

Dec. 8, 1964

L. S. ROARK
TILE LOADING MACHINES

3,160,295

Filed Dec. 1, 1961

5 Sheets-Sheet 1

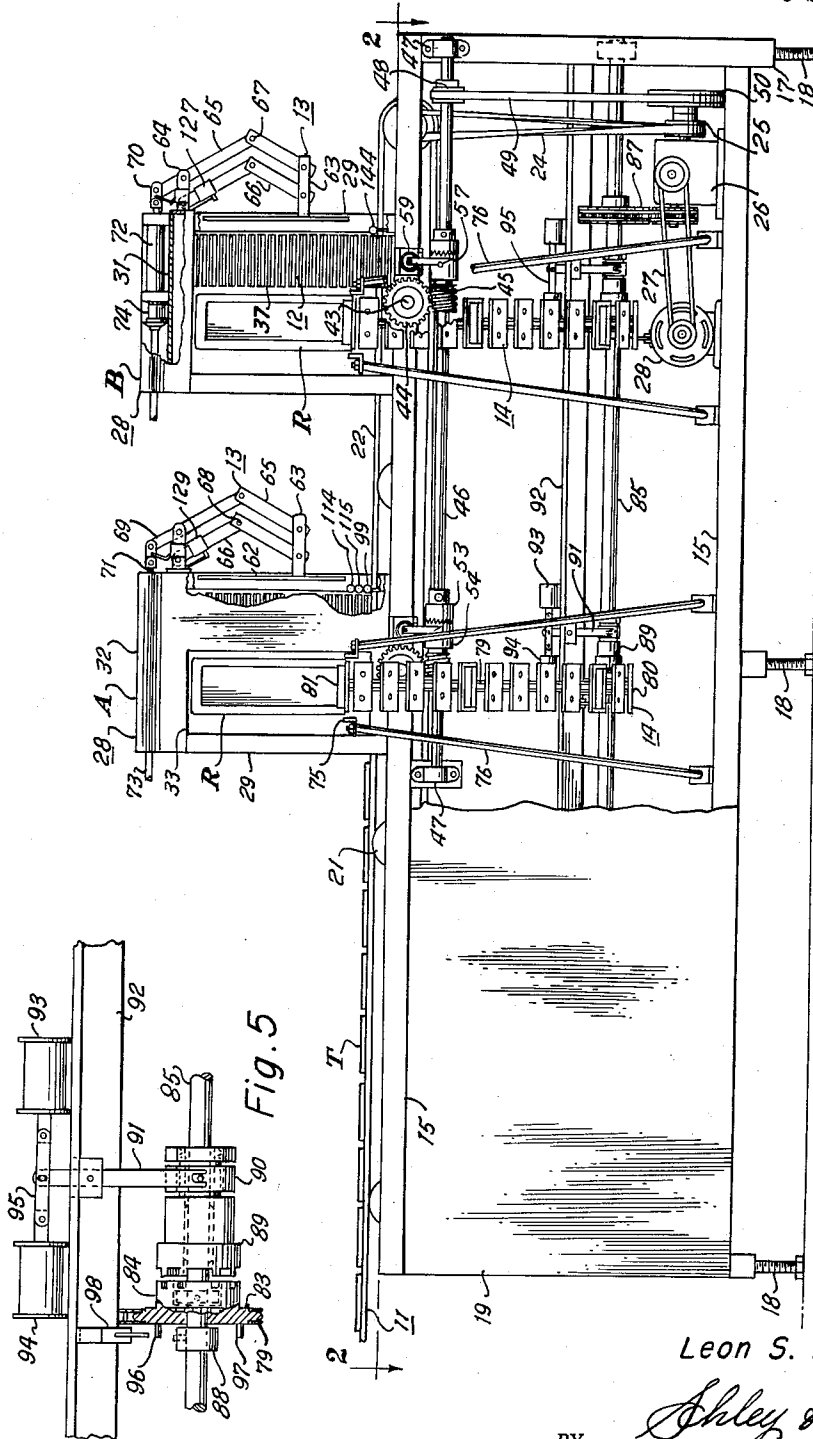


Fig. 1

Fig. 5

INVENTOR

Leon S. Roark

BY

Shley & Shley

ATTORNEYS

Dec. 8, 1964

L. S. ROARK

3,160,295

TILE LOADING MACHINES

Filed Dec. 1, 1961

5 Sheets-Sheet 2

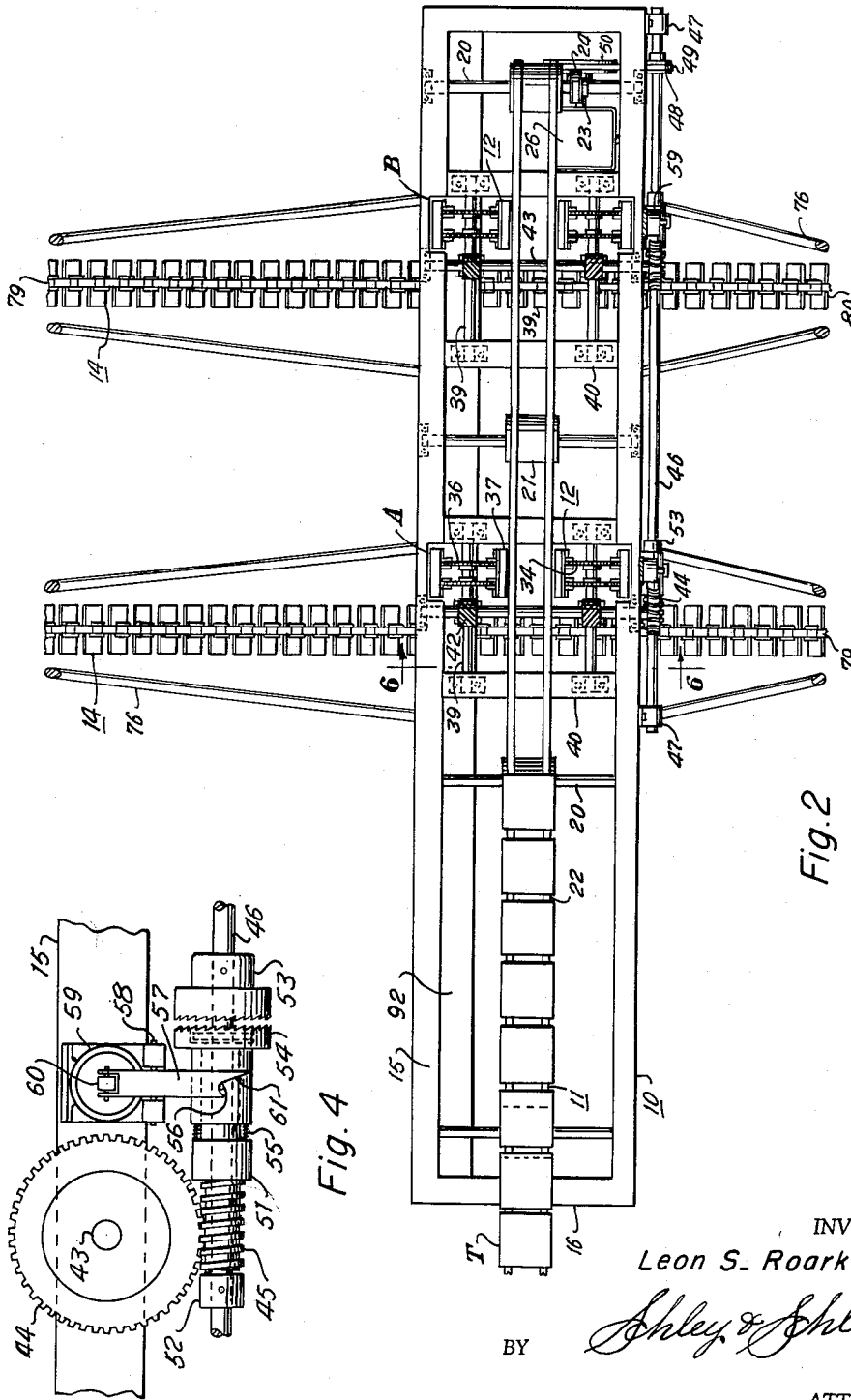


Fig. 2

Fig. 4

INVENTOR

Leon S. Roark

BY

Shley & Shley

ATTORNEYS

Dec. 8, 1964

L. S. ROARK

3,160,295

TILE LOADING MACHINES

Filed Dec. 1, 1961

5 Sheets-Sheet 3

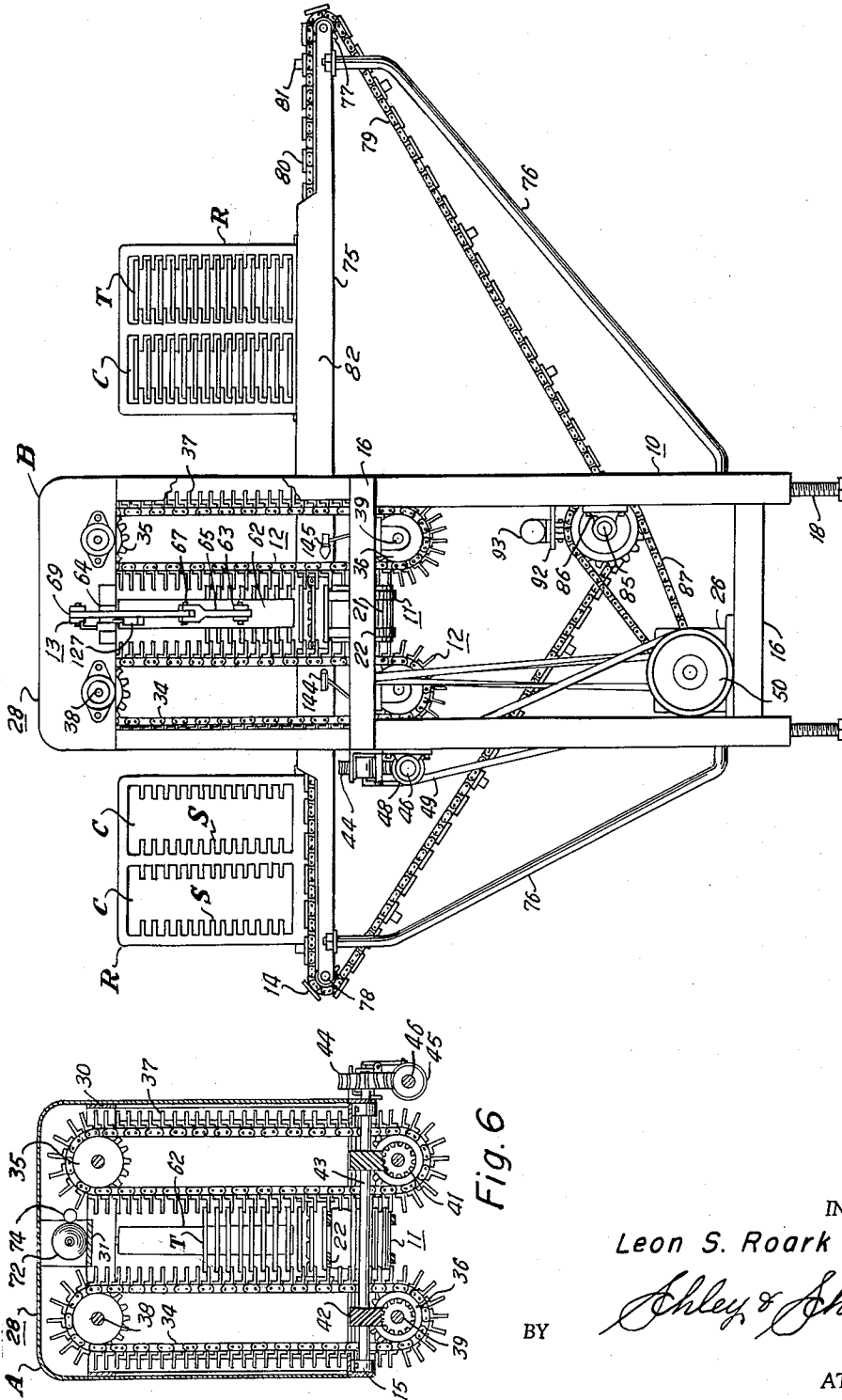


Fig. 3

Fig. 6

INVENTOR

Leon S. Roark

Shley & Shley

BY

ATTORNEYS

L. S. ROARK
TILE LOADING MACHINES

Filed Dec. 1, 1961

INVENTOR
Leon S. Roark

BY

Shley & Shley

ATTORNEYS

Dec. 8, 1964

L. S. ROARK

3,160,295

TILE LOADING MACHINES

Filed Dec. 1, 1961

5 Sheets-Sheet 5

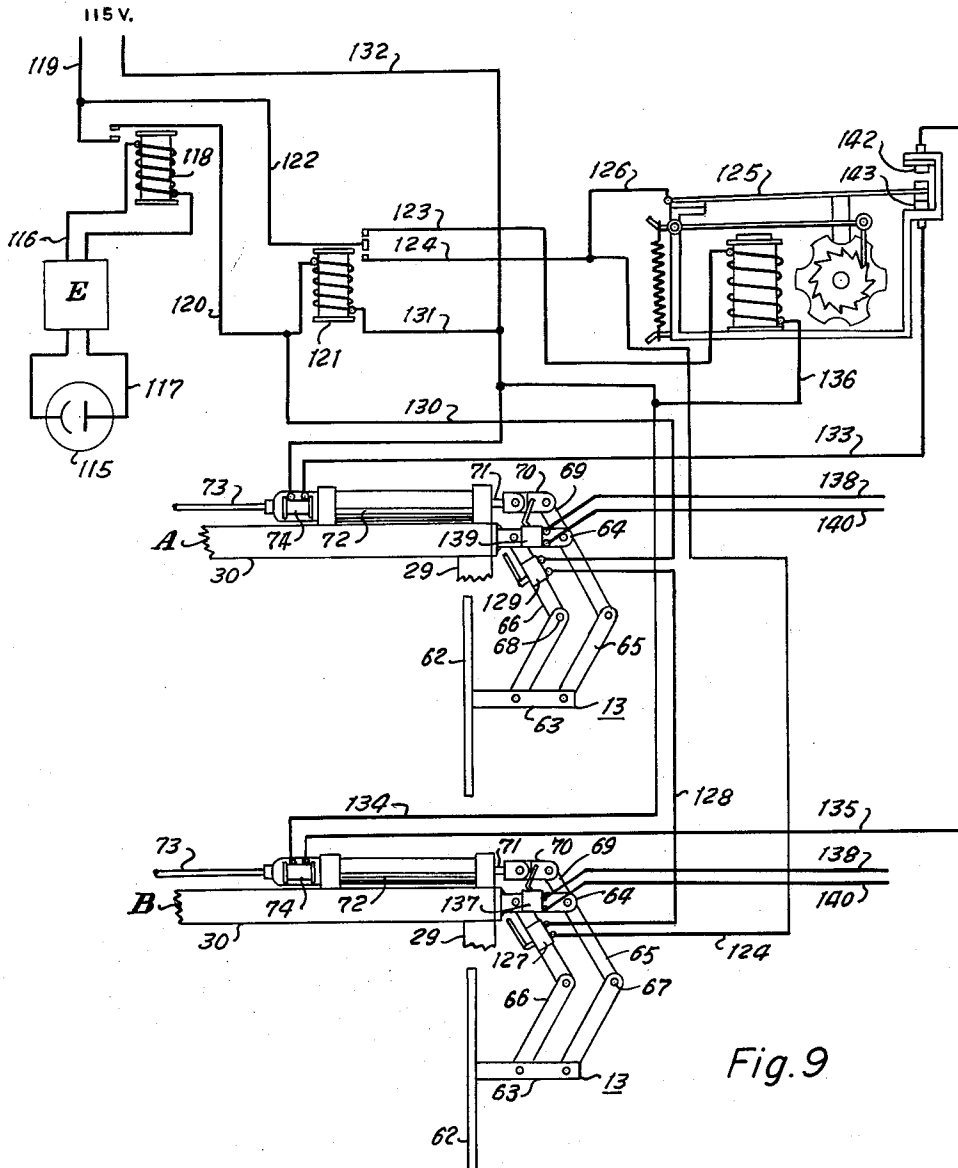


Fig. 9

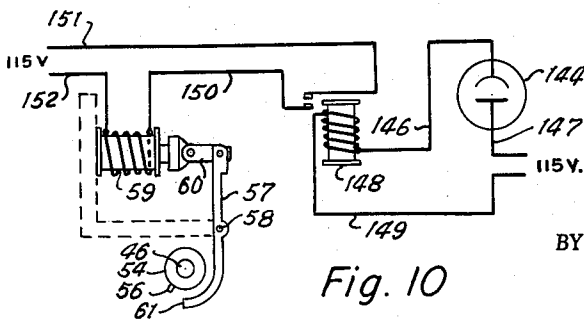


Fig. 10

INVENTOR
Leon S. Roark

BY

Shley & Shley

ATTORNEYS

1

3,160,295

TILE LOADING MACHINES

Leon S. Roark, Shreveport, La., assignor to Claiborne Sales Company of Texas, Palestine, Tex., a corporation of Texas

Filed Dec. 1, 1961, Ser. No. 156,339

4 Claims. (Cl. 214-16.6)

This invention relates to new and useful improvements in loading machines and more particularly to a machine for automatically loading ceramic bisque or greenware in racks.

