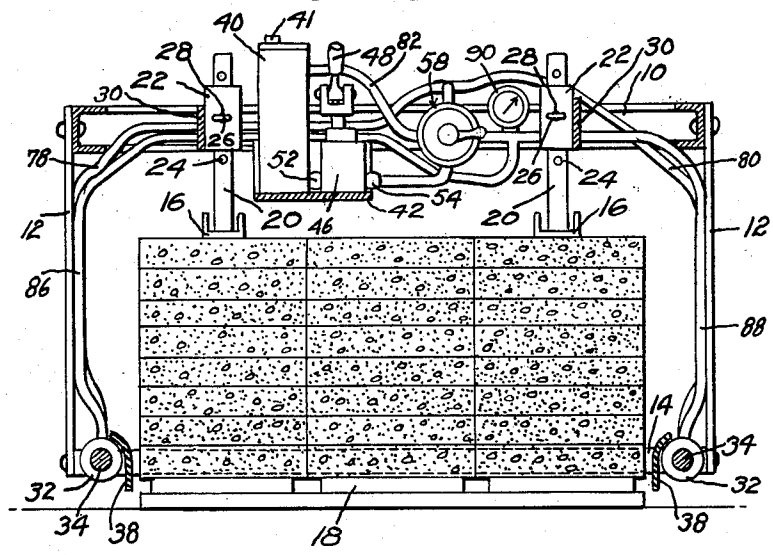
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LIFTING DEVICE

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Fig. 1



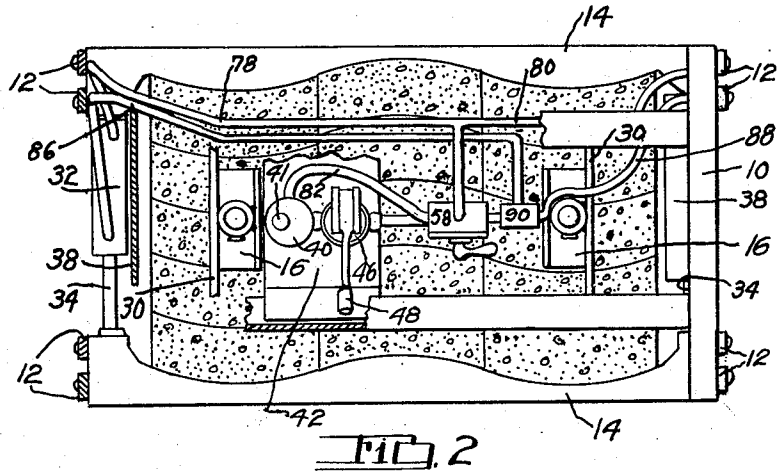


Fig. 2

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Fig. 3

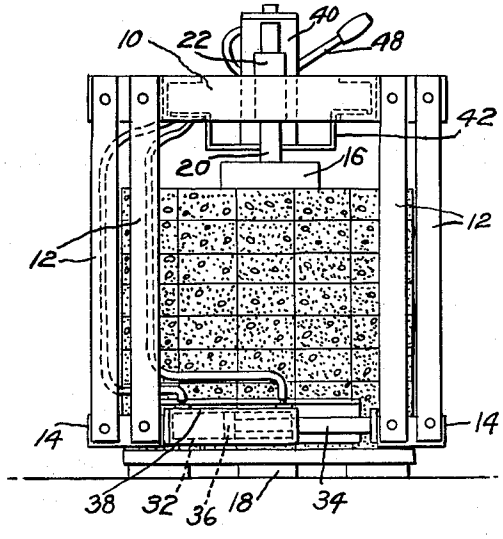
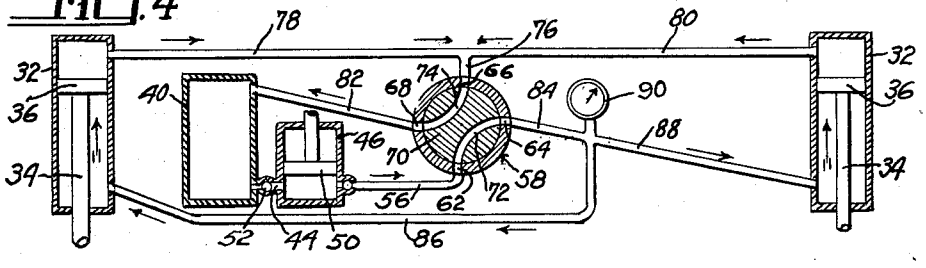


Fig. 4



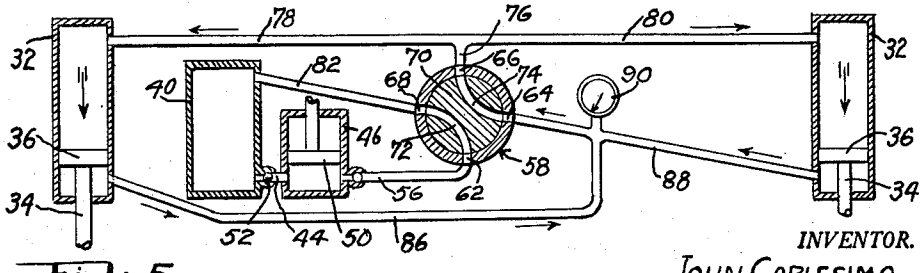


Fig. 5

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LIFTING DEVICE

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2 Claims. (Cl. 294—63)

This invention relates to a lifting device and more particularly to a device for lifting a plurality of stacks of articles such as concrete blocks which are herein used to illustrate the invention.

