July 3, 1962 J. J. BARSKI 3,042,230

CASE LOADING APPARATUS

Filed July 21, 1960 5 Sheets-Sheet 1

Fig. 1.

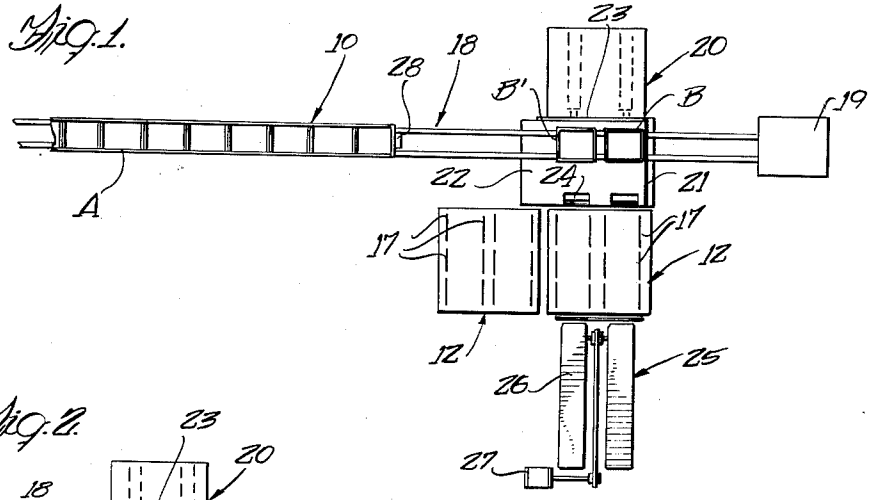


Fig. 2.

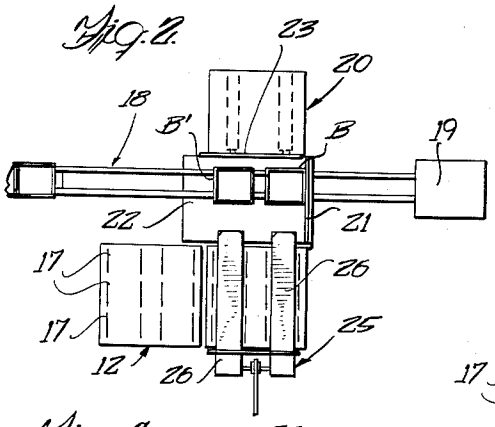


Fig. 3.

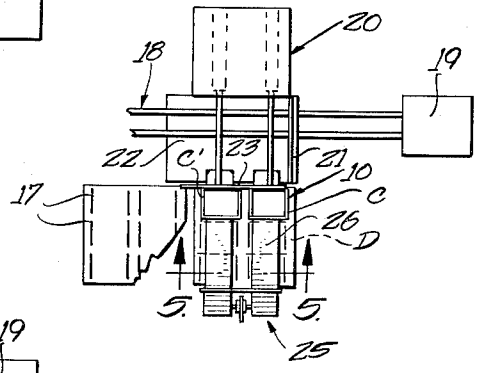


Fig. 4.

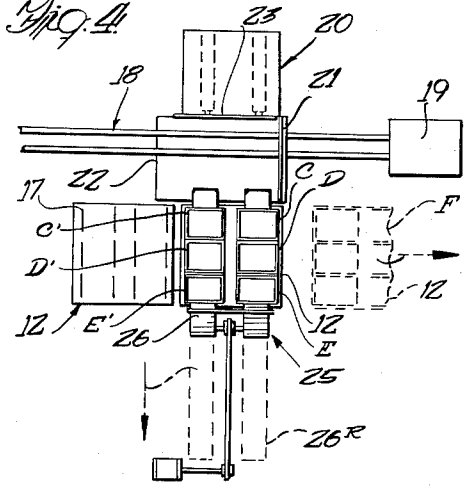
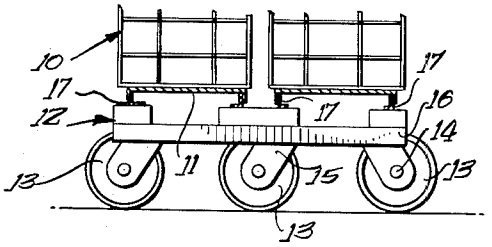


Fig. 5.



