such jaws into work clamping position.

7. A lifting tool comprising an upper jaw member, a lower jaw member pivotally secured thereto, a slot in one of said members located to the other side of such pivot from such jaws and extending upwardly generally toward such pivot, a clevis pin passing through said slot adapted to bear against a cam surface on the other said member, and a lifting clevis secured to said pin, whereby a lifting pull on said clevis in a direction generally toward such jaws will cause said clevis pin to move in said slot to cam said members to force such jaws together.

8. A lifting tool comprising an upper jaw member, a lower jaw member pivotally secured thereto, cam means carried by such jaw members on the other side of such pivot from such jaws operative when moved upwardly and generally toward such jaws to cam said members to urge such jaws into clamping position, and lifting means secured to said cam means adapted thus to move the latter under load.

9. A lifting tool comprising an upper jaw member, a lower jaw member pivotally secured thereto, cam means carried by such jaw members operative when moved in the direction in which such jaws are disposed to cam said members to urge such jaws into clamping position, and lifting means secured to said cam means adapted thus to move the latter under load.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
761,282	Aires	May 31, 1904
2,324,361	Chandler	July 13, 1943
2,360,366	Renfroe	Oct. 17, 1944
2,367,766	Foss	Jan. 23, 1945