

Sept. 22, 1964

P. GAGNON ETAL
ELEVATOR SYSTEM

3,149,732

Filed May 7, 1962

3 Sheets-Sheet 1

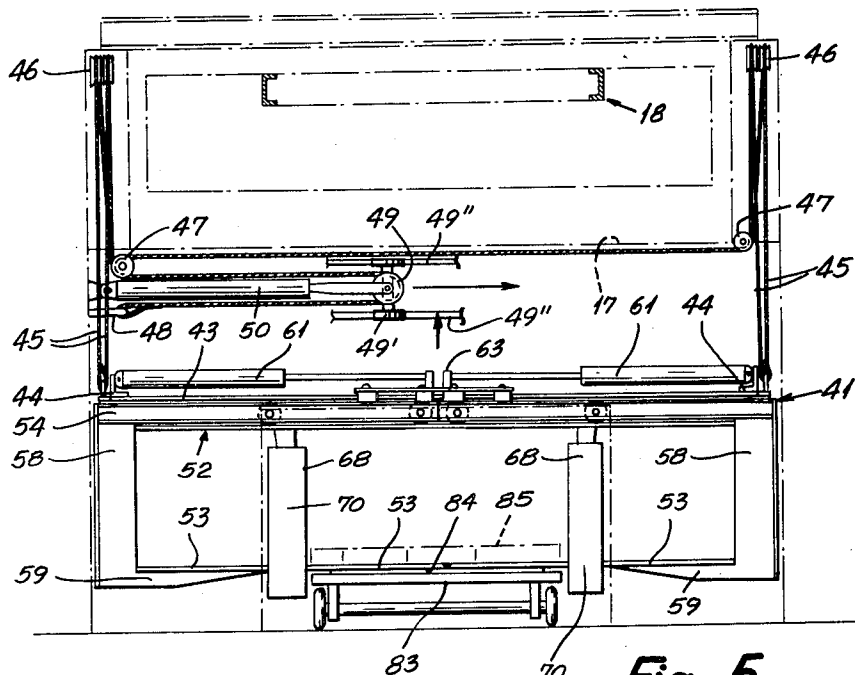


Fig. 5

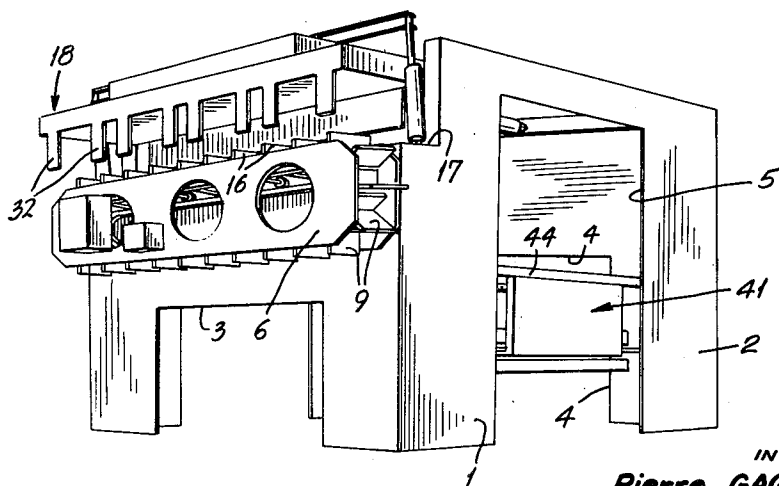


Fig. 1