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CASE LOADING APPARATUS

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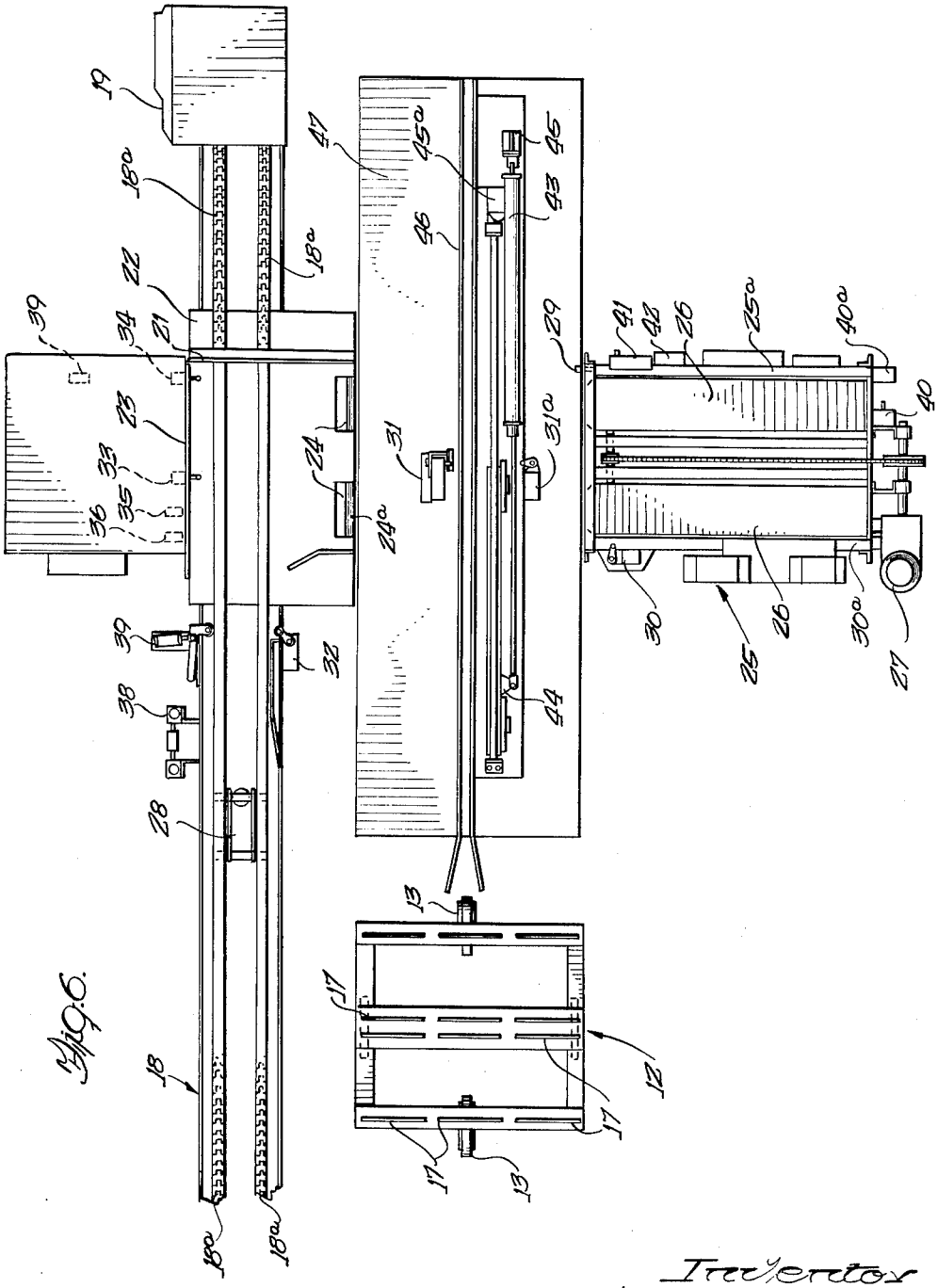


Fig. 6.

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CASE LOADING APPARATUS

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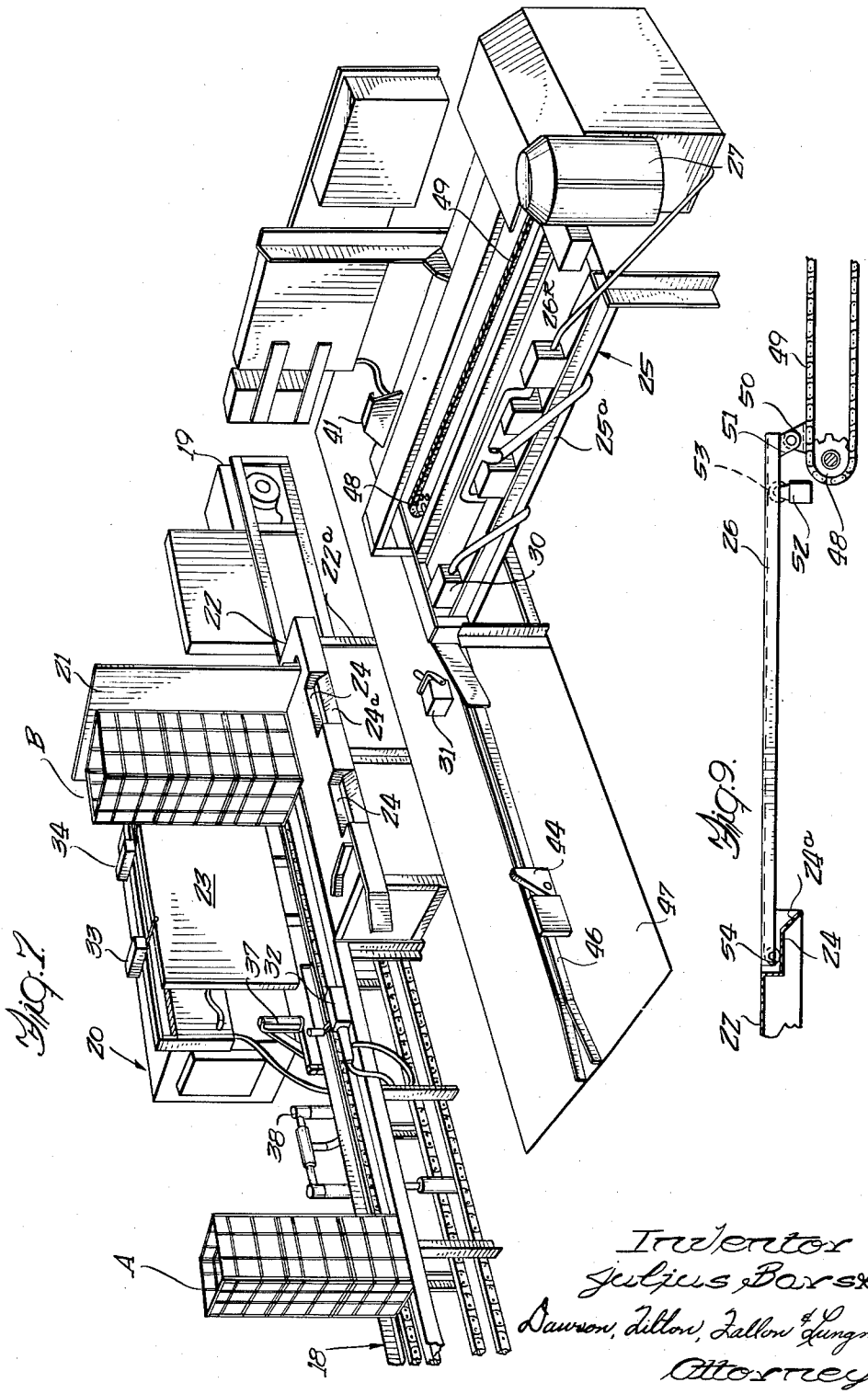


Fig. 2.

