Jan. 12, 1971 A. P. REVICKI 3,553,929

RETRACTING CARRIAGE MECHANISM

Filed Dec. 13, 1968 2 Sheets-Sheet 1

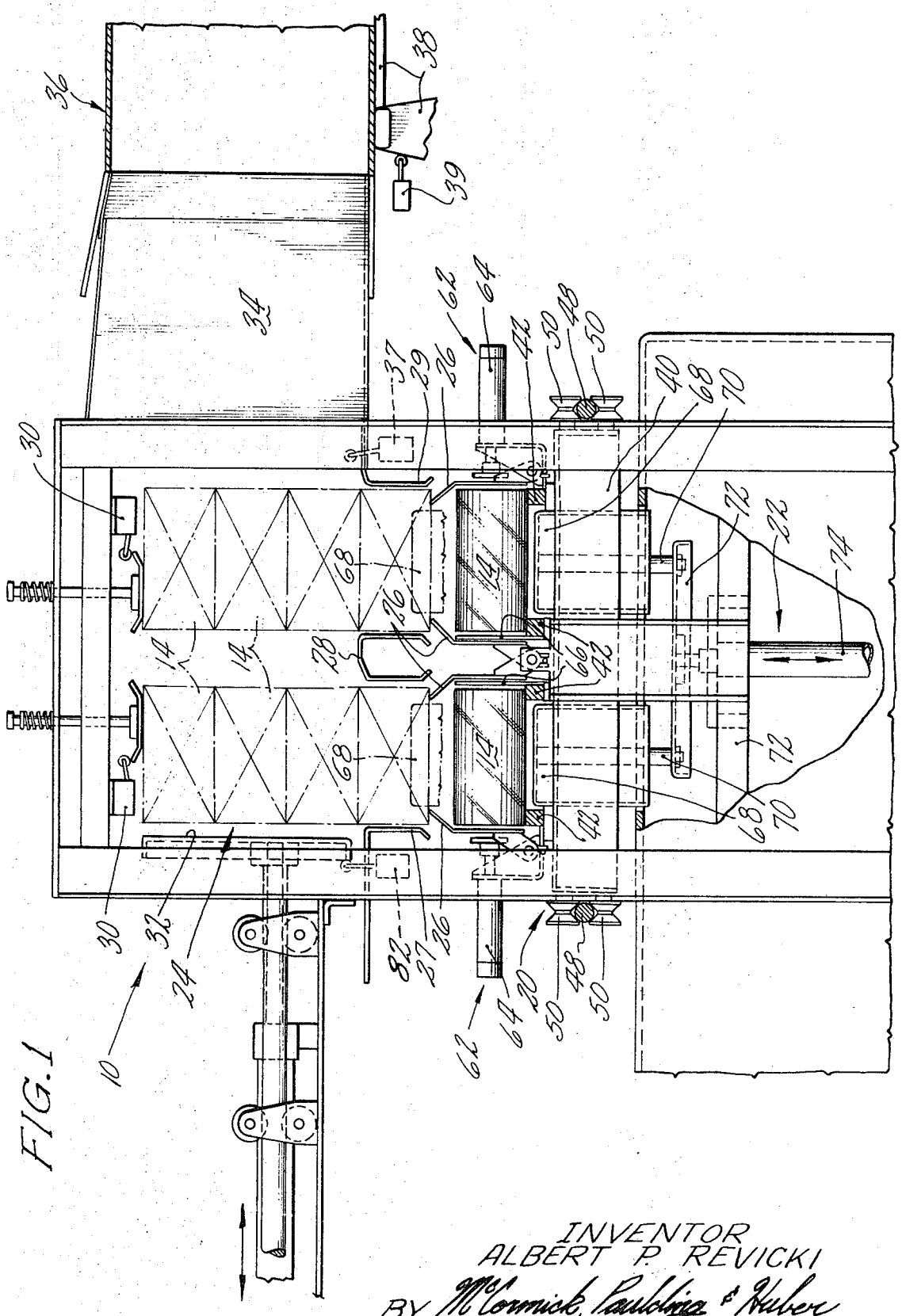


FIG. 1

INVENTOR
ALBERT P. REVICKI