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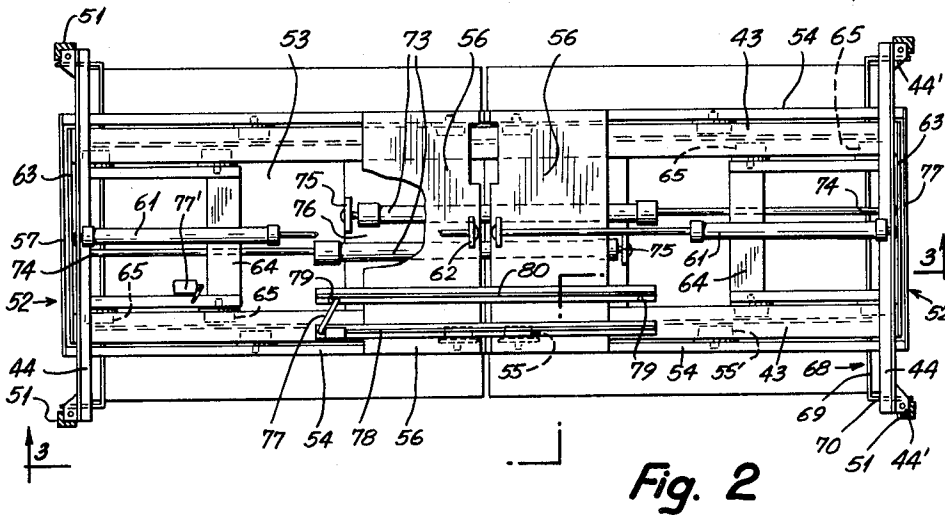
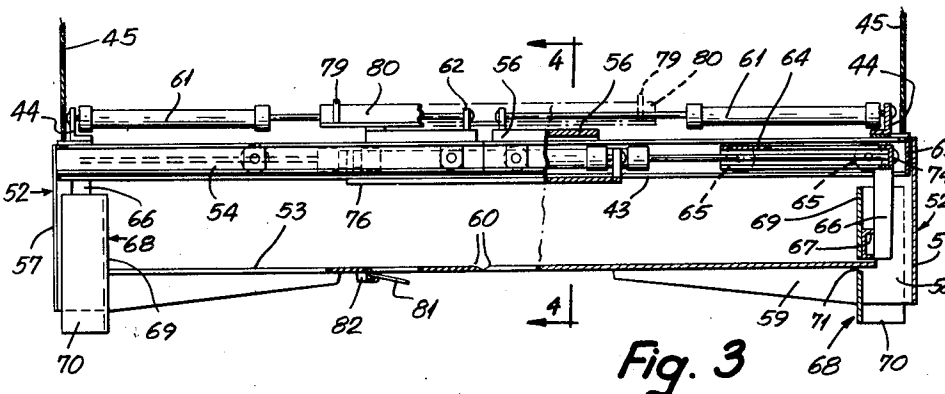
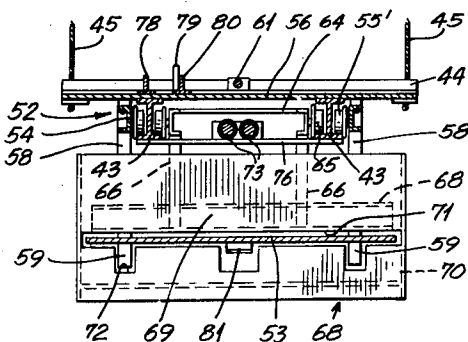
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3 Sheets-Sheet 3