Fig. 9.

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CASE LOADING APPARATUS

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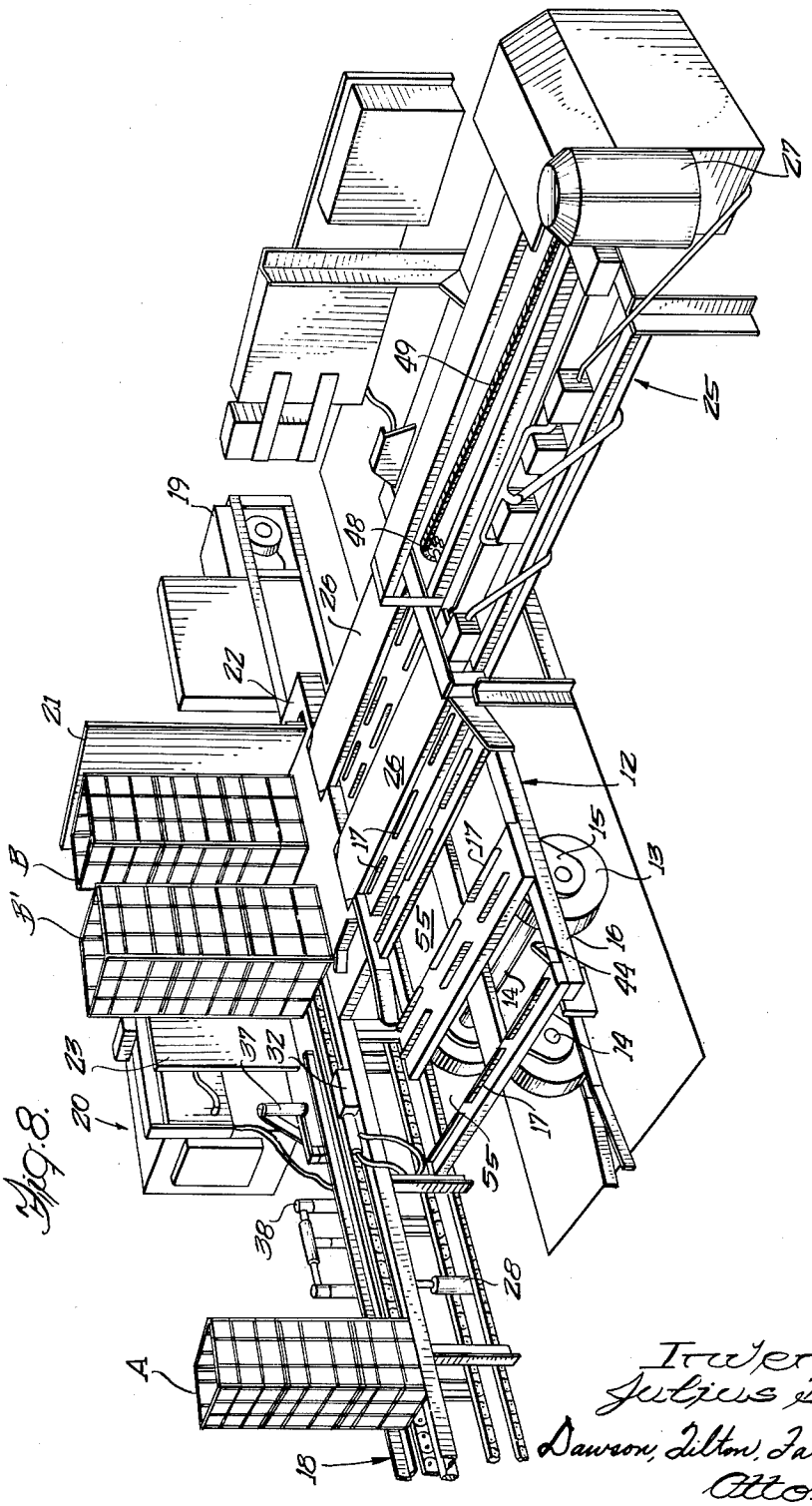


Fig. 8.