BY McCormick, Paulding & Huber
ATTORNEYS

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FIG. 3

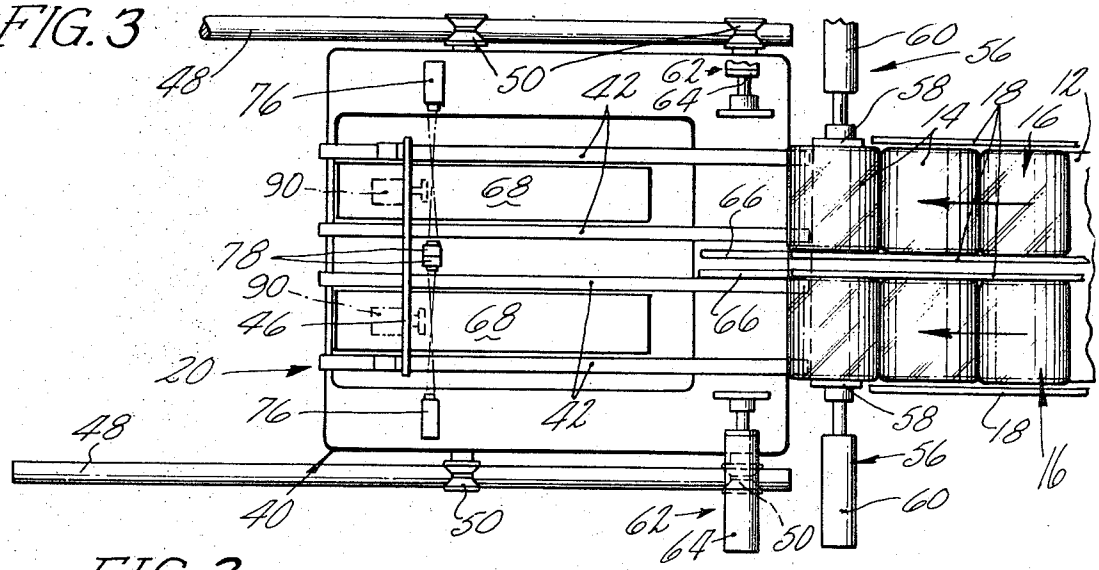
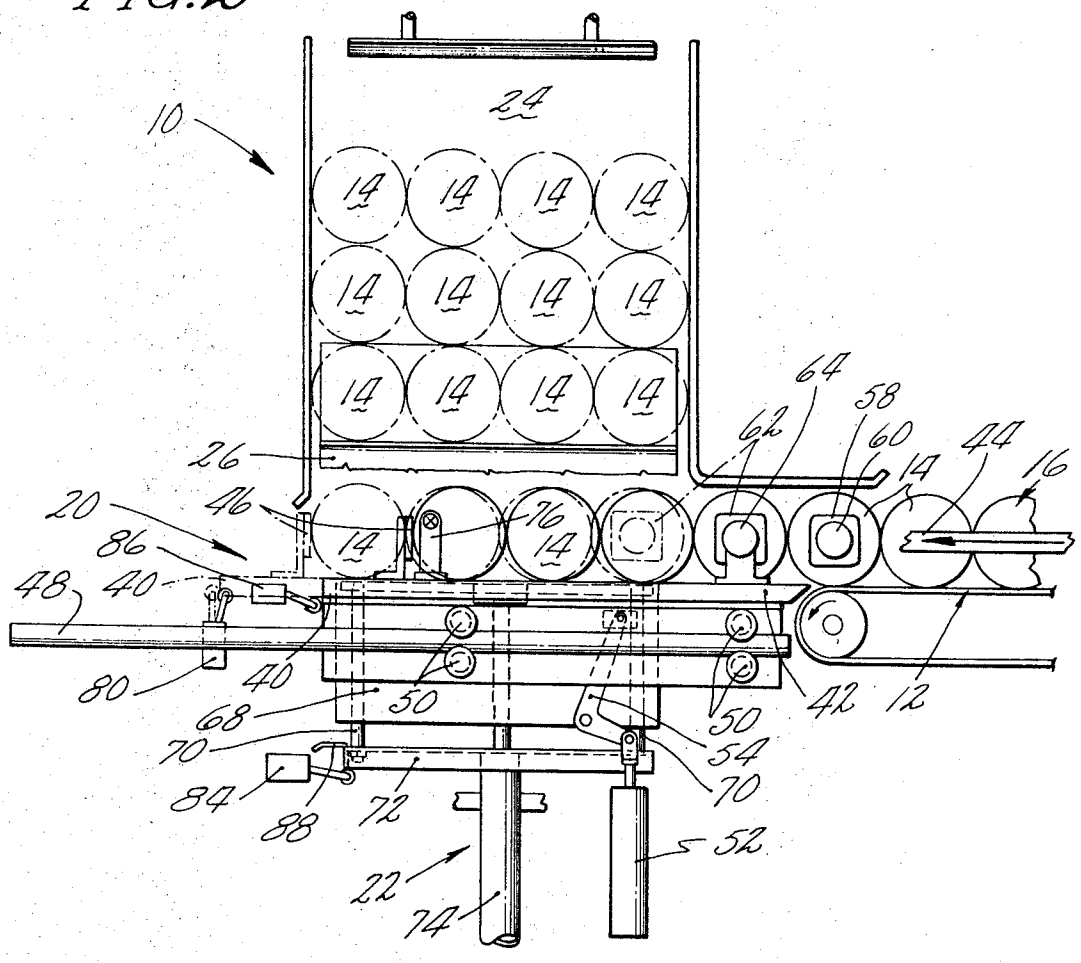


