Dec. 7, 1954 R. D. MILEWSKI 2,696,310

BLOCK OFF-BEARING APPARATUS

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Fig. 1.

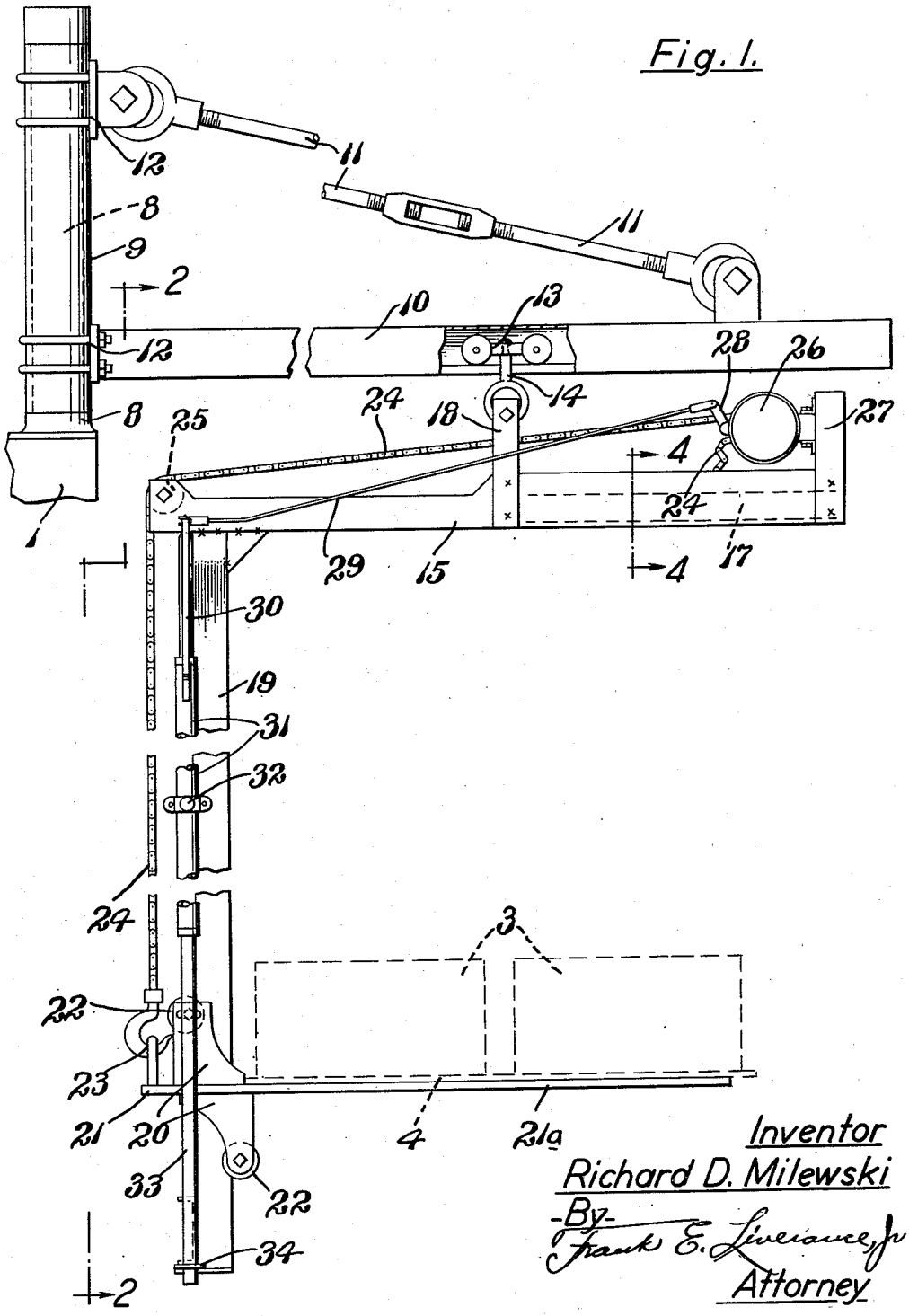

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Fig. 2.