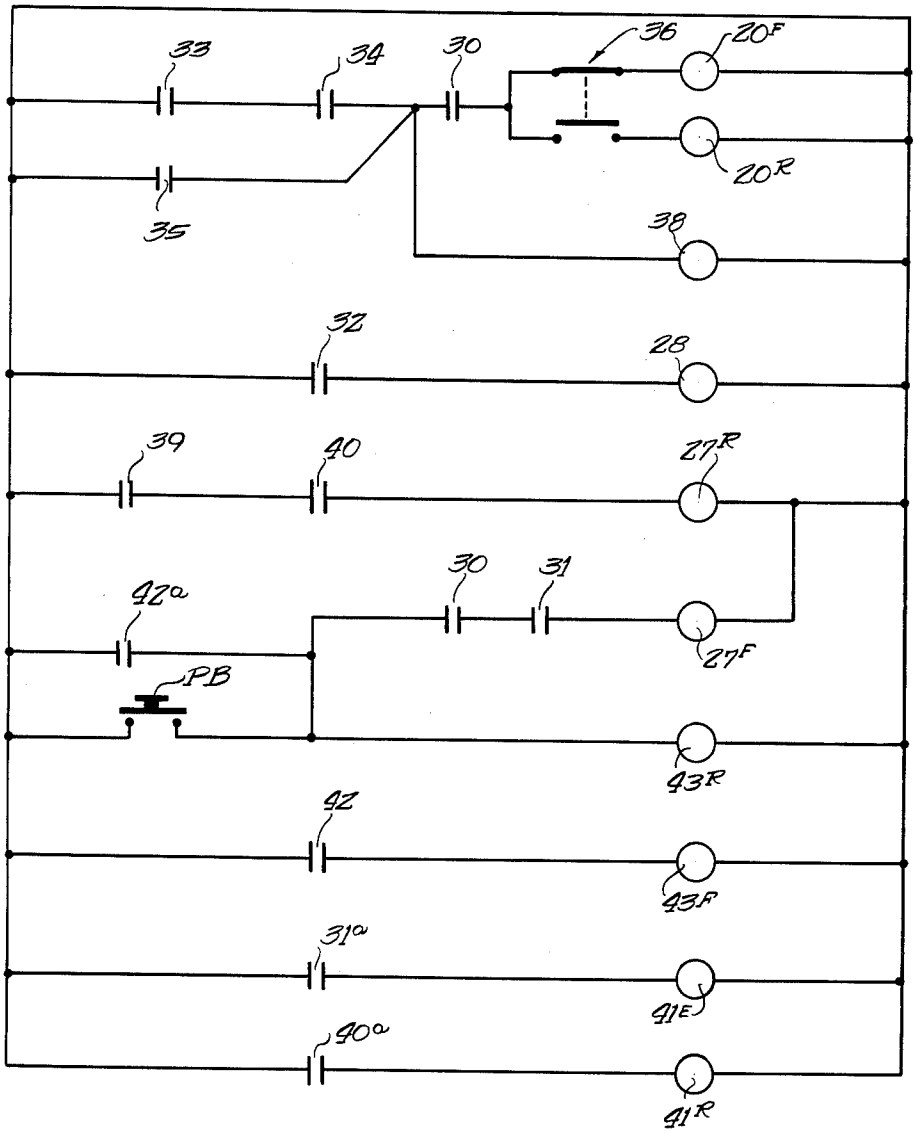
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CASE LOADING APPARATUS

Filed July 21, 1960 5 Sheets-Sheet 5

Fig. 10.



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3,042,230

CASE LOADING APPARATUS

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Filed July 21, 1960, Ser. No. 44,453
10 Claims. (Cl. 214—41)

This invention relates to case loading apparatus, and, more particularly, to apparatus suited for loading stacks of cases on dolly-like vehicles.

The invention finds particular utility in the handling of milk carton cases which are rectangular baskets constructed of metal wire and which are equipped with a depending flange on the base for nesting purposes. A dozen or more milk containers, depending upon the container size, may be received within the basket-like case.

In the course of the bottling operation, the cases are filled with cartons and then stacked for more convenient distribution. Dairies are equipped with case-stacking machines, but heretofore there has been no suitable mechanism for transferring the stacked cases from the bottling line to a vehicle for relocation. In the past, the stacks of cases were transferred to dollies which were equipped with upstanding ribs adapted to mate with the basket flanges and thus immobilize the stacks. The stacks, which may contain three or four superposed cases, must be maintained in a substantially vertical condition to prevent toppling, notwithstanding the interlocking means provided. Attempts in the past to shift stacks have resulted in substantial losses because of the instability of the stacks when they are canted.

An object of this invention is to provide apparatus for shifting stacks of cases, such as the type just described, and which avoids the problems heretofore encountered. Another object is to provide a novel system for loading dollies with stacks of cases. Still another object is to provide apparatus especially adapted to transfer containers equipped with depending flanges, whereby the same may be previously stacked in interlocked relation.

Yet another object is to provide a mechanism for the handling of stacks of milk cases, and the like, wherein the stacks are transferred from conveyor means to a vehicle without the need for canting the stacks. A further object is to provide apparatus for transporting cases equipped with rectangular positioning rings on the bottom thereof for placing the same on upstanding, rib-equipped dollies. Other objects and advantages of this invention may be seen in the details of construction and operation set forth in the specification hereof.

The invention will be explained in conjunction with an illustrative embodiment in the accompanying drawing, in which—

FIG. 1 is a fragmentary plan schematic view of a dolly-loading system embodying teachings of the invention;

FIG. 2 is a view similar to FIG. 1 but showing elements in a subsequent stage of operation;

FIGS. 3 and 4 are similar to FIG. 2 but show still later stages of the system operation;

FIG. 5 is a sectional view, taken along the line 5—5 of FIG. 3;

FIG. 6 is a fragmentary plan view of a dolly-loading system embodying teachings of the invention, and is essentially similar to FIG. 1 but in large scale and in greater detail;

FIG. 7 is a fragmentary perspective view of the apparatus of FIG. 6 with the baskets partially assembled and prior to the loading of a dolly;

FIG. 8 is a view similar to FIG. 7 but with the apparatus in another operating condition, i.e., a stage subsequent to that of FIG. 7;

FIG. 9 is a fragmentary elevational view of the case transfer mechanism portion of the apparatus; and

FIG. 10 is a wiring diagram of the dollyizer.

In the illustration given, and with particular reference to FIG. 5 of the first drawing sheet, the numeral **10** designates generally a case or wire basket adapted to receive a plurality of milk containers. As mentioned hereinbefore, each case **10** is equipped on the bottom thereof with a depending flange or ring which has a rectangular plan configuration and thus adapts cases to be stacked in interlocking relation.

Still referring to FIG. 5, the numeral **12** designates a dolly or wheeled platform vehicle for short distance transport of stacks, as from a bottling line to a delivery truck. The dolly **12** is equipped with wheels **13**, four of which are usually provided, as can be appreciated from a consideration of FIG. 8 and comparing the same with the showing in FIG. 5.

