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METHOD AND APPARATUS FOR LIFTING CONCRETE PRODUCTS

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2 SHEETS—SHEET 1

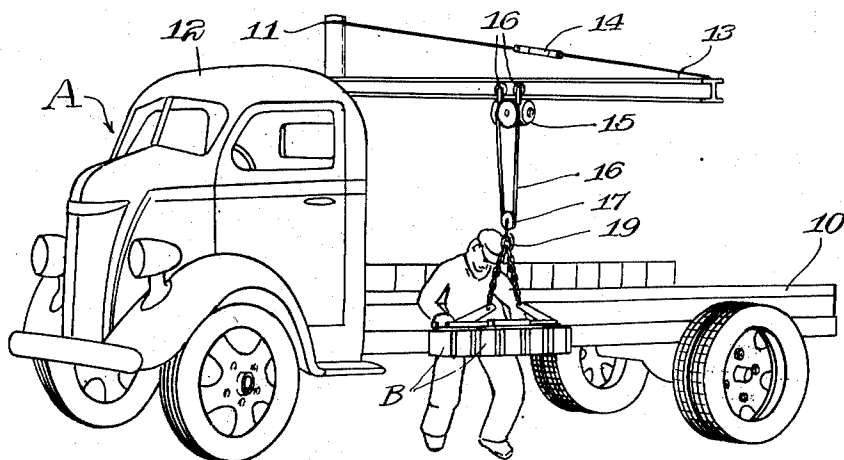


Fig. 1

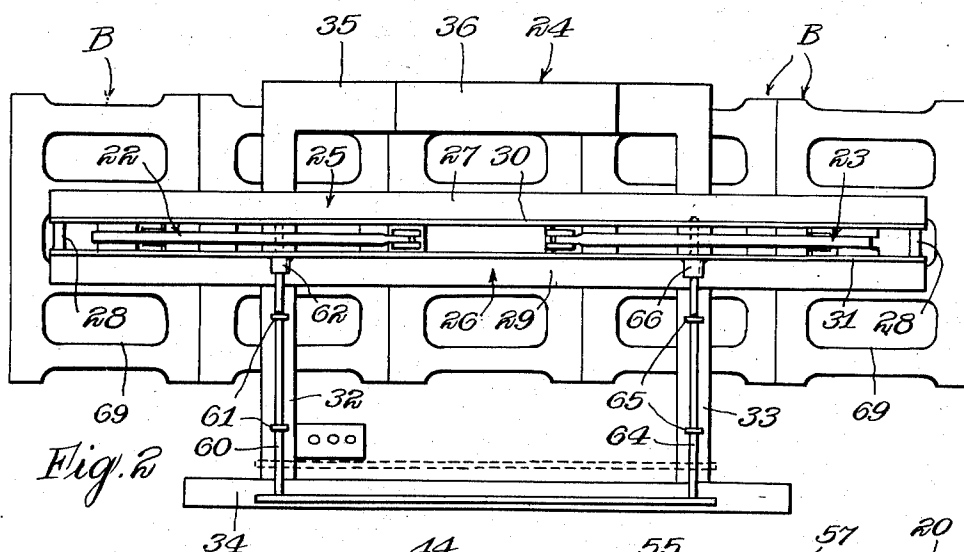


Fig. 2

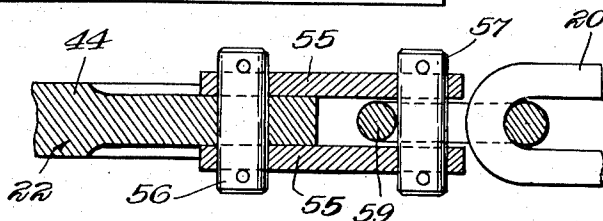


Fig. 8

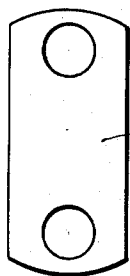


Fig. 9

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2 SHEETS—SHEET 2

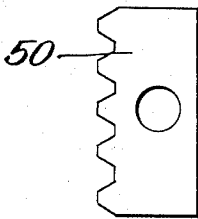
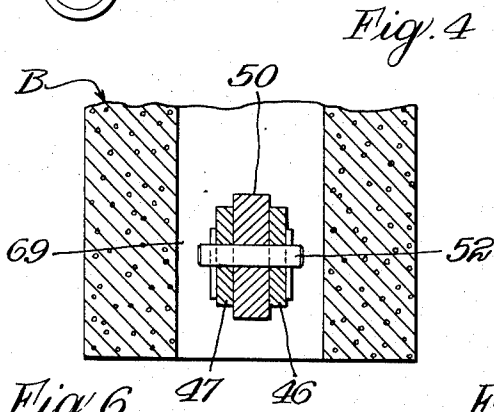
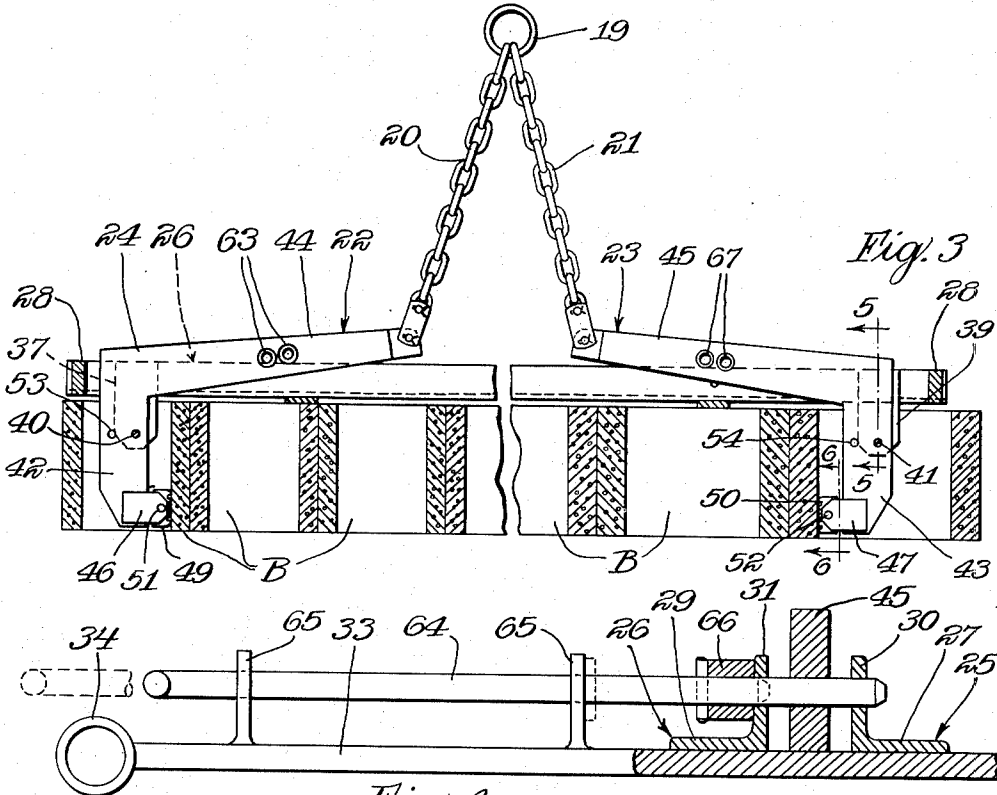


Fig. 5

Fig. 6

Fig. 7

334

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METHOD AND APPARATUS FOR LIFTING
CONCRETE PRODUCTSHubert C. Berchem, Jr., White Bear, Minn., and
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6 Claims. (Cl. 294—62)

1

Our invention relates to an improvement in method and apparatus for lifting concrete products wherein it is desired to provide a simple and efficient mechanism for lifting and handling a series of concrete products simultaneously.

Various types of clamping means have been employed for lifting concrete products. Most such devices have not been found extremely helpful because of the fact that they grip the block along the outer surfaces thereof. As a result in order to use the device it has been necessary to separate each block or series of blocks from remaining blocks so that the gripping device may properly engage the outer surfaces thereof.

We have found that concrete blocks may be more easily and effectively handled by gripping the interior surfaces of the blocks. Virtually all types of concrete blocks have openings therethrough designed to form air spaces in the constructed walls. By placing a series of blocks in side by side relation and by extending a gripping means into the openings or apertures in the outermost blocks of the series a clamping pressure may be exerted inwardly upon the outermost walls of the outer blocks which will hold the series of blocks clamped together during the lifting operation. As a result it is no longer necessary to space the blocks apart before the lifting operation and it is not necessary to pile the blocks in spaced relation after the lifting operation.