In forming concrete blocks, they are molded to form and stacked in piles on a dolly for drying. After they have dried the dolly and blocks are lifted by lifting forks and placed on a truck for transportation to location where they are removed along with the dolly in a single operation.

Considerable difficulty has been experienced in return of the dollys to the manufacturer of the blocks. These dollys are costly and the manufacturer is required to make another trip to the location of delivery to pick up the dollys when the builder is negligent or refuses to return the dollys. This is expensive and adds to the cost of the blocks.

It is therefore an object of the invention to provide a device which will lift the stacks of blocks off of the dolly and place them on a truck for delivery. When delivered the blocks are removed by the lifting device and the lifting device is returned with the return trip of the truck.

Another object of the invention is to provide a mechanism which operates similar to a pair of tongs which grip the bottom layer of blocks for lifting the entire stack of blocks.

A further object of the invention is to provide a mechanism which can be operated manually, preferably by hydraulic means.

Other objects and advantages of the invention will be more fully understood from the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a side view of the lifting device, parts being broken away and in section;

FIG. 2 is a top plan view of FIG. 1, parts being broken away and in section;

FIG. 3 is an end elevational view of FIG. 1;

FIG. 4 is a diagrammatic view illustrating the hydraulic control system for operating the device; the valve being shown in a position for conducting the fluid through the system for moving the clamping beams toward each other; and

FIG. 5 is a view corresponding to FIG. 4 but showing the valve in a position for permitting movement of the clamping beams away from each other.

Referring to the drawings, the lifting device comprises an upper rectangular frame 10 which may be made from angle or channel members welded or bolted together at the four corners. Two pairs of vertically depending bars 12 are pivotally mounted at their upper ends to each end portion of the frame 10, each pair being located on an extending projection beyond the side faces of the frame 10. The lower ends of each pair of bars 12 are pivotally attached to the opposite ends of horizontally extending beams 14 below frame 10. The bars 12 are in parallel relation and support the beams; one pair of bars at one end of one beam and another pair at the opposite end of the same beam, one pair at one end of the other beam and another pair at opposite end of said last named beam. The beams 14 are supported by a parallelogram arrangement of the bars which permit the beams to independently swing in an arc, below the frame 10, without alteration of the vertical plane of the inner surfaces of the beams, which will be later seen contact the outer surfaces of the lower layer of blocks B in the stack.

The lifting device is supported on the top of the stack

of blocks by vertically adjustable shoes 16 carried by the upper frame 10, which supports the beams 14 above the upper surface of a dolly 18 and for pinching contact with the outer surfaces of the lower layer of the stacked blocks B. The shoes 16 are attached to rods 20 which are vertically slidable in tubes 22 and are provided with vertically spaced apertures 24 through which a pin 26, inserted through an aperture 28 in the tubes 22 with one of the aligned apertures in the rods 20, adjustably positioning the shoes 16 vertically relative to the frame 10. The tubes 22 are attached to a transverse plate 30 carried by the longitudinal side frame members of the frame 10.

Piston cylinders 32 have their closed end attached to the inner face of one of the beams 14 adjacent the outer ends thereof, and piston rods 34 provided with pistons 36, reciprocable in the cylinders 32, are attached to the inner surfaces of the other beam 14; the cylinder 32 and rod 34 being located between the swingable beams 14 and form a connection therebetween. Shields 38 attached to one of the beams 14 form a guard between the cylinders 32 and the stack of blocks B.

A fluid supply tank 40 is supported on a plate 42 secured to the side members of the frame 10. A filler and vent cap 41 is provided for the tank 40. The tank 40 has a fluid conduit 44 in its lower end leading to a pressure pump 46 having a handle 48 and the usual piston 50. A one way check valve 52 is provided in the conduit 44 for permitting a flow of fluid to the pump 46 and a one way check valve 54 is provided in a conduit 56 leading from the pump 46 to prevent a return fluid flow to the pump. A double two way valve body 58 controls the flow of fluid to and from the cylinders 32.