The wheels **13** are suitably mounted on axles **14** in conventional fashion, with the axles **14** in turn being carried in axle brackets **15**. The brackets **15** in turn are suitably secured to the frame **16** of the dolly **12**, again in conventional fashion. The frame of the dolly is equipped with upstanding ribs **17** (see particularly FIGS. 5 and 8), which lock with the ring **11** of the bottommost case **10** of a stack. In the illustration given, each dolly is equipped with six pairs of ribs **17**, so that the dolly is arranged for supporting six stacks aligned in two rows of three each.

Referring now to the remaining views on the first sheet of drawings, particularly FIGS. 1–4, the numeral **18** therein designates generally a conveyor. The conveyor, as also seen in FIGS. 7 and 8, is a chain conveyor having a horizontally traveling top run on which stacked cases are transported from the bottling line and, more immediately, from an upstacking apparatus. In the usual operation, milk containers are individually filled and then grouped for introduction into a case such as the basket **10**. The filled baskets **10** proceed sequentially to a case stacker, where stacks are developed in the form seen in FIGS. 7 and 8 and designated by the symbol A. Illustrative of stacking apparatus suitable for this purpose is that shown in the co-owned application of Warren Du Broff, Serial No. 741,622, filed June 12, 1958. Illustrative of the apparatus employed for filling the baskets **10** with the milk containers, is that seen in the co-owned application of Warren Du Broff, Serial No. 30,797, filed May 23, 1960.

The conveyor **18** thus may start out with individual empty cases **10** at one end and at the other end transport stacked filled cases. For the purpose of ease of understanding, the stacked cases A in FIGS. 7 and 8 are shown in the empty condition, and it will be appreciated that the inventive structure is also capable of advantageous use for such empty cases, since often it is desirable to transport empty cases in stacks from place to place within a dairy, or the like.

For the purpose of operating the conveyor **18**, a drive **19** is provided (see FIGS. 1–4, 7 and 8).

Adjacent the discharge end of the conveyor **18**, a pusher apparatus generally designated **20** is provided. The pusher apparatus **20** operates to translate the stacked cases transversely of the conveyor **18**. A more detailed description of such a pusher apparatus **20** can be found in the co-owned application of Warren Du Broff, Serial No. 792,828, filed February 12, 1959, and reference may be made to that case for additional details of construction.

Cooperatively related with the pusher **20** for orienting stacks for translation from the conveyor **18** is an abutment or stop member **21** provided as part of a platform **22**. As can be seen most clearly in FIG. 7, the platform **22** is flush with the top run of the conveyor **18** and is located on one sde thereof. For this purpose, a suitable

supporting frame 22*a* (designated only in FIG. 7) may be employed. The pusher 20 is equipped with a reciprocably mounted pusher element or ram 23 which is effective to shift stacks laterally of the conveyor 18.

The platform 22 is equipped with recesses 24 (best seen in FIG. 7) which are adapted to receive extensible fingers 26 of the transfer mechanism generally designated 25. In FIG. 7, the fingers 26 are in a retracted position, while in FIG. 8 the fingers 26 are extended to positions in which the cantilevered ends are supported in the recesses 24. It will be noted that the recesses 24 have a beveled lower lip as at 24*a* (see also FIG. 9) which is effective in positioning the finger for the transfer operation.

The numeral 27 designates a drive mechanism for the fingers 26, and the construction of this will be set forth in greater detail hereinafter. The numeral 28 (see particularly FIG. 1) designates a spacer mechanism effective to space successive stacks apart corresponding to the ultimate orientation on the dollies 12.

For the purpose of clarifying the detailed description of the invention to be set down hereinafter, a brief summary of the overall operation will now be given and relative to FIGS. 1–4. As mentioned previously, the symbol A designates case stacks such as the three-high stacks illustrated in FIGS. 7 and 8. These proceed horizontally on the conveyor 18 until they reach the position designated by the symbol B in FIG. 1. When two stacks are positioned as seen in FIG. 1, the drive mechanism 27 operates to extend the fingers 26 from the retracted position of FIG. 1 to the extended position of FIG. 2. During this operation, the two stacks, B and B', are maintained against movement by the abutment or stop 21. Thereafter, the pusher element or ram 23 is extended and the stacks are moved from the B and B' position to the positions designated by the symbols C and C' in FIG. 3. In the illustration given, each dolly 12 is adapted to receive three pairs of stacks, so that the overall operation for each dolly contemplates three successive reciprocations of the ram 23. The second reciprocation is not illustrated, but would result in shifting the two stacks of FIG. 3 to the positions indicated in dotted line and designated by the symbols B and B'. Thereafter, the reciprocation of the ram 23 in translating yet another pair of stacks results in the configuration seen in FIG. 4, where stacks are now designated by the symbols C, D and E with the other row similarly designated but for the addition of a prime. Once the stack configuration of FIG. 4 has been achieved, the fingers 26 are retracted to the dotted line position designated 26*r* in FIG. 4, and the dolly 12 is removed from the space between the platform 22 and the mechanism 25, i.e., in the direction indicated in FIG. 4 and in which a dolly 12 is seen in dashed line.

For the purpose of implementing the operational sequence just described, certain controls are employed, and these will now be described in conjunction with FIGS. 6 and 10 of the drawing.

Referring now to FIG. 6, the numeral 29 designates a stop pin or projection retractable to permit dolly removal of the character indicated in FIG. 4. The stop pin 29 is provided as part of the transfer mechanism 25 and may be a solenoid-operated element reciprocably mounted in the frame 25*a* of the mechanism 25.