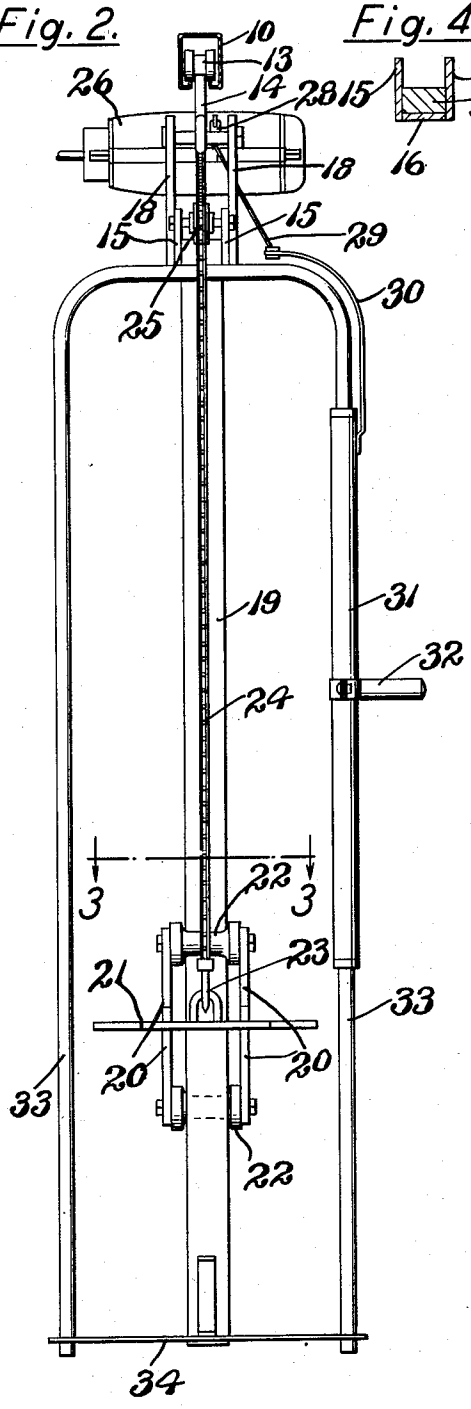


Fig. 4.

Fig. 5.

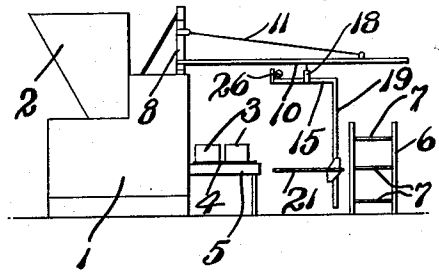
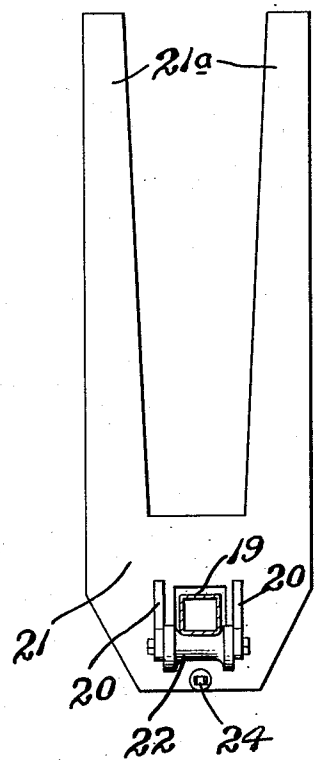


Fig. 3.



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BLOCK OFF-BEARING APPARATUS

Filed May 10, 1951 3 Sheets-Sheet 3

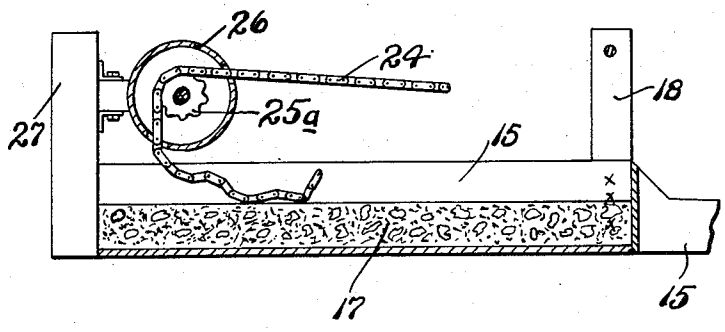

Fig. 6.