One object of the invention is to provide an improved machine for automatically loading fragile articles, such as ceramic bisque or greenware, in racks whereby it is unnecessary to handle the articles and the possibility of damaging the articles is eliminated.

Another object of the invention is to provide an improved loading machine for ceramic bisque or greenware wherein the greenware is conveyed to one or more elevating stations and lifted into position for movement into racks which are conveyed transversely of each elevating station for receiving and carrying the greenware therefrom.

A further object of the invention is to provide an improved loading machine, of the character described, wherein the racks are automatically positioned in alignment with the lifting means of the elevating station and said station has pusher means for automatically transferring the greenware from said lifting means to said racks upon the elevating of a predetermined quantity of greenware.

A particular object of the invention is to provide an improved loading machine, of the character described, having a pair of elevating stations fed by a common conveyor so that greenware may be conducted to and lifted by one of the elevating stations while greenware is being transferred to a rack at the other station whereby the operation of the common conveyor is continuous and uninterrupted.

Another object of the invention is to provide an improved loading machine, of the character described, having a transverse conveyor for supporting racks above the common feed conveyor adjacent each elevating station and means for intermittently operating the transverse conveyor to position the racks relative to the lifting and pusher means of the elevating station.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, wherein an example of the invention is shown and wherein:

FIG. 1 is a side elevational view, partly in section, of a loading machine constructed in accordance with the invention,

FIG. 2 is a horizontal, cross-sectional view, taken on the line 2-2 of FIG. 1,

FIG. 3 is an end elevational view of the loading machine,

FIG. 4 is an enlarged, fragmentary view showing the drive of one of the elevating conveyors,

FIG. 5 is a view, similar to FIG. 4, showing the drive for one of the transverse conveyors,

FIG. 6 is a transverse, vertical, sectional view, taken on the line 6-6 of FIG. 2,

FIG. 7 is a simplified wiring diagram of the first elevating station circuit,

FIG. 8 is a simplified wiring diagram of one of the transverse conveyor circuits,

2

FIG. 9 is a simplified wiring diagram of the loader circuit of the elevating stations, and

FIG. 10 is a simplified wiring diagram of the second elevating station circuit.

In the drawings, the numeral 10 designates the elongate, horizontal frame of a loading machine having an endless feed conveyor 11 extending longitudinally thereof for conducting ceramic bisque or greenware, such as tile T, from a glaze sprayer (not shown) to a pair of elevating stations A and B. Each of the elevating stations includes a pair of upright, parallel, endless conveyors 12 for receiving and lifting the tile T from the feed conveyor 11 and transfer means 13 for pushing the elevated tile into the compartments C of racks R which are known in the trade as setters, compacts or kiln furniture. A horizontal, endless conveyor 14 extends transversely of the feed conveyor adjacent and to the left of each elevating station for supporting the racks R and positioning the compartments thereof in alignment with the transfer means 13 and the space between the conveyors 12 of the station. The racks are adapted to be removed from the transverse conveyors 14 and placed in a kiln (not shown) for curing the tile T. As shown in FIG. 3, each rack R may include a pair of open, upright, parallel compartments C having horizontal, spaced, side rails or shoulders S in opposed relation for supporting the tile therebetween in tiers; however, it is noted that the racks may be of different construction.