At the commencement of a dolly loading operation, the first dolly 12 is positioned against the stop pin 29 and the drive mechanism 27 is energized by depressing pushbutton PB (FIG. 10) to extend the fingers 26 across the dolly into engagement with the platform 22—as seen in FIG. 8. The depression of temporary pushbutton PB energizes coil 27F of motor 87 to move fingers 27 forwardly. The extension of the fingers 26 is effective to operate the double contact limit switch 30 (see FIG. 6) by virtue of engagement thereof by the projection 30*a* on one of the fingers 26. The limit switch 30 is electrically interconnected with the pusher mechanism 20 so as to energize the latter while deenergizing coil 27F. Thus, the pusher mechanism 20, particularly the ram 23, can only operate when the fingers 26 are extended. Still further, a normally open (N.O.) limit switch 31 is provided in the path of a dolly to be loaded, and is engaged by a portion thereof (not shown). The limit switch 31 is electrically interconnected with the switch 30 and the drive mechanism 27 (see FIG. 10) so that the fingers can only be extended when a dolly is effectively energizing the limit switch 31.

Each stack A proceeding along the conveyor 18 passes a limit switch 32 mounted on the frame of conveyor 18 which engages the bottommost case and is effective to actuate the stack spacer or stop mechanism 28. As will be appreciated from FIG. 6, the conveyor 18 includes longitudinally-extending, spaced-apart chains 18*a*, so that the spacer stop mechanism 28 is adapted to extend upwardly between the spaced chains 18*a*. Thus, the operation of the spacer mechanism 28 converts the stacks from the abutting relation designated A in FIG. 1 to the spaced relation designated B and B' in FIG. 1.

Two microswitches 33 and 34 (see FIGS. 6 and 7) are provided over the pusher plate or ram 23 for engagement by the stacks proceeding along the conveyor 18. These microswitches are electrically connected in series and are normally open.

When the first stack (B) enters the portion of the conveyor 18 aligned with the pusher mechanism 20, it closes the microswitch 34. The second stack (B') engages the microswitch, and when both microswitches are closed, an electrical signal is delivered to the pusher mechanism 20 to advance the ram 23 and translate the stacks B and B' onto the platform 22 and while the conveyor is operating. Contact of switches 33 and 34 engages the air stop solenoid 38 and maintains contact until the ram 23 returns. When the stacks B and B' move away from the microswitches 33 and 34, a take-over switch 35 on the pusher mechanism 20 is engaged by the moving ram 23, and this switch 35 is held in contact for the entire stroke, thereby providing power for the mechanism 20 notwithstanding the fact that the microswitches 33 and 34 are now open.

The ram continues to advance sufficiently to move the stacks B and B' to the positions C and C' of FIG. 3, whereupon a reversal of stroke occurs and the ram 23 returns to its retracted position. The reversal may be effected through the engagement of a direction switch 36 provided in the mechanism 20 by the ram 23. The switch 36 thus effectively serves as an adjustable trigger and can be adjusted to regulate the stroke of forward travel, as might be desirable when different sized cases are to be transferred. As seen from FIG. 10, switch 36 is effective to direct current to either coil 20F or 20R of the motor (not shown) associated with the pusher 20.

Meanwhile, the movement of stacks A on the conveyor 18 is impeded by a stop mechanism 37 which is moved to the position shown in FIG. 6 by the initial dual energization of microswitches 33 and 34. The stop mechanism 17 is maintained in the hold-back position by means of the solenoid 38 until the ram 23 returns to its retracted position, whereupon the solenoid 38 is deenergized and the stop mechanism 37 is retracted to permit further advancement of stacks into alignment with the pusher mechanism 20. As the ram 23 returns, it trips a star wheel (not shown). On the third return trip of the ram 23, the star wheel operates a microswitch 39 that energizes coil 27R of the drive mechanism 27 to retract the fingers 26. As the fingers 26 complete their retraction stroke, they contact a limit switch 40 which stops the drive mechanism 27 and also retracts the stop pin 29 via the operation of a solenoid 41. Solenoid 41 is represented by elements 41E and 41R in FIG. 10, corresponding to the dual operation of the solenoid in extending and retracting the stop pin 29. The portion 41E is only energizable when limit switch 31*a* is closed while the portion 41R is supplied current through limit switch 40*a*. The operation of the solenoid 41 in this fashion

is also effective to mechanically energize a limit switch 42 which opens a valve (not shown) to deliver air to an air cylinder 43 via solenoid valve 43F. The air cylinder thereupon operates to pull the loaded dolly 12 out from between the mechanism 25 and the platform 22 and simultaneously serves to bring a subsequent dolly into a loading position. Solenoid 43R is initially activated by the depression of pushbutton PB and subsequently by current flowing through swtich 42*a*, energized by the piston rod of cylinder 43.

Referring now to FIG. 8, it will be seen that an axle 14 of an unloaded dolly is engaged by a dog 44 of the air cylinder 43, and that upon energization of the cylinder 43, which may be suitably anchored to the floor as at 45, the dolly to be loaded moves into the loading position and simultaneously pushes the loaded dolly away from the loading position. As seen in FIG. 6, the dollies may be guided by means of a track 46 anchored to a floor pad 47 which also supports the switch 31.

In FIG. 9, the finger portion of the transfer mechanism 25 can be seen. The frame 25*a* (see FIG. 7) rotatably supports a sprocket 48, over which is entrained a chain 49. A lug 50 is secured to the chain 49 and is pivotally secured to a depending lug 51 on each of the fingers 26. Thus, by movement of the chain through rotation of the sprocket 48, the fingers 26 are reciprocated. The chain 49 is driven by a sprocket (not shown) at the far end of the mechanism 25, i.e., at the end associated with the drive mechanism 27 which may include a motor, speed reducer, etc. The frame 25*a* also provides a pedestal 52 for each finger 26, upon which is rotatably mounted a roller bearing 53. The finger 26 may be provided wtih a longitudinally-extending recess for the receipt of the bearing wheel 53 so as to effectively support each finger 26 in cantilever fashion when the finger is extended across a dolly 12 and toward the platform 22. The cantilevered end of each finger 26 is equipped with a roller 54 which engages the recess 24, first climbing the inclined or beveled portion 24*a*.