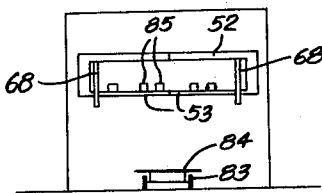


Fig. 6

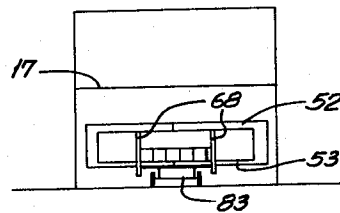


Fig. 7

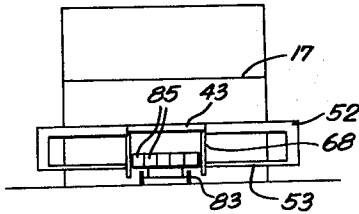


Fig. 8

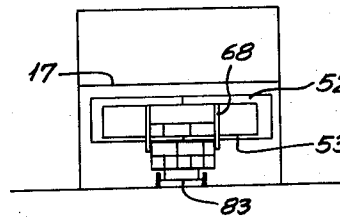


Fig. 9

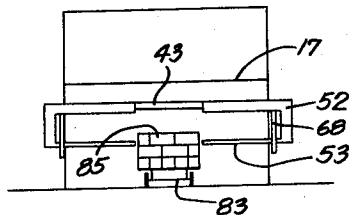
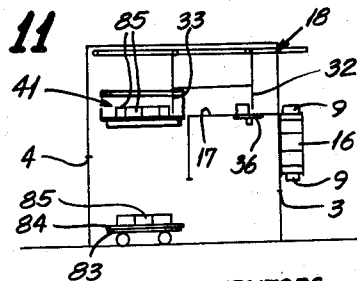


Fig. 10

Fig. 11



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ELEVATOR SYSTEM

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5 Claims. (Cl. 214—6)

The present invention relates to an elevator system more particularly designed for transferring from an upper to lower levels successive layers of block shaped objects and depositing the same on top of the other at said lower levels, in order to form a stack or cube of such objects on a pallet or the like support surface.

The elevator system in accordance with the present invention is more particularly adapted to be used in a cubing machine such as the machine described and claimed in applicants' co-pending patent application Serial No. 188,730 dated April 19, 1962, and entitled "Automatic Cuber and Method of Cubing."

The general object of the present invention resides in the provision of an elevator system of the character described which is capable of depositing block shaped objects onto an underlying support surface with a minimum of jarring or drop of said objects which is important when such objects are fragile or liable to chipping as in the case of concrete blocks.

Another important object of the present invention resides in the provision of an elevator system of the character described which incorporates pusher blades to bring spaced courses of objects together on the elevator itself and during lowering of said elevator to thereby complete the formation of a layer of objects on the elevator itself, thereby gaining much time in the cubing operation.

Another important object of the present invention resides in the provision of an elevator system of the character described in which the pusher blades act as means for aligning the superposed layers of objects in the stack or cube so as to form a cube with substantially flat side surfaces.

Another important object of the present invention resides in the provision of an elevator system of the character described which is completely automatic in operation.

The foregoing and other important objects of the present invention will become more apparent during the following disclosure and by referring to the drawings, in which:

FIGURE 1 is a perspective view of an automatic cuber incorporating the elevator system in accordance with the invention;

FIGURE 2 is a top plan view of the elevator system with part thereof cut out to show underlying elements;

FIGURE 3 is a side elevation and partial longitudinal section taken along line 3—3 of FIGURE 2;

FIGURE 4 is a cross-section taken along line 4—4 of FIGURE 3;

FIGURE 5 is a side elevation of the elevator system in its position relative to the entire cubing machine shown in end elevation;

FIGURES 6 to 10 are diagrammatic end elevations of the cubing machine similar to that of FIGURE 5 and showing different stages of the operation of the elevator system, as used in the cubing operation; and

FIGURE 11 is schematic side section of the cubing machine with the elevator in its uppermost position.

Referring now more particularly to the drawings in which like reference characters indicate like elements throughout, FIGURE 1 shows the cuber machine in which the elevator system of the present invention is more particularly used although the elevator system could be used in conjunction with other types of ma-

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chines. The cubing machine of FIGURE 1 is more clearly illustrated and described in applicants' co-pending patent application entitled "Automatic Cuber and Method of Cubing" above noted.

The cubing machine generally comprises a box-like body made of framework and platework and defining upright corner legs 1 and 2 interconnected at their top ends and defining an inlet opening 3 between legs 1, an outlet opening 4 between legs 2 and side openings 5 between legs 1 and 2 all of said openings extending down to the supporting floor. A conveyor assembly 6 comprising a closed loop of buckets 9 disposed in vertical position, is applied to the front wall of the machine. The buckets 9 are fed with a series of concrete blocks or other similar block-shaped objects in accordance with a predetermined program, such as selected buckets may be left empty, and the objects are turned sideways during movement of the buckets from a vertical to the top horizontal run of the conveyor and finally positioned at sweeping stations 16 level with and along an edge of a table 17 formed between legs 1 (see FIGURE 11).