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BLOCK OFF-BEARING APPARATUS

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Application May 10, 1951, Serial No. 225,503

2 Claims. (Cl. 212—135)

This invention relates to a block off-bearing apparatus, and is concerned with desirable and advantageous improvements in apparatus of the character noted. Such apparatus is used at the front of high production, concrete block machines for removing the blocks in their uncured state as they leave the block making machine, and transferring them to racks which in turn are transported to the curing room where the blocks are subjected to water vapor which penetrates the blocks and, in about 24 hours, cures the blocks which are then set and hardened.

Blocks made on automatic or semi-automatic concrete block making machines are ejected from the machines either one, two or three at a time, carried on pallets, after the concrete has been shaped and molded and condensed usually by vibration of the mold and the concrete mix in it, tamping or by pressure. And after such packing or condensing of the concrete the blocks are withdrawn from the mold, usually in a downward direction. A block, or a number of blocks, made in each cycle of the block making machine rest upon the upper side of a pallet, which is a flat plate of metal, the pallet and the block or blocks thereon, being ejected to the front of the machine. From such position they are removed by the block off-bearing apparatus, the pallet, with either a block or more than one block thereon, being lifted and moved and swung around for delivery to horizontal supporting shelves of a rack which is sufficiently large that it carries a large number of pallets and the blocks on such pallets.

The supporting shelves for the blocks are at varying heights from adjacent the lower side of the rack to the uppermost shelf which may be as high or higher than a man's head. The guidance of such blocks into the shelves has heretofore required the operator to bend over when filling lower shelves, such bending being to different degrees in accordance with the height of the shelves. And if a block or blocks should disintegrate more or less, either in loading onto or after placing on the rack, there is no way to remove it except manually if it should be at one shelf and blocks were both above and below it on other shelves.

It is an object and purpose of the present invention to provide a block off-bearing apparatus in the use of which the operator may remain erect at all times, and can fill any selected shelf with the blocks upon pallets, remove a pallet with blocks from any shelf if it is desirable because a block on such pallet is imperfect for any reason, and replace such removed blocks and pallet with others irrespective of the extent to which the rack is loaded.

Many novel improvements and arrangements and combinations of parts are provided for effectively attaining a better removal and placing of the blocks from the block making machine on racks, and for saving the operator from the fatigue to which he has been subjected with former apparatus.

A further object of the invention is to provide a novel and very effective structure which is readily and economically produced, and which works especially satisfactorily with little or no liability of getting out of order.

An understanding of the invention may be had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a side elevation illustrative of the block off-bearing apparatus made in accordance with my invention, with some parts broken away for a better disclosure.

Fig. 2 is a front elevation thereof, the upper track which carries it being shown in vertical cross section on the plane of line 2—2 of Fig. 1.

Fig. 3 is a horizontal section and plan substantially on the plane of line 3—3 of Fig. 2 looking downwardly.

Fig. 4 is a transverse vertical section substantially on the plane of line 4—4 of Fig. 1,

Fig. 5 is a side elevation, at reduced scale, showing the environment in which my invention is used and how it is associated with a concrete block producing machine and block rack, and

Fig. 6 is a fragmentary longitudinal vertical section through the outer end of the upper suspended beam of the block off-bearing apparatus showing the driving connection between the actuating motor and the chain which is driven thereby.

Like reference characters refer to like parts in the different figures of the drawings.

In Fig. 5 a diagrammatic showing of the environment and place of use of the present invention is shown. A concrete block forming machine 1, into which concrete is delivered from a hopper 2 to the mechanism of the machine is shown; and the blocks, which may be either one, two or three in number, indicated at 3, resting upon a lower pallet 4 are, after they are formed, ejected or pushed out of the machine to the front to rest upon a supporting platform 5. The pallet with the blocks 3 thereon is taken from the supporting platform 5 and delivered to a rack 6 which has a spaced number of horizontal shelves 7 upon which the pallets with the blocks above them are placed. After the rack is filled, it is lifted and carried by a lifting and transporting truck, being moved to the curing room where the blocks are left for at least 24 hours for curing, setting and hardening.

The present invention is concerned with a novel and better mechanism used with such concrete block machine for getting the pallets, with the blocks thereon from the platform 5 in front of the machine to the rack shelves.

At the upper front part of the machine a vertical post 8 is permanently secured to and extending upwardly from the frame. A surrounding vertical sleeve 9 is mounted thereon so that it may be turned about the vertical axis of the post. Near the lower end of the sleeve a horizontal track 10 is secured at one end of the track, and is adjustably supported by rods 11, connected by a turn buckle. Suitable clamps, indicated at 12 are used to attach one end of the track 10 and one end of the rod 11 to the sleeve 8. The track 10 will preferably be maintained as nearly horizontal as possible by adjustment of the divided rod 11.