The frame 10 is rectangular and has upper and lower pairs of longitudinal members 15 and transverse, end members 16 connected to one another and to upright legs or standards 17. Suitable adjustable feet 18 are provided for supporting the legs 17 and the medial portions of the lower longitudinal members 15. If desired, the sides of the frame may be enclosed by thin plate or sheet metal 19. A plurality of horizontal shafts 20 extend transversely between and are rotatably supported by the upper longitudinal members 15 for supporting rollers 21 upon which the pair of endless, parallel belts 22 of the feed conveyor 11 ride (FIG. 2). As shown, the feed conveyor may be of greater length than the frame so as to project therefrom toward the glaze sprayer and the belts 22 extend between the adjacent, inner flights of each pair of upright conveyors 12, the over-all width of said belts being less than the width of the tile T so that the lateral edges of the tile overhang said belts. For driving the feed conveyor, a pulley 23 is mounted on the shaft 21 at the right-hand or outer end of the frame (FIG. 2) and is connected by a belt 24 to one of the drive pulleys 25 of a gear reducer 26 which has a belt and pulley drive connection 27 with a motor 28. The gear reducer 26 and motor 28 are suitably mounted on one of the lower frame members 15.

Each of the elevating stations A and B includes a superstructure 28 overlying the feed conveyor 11 and having upright corner members or bars 29 upstanding from the upper frame members 15 (FIGS. 1, 3 and 6). A horizontal, rectangular frame 30 is fastened to the upper ends of the upright bars 29 and supports a longitudinal medial bar or member 31. Preferably, the sides and top of each superstructure 28 are enclosed by thin plate or sheet metal 32 having opposed openings 33 therein for accommodating the conveyor 14 and the racks R supported thereon. Each of the upright conveyors 12 includes a pair of endless chains 34 supported by upper and lower pairs of sprockets 35 and 36 and having right angular cleats or plates 37 connected thereto and extending transversely thereof. The upper pair of sprockets 35 is mounted on a longitudinal shaft 38 supported by the frame 30 (FIG. 6) and the lower pair of sprockets 36 is mounted on a longitudinal shaft 39 which is sup-

3

ported by a pair of cross bars or members 40 extending transversely between the upper frame members 15 (FIG. 2). As shown in FIGS. 3 and 6, the distance between the lateral flanges of the cleats 37 on the inner flights of each pair of the conveyors 12 is less than the width of the tile T and the opposed cleats of said flights are in horizontal alinement for engaging and lifting the tile therebetween by its lateral edges which overhang the feed conveyor belts 22.

For imparting rotation to the lower sprockets 36 so as to drive the chains 34 of each conveyor 12, a helical gear 41 is fixed on each shaft 39 and has its teeth meshing with one of a pair of helical gears 42 carried by a shaft 43 journaled and extending transversely between the upper frame members 15 (FIGS. 2 and 6). One of the coacting gears 41 and 42 is reversed relative to the other gear so that the inner flights of each pair of conveyors travel upwardly. A worm wheel 44 is mounted on one end of the shaft 43 for meshing with one of a pair of worms 45 carried by a shaft 46, common to both elevating stations, extending longitudinally of one of the upper frame members and journaled in suitable bearings 47. As shown in FIGS. 1 and 3, the shaft 46 has a pulley 48 on one end thereof connected by an endless belt 49 to one of the drive pulleys 50 of the gear reducer 26.

Each worm 45 forms a part of a flanged clutch sleeve 51 rotatably confined on the shaft 46 between a set collar 52 and a clutch member 53 fixed on said shaft (FIG. 4). A second clutch member 54 is slidably confined on the sleeve 51 and is urged toward the first clutch member 53 by a plurality of helical springs 55 for meshing the coacting teeth of the clutch members and causing rotation of the worm 45 with the shaft 46 to drive the worm wheel 44 and its shaft 43. For holding the clutch members out of engagement, a pin 56 projects laterally from the clutch member 54 and is adapted to be engaged by a latch lever 57 which is pivotally suspended as shown at 58 from a solenoid 59 mounted on the frame member 15 adjacent and transversely of the shaft 46. The upper end of the lever 57 is pivotally attached to the outer end of the armature, which is spring-loaded, of the solenoid 59 as shown at 60 so as to pivot transversely of the clutch member 54 and longitudinally of its pin 56, the lower end of said lever being tapered as shown at 61 so that it will engage said pin as it pivots inwardly and move said clutch member out of engagement with the first clutch member 53.

The transfer means 13 of each of the elevating stations A and B includes an elongate, upright, flat pusher member or plate 62 of a width less than the distance between the angular cleats 37 of the inner flights of the upright conveyors 12 for movement therebetween to eject the tile T from between said cleats onto the rails S of the racks R supported on the transverse conveyor 14 (FIGS. 1, 3 and 6). A horizontal bar or rod 63 extends from the intermediate portion of the pusher plate 62 toward the right-hand or outer end of the frame 10 and is pivotally suspended from an overlying bracket 64, which projects horizontally from the frame 30 of the superstructure 28, by two pairs of arms or links 65 and 66. In addition to being pivoted to the bar 63 and bracket 64, each pair of arms 65 and 66 has limited pivotal connection 67 and 68, respectively, at the adjacent ends of the arms whereby the lower arms may pivot upwardly only relative to the upper arms. The corresponding arms of the pairs of arms are parallel and of the same length so that the bar is maintained in parallel relation to the bracket upon pivotal movement of said arms. An extension 69 upstands from the upper arm of the outer pair of arms 65 for pivotal connection with the piston rod 71 of a horizontal pressure fluid cylinder 72 which overlies and is supported by the medial bar 31 of the superstructure 28. Air or other fluid under pressure is supplied by a line 73 to the cylinder 72, which has a spring-pressed piston (not shown), and the admission and exhaust of the fluid is

4

controlled by a solenoid 74. Due to this arrangement, when the piston rod 71 is ejected from the cylinder, the pairs of arms 65 and 66 are pivoted clockwise about the pivot axis of the bracket 64 to swing the bar 63 and plate 62 through the space between the inner flights of the upright conveyors. Upon retraction of the piston rod, the transfer means 13 moves counterclockwise to its original position.