FIG. 2



INVENTOR
ALBERT P. REVICKI
BY McCormick, Paulding & Huber
ATTORNEYS

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RETRACTING CARRIAGE MECHANISM

Albert P. Revicki, Portland, Conn., assignor to Emhart Corporation, Bloomfield, Conn., a corporation of Connecticut

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U.S. Cl. 53—61 10 Claims

ABSTRACT OF THE DISCLOSURE

In a packing machine wherein relatively soft resilient compressible articles to be packed, such as rolls of towel paper, are intermittently advanced in line and in contact with each other, each of the articles is or may be compressed or temporarily deformed to some degree of cumulative pressure exerted by the other articles in the line. A carriage mechanism receives and separates a load-group consisting of a predetermined number of articles from the line and permits each of the articles in the group to relax or otherwise return to its normal shape free of line pressure influence before the load-group is elevated to a collector or accumulator area.

BACKGROUND OF THE INVENTION

This invention relates generally to improvements in machines for packing articles in cases or cartons for shipment or other purposes and deals more particularly with an improved carriage mechanism for a machine for packing relatively soft compressible articles in cartons in lines or rows and in contact with each other.

Where articles are to be packed in cartons in line and in contact with each other, it is highly desirable that the articles also be advanced or fed into the packing machine in line and in contact with each other to minimize machine cycle time. Articles intermittently advanced in the aforedescribed manner are or may be at times during the packing cycle subjected to cumulative line pressure exerted by all of the successive articles in the line. Where the articles to be packaged are of a soft or relative compressible character, as for example rolls of towel paper or the like, this cumulative line pressure may tend to compress or at least temporarily deform each of the articles in the general direction of advance. Thus, cylindrical rolls of towel paper advanced in the aforedescribed manner and side-by-side relation may be compressed or deformed to somewhat elliptical cross section. If the articles are of a sufficiently resilient character, however, they will tend to return to normal shape when line pressure is relieved, provided, of course, that this pressure does not become so great or of such duration as to cause the articles to take a permanent set.

It is the general aim of the present invention to provide an improved retracting carriage mechanism for a machine of the aforedescribed character for eliminating or at least substantially reducing the line pressure acting on each article to be packed to allow each article to relax or otherwise return to substantially normal shape before it is packed.

SUMMARY OF THE INVENTION

In accordance with the present invention, a retracting carriage mechanism is provided for controlling the intermittent advance of a line of articles advancing in contact with each other and for receiving a load-group from the line consisting of one or more articles and moving the load-group to a position spaced from the line so that each of the articles in the load-group may relax to or otherwise substantially return to its normal shape free of line pressure before being packed in a carton.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view of a packing machine embodying the present invention.