The track 10, preferably is of inverted channel form, as shown in Fig. 2, having inwardly extending terminal flange portions extending toward each other. It has within it a carriage 13 mounted on wheels or rollers for movement lengthwise of the track. A vertical rod 14 terminating at its lower end in a ring, as shown, has a swivel connection at its upper end to the carriage 13. The rod 14 and parts suspended therefrom may be turned freely about a vertical axis.

Below the track 10 the immediate block removing apparatus is suspended. It includes an upper horizontal beam having spaced sides 15, at the lower edge portions of which a horizontal web is located and secured, either integrally or by welding, the beam being of generally channel form in cross section. The free end portion, of this beam is adapted to be weighted by concrete 17 or other suitable material for balancing the block removing apparatus to hold the beam substantially horizontal said block removing apparatus will not unduly tilt. The beam is suspended by spaced vertical bars 18 one welded at its lower portion to each of the sides 15, and extending above said sides, having a horizontal rod mounted on and located between the upper end portions thereof, the rod passes through the ring at the lower end of the swivelly mounted member 14.

From the unweighted end of the beam a vertical post 19 extends downwardly, having a permanent welded connection to the beam at its upper end. The post of a hollow metal structural form (Fig. 3), has a vertically movable carriage thereon which comprises, a pair of spaced upwardly extending plates 20, and a pair of

spaced similar downwardly extending plates **20** welded or otherwise permanently connected with a horizontal fork plate **21**, which is located underneath the beam **15** and extends away from the post **9**. It is formed with two spaced apart forks **21***a* (Fig. 3). Rollers **22** are carried on and between the upper ends of the upper plates **20**, and between the lower ends of the lower plates **20**, riding against opposite sides of the post **19** as shown, and the upper rollers **22**, for example, may be adjustable on the plates which support it toward or away from the post **19**.

A hook and eye structure indicated at **23**, the eye preferably permanently secured to the fork plate **21**, and the hook to one end of a chain **24**, connects the fork, by means of the chain **24** which passes upwardly and over an idle wheel **25** therefore, to a rotary compressed air motor **26**, mounted on a suitable support **27** at the free end of the beam **15**, **16**. The idle sprocket wheel **25** is at the opposite end of the beam. The chain passes between the bars **18** and through the compressed air motor **26** around a shaft having a sprocket wheel **25***a* thereon. The rotation of the motor in one direction causes an upward pull upon the vertical section of the chain **24**. The free end of the chain, as shown in Figs. 1 and 6, is received between the sides **15** of the beam over the weight or ballast **17**. When the motor is turned in the opposite direction the vertical section **24** of the chain is released and the concrete carrying fork and the carriage therefor will move by gravity downward on the post **19**.

The motor **26** is controlled by a lever **28** which, in Fig. 1, is shown at its neutral position. When in such position the motor is at rest. When the lever is moved in one direction the motor will wind the chain and lift the carrying fork **21**, **21***a* and any blocks or pallets thereon. When moved in the opposite direction away from neutral position, the fork and its carriage and any blocks or pallets thereon will move downwardly. The motor shown is of old and well-known structure, not designed by applicant, but purchased for use with applicant's invention, and is well-known to those skilled in the art.

The lever **28** is manually actuated. One end of a rod **29** is pivotally connected to the outer end of the lever **28**, extending therefrom, at one side of the beam **15**, **16**, substantially to the upper end of the post **19**, and has a pivotal connection with the upper end of a bent rod **30** which curves outwardly and thence downwardly and is permanently secured, at its lower end, to the upper end portion of an elongated vertical tube or sleeve **31** between the ends of which an outwardly extending handle **32** is connected. Sleeve **31** is mounted for turning movement upon one vertical side **33** of a frame which includes two spaced apart rods or tubes **33**, integrally connected by a cross portion at their upper ends, and connected at their lower ends by a flat bar **34**. The flat bar **34** is permanently secured to the lower end of the post **19**, and the upper cross connecting portion of the frame is connected to the web **16** or frame immediately adjacent the upper end of the post **19**. The vertical sides **33** of the frame are located symmetrically with respect to the post **19**.