Each transverse conveyor 14 includes an elongate, rectangular bed or frame 75 overlying the feed conveyor 11 and extending through the opposed openings 33 of the superstructure 28 of each of the elevating stations A and B (FIGS. 1 and 3). The outer, projecting ends of the conveyor bed 75 are connected to the lower frame members 15 by suitable reinforcing rods or members 76. Sprockets 77 are mounted on shafts 78 extending transversely of the ends of the conveyor bed for supporting the upper flight of an endless chain 79 having transversely-extending, flat cleats or plates 80 and spacers 81 which support and space the racks R. Preferably, longitudinal flanges 82 upstand from the medial portion of the conveyor bed 75 to prevent lateral displacement of the racks. The lower portion of the chain 79 extends around one of a pair of sprockets 83 which form a part of a clutch member 84 journaled on a horizontal shaft 85 as shown in FIG. 5. The shaft 85 extends longitudinally of the frame 10, being journaled in bearings 86 mounted on the legs 17 of said frame, and has a chain and sprocket drive connection 87 with the gear reducer 26 (FIGS. 1 and 3). A set collar 88 on the shaft 85 confines each clutch member 84 in close proximity to one of a pair of complementary clutch member 89 which is keyed on said shaft and which has a collar 90 rotatably mounted thereon for connection with a forked lever 91 (FIG. 5). The lever 91 is pivotally suspended from a horizontal angle bar 92 extending longitudinally of the frame 10 and supporting a pair of solenoids 93 and 94. A suitable linkage 95 pivotally connects the armatures of the solenoids 93 and 94 to the upper end of the lever which projects above its pivotal connection to the angle bar 92. When the solenoid 93 is energized and the solenoid 94 is de-energized, the lever 91 is pivoted clockwise to slide the clutch member 89 into engagement with the clutch member 84 so that the sprocket 83 is rotated by the shaft 85 to drive the conveyor 14. The clutch members are disengaged and the sprocket remains stationary upon energizing of the solenoid 94 and de-energizing of solenoid 93 so as to pivot the lever counterclockwise. As will be explained, pins 96 and 97 extend laterally from the sprocket 83 for actuating a switch 98 which is suspended from the angle bar 92.

In operation, the tile T is conducted from the glaze sprayer to the first elevating station A by the feed conveyor 11. Although not shown, one of the racks R is positioned with its right-hand compartment C (FIG. 3) in alinement with the space between the inner flights of the upright conveyors 12 and with the pusher plate 62 of the transfer means 13 by operation of the transverse conveyor 14. When the first tile moves over the angular cleats 37 of the upright conveyors, it breaks the light beam to a photoelectric cell 99 mounted at the lower end of the superstructure 28 of the elevating station A (FIG. 1). The cell 99 is connected by a lead 100 to a source of electrical current and by a lead 101 to a relay 102 from which a lead 103 extends to the electrical current source (FIG. 7). It is noted that this circuit has been simplified since it is conventional. Leads 104 and 105 connect the contacts of the relay 102 to the solenoid 59 of the transverse conveyor 14 of the station A and to a lead 106 which extends from an electrical current source to one of the contacts of another relay 107. A ratchet relay 108 has one of its contacts connected to the relay 59 by a lead 109, to the electrical current source by leads 110, and to one of the contacts of the relay 107 by a lead 111. The relay 107 is connected by leads 112 and

5

113 to a second photoelectric cell 114 which is mounted adjacent the cell 99 as shown in FIG. 1 and the beam to which is broken by the movement of the tile by the feed conveyor. A conventional counter circuit or other counting means D is connected in the leads 112 and 113 between the relay 107 and cell 114 for actuating the ratchet relay 108 at predetermined intervals, such as every sixteenth tile.

The relay 102 is energized by the breaking of the beam to the cell 99 so as to energize the solenoid 59 when the contacts of the ratchet relay 108 are engaged, whereby the lever 57 is pivoted counterclockwise and disengaged from the pin 56 of the clutch member 54 to permit engagement of the latter with the clutch member 53. This connects the worm 45 to the shaft 46 for rotation therewith during one complete revolution and imparting intermittent rotation to the worm wheel 44 to drive the shaft 43 and, through the meshing gears 41 and 42, the shafts 39 upon which the lower sprockets 36 of the upright conveyors 12 are mounted (FIGS. 2-4 and 6). The intermittent travel of the upright conveyors is equal to the vertical distance between the rails S of the racks R for aligning the tile with the spaces therebetween and continues until a predetermined number of tile, such as sixteen or other number corresponding to the number of the rack rails, has been lifted. It is noted that each tile carried by the feed conveyor breaks the beam to the cell 99 for energizing the relay 59 which is de-energized when the tile is lifted or moved out of said beam. Although the beam to the cell 114 is broken by each tile, the counter circuit D between said cell and the relay 107 is such that said relay is not energized until the predetermined number of tile is lifted. The ratchet relay 108 is energized by the energization of the relay 107 to disengage the contacts of said ratchet relay and break the circuit to the solenoid 59 and prevent energization thereof by the relay 102. Due to the spring-loaded armature of the solenoid 59, the lever 57 pivots clockwise into engagement with the pin 56 of the clutch member 54 upon each de-energization of said solenoid and moves said clutch member out of engagement with the clutch member 53 to stop the travel of the upright conveyors 12.