A feature of the present invention lies in the provision of a substantially horizontal boom mounted for pivotal movement about a vertically extending pivot supported by a suitable frame or vertical mast. A hoist is mounted upon the boom for movement longitudinally thereof. Our clamping device is suspended below the hoist and by raising and lowering the clamping device and by moving the hoist longitudinally of the boom and pivoting the boom about its vertical pivot, blocks may be lifted, piled, unpiled, loaded or unloaded in a simple and effective manner.

A feature of the present invention lies in the fact that in preferred form our hoisting device is mounted upon a movable support such as a truck or the like, and the truck may be used for loading or unloading purposes, or for the other purposes previously mentioned.

An added feature of the present invention lies in the mounting of a pair of opposed clamping jaws in such a manner that they may extend down into the apertures formed in the blocks to permit the handling of the series of blocks in unison.

An added feature of the present invention lies

2

in pivotally supporting the jaws so that they may remain firmly engaged with the walls of the aperture regardless of the pivotal relation of the jaws with the remainder of the clamping apparatus.

A further feature of the present invention lies in the provision of an elongated frame for pivotally supporting a pair of levers intermediate the ends thereof and in providing clamping jaws on one end of each such lever. The other ends of the levers are connected to the hoist so that the lifting pull upon the levers tends to clamp the blocks together and to hold them in side by side relation between the blocks actually engaged by the clamps.

A further feature of the present invention lies in the provision of an elongated frame for supporting the clamping levers and in providing a handle bar parallel to the frame and connected in spaced relation thereto for controlling the movement of the blocks being lifted. The controlling bar permits the operator to stand in spaced relation to the blocks to prevent danger of injury in the event a failure of any part of the mechanism or of a block should cause the same to drop.

A further feature of the present invention lies in the provision of an elongated frame for supporting clamping jaws, in the provision of a handle bar supported in spaced relation to the frame on one side thereof; and in providing a counterweight on the other side of the frame to counter-balance the weight of the controlling bar. As a result the device tends to remain in a horizontal position to simplify the piling or unpling of the blocks.

These and other objects and novel features of our invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of our specification:

Figure 1 is a perspective view of a truck having our apparatus supported thereupon.

Figure 2 is a plan view of our clamping device showing the general assembly thereof.

Figure 3 is a front elevational view of our clamping device clamping a series of blocks, certain of the blocks being shown in section to show the manner in which the blocks are engaged.

Figure 4 is a sectional view through a portion of our device showing a locking arrangement for holding the device in inoperable position.

Figure 5 is a sectional view through a portion of a block and through a portion of our clamping device, the position of the section being indicated by the line 5—5 of Figure 3.

Figure 6 is a sectional view showing the man-

3

ner in which the clamping jaws are pivotally connected to the supporting mechanism, the position of the section being indicated by the line 6-6 of Figure 3.

Figure 7 is a side elevational view of one of the jaws removed from the remaining mechanism.

Figure 8 is a sectional view through the connecting means connecting the levers and the weights leading to the hoisting mechanism.

Figure 9 is an elevation view of one of the links used in the portion of the apparatus illustrated in Figure 8.

Our block lifting mechanism is shown in general assembly in Figure 1 of the drawings. In this figure is illustrated a truck A having a body 10 on which blocks may be piled. A vertical mast 11 is mounted upon the truck rearwardly of the cab 12 thereof. A horizontally extending boom 13 is pivotally supported upon the mast 11 for rotation about a vertical axis. A brace 14 is provided between the mast 11 and the free end of the boom 13 to assist in supporting the boom extending at substantially right angles to the mast.

A hoist 15 is supported by suitable rollers such as 16 so that it is movable longitudinally of the boom 13. The hoist 15 acts through a suitable hoisting cable 16 to raise and lower a pulley block 17. The concrete block lifting apparatus which forms the important part of the present invention is supported by a ring 19 connected to the pulley block 17.

As indicated in Figure 3 of the drawings the ring 19 is connected by a pair of flexible cables or chains 20 and 21 to a pair of oppositely disposed lever arms 22 and 23. These lever arms are pivotally connected to a frame which will be described in detail.

