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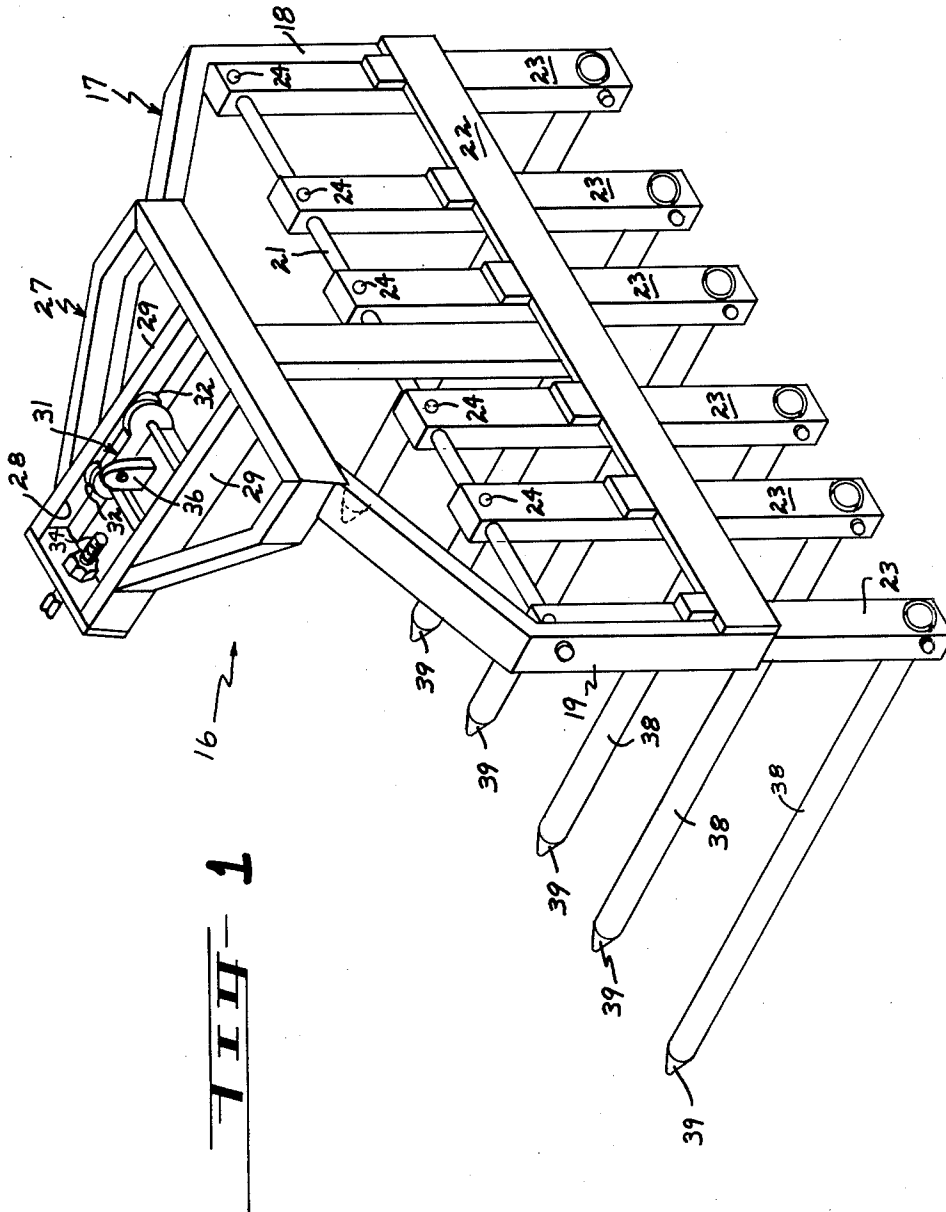
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APPARATUS FOR LIFTING A STACK OF BUILDING UNITS AND THE LIKE