Referring to FIG. 4, the valve body 58 is provided with four ports, 62, 64, 66 and 68, and the rotatable portion 70 of the valve is provided with transverse passages 72 and 74. A conduit 76, leading from the port 66, is connected to conduits 78 and 80, each leading to one of the piston cylinders 32 at one end of piston 36. A conduit 82 is connected between the port 68 and the upper portion of the fluid supply tank 40. The conduit 56 is connected to the port 62 and the port 64 is connected through conduit 84 to conduits 86 and 88, each leading to one of the piston cylinders 32 at the piston rod end of the piston 36. A pressure indicator 90 is in communication with the passage in conduit 84.

When the rotatable portion 70 of the valve body 58 is in the position shown in FIG. 4, the pump 46 will supply a fluid pressure through conduit 56, port 62, passage 72, port 64, conduits 86 and 88 to the piston rod end of the pistons 36, moving the pistons 36 inwardly of the cylinders 32, indicated by the arrows. The fluid at the other side of the pistons 36 is returned to the tank 40 through conduits 78 and 80 to conduit 76, port 66, passage 74, port 68 and conduit 82 to the tank 40. This fluid pressure draws the beams 14 toward each other into gripping engagement with the lower layer of blocks B.

When it is desired to separate the beams 14 and remove the lifting device from the stack of blocks B, the valve 70 is turned in a clockwise direction to a position indicated in FIG. 5. This permits a reversal of direction of fluid flow and the pressure at the piston rod end of the pistons 36 is relieved, flowing through conduits 86 and 88 to conduit 84, port 64, passage 74, port 66, conduit 76, conduits 78 and 80 to the piston end of the cylinders 32, as indicated by the arrows. The passage 72 forms a fluid passage between the conduits 56 and 82, so that if the pump should be operated the fluid will flow from pump 46 through conduit 56, passage 72 and conduit 82 back to the tank 40.

The particular blocks herein illustrated are blocks for building manholes and their particular shape make them ideal for illustrating the invention, because they can be nested or interlocked and remain stacked for lifting. With

reference to FIG. 2, it will be noted that the convex surface of one block fits the concave surface of an adjacent block and that the blocks of one row are reversely arranged so that the outer surfaces of the sides of the stack present a scallop edge. The beams 14 have their inner gripping surfaces shaped to fit the same scallop surface as presented by the blocks. This prevents lateral slipping of the rows of blocks when they are lifted.

In its operation, the device is lifted over the previously stacked blocks and then lowered until the shoes 16 rest on the top surface of the stack of blocks. By adjustably positioning the shoes 16 vertically the beams 14 can be positioned for contact engagement with the outer surfaces of the bottom row of blocks. The valve 70 is then returned to a position shown in FIG. 4 and the pump 46 operated to supply a fluid pressure through conduits 86 and 88 to the cylinders 32 at the piston rod end of the pistons 36. This fluid pressure causes the beams 14 to be forced inwardly into tight gripping engagement with the outer surfaces of the bottom rows of blocks. The device is then lifted with the entire stack of blocks from the dolly to a truck or other transporting mechanism. The device remains on the stack of blocks during transportation, after which the blocks are removed by the device. The valve 70 is then turned to the position shown in FIG. 5 where the pressure is released. The beams may then be separated and the device lifted over the blocks and placed on the transporting device for return to the maker of the blocks for repeated use.

It will be understood that various changes in the size, shape and arrangement of parts may be made without departing from the spirit of the invention and it is my intention to cover by the appended claims such changes as may be reasonably included within a fair interpretation of the meaning of the terms therein.

I claim:

1. A device for lifting a stack of blocks comprising, a frame, downwardly extending bars pivotally supported at their upper ends to the opposite ends of said frame, a pair of spaced longitudinally extending beams, each end of each of said beams being supported by the lower ends of several of said bars which are arranged in parallogram formation for swinging movement of said beams toward and away from each other, a cylinder secured to each of the opposite ends of one of said beams, a piston rod secured to each of the opposite ends of the other of said beams, a piston carried by said rods for reciprocation within said cylinder, and fluid pressure means for moving said pistons.

2. A device for lifting a stack of blocks having arcuate inner and outer faces comprising, a frame, depending beams pivotally supported on said frame for movement toward and away from each other, the beams extending longitudinally along the sides of said frame but vertically spaced there below and having their inner gripping faces in a vertical plane formed to an irregular surface to fit the arcuate faces of the blocks, a cylinder secured to each of the opposite ends of one of said beams, a piston rod secured to each of the opposite ends of the other of said beams, a piston carried by said rods for reciprocation within said cylinders, a fluid pump for supplying fluid pressure to said cylinders, conduit means interconnecting said pump and cylinders, valve means mounted in said conduit means for controlling a fluid pressure flow from said pump to either of the opposite sides of said pistons within said cylinders for moving said beams toward and away from each other, and a pair of depending bars pivotally attached to said beams and to the adjacent portion of said frame for supporting the opposite ends of said beams arranged in parallelogram formation for maintaining the gripping surfaces of said beams in a vertical position during their movement toward and away from each other.

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