The frame of the block clamping device is indicated in general by the numeral 24. In the construction illustrated the frame 24 includes a pair of substantially parallel angle iron members 25 and 26 which are secured in spaced parallel relation by spacing members such as 28. The angle members 25 and 26 are preferably arranged with horizontal flanges 27 and 29, respectively, in substantially coplanar relation with each other, and with vertical flanges 30 and 31 respectively in parallel spaced relation with each other. A pair of substantially parallel arms 32 and 33 are welded or otherwise secured in spaced relation to the horizontal flanges 27 and 29 of the angle members and extend on both sides thereof. A handle 34 connects the forward ends of the arms 32 and 33 providing a means by which the clamping apparatus may be conveniently handled. A bar 35 generally parallel to the angle members 25 and 26 connects the rearward ends of the arms 32 and 33 and supports a suitable counter-balance 36 which balances the weight of the handle 34 and other structure which projects forwardly on the frame.

A pair of spaced ears 37 project downwardly in spaced relation from the angle members 25 and 26 near one end of the frame 24 and a similar pair of ears 39 project downwardly from these angle members near the opposite ends thereof. The manner in which the ears 37 and 39 are spaced is best indicated in Figure 5 of the drawings. A pivot pin 40 extends through the ears 37 and a similar pivot pin 41 extends through the ears 39. The pivot pins 40 and 41 pivotally connect the ears to the downwardly projecting ends 42 and 43 of the levers 22 and 23 respectively. In other words, the levers 22 and 23 are

4

L-shaped in form having generally horizontal arms 44 and 45 respectively and generally vertical arms 42 and 43. The pivots 40 and 41 pivotally connect the levers to the frame 24 along parallel pivots.

As indicated in the drawings a pair of spaced projecting plates 46 are welded or otherwise connected to the lower end of the lever portion 42 and a similar pair of spaced plates 47 are fixed to the lower ends of the lever arm 43. These spaced plates 46 and 47 act as supports for the pivotal jaws 49 and 50 respectively. A pivot 51 extends through the spaced plates 46 and through the jaw 49 to pivotally support this jaw 49. A similar pivot 52 extends through the plates 47 and through the jaw 50 to pivotally support this jaw.

In view of the variations in the sizes of blocks and in the sizes of the apertures in which the clamping device may extend, we prefer to provide a series of spaced openings such as 53 in the lever arm 42 and such as 54 in the lever arm 43 in which the pivots 40 and 41 may engage. By changing the location of the pivots 40 and 41, the spacing between the levers 22 and 23 may be regulated. Thus the levers may be moved together or spread apart to accommodate blocks of varying thicknesses. The manner in which the levers 22 and 23 are connected to the chains 20 and 21 is best illustrated in Figures 8 and 9 of the drawings. Figure 8 shows the free end of one lever such as the lever 22 and the manner in which it is connected to the chain 20. A pair of links 55 are pivotally connected to the lever arm 44 by a pivot 56. A second pivot pin 57 extending through the links 55 forms a removable support for the end link 59 of the chain 20. The formation of the links 55 is illustrated in Figure 9 of the drawings.

A locking means is provided for locking the levers 22 and 23 in inoperative position so that the frame and clamping structure may be lifted and conveyed about with the jaws spread apart so that they may be easily inserted into the blocks. As shown in Figure 2 of the drawings a plunger rod 60 is slidably supported in bearings 61 on the frame member 32. The plunger 60 is engageable in a boss 62 on the vertical flange 31 of the angle member 26. The end of the plunger 60 is engageable in one of the holes 63 in the horizontal arm 44 of the lever 22. When the plunger 60 is thus engaged the lever arm is held from pivotal movement and the entire device may be lifted by the chains 20 and 21 without clamping the jaws together.

A similar locking device is provided on the frame member 33 engageable with the lever 23. A plunger rod 64 is slidably mounted on bearings 65 on the frame member 33 and is engageable through a boss 66 on the vertical flange 31 of the angle member 26. In one position the plunger rod 64 is engageable through one of the apertures 67 in the lever arm 23 to lock the lever arm from pivotal movement. The holes 67 are similar in number to the holes 54 in the lever end 42 and insure that one such hole will be alignable with the plunger rod regardless of which hole 54 the pivot pin 41 is in. The number of holes 63 and the spacing thereof also corresponds with the number of holes 53 in the lever 22.