A sweeper assembly 18 is designed to move the blocks at the sweeping stations 16 across table 17 by means of fingers 32 of the sweeper assembly and from a position on table 17 onto the elevator system in accordance with the present invention by means of pusher plate 33 of the sweeper assembly 18. The table 17 is provided with rotatable discs 36 for turning selected ones of the blocks in order to form on the elevator assembly of the present invention, a layer of concrete blocks in which some of said blocks are turned at right angles to the other blocks to obtain any desired block pattern.

The elevator assembly 41 in accordance with the present invention is mounted for vertical up and down movement within the well defined between the back edge of the table 17 and the legs 2 of the body of the machine, as shown in FIGURE 11, and also in FIGURE 1.

The elevator assembly comprises a pair of spaced parallel I-beams 43 rigidly connected at their outer ends to overlying transverse angle irons 44 which protrude laterally of the I-beams and which are provided at their outer ends with brackets 44' for connection to four suspension cables 45 which are trained on idle pulleys 46 (see FIGURE 5) at the top of the legs 2 of the body of the machine, then on idle pulleys 47 disposed underneath the level of table 17; the four cables are anchored at 48 to the body of the machine and pass over a four-sheave idle pulley 49 mounted in the forked end of the piston rod of a hydraulic cylinder and piston unit 50 which upon extension shortens the cables and raises the elevator assembly 41. Pulley 49 is guided by shoes 49' slidably engaging guide beams 49''. This mechanism is disposed underneath table 17.

The outer ends of the transverse angle irons 44 are guided in vertical guide rails 51 consisting of angle irons which form part of the frame of the body of the machine. Rails 51 are shown in FIGURE 2.

A pair of outer carriages 52 are mounted for travelling movement along I-beams 43 and support horizontal drawer plates 53 which are suspended from said carriages and extend underneath the I-beams 43; each outer carriage comprises a pair of longitudinal channel members 54 disposed on the outside of the respective I-beams and each provided with inwardly directed idle rollers 55, 55' in rolling engagement with the I-beams 43 on the outside face thereof, as clearly shown in FIGURE 4.

Each pair of channel members 54 are interconnected at their inner end portions by a web plate 56 welded thereto and passing over the I-beams 43 but free of the same. The outer ends of the channel members 54 of the outer carriage 52 are rigidly interconnected by a vertical plate 57 which overlies the ends of the I-beams but are free of any

connection thereto. Downwardly extending L-shaped arms 58 are secured to the outer ends of channel members 54 and to the inside of plate 57 and their inwardly directed horizontal tapered legs 59 support a drawer plate 53 which is rigidly secured thereto.

In the closed position of the two drawer plates 53, as shown in FIGURES 2 and 3, their inner bevelled edges 60 are in contact, at the center of the elevator assembly.

Each outer carriage 52 is movable relative to the I-beams 43 under action of a double acting hydraulic cylinder and piston unit 61, the cylinder of which is attached to the associated transverse angle iron 44 of the main frame of the elevator assembly at the center thereof, and the piston rod of which is attached by bracket 62 to the inner edge of the center portion of the web plate 56 of the associated outer carriage 52. In the closed position of the outer carriages 52, as shown in FIGURE 2, the units 61 are in their extended position; upon retraction of their piston rod, the two outer carriages 52 move outwardly of the I-beams 43 until the outer rollers 55' abut transverse end members 63 interconnecting the outer ends of the I-beams 43.

During outward movement of the carriages 52 and dependent drawer plates 53, the latter move outwardly of the machine body through side openings 5 as clearly shown in FIGURES 8 and 10. Outward movement of the drawer plates can be effected in any vertical position of the elevator assembly, as clearly shown in FIGURE 1.