Filed April 19, 1961

2 Sheets-Sheet 1



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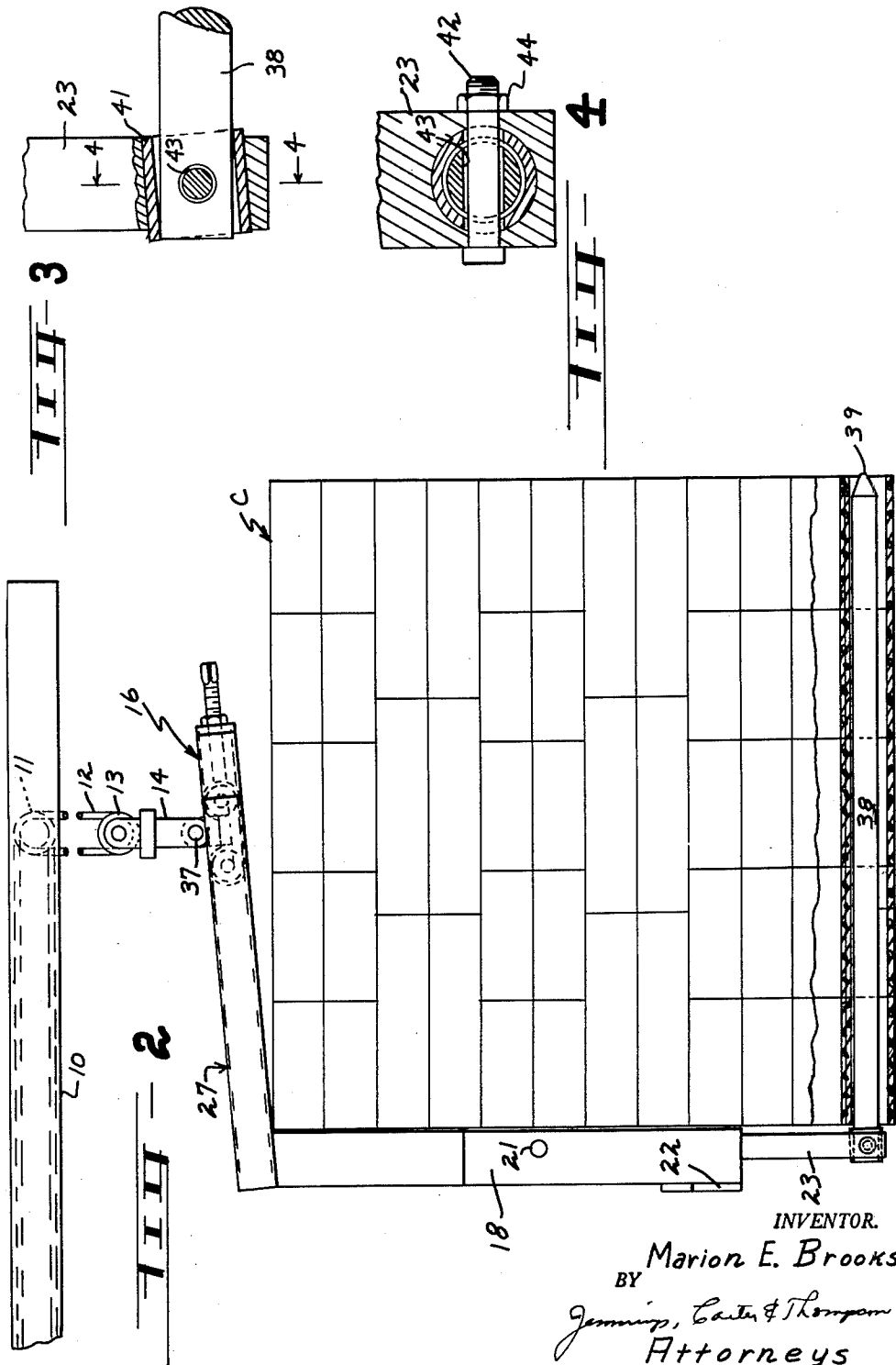
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**APPARATUS FOR LIFTING A STACK OF BUILD-
ING UNITS AND THE LIKE**
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This invention relates to apparatus for lifting stacks of building units such as concrete blocks and more particularly to an improved mounting of the tines of the apparatus to the frame thereof.

Heretofore, the tines of frames for lifting stacks of concrete blocks or other similar units having openings therethrough have been secured rigidly to the frames. When rigidly secured tines are inserted through openings in a plurality of stacked blocks, the lower tier of which consists of blocks having their openings generally aligned, the tines hit or strike against the blocks that are out of alignment and shift the blocks of the lower tier or else break or chip the blocks. In the stacking of hollowed-out tile or concrete blocks, the blocks are often out of alignment and to keep from chipping the same the operator of the lifting apparatus must be very careful. Such extra caution slows the lifting operation thereby increasing the cost of loading or unloading such units.