A third photoelectric cell 115 is mounted adjacent the cells 99 and 114 and the beam thereto is broken by the movement of the tile by the feed conveyor 11. As shown in FIG. 9, leads 116 and 117 connect the cell 115 to a relay 118 from the contacts of which leads 119 and 120 extend to an electrical current source and to a holding relay 121. A conventional counter circuit or other counting means E is connected in the leads 116 and 117 between the cell 115 and relay 118 for actuating said relay at predetermined intervals, such as every sixteenth tile. The lead 119 is connected by a lead 122 to the holding relay and leads 123 and 124 extend from the contacts of said relay to a ratchet relay 125 and to a lead 126 also connected to the ratchet relay, the lead 124 extending to a normally-closed switch 127 mounted on the upper arm 66 of the transfer means 13 of the second elevating station B. A lead 128 connects the switch 127 to an identical switch 129, of the transfer means 13 of the elevating station A, from which a lead 130 extends to the lead 120. The switches 127 and 129 are adapted to be opened by engagement with the brackets 64 upon clockwise pivoting of the arms 66 and inward reciprocation of the pusher plate 62 to break the circuit to and release the holding relay 121. A lead 131 connects the holding relay to a lead 132 which extends from the electrical current source to the solenoid 74 which controls the supply of pressure fluid to the cylinder 72 of the elevating station A. The latter solenoid is connected by a lead 133 to one of the contacts 143 of the ratchet relay 125, the lead 132 and the other contact 142 of said ratchet relay being connected by leads 134 and 135 to the solenoid 74 of the elevating

6

station B, and a lead 136 extends from the lead 134 to said ratchet relay. Switches 137 and 139, connected by leads 138 and 140 to an electrical current source and ratchet relays 141 (FIG. 8), are mounted on the brackets 64 for engagement and actuation by the links 70 to energize the relays 141 upon counterclockwise pivoting of the arms 65 and 66 and outward reciprocation of the pusher plates 62. As will be explained, each ratchet relay 141 controls the energization of the solenoids 93 and 94 for engaging and disengaging the clutch members 84 and 89 of each transverse conveyor 14.

Since the ratchet relay 125 has separate contacts 142 and 143 connected to the leads 135 and 133, only one of the transfer means 13 is actuated at a time. The contact 143 of the lead 133 is shown engaged in FIG. 9 for actuating the transfer means of the elevating station A. Upon energization of the relay 118 by breaking of the beam to the cell 115, the holding relay 121 is energized so as to energize the ratchet relay and the solenoid 74 for admitting pressure fluid to the cylinder 72 and thereby actuate the transfer means 13 of the elevating station A. The circuit between the cell 115 and relay 118 is such that the relay is not energized until a predetermined number of tile, such as eight or one-half of the number lifted, are moved past the first station A by the feed conveyor 11. As has been explained, admission of pressure fluid to the cylinder causes ejection of the piston rod 71 and clockwise pivoting of the arms 65 as well as the arms 66 so as to reciprocate the pusher bar 63 and plate 62 inwardly for pushing the tile T from between the inner flights of the upright conveyors 12 into the right-hand compartment C of the rack R (FIG. 3). When the pusher plate reaches the end of its inner stroke, the switch 129 engages the bracket 64 and breaks the circuit to and releases the holding relay 121 so as to de-energize the solenoid 74 and permit the escape of pressure fluid from the cylinder 72 whereby the piston rod is retracted and pivots the arms 65 and 66 counterclockwise to impart outward reciprocation to the pusher bar and plate (FIG. 1).

Since the elevating stations A and B are spaced apart a distance equal to the length of five tile and the necessary spacing therebetween, neither station functions during the time required for the tile T to reach the upright conveyors 12 of the second station B. A photoelectric cell 144 and its actuating lamp bulb 145 are mounted at the lower end of the superstructure 28 of the elevating station B (FIG. 3) so that the light beam therebetween is broken by the tile being moved into overlying relation to the cleats 37 of the upright conveyors of said station. As shown in FIG. 10, the cell 144 is connected by leads 146 and 147 to a relay 148 and an electrical current source and a lead 149 extends between the relay and the electrical current source to complete a circuit which has been simplified for purposes of illustration. A lead 150 connects one contact of the relay 148 to the solenoid 59 of the transverse conveyor 14 of the station B and leads 151 and 152 extend from the other contact of said relay and from said solenoid to an electrical current source. The relay 148 is energized by the breaking of the beam between the cell 144 and bulb 145 so as to energize the solenoid 59 for pivoting the lever 57 counterclockwise to release the clutch member 54 and permit its engagement with the clutch member 53 whereby the worm wheel 44 and its shaft 43 are driven by the worm 45 and shaft 46 to drive the shafts 39 and lower sprockets 36 of the upright conveyors 12.