A pair of inner carriages 64 are mounted for travelling movement along the I-beams 43 and are disposed inwardly of the same, each consisting of a substantially rectangular frame provided at its ends with outwardly and laterally directed idle rollers 65 in rolling engagement with the lower flanges of the I-beams 43 on the inside face of said I-beams, as clearly shown in FIGURE 4. A pair of downwardly extending depending arms 66 are secured to the outer transverse portion of each carriage 64 and are interconnected at their lower ends by a transverse channel member 67 to which is secured a pusher blade 68.

Each pusher blade 68 has a front portion 69 and right angularly directed and outwardly extending side wings 70 which extend on the outside of the associated drawer plate 53 as clearly shown in FIGURES 2 and 4. The front portion 69 extends above and below the drawer plate 53, the latter being movable with respect to the pusher blades 68 by freely passing through an elongated horizontal slot 71 made in the front portion 69 of the pusher blade. Slot 71 is further provided with downward extending notches 72 for the free passage of the tapered legs 59 of the L-shaped arms 58 which support the drawer plates 53.

Each inner carriage 64 is moved inwardly and outwardly with respect to the elevator assembly by means of a double acting hydraulic cylinder and piston unit 73, the piston rod of which is secured to the outer transverse member of the associated carriage at 74 and the cylinder of which is secured to bracket 75 in turn secured to and upstanding from a transverse horizontal plate 76 welded or otherwise secured to the underface of the I-beams 43 and extending across the same.

The two units 73 are in offset and overlapping position, clearly shown in FIGURE 2, and are disposed at the level of the I-beams 43 between the bottom plate 76 secured to said I-beams and the plates 56 secured to the channel members 54 of the outer carriages 52.

In the FIGURES 2 and 3, the pusher blades 68 are in their outermost limit position. Upon retraction of the units 63, the carriages are brought inwardly of the elevator assembly to thereby close the pusher blades 68. A suitable lever actuated limit switch 77 is mounted on bar 78 which is secured to right hand web plate 56. The lever of switch 77 is actuated when abutting end pins 79 upstanding from control bar 80 secured to left hand web plate 56. Thus switch 77 stops the outer carriages 52

in their two limit positions. Similarly a lever actuated switch 77' mounted on one of the inner carriages 64 stops these carriages in their two limit positions. A lever 81 is pivotally mounted in a slot made in one of the drawer plates 53 and upon engagement with an underlying surface raises and actuates switch 82 which stops further downward movement of the elevator assembly 41. Suitable electro-mechanical valves for admitting and discharging hydraulic fluid to the hydraulic cylinder and piston units 61 and 73 are under the control of the above noted switches and of additional switches in turn under the control of a perforated programming tape, as disclosed in the above noted co-pending patent application. Hydraulic fluid is fed to the units 61, 73 and also to the unit 50 for raising and lowering the elevator assembly by a common hydraulic pump (not shown).

The transfer elevator in accordance with the present invention is operated as follows:

A truck 83 or conveyor or an suitable movable supporting surface, preferably supporting a removable pallet 84 disposed thereon, is positioned underneath the elevator assembly at the center of the same, said trucks 83 being movable longitudinally through the machine of FIGURE 1 by entering inlet opening 3 and eventually leaving the machine through outlet opening 4. The elevator assembly 41 is raised to its uppermost level, as shown in FIGURES 6 and 11, wherein its drawer plates 53 are level with table 17 and adjacent the back edge thereof. As shown in FIGURE 6, the drawer plates 53 are in closed position, while the pusher blades 68 are in their outermost position. The elevator assembly remains at that level while blocks 85 are fed thereto in accordance with the desired pattern to form a layer of blocks, as described and claimed in the above noted co-pending patent application. Once the necessary number of blocks, arranged in the desired pattern and in spaced courses, have been transferred onto the drawer plates 53, the elevator assembly 41 starts to move downwardly while the pusher blades 68 are caused to move inwardly under action of their hydraulic units 73; they push the separate courses of blocks 85 inwardly against one another until all the blocks of the layer are in contact with one another. As soon as the levelling switch lever 81 underneath one drawer plate 53 comes in contact with the pallet 84, the elevator stops, as shown in FIGURE 7, and the drawer plates 53 move laterally outwardly, as shown in FIGURE 8, to thereby deposit the layer of blocks 85 directly onto the pallet 84. During this outward movement of the drawer plates 53, inward pressure is still applied on the blocks by means of the pusher blades 68 to maintain the same in close contact, despite outward force exerted thereon by the retracting drawer plates 53.