Such structure, in the position shown in Fig. 5, has the block and pallet removing fork **21** extended toward the platform **5**. Such platform, in concrete block machines, has open spaces for the sides **21** of the fork to pass underneath the pallet **4**, the entire block removing structure being readily moved on the track **10**. The operator grasps the handle **32** with one hand and the vertical side **33** of the described frame with the other hand so as to manually move the removing fork from the position in Fig. 5 to underneath the pallet **4**.

By moving the handle **32** so as to turn the sleeve **31** about its longitudinal axis, rod **29** is moved longitudinally in one direction or the other, depending upon the direction that the sleeve **31** is turned. The operation of the motor **26** is one in which there is progressively increasing speed of the motor rotor from its no-speed neutral position of the lever **28**, to maximum speed when the lever is at its farthest distances away from the neutral position in either direction. Thus the operator may, by a slight twist of the handle **32** to turn sleeve **31** in one direction, lift the pallet **4** and the blocks **3** above it from the supporting platform **5** and then turn the block lifting apparatus through 180° about the pivotal axis of the swivelly connected rod **14** to present the blocks to the rack **6**, and also move the block removing apparatus upon the track **10** so that the pallet and blocks are outside of the rack. By further operating the handle **32** the carriage and fork **21** may be raised or lowered to a desired position above a selected shelf **7**, below the shelf next above the selected shelf, and then move the entire block removing apparatus on the track **10** to carry the sides **21***a* of the pallet carrying fork, the pallet and the blocks thereon into the rack above the selected shelf to proper position, thereafter lowering the pallet until it rests upon the shelf, and withdrawing the fork from underneath the pallet.

The operator stays in an upright position with one hand on the handle **32** and the other hand directly opposite on the opposite rod **3**. He has complete command of the movements of the apparatus on the track **10**, and of the vertical movements of the blocks and pallets when in such upright position. The handling of the blocks, which are of a fragile character when they come from the block machine, is within the control of the operator and may be as careful or delicate as necessary to safeguard the pallet or the blocks thereon from any jar or other shock. The control of the speed of the motor **26** from rest, progressively to the maximum speed attainable, permits lifting and lowering the blocks at the beginning and at the end of the cycle of removal from the platform **5** to depositing the blocks and pallets carrying them on a selected shelf of the rack, at very slow motion or speed, with greater rapidity of operation of the motor in between.

With my invention also, after the shelves are loaded or wholly or partly loaded, a pallet **4** with the blocks thereon which have been delivered to the rack may be readily removed. Such removal at times is desirable if a block or blocks on a pallet should become broken or otherwise disrupted, the concrete thereof being returned to the hopper **2** for reprocessing. This is very quickly and easily done, without the operator being required to leave his upright position.

The apparatus described is very practical and useful, and is in commercial use. The operator is not fatigued at the end of the day's work as before, and racks do not need to have unsatisfactory blocks and their pallets manually removed from the racks as is now substantially universally required.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. In a structure as described, a carriage adapted to run upon a horizontal track, a horizontal beam suspended between its ends from said carriage for movement about vertical and horizontal axes, a vertical post secured at its upper end adjacent one end of the beam, extending downwardly therefrom, a rotary motor mounted on said beam adjacent its opposite end, a second carriage mounted on the post for up and down movements thereon, a horizontal plate connected at one end with the second carriage, through which said post passes, said plate being located underneath said beam, a flexible chain connected to said plate at the end thereof nearest the post and extending upwardly and around the end of the beam at which the post is connected and thence to said rotary motor, said chain having operative connection to said motor for winding to raise said horizontal plate or unwinding to lower it, a control lever on said motor, operation of which controls the motor in rotation in opposite directions from an intermediate static position of the motor, a frame connected wtih said beam and post including two vertical spaced frame members, one at each side of the post, a handle rotatably mounted on one of said frame members to turn about a vertical axis, and connections between said handle and the motor control lever for shifting said lever from motor static position in either direction therefrom, in one direction rotating the motor to wind said flexible chain thereon and the other to release said chain for unwinding.

2. A structure as defined in claim 1, said vertical member of the frame on which the handle is mounted having an elongated sleeve thereon to which the handle is connected, said sleeve being turnable about the axis of said vertical member of the frame, and said connections between the handle and said motor lever comprising

a rod secured at one end to the motor control lever and a vertical member secured to the upper end of said sleeve at one end, extending to and having a pivotal connection with the opposite end of said rod.

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