The operation of our device can be understood from the previous description. The plunger rods 60 and 64 may be inserted through the holes 63 and 67 respectively of the levers 22 and 23 to lock these levers from pivotal movement. The frame

5

is then lowered upon a row of blocks B arranged in side by side relation. The lever arms 42 and 43 extend into apertures such as 69 in the outermost blocks B of the series until the frame 24 substantially rests upon the upper surfaces of the blocks. The plunger rods 60 and 64 are then removed from locking position and an upward pull is exerted upon the ring 19, thus conducting an upward pulling force upon the chains 20 and 21. This action pivots the levers 22 and 23 about their pivots 40 and 41 exerting an inward force against the inner walls of the outermost blocks. This force presses the intermediate blocks together and presses the outermost blocks against the intermediate blocks with sufficient clamping pressure so that a series of the blocks may be simultaneously lifted. The blocks remain clamped until the upward force upon the levers 22 and 23 is released. It will be noted that the pivots 40 and 41 are located in the downwardly extending ears 37 and 39 and in the vertically extending ears 42 and 43 of the levers 22 and 23. As a result a compressive force is urged against the blocks near the lower ends thereof holding the blocks clamped together at this point. When thus clamped the blocks are held from rotation by the frame 24. The specific location of the pivots 40 and 41 is of importance in the proper operation of our device.

The method we have developed of picking up blocks by extending interiorly of the outermost blocks of a series and clamping these outermost blocks against the intermediate blocks is of importance. Other clamping devices have been made for lifting a series of bricks or the like, but these devices have engaged the outer surfaces of the blocks in the clamping operation. Such an arrangement is not desirable for use with concrete blocks as the blocks are usually stored in piles and are piled in continuous rows on trucks and the like to prevent relative movement. By engaging in the apertures of the blocks it is not necessary to space the blocks so that the clamping means can engage the outer surface thereof and thus the lifting operation is greatly simplified.

In accordance with the patent statutes, we have described the principles of construction and operation of our method and apparatus for lifting concrete products, and while we have endeavored to set forth the best embodiment thereof, we desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of our invention.

We claim:

1. A block lifting device comprising a pair of elongated frame members, a pair of L-shaped levers pivotally mounted therebetween, a pair of spaced arms connecting said frame members and projecting substantially perpendicularly therefrom, handle means connecting the forward ends of said arms, and downwardly extending gripping ends on said pivotally supported levers.

2. The structure described in claim 1 in which the arms extend rearwardly from the frame members, and including counterbalance means connecting the rearwardly extending ends of said arms.

6

3. A lifting device for blocks including an elongated frame, a pair of downwardly projecting arms rigidly secured to said frame, a pair of L-shaped levers, means pivotally securing said L-shaped levers to said downwardly projecting frame members near the lower ends thereof, said last named means engaging said levers mid-way between the ends of one leg of the L, and means engaging the other end of the L-shaped levers for pivoting said one end of the levers inwardly.

4. A block lifting device comprising an elongated frame, a pair of downwardly projecting frame members rigidly secured to said frame near opposite ends thereof, a pair of L-shaped levers having a generally vertical leg and a generally horizontal leg, a pair of spaced apertures in each of said vertical legs, a cooperable aperture in each said downwardly projecting frame member, a pivot removably secured extending through each of said apertures in the downwardly projecting frame members and through one aperture of each of said vertical legs, and means connected to the free ends of the generally horizontal legs for pivoting the legs in unison.

5. The structure described in claim 4 and including means laterally extendable through said frame and engageable with each of said horizontal legs for holding the same from pivotal movement.

6. A block lifting device comprising an elongated frame, a pair of downwardly projecting frame members rigidly secured to said frame near opposite ends thereof, a pair of L-shaped levers having a generally vertical leg and a generally horizontal leg, a pair of spaced apertures in each of said vertical legs, a cooperable aperture in each said downwardly projecting frame members, a pivot removably secured extending through each of said apertures in the downwardly projecting frame members and through one aperture of each of said vertical legs, means connected to the free ends of the generally horizontal legs for pivoting the legs in unison, a pair of pins slidably supported by said frame in parallel relation, said pins being engageable with the horizontal legs in one slidable position thereof and disengageable from the legs in another slidable position thereof, and means connecting said slidable pins for moving the same in unison.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
424,825	Scheffold	Apr. 1, 1890
661,033	Brownfield	Nov. 6, 1900
679,440	Tempest	July 30, 1901
2,060,722	Breslav	Nov. 10, 1936
2,076,204	Martin	Apr. 6, 1937
2,170,706	Callaghan	Aug. 22, 1939
2,277,235	Kidder	Mar. 24, 1942
2,369,727	Falkner	Feb. 20, 1945
2,437,485	Sonnenschein	Mar. 9, 1948