FIG. 2 is a schematic end elevational view of the retracting gate mechanism and in-feed conveyor of the machine of FIG. 1.

FIG. 3 is a schematic plan view of the retracting gate mechanism and conveyor of FIG. 2.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

In the description which follows and in the drawings forming a part of this specification, the present invention is described and illustrated with reference to a machine for packing rolls of towel paper or the like into cases or cartons. With the exception of the retracting carriage mechanism of the present invention, the packing machine shown in the drawings is conventional and need not be described in detail. In general, the packing machine indicated generally at **10** in FIG. 1 comprises an in-feed conveyor **12** shown in FIGS. 2 and 3 which advances rolls of towel paper **14, 14** in two parallel lines or rows **16, 16** in side-by-side relationship and in contact with each other between stationary longitudinally extending guide plates **18, 18**. A retracting carriage mechanism indicated generally at **20** receives and separates a load-group consisting of a predetermined number of rolls **14, 14** from the lines **16, 16** after which a lifting apparatus indicated generally at **22** elevates the load-group to a collector **24** above the carriage mechanism. The collector is provided with gates **26, 26** or pivoted spring fingers which permit the elevated load-group to move upwardly between guide plates **27, 28** and **29** to enter the collector **24** but which prevent the retrograde or downwardly movement thereof. After one load-group has been moved to a position above the gates **26, 26** the elevation cycle is repeated and another load-group is elevated. As each successive load-group is elevated, the load-group immediately above the gates **26, 26** is moved upwardly in the collector **24**. When a full-load or charge, which as shown comprises three tiers of load-groups, has been accumulated in the collector **24**, the uppermost tiers engage sensing devices or switches **30, 30** which activates a fluid cylinder (not shown) to move a pusher **32**. The charge is moved horizontally into a funnel **34** by the pusher **32** from which it is moved into a container **36**, positioned adjacent the funnel, by the next successive charge. A switch **37** positioned in the path of the pusher **32** signals the pusher to return to its ready position as it appears in FIG. 1 and also activates a pivoted drop-off **38** which up-ends the filled container **36**. Another switch **39** electrically interlocks the pusher **32** with the drop-off **38** so that the pusher cannot operate to move a load through the funnel **34** unless the drop-off is in its load receiving position.

The retracting carriage mechanism of the present invention provides means for receiving a load-group comprising one or more articles from a line of articles advancing in contact with each other and for transferring the load-group to a position sufficiently spaced from the line to allow each of the articles in the group to relax or otherwise return to its original or substantially normal shape free from influence of the other articles in the line. The carriage mechanism also includes means for braking or halting the advance of the line during the aforesaid transfer cycle. In the illustrated embodiment of the invention, a load-group is shown to comprise eight rolls **14, 14** arranged in two adjacent columns with four rolls in each column as shown in FIG. 2, each load-group being indicated by broken lines. One load-group is shown posi-

tioned on the retracting carriage mechanism **20**, another load-group is shown positioned immediately above the gates **26, 26** and two additional load-groups appear in the collector **24**.

Considering now the retracting carriage mechanism **20** in further detail, the mechanism includes a transfer table **40** which carries two pairs of transversely spaced longitudinally extending rails **42, 42** on its upper surface, as best shown in FIG. 3. Each pair of rails is adapted to receive and support a column of rolls received from one of the lines **16, 16**. Side plates, such as indicated at **44, 44**, are or may be provided for maintaining a load-group in proper position with respect to the transfer table **40**. Preferably, a transversely extending barrier rail **46** is also provided which extends transversely of the table **40** at the forward end thereof. Support for the table **40** is provided by a pair of support rods **48, 48** fixed to opposite sides of the frame of the machine **10**. Four sets of rollers **50, 50** journaled on shafts which project from opposite sides of the table engage the rods **48, 48** to support the table for reciprocating movement in horizontal alignment with and generally toward and away from the conveyor **12**. Thus, the transfer table **40** is movable between a full line or load-receiving position generally adjacent the discharge end of the conveyor **12** and the forward end of the lines **16, 16** and a retracted or broken line position wherein it is longitudinally spaced from the forward end of the conveyor **12** as shown in FIG. 2. A vertically disposed fluid cylinder **52** mounted below the table **40** acts through a crank arm **54** to drive the table between its load-receiving and retracted positions.