It is an object of the present invention to provide in stack lifting apparatus, tines which are connected somewhat in universal joint fashion to the lift frame so that when inserted through a row of blocks, the openings in which may not be perfectly aligned, the outer ends of the tines are individually free to move or shift, thus to enter the blocks without jamming or damaging them.

A further object is to provide lifting apparatus for stacks of rectangular objects in which loosely secured tines are mounted for movement relative to each other so that the distance between adjacent tines may be varied to accommodate various sizes and types of concrete blocks and the like.

An additional object is to provide stack lifting apparatus with loosely secured tines and the apparatus being carried by an overhead boom and comprising an overhanging support having a trackway to receive a trolley connected to the boom for lifting the frame and objects thereon.

Apparatus embodying features of my invention is shown in the accompanying drawings, forming a part of this application, in which:

FIG. 1 is a perspective view of my lifting apparatus having a plurality of loosely mounted tines adapted to engage openings in rectangular objects for lifting the objects;

FIG. 2 is a side elevational view of the lifting apparatus shown in FIG. 1 supported by an overhanging boom and having a stack of concrete blocks thereon with a portion of the lower layer of blocks broken away to show the tines within openings therein;

FIG. 3 is an enlarged sectional fragmentary view of a tine loosely connected within a bushing; and,

FIG. 4 is a sectional view taken generally along line 4—4 of FIG. 3.

Referring now more particularly to the drawings for a better understanding of my stack lifting apparatus, I show a boom 10 of a crane or the like (not shown) and having a movable pulley 11 thereon. Cable 12 is secured to pulley 13 on a clevis 14 and is adapted to carry a lift frame indicated generally by the numeral 16 having stacks of concrete blocks C thereon.

Frame 16 comprises a back 17 having side members 18 and 19. A rod 21 extends between side members

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18 and 19 and is secured thereto. Cross member 22 is secured to the lower end of side members 18 and 19.

Arms 23 are mounted on rod 21 and set screws 24 hold arms 23 in position on rod 21. Arms 23 can thus be adjusted along rod 21 so that the distance between adjacent arms may be varied. An overhanging frame 27 extends in a generally horizontal direction over blocks C and has an upwardly inclined trackway 28 therein formed by channel members 29. Trolley 31 has wheels 32 thereon mounted in trackway 28 and is adapted to move into engagement with adjusting screw 34 when frame 16 is lifted by boom 10. Extension 36 on trolley 31 is secured to clevis 14 by pin 37 as shown in FIG. 2. The position of trolley 31 when in lifting position may be varied by the adjustment of screw 34 so that the point at which blocks C are carried may be moved relative to the blocks allowing trolley 31 to be adjusted for different weights or shapes of stacks.

A tine 38 is mounted on each of arms 23 and has a pointed end 39 which is adapted to enter openings in concrete blocks or the like. For tines around 40" long a diameter of 2" with a solid steel tine has worked effectively.

The mounting of the tines 38 is shown in FIGS. 3 and 4. A circular bushing 41 is secured to each arm 23 in tilted relation. The longitudinal axis of bushing 41 is inclined slightly upwardly with respect to the longitudinal axis of tine 38 so that tines 38 are perpendicular to back 17 and in horizontal relation when the tines are at rest. Tine 38 is shown at rest in FIG. 3 engaging the outer upper end and the lower inner end of bushing 41. The inner diameter of bushing 41 is sufficiently larger than the outer diameter of tine 38 to allow the tine to move relative to bushing 41 in the event the tine strikes or engages the surface of the concrete block C. With tine 38 forty inches long the outer end of tine 38 may be moved in a circle approximately four inches in diameter. Thus, considerable play is obtained by the tines to permit tines 38 to "wobble" or shift as they move through openings in blocks C.

To hold tine 38 loosely in bushing 41, a bolt 42 extends through an opening 43 of enlarged diameter in the tine. Nut 44 secures bolt 42 to arm 23. It is highly desirable that tines 38 remain in perpendicular relation to back 17 as they move through aligned openings in blocks C since inclination of the tines from a horizontal position would cause the tines to engage sides of the blocks thereby chipping or shifting the blocks.