Upon retraction of the fingers 26, the finger is first translated horizontally a short distance until the roller 54 reaches the inclined portion 24*a*. During this short travel of the fingers, which for all intents and purposes can be minimal, the stacks are supported thereon and are translated into the proper positions over the dolly 12. If desired, the recess 24 need only consist of the inclined portion 24*a*, or still further, the initial movement of the fingers upon retraction can be vertical. As the roller 54 proceeds down the incline 24*a*, the stacks are moved vertically downward into positions on the dollies, with the simultaneous cessation of horizontal movement. Thereafter, the fingers are positioned between the rows of ribs on the dollies 12, the open spaces being designated by the numeral 55 in FIG. 8, which permits their retraction without interfering with the seating of the stacks of cases on the dollies 12.

While, in the foregoing specification, I have set forth a detailed description of an embodiment of the invention for the purpose of illustration, many variations in the details herein given may be made by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. In dolly loading apparatus, a horizontally traveling conveyor, a frame beside said conveyor providing a platform, abutment means on said frame positioned above said conveyor, pusher means beside said conveyor adapted to translate onto said platform articles stopped on said conveyor by said abutment means, and a transfer mechanism aligned with said platform and pusher means and spaced therefrom, said mechanism being equipped with an extensible, cantilvered element and means for reciprocating the same relative to said platform to receive articles therefrom and deposit the same on a dolly interposed between said mechanism and platform, said platform being equipped with inclined recess means for supporting the cantilevered end of said element at the elevation of said platform.

2. In combination, a continuously moving conveyor having a top run adapted to horizontally transport stacked, interlocked cases, a frame adjacent said conveyor providing a platform horizontally aligned with said top run on one side thereof so as to receive said cases when the same are moved laterally of said conveyor and without change in case elevation, a subframe on said frame extending across said conveyor to retard the advancement of cases on said moving conveyor, a ram frame positioned on the other side of said top run, a ram movably mounted on said ram frame, means on said ram frame coupled to said ram for moving the same across said top run to move a stack of cases retarded by said subframe to said platform, a dolly positioned adjacent said platform, said dolly having spaced case-engaging ribs extending upwardly therefrom, and a transfer mechanism positioned beside said dolly and equipped with fingers extensible across said dolly between said ribs into contacting engagement with said platform, said platform being equipped with finger-supporting recesses aligned with said fingers and adapted to support said fingers with the finger top surfaces above said ribs, means in said mechanism for moving said fingers, said fingers when retracted from said recesses being supportable on said dolly with the finger top surfaces below said ribs.

3. In combination, a continuously moving conveyor having a top run adapted to horizontally transport stacked, interlocked cases, a frame adjacent said conveyor providing a platform horizontally aligned with said top run on one side thereof so as to receive said cases when the same are moved laterally of said conveyor and without change in case elevation, a subframe on said frame extending across said conveyor to retard the advancement of cases on said moving conveyor, a ram frame positioned on the other side of said top run, a ram movably mounted on said ram frame, means on said ram frame coupled to said ram for moving the same across said top run to move a stack of cases retarded by said subframe to said platform, switch means on said ram frame actuatable by spaced-apart case stacks for energizing said ram-moving means, a dolly positioned adjacent said platform, said dolly having spaced case-engaging ribs extending upwardly therefrom and a transfer mechanism positioned beside said dolly and equipped with fingers extensible across said dolly between said ribs into contacting engagement with said platform, said platform being equipped with finger-supporting recesses aligned with said fingers and adapted to support said fingers with the finger top surfaces above said ribs, means in said mechanism for moving said fingers, said fingers when retracted from said recesses being supportable on said dolly with the finger top surfaces below said ribs, and stop means on said conveyor responsive to the actuation of said ram frame switch means for retarding cases on said conveyor from advancing into positions of alignment with said ram.

4. In combination, a continuously moving conveyor having a top run adapted to horizontally transport stacked, interlocked cases, a frame adjacent said conveyor providing a platform horizontally aligned with said top run on one side thereof so as to receive said cases when the same are moved laterally of said conveyor and without change in case elevation, a subframe on said frame extending across said conveyor to retard the advancement of cases on said moving conveyor, a ram frame positioned on the other side of said top run, a ram movably mounted on said ram frame, means on said ram frame coupled to said ram for moving the same across said top run to move a stack of cases retarded by said subframe to said platform, switch means on said ram frame actuatable by spaced-apart case stacks for energizing said ram-moving means, a dolly positioned adjacent said platform, said dolly having spaced case-engaging ribs extending up-

wardly therefrom, a transfer mechanism positioned beside said dolly and equipped with fingers extensible across said dolly between said ribs into contacting engagement with said platform, said platform being equipped with finger-supporting recesses aligned with said fingers and adapted to support said fingers with the finger top surfaces above said ribs, means in said mechanism for moving said fingers, said fingers when retracted from said recesses being supportable on said dolly with the finger top surfaces below said ribs, and switch means on said mechanism responsive to the extension of said fingers and cooperating with the ram frame switch means in energizing said ram-moving means.