A braking device is provided to halt the advance of the lines **16, 16** during the transfer cycle, that is, while the transfer table **40** moves a load-group to its retracted position. In the presently preferred embodiment of the invention, clamping devices **56, 56** are provided for braking the advancing lines **16, 16**. Each clamping device **56** is mounted on the frame of the machine **10** and includes a clamping plate **58** and a fluid cylinder **60** which moves the plate into and out of engagement with the end surface of a roll **14** at the forward end of an associated line **16** to clamp the roll against one of the guide plates **18, 18**. Additional clamping devices **62, 62** are mounted on the transfer table **40** to clampingly engage the two rolls at the rear of a load-group positioned on the table to prevent the retrograde movement of the load-group during the transfer cycle. Each clamp member **62** is operated by a fluid cylinder **64** and cooperates with a clamping plate **66** which extends upwardly from an associated inner rail **42** to effect clamping engagement with an associated roll **14**.

The elevating apparatus **22** which forms a part of the carriage mechanism **20** includes two generally rectangularly shaped lift tables **68, 68**. Each table **68** is supported for vertical movement through an elongated opening in the transfer table **40** between an associated pair of rails **44, 44**. Two vertically extending guide rods **70, 70** connect each of the lift tables **68, 68** to a lifting frame **72** positioned below the transfer table **40**. A fluid cylinder **74** operably connected to the frame **72** serves to simultaneously move the two lift tables **68, 68** between lowered or full-line positions wherein the tables are positioned below the rails **44, 44** and elevated or lifting positions indicated by broken lines wherein the lift tables are positioned above the gates **26, 26**, as shown in FIG. 1.

Sensing devices of various types may be employed for controlling the sequence of operation of the various elements comprising the carriage mechanism. In the illustrated embodiment, a plurality of electrically operated sensing devices is provided for this purpose. In accordance with one preferred construction, a detector device comprising a pair of photoelectric cells **76, 76** operate the stop means or clamps **56, 56** which halt the advancing lines **16, 16** and also simultaneously operate the clamp means or clamp members **62, 62** which releasably retain the load-group in position on the transfer table **40** during the transfer cycle. The photoelectric cells **76, 76** also simultaneously activate the fluid cylinder **52** to move the transfer table to its retracted position. The photoelectric cells **76, 76** are positioned a sufficient distance rearwardly of the barrier rail **46** so that the clamps **62, 62** engage the two rolls at the rear of the load-group at or before the instant that the rolls at the forward end of the group contact the barrier.

When the transfer table **40** attains its fully retracted position, it engages a switch **80** which signals the start of the lifting cycle causing the fluid cylinder **74** to move the lift tables **68, 68** to their respective elevated positions. However, it should be noted that the sensing circuit for the elevating mechanism **22** is interlocked with the pusher **32** through a switch **82** so that the lift tables **68, 68** cannot be elevated unless the pusher **32** is fully retracted or in its ready position. As the lift tables start their initial upwardly movement a switch **84** engageable with the frame **72** operates to move the clamps **62, 62** to move to their respective released positions. When the lift tables **68, 68** reach their fully elevated positions, another switch **86** is operated by a finger **88** carried by the frame **72** which causes the fluid motor **74** to reverse and thereby lower the lift tables. As the lift tables **68, 68** return to their lowered positions the frame **72** again engages the switch **84** which reverses the action of the fluid cylinder **52** to return the transfer table **40** to its load-receiving position and also releases the braking clamps **56, 56** so that the cycle may be repeated.