From the foregoing, it will be understood that I have provided tines for lifting apparatus which are connected loosely to the lift frame so that the tines are free to move when the surface of the concrete block or the like is contacted, thereby holding to a minimum chipping or shifting of the blocks. The tines remain in a horizontal position and perpendicular to the back of the lifting frame when at rest and this is accomplished by having the bushings in which the tines are mounted arranged at an angle to the tines. Further, my lifting frame is adapted to be carried by an overhanging boom from a crane or the like with the boom connected to a movable trolley which may be adjusted to vary the position of the trolley over the stack of blocks C.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In lifting apparatus adapted to lift a stack of generally rectangular objects in which the lower layer there-

of has generally aligned horizontally extending openings, a vertically extending back having a horizontally extending rod thereon, a plurality of generally vertical arms mounted on said rod and adapted to be adjusted along said rod to vary the spacing between adjacent arms, each of said arms having an opening adjacent the lower end thereof, a rod-like circular tine in each of the arm openings adapted to enter the generally aligned circular openings of the lower layer of the stack, said arm openings being of a diameter sufficiently larger than the outer diameter of the tines to allow movement of the outer ends of the tines, the length of the tines and the relative diameters being sufficient to allow the outer ends of the tines to inscribe a circular path approximately four inches in diameter, and means securing said tines loosely within the arm openings.

2. In lifting apparatus adapted to lift a stack of generally rectangular objects in which the lower layer thereof has generally aligned horizontally extending openings, a vertically extending back having a plurality of spaced horizontally extending openings adjacent the lower end thereof, a rod-like tine in each of the back openings adapted to enter the openings in the lower layer of the stack, said back openings being of a diameter sufficiently larger than the outer diameter of the tines to allow movement of the outer ends of the tines, means holding the tines loosely within the back openings, an overhanging support adjacent the upper end of the back and extending outwardly in the same direction as the tines, and a movable member on said support by which the lifting apparatus is adapted to be supported from a cable or the like, said movable member being adjustable in a horizontal direction thereby to vary the point of pickup of the apparatus.

3. In a tine frame adapted to lift a stack of generally rectangular objects in which at least the lower layer has generally aligned openings therethrough, a vertically extending back having a plurality of spaced horizontally extending openings adjacent the lower end thereof, a rod-like tine in each of the openings adapted to enter the openings in the stack of objects, said openings being of a diameter sufficiently larger than the outer diameter of the tines to allow movement of the outer ends of the tines, means holding the tines loosely within the openings, an overhanging support adjacent the upper end of the back and extending outwardly in the same direction as the tines, a trackway in said overhanging support, a trolley mounted in said trackway for movement therealong and adapted to be supported from a cable or the like, and means on the support to limit the outward movement of the trolley, whereby the point of pickup of the tine frame over the stack may be varied.

4. In a tine frame adapted to lift a stack of generally rectangular objects in which the lower layer thereof has

generally aligned openings extending therethrough, a vertically extending back, a plurality of spaced horizontally extending bushings adjacent the lower end of the back, a rod-like circular tine in each of the bushings and adapted to enter the aligned openings in the stack, said bushings being of an inner diameter sufficiently larger than the outer diameter of the circular tines to allow movement of the outer ends of the tines, the longitudinal axis of said bushings being inclined slightly upwardly with respect to the longitudinal axis of said tines so that the tines are perpendicular to the back when the tines are at rest with the tines engaging the bushings when at rest only at the upper outer ends and the lower opposite ends thereof, means holding the tines loosely within the bushings, an overhanging support adjacent the upper end of the back and extending outwardly in the same direction as the tines, a trackway in said overhanging support, a trolley mounted in said trackway for movement therealong and adapted to be supported from a cable or the like, and means on the support in contact with the trolley to adjust the outward movement thereof whereby the point of pickup of the lift frame over the stack may be varied.

5. In lifting apparatus for lifting a stack of generally rectangular objects in which the lower layer thereof has generally aligned openings therethrough, a lift frame adapted to support a stack of objects, said lift frame comprising an overhanging member adapted to extend over the objects, a boom over the lift frame, a movable member on the overhanging member connected to the boom for carrying the lift frame and the objects, a plurality of generally horizontally extending bushings adjacent the lower end of the lift frame, a plurality of circular rod-like tines in the bushings adapted to enter aligned circular openings in the lower layer of the stack of objects, said bushings being of an inner diameter sufficiently larger than the outer diameter of the circular tines to allow movement of the tines, the length of the tines and the relative diameters being sufficient to allow the outer ends of the tines to inscribe a circular path over two inches in diameter, and means securing the tines loosely within the bushings.

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