5. In combination, a continuously moving conveyor having a top run adapted to horizontally transport stacked, interlocked cases, a frame adjacent said conveyor providing a platform horizontally aligned with said top run on one side thereof so as to receive said cases when the same are moved laterally of said conveyor and without change in case elevation, a subframe on said frame extending across said conveyor to retard the advancement of cases on said moving conveyor, a ram frame positioned on the other side of said top run, a ram movably mounted on said ram frame, means on said ram frame coupled to said ram for moving the same across said top run to move a stack of cases retarded by said subframe to said platform, switch means on said ram frame actuatable by spaced-apart case stacks for energizing said ram-moving means, a dolly positioned adjacent said platform, said dolly having spaced case-engaging ribs extending upwardly therefrom, a transfer mechanism positioned beside said dolly and equipped with fingers extensible across said dolly between said ribs into contacting engagement with said platform, said platform being equipped with finger-supporting recesses aligned with said fingers and adapted to support said fingers with the finger top surfaces above said ribs, means in said mechanism for moving said fingers, said fingers when retracted from said recesses being supportable on said dolly with the finger top surfaces below said ribs, switch means on said mechanism responsive to the extension of said fingers and cooperating with the ram frame switch means in energizing said ram-moving means, and switch means interposed between said mechanism and platform responsive to the positioning of a dolly thereagainst for energizing said finger-moving means.

6. In combination, a continuously moving conveyor having a top run adapted to horizontally transport stacked, interlocked cases, a frame adjacent said conveyor providing a platform horizontally aligned with said top run on one side thereof so as to receive said cases when the same are moved laterally of said conveyor and without change in case elevation, a subframe on said frame extending across said conveyor to retard the advancement of cases on said moving conveyor, a ram frame positioned on the other side of said top run, a ram movably mounted on said ram frame, means on said ram frame coupled to said ram for moving the same across said top run to move a stack of cases retarded by said subframe to said platform, a dolly positioned adjacent said platform, said dolly having spaced case-engaging ribs extending upwardly therefrom, and a transfer mechanism positioned beside said dolly and equipped with fingers extensible across said dolly between said ribs into contacting engagement with said platform, said platform being equipped with finger-supporting recesses aligned with said fingers and adapted to support said fingers with the finger top surfaces above said ribs, means in said mechanism for moving said fingers, said fingers when retracted from said recesses being supportable on said dolly with the finger top surfaces below said ribs, said finger-moving means including a chain and sprocket system, one end of each finger being coupled to said chain, and bearing means on said mechanism for supporting said fingers at spaced distances from the point of chain coupling.

7. In combination, a continuously moving conveyor having a top run adapted to horizontally transport stacked, interlocked cases, a frame adjacent said conveyor providing a platform horizontally aligned with said top run on one side thereof so as to receive said cases when the same are moved laterally of said conveyor and without change in case elevation, a subframe on said frame extending across said conveyor to retard the advancement of cases on said moving conveyor, a ram frame positioned on the other side of said top run, a ram movably mounted on said ram frame, means on said ram frame coupled to said ram for moving the same across said top run to move a stack of cases retarded by said subframe to said platform, a dolly positioned adjacent said platform, said dolly having spaced case-engaging ribs extending upwardly therefrom, and a transfer mechanism positioned beside said dolly and equipped with fingers extensible across said dolly between said ribs into contacting engagement with said platform, said platform being equipped with finger-supporting recesses aligned with said fingers and adapted to support said fingers with the finger top surfaces above said ribs, means in said mechanism for moving said fingers, said fingers when retracted from said recesses being supportable on said dolly with the finger top surfaces below said ribs, said finger-moving means including a chain and sprocket system, one end of each finger being coupled to said chain, and bearing means on said mechanism for supporting said fingers at spaced distances from the point of chain coupling, said bearing means including roller bearing means on said mechanism and a longitudinally-extending, roller-receiving recess in each finger.

8. In combination, a continuously moving conveyor having a top run adapted to horizontally transport stacked, interlocked cases, a frame adjacent said conveyor providing a platform horizontally aligned with said top run on one side thereof so as to receive said cases when the same are moved laterally of said conveyor and without change in case elevation, a subframe on said frame extending across said conveyor to retard the advancement of cases on said moving conveyor, a ram frame positioned on the other side of said top run, a ram movably mounted on said ram frame, means on said ram frame coupled to said ram for moving the same across said top run to move a stack of cases retarded by said subframe to said platform, a dolly positioned adjacent said platform, said dolly having spaced case-engaging ribs extending upwardly therefrom, and a transfer mechanism positioned beside said dolly and equipped with fingers extensible across said dolly between said ribs into contacting engagement with said platform, said platform being equipped with finger-supporting recesses aligned with said fingers and adapted to support said fingers with the finger top surfaces above said ribs, means in said mechanism for moving said fingers, said fingers when retracted from said recesses being supportable on said dolly with the finger top surfaces below said ribs, and means between said mechanism and platform for sequentially moving dollies into position for receiving cases supported on said fingers.

9. In combination, a platform, means for sequentially delivering stacked cases to said platform, pusher means adjacent said platform adapted to move stacked cases horizontally from said platform, a dolly movable into a position adjacent said platform to receive cases shifted from said platform by said pusher means, a transfer mechanism adjacent said dolly on the side thereof remote from said platform, said transfer mechanism including an extensible finger adapted to support a plurality of case stacks, means on said transfer mechanism for reciprocating said finger, and a recess in said platform into which said finger is movable in its extended position, said recess having a downwardly and outwardly inclined lip portion.

10. The structure of claim 9 in which chain means interconnects one end of said finger with the means for re-

ciprocating the same, whereby said finger is adapted to be supported in cantilever fashion on said mechanism.

References Cited in the file of this patent

UNITED STATES PATENTS

894,392 Prosser et al. ---------- July 28, 1908
1,142,025 Christoe ---------- June 8, 1915
1,559,591 Weaver et al. ---------- Nov. 3, 1925
1,764,153 Cramer ---------- June 17, 1930
1,811,593 Peterson ---------- June 23, 1931
2,627,959 Seward ---------- Feb. 10, 1953