Once the first layer of blocks has been deposited onto the pallet 84, as shown in FIGURE 8, the elevator assembly moves upwardly and during this movement, the drawer plates 53 move inwardly while the pusher blade 68 moves outwardly whereby the elevator takes its original elevated position, shown in FIGURE 6, to receive a second layer of blocks. This second layer of blocks once completed is lowered and deposited on the first layer already on the pallet 84.

The operation is repeated until the desired number of layers of blocks are stacked onto the pallet 84.

It will be noted that the portions of the pusher blades 68 protruding downwardly underneath the drawer plates 53 abut against the layer of blocks onto which the next layer of blocks is being deposited and thus serve to properly center the layer of blocks being deposited with respect to the underlying layers of blocks whereby the completed cube will have flat side surfaces.

Once a cube is completed on the pallet 84, the truck 83 is simply moved out of the machine through outlet opening 4, and another truck 83 with a pallet 84 is positioned underneath the elevator assembly which con-

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tinues its operation to form another cube or stack of blocks.

While a preferred embodiment in accordance with the present invention has been illustrated and described, it is understood that various modifications may be resorted to without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A transfer elevator for receiving objects at a first level and discharging the same at a second lower level onto an underlying surface, comprising, in combination, vertical guide rails, a framework guided by said guide rails for up and down movement, power means for raising and lowering said framework, a pair of horizontal coplanar drawer plates mounted for horizontal movement on said framework between a closed position in which said drawer plates abut each other at their inner edge to form a substantially continuous platform, and an open retracted position in which said drawer plates are spaced from each other, a pair of pusher blades carried by said framework and disposed in proximity with and over the respective drawer plates, said pusher blades movable horizontally with respect to said framework towards and away from each other, power means to move said pusher blades and power means for horizontally moving said drawer plates between said closed and open positions.

2. A transfer elevator as claimed in claim 1, wherein said pusher blades have a first portion extending above said drawer plates, and a second portion extending below said drawer plates and having a slot through which said drawer plates freely pass, so that said second portion

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is capable of engaging the side of said underlying supporting surface.

3. A transfer elevator as claimed in claim 1, wherein said framework includes two spaced horizontally disposed parallel I-beams, a first pair of carriages in rolling engagement with said I-beams, downwardly extending arms secured to the outer ends of said carriages, and extending below said I-beams, said drawer plates being secured in horizontal position to the lower ends of the arms of the respective carriages.

4. A transfer elevator as claimed in claim 3, wherein said first pair of carriages each have members disposed laterally outwardly of said I-beams and inwardly directed rollers in engagement with the outer faces of said I-beams, said elevator further including a second pair of carriages each disposed between said I-beams and having outward lateral rollers in rolling engagement with the inner faces of said I-beams, downwardly depending arms secured to the outer ends of each of said second pair of carriages, said pusher blades being secured to said arms and extending underneath said I-beams.

5. A transfer elevator as claimed in claim 4, wherein said pusher blades have a transverse slot made therein for the free passage of the associated drawer plate, said pusher blades extending below as well as above said drawer plates.

References Cited in the file of this patent

UNITED STATES PATENTS

30	2,609,109	Ardell	Sept. 2, 1952
	2,785,818	Mercier et al.	Mar. 19, 1957
	2,832,487	Oster et al.	Apr. 29, 1958