During the lifting of the tile T at the second station, as explained, the transfer means 13 of the first station is actuated. Upon retraction of the piston rod 71, the link 70 engages and actuates the switch 139 to energize the ratchet relay 141. As shown in FIG. 8, the relay 141 is similar to the relay 125 and has its contacts 153 and 154 connected by leads 156 and 157 to the solenoids 93 and 94 which engage and disengage the clutch members 84 and 89 for controlling the rotation of the sprocket 83 and

the driving of the transverse conveyor 14. A lead 157 extends from the solenoid 93 to the lead 138, which connects one contact of the switch 139 to an electrical current source, and leads 158 and 159 extend from the lead 157 to the solenoid 94 and switch 98. In addition to being connected to the relay 141, the lead 140 of the other contact of the switch 139 is connected by a lead 160 to the switch 98. Leads 160 and 161 extend from the ratchet relay to the electrical current source. When the solenoid 93 is energized and the solenoid 94 de-energized by the contact 153 of the lead 155 being engaged, the lever 91 is pivoted clockwise to engage the clutch members 84 and 89 to cause driving of the transverse conveyor 14 of the first elevating station A to move the rack R and align its left-hand compartment C with the space between the upright conveyors 12. The amount of movement is controlled by the positions of the pins 96 and 97 of the sprocket 83 which are adapted to engage and actuate the switch 98 for energizing the relay 141 and thereby engage the contact 154 of the lead 156 so as to de-energize the solenoid 93 and energize the solenoid 94 for disengaging the clutch members. Due to the construction of the racks R and the spacing therebetween, a greater movement of the transverse conveyor is required between racks than between the compartments of the same rack in order to accurately position the compartments. Accordingly, the clockwise distance between the pins 96 and 97 is greater than the clockwise distance of said pin 97 from said pin 96 and, for example, may be 202.5 degrees and 157.5 degrees, respectively.

The aforesaid movement of the transverse conveyor 14 of the elevating station A is completed during the lifting of the tile T by the upright conveyors 12 of the second station B and the lifting of tile at said station A is resumed. Upon completion of the lifting operation at the second station, the relays 118 and 121 are energized to energize the ratchet relay 125 and engage the contact 142 of the lead 135 for actuating the transfer means 13 of said second station (FIG. 9). The holding relay 121 is released by the breaking of the circuit thereto when the switch 127 engages the bracket 64 at the end of the inner stroke of the transfer means to permit outward reciprocation of said means and actuation of the switch 137 by engagement with the link 70. Although not shown, the switch 137 is connected to the solenoids 93 and 94 and switch 98 of the transverse conveyor 14 of the second station B and to a ratchet relay, identical to the relay 141, in the manner shown in FIG. 8 whereby said conveyor is driven to position another rack compartment for receiving tile lifted at said station. During the travel of the transverse conveyor of the second station, the lifting operation is completed by the first station and the tile on the feed conveyor 11 is conducted to said second station.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A machine for loading articles in racks having means for supporting a plurality of articles in superimposed relationship including
 - an endless feed conveyor for continuously advancing articles in a single line,
 - first and second upright conveyor means in alignment with and spaced longitudinally of the feed conveyor for receiving and lifting the articles therefrom,
 - means overlying said feed conveyor and adjacent each of the upright conveyor means for supporting a rack,
 - first and second means for transferring the lifted arti-

cles from each upright conveyor means to the adjacent rack,

fixed means adjacent each one of said upright conveyor means responsive to each article fed thereto by said feed conveyor for intermittently actuating each one of said conveyor means,

and second means at the first upright conveyor means responsive to the feeding thereto of a predetermined number of articles by said feed conveyor for rendering the intermittent actuating means inoperable and thereby prevent actuation of said first upright conveyor means to enable the articles to pass said first upright conveyor means and feed to the second upright conveyor means without causing operation of said first upright conveyor means.

2. A loading machine as set forth in claim 1 including third means at the first upright conveyor means responsive to the advancement by the feed conveyor of a predetermined number of articles for alternately actuating the first and second transferring means.

3. A machine for loading fragile articles in racks having means for supporting a plurality of articles in superimposed relationship including

- an endless feed conveyor for continuously advancing fragile articles in a single line with opposed edge portions of the articles projecting laterally therefrom,
- first and second elevating stations in alignment with and spaced longitudinally of the feed conveyor,

- a pair of coacting endless upright conveyors at each of the elevating stations having inner flights on opposite sides of said feed conveyor for receiving and lifting therefrom the articles by their edge portions,

- means overlying said feed conveyor at each station for supporting a rack in close proximity to the inner flights of the pair of upright conveyors of the station,

- a pusher member at each station and movable longitudinally of said feed conveyor between said inner flights of said upright conveyors for engaging and pushing a plurality of the lifted articles from said flights into the adjacent rack,

- means fixed at each station responsive to each article advanced by said feed conveyor between said inner conveyor flights of the station for intermittently actuating its upright conveyors,

- and second means at the intersection of said feed conveyor with the inner conveyor flights of the first station and responsive to the advancement by said feed conveyor of a predetermined number of articles between said inner flights for rendering the intermittent actuating means inoperable and thereby prevent actuation of said pair of upright conveyors to enable the articles to pass said inner flights and feed to the inner conveyor flights of the second station without causing operation of said upright conveyors of said first station.

4. A loading machine as set forth in claim 3 including third means at the first station adjacent the second means and responsive to the advancement by the feed conveyor of a predetermined number of articles between the inner flights of the upright pair of conveyors of said station for alternately actuating the pusher members of said first and second stations.

References Cited in the file of this patent

UNITED STATES PATENTS

1,606,477	McClelland	Nov. 9, 1926
1,779,210	Davis	Oct. 21, 1930
2,698,693	Nordquist	Jan. 4, 1955
2,936,908	Carothers	May 17, 1960