In accordance with another construction in-feed detector switches **90, 90** are provided in place of the photoelectric cells **76, 76** as indicated in broken lines in FIG. 3. The detector switches are mounted in the path of and are actuated by the advancing load-group. Preferably, the two switches **90, 90** are connected in series so that both switches must be actuated to indicate the presence of a properly positioned load-group on the transfer table **40**. Operation of the switches **90, 90** serve to simultaneously activate the clamping devices **56, 56** and **62, 62** and to cause the cylinder **52** to move the transfer table **40** to its retracted position forwardly of the conveyor **12**. It will be evident that when the detecting switches **90, 90** are arranged in the aforedescribed manner the load-group will be clamped in position on the transfer table by the clamps **62, 62** while under the influence of cumulative compressive force exerted by the other articles in the lines **16, 16**. The remaining switches are arranged and function generally as aforedescribed. Thus, as the lifting cycle begins the switch **84** will operate as aforedescribed to release the clamps **62, 62** so that each of the rolls in the load-group on the transfer table will be free to relax or otherwise resume its normal or undeformed shape before moving into the collector **24**.

I claim:

1. In a machine for packing resilient compressible articles into cases and having means for assembling the articles in a line and in contact with each other and for advancing the line longitudinally of itself and wherein each of the articles in said line is subjected to cumulative pressure exerted by the other articles in said line tending to compress each of said articles in said longitudinal direction, a retracting carriage mechanism comprising transfer means in the path of said line for receiving a load-group from said line consisting of a predetermined number of articles and for moving said load-group from a first position generally adjacent the forward end of said line to a second position longitudinally spaced from said forward end, said transfer means adapted to accommodate said load-group with each of the articles in said group relaxed in said longitudinal direction, means operable to releasably retain said load-group on said transfer means, means for moving said transfer means be-

tween load receiving and retracted positions corresponding respectively to said first and second positions, stop means operable to halt the advance of said line, and detecting means for operating said stop means and said moving means to move said transfer means to said retracted position in response to the presence of a load-group ou said transfer means.

2. The combination defined in claim 1 wherein said means for releasably retaining said load-group comprises a clamping member operable to engage at least one of said articles comprising said load-group.

3. The combination as set forth in claim 1 wherein said means for releasably retaining said load-group is operated by said detecting means.

4. The combination set forth in claim 1 wherein said stop means comprises a clamping member operable to clampingly engage an article defining said forward end.

5. The combination as set forth in claim 1 wherein said transfer means comprises a generally horizontally disposed table supported for reciprocating movement in said longitudinal direction between said first and second positions and relative to the frame of said packing machine.

6. The combination set forth in claim 5 including a barrier at the forward end of said table in the path of said load-group and wherein said detecting means is spaced rearwardly of said barrier and responsive to movement of said load-group toward said barrier.

7. The combination set forth in claim 5 wherein said detecting means comprises a switch mounted at the forward end of said table and in the path of advance of said load-group.

8. In a machine as set forth in claim 1 and including a load collector the combination wherein said transfer means in said second position is generally aligned with said load collector and including means for moving said load-group from said transfer means to said load collector.

9. In a machine for packing resilient compressible articles into cases and having means for assembling the articles in a line and in contact with each other and for advancing the line longitudinally of itself and wherein each of the articles in said line is subjected to cumulative pressure exerted by the other articles in said line tending to compress each of said articles in said longitudinal direction, a retracting carriage mechanism comprising transfer means in the path of said line for receiving a load-group from said line consisting of a predetermined number of articles and for moving said load-group from a first position generally adjacent the forward end of said line to a second position longitudinally spaced from said forward end, said transfer means adapted to accommodate said load-group with each of the articles in said group relaxed in said longitudinal direction, means for moving said transfer means between load receiving and retracted positions corresponding respectively to said first and second positions, stop means operable to halt the advance of said line, detecting means for operating said stop means and said moving means to move said transfer means to said retracted position in response to the presence of a load-group on said transfer means, a load collector positioned above and in general alignment with said transfer means in said second position, and lifting means for elevating said load-group from said transfer means to said load collector.

10. The combination as set forth in claim 9 wherein said transfer means comprises a generally horizontally disposed table and said lifting means is operable through an opening in said table.

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TRAVIS S. McGEHEE, Primary Examiner

U.S. Cl. X.R.

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