Jan. 19, 1971 E. F. ROWEKAMP 3,555,773

FOUR-HEAD CARRIAGE FOR CASE PACKER

Filed June 23, 1969 2 Sheets-Sheet 1

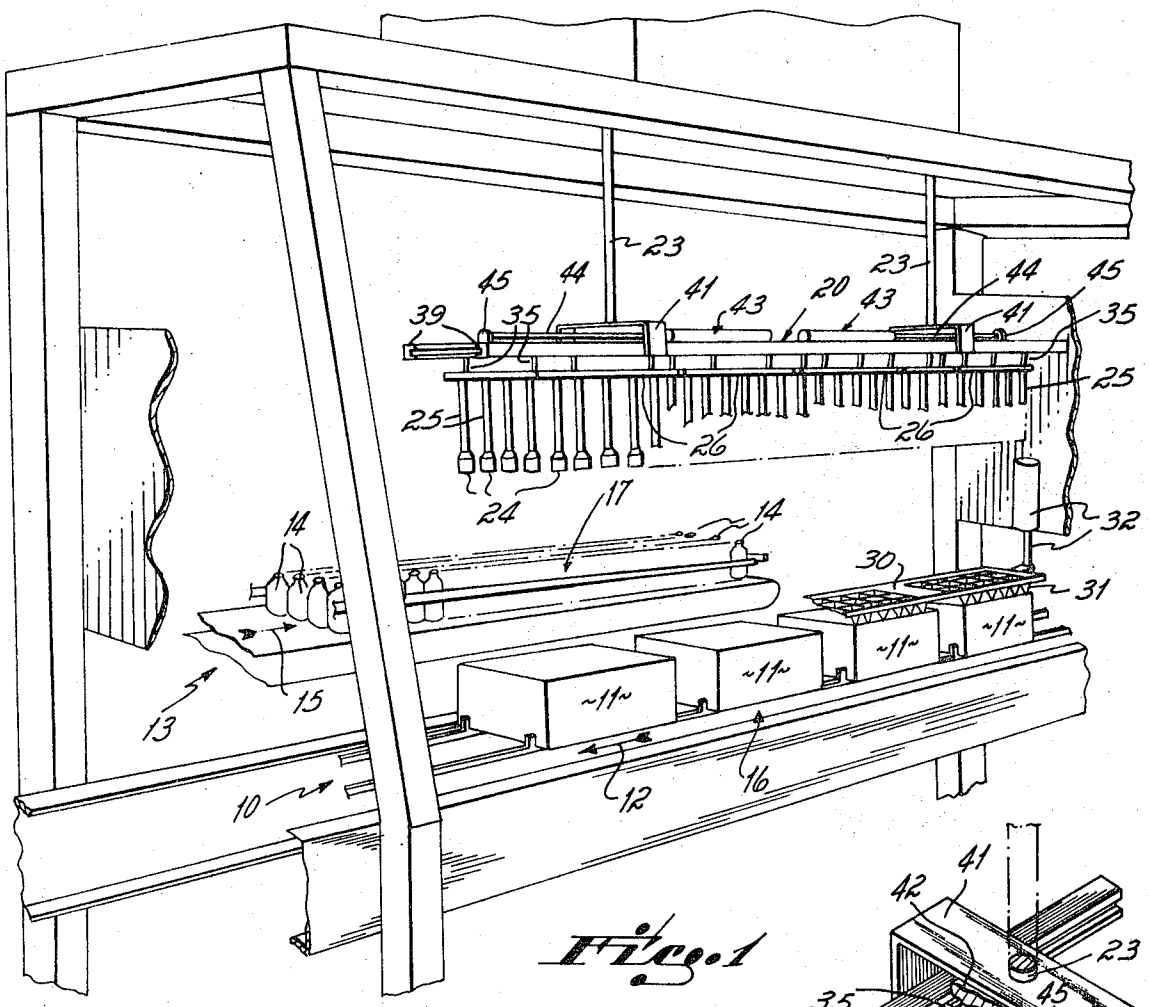


Fig. 1

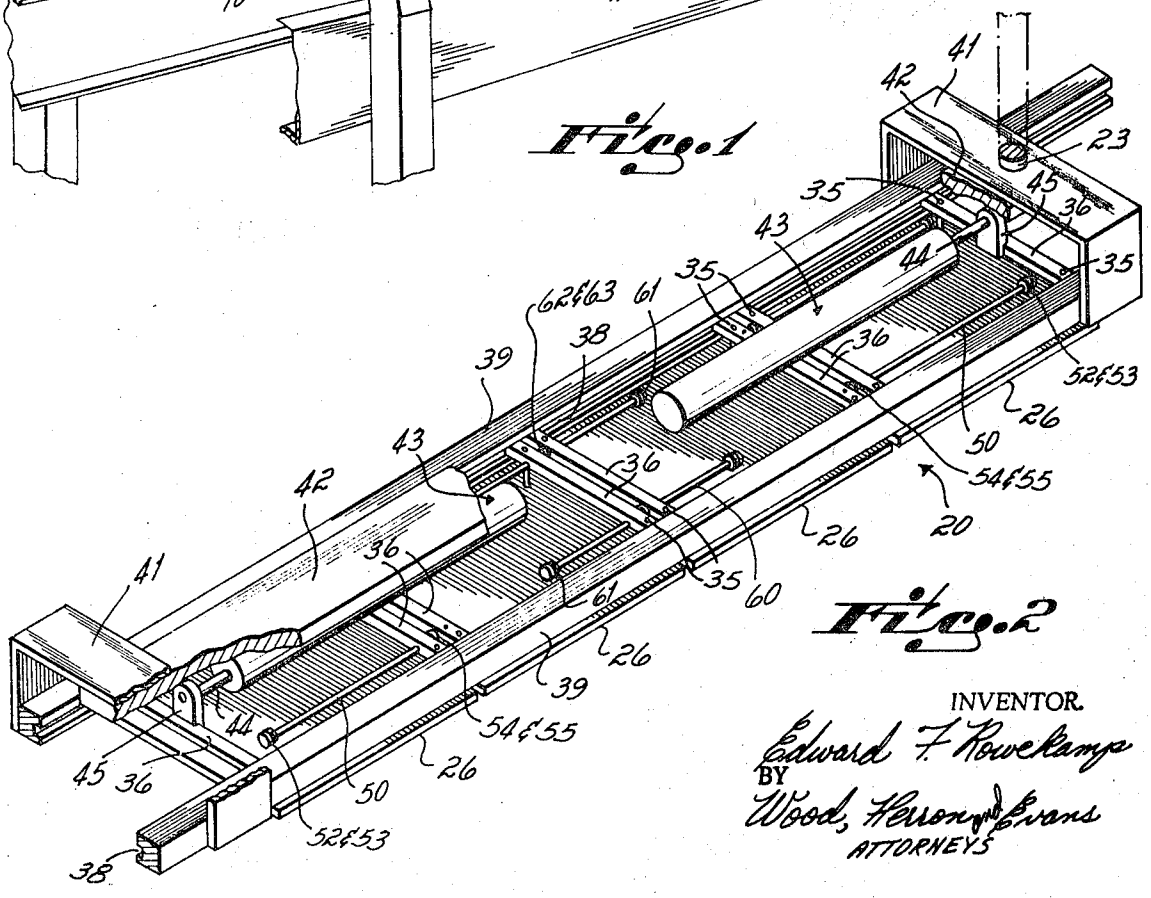


Fig. 2

INVENTOR.
Edward F. Rowekamp
BY
Wood, Herron & Evans
ATTORNEYS

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FOUR-HEAD CARRIAGE FOR CASE PACKER

Filed June 23, 1969 2 Sheets-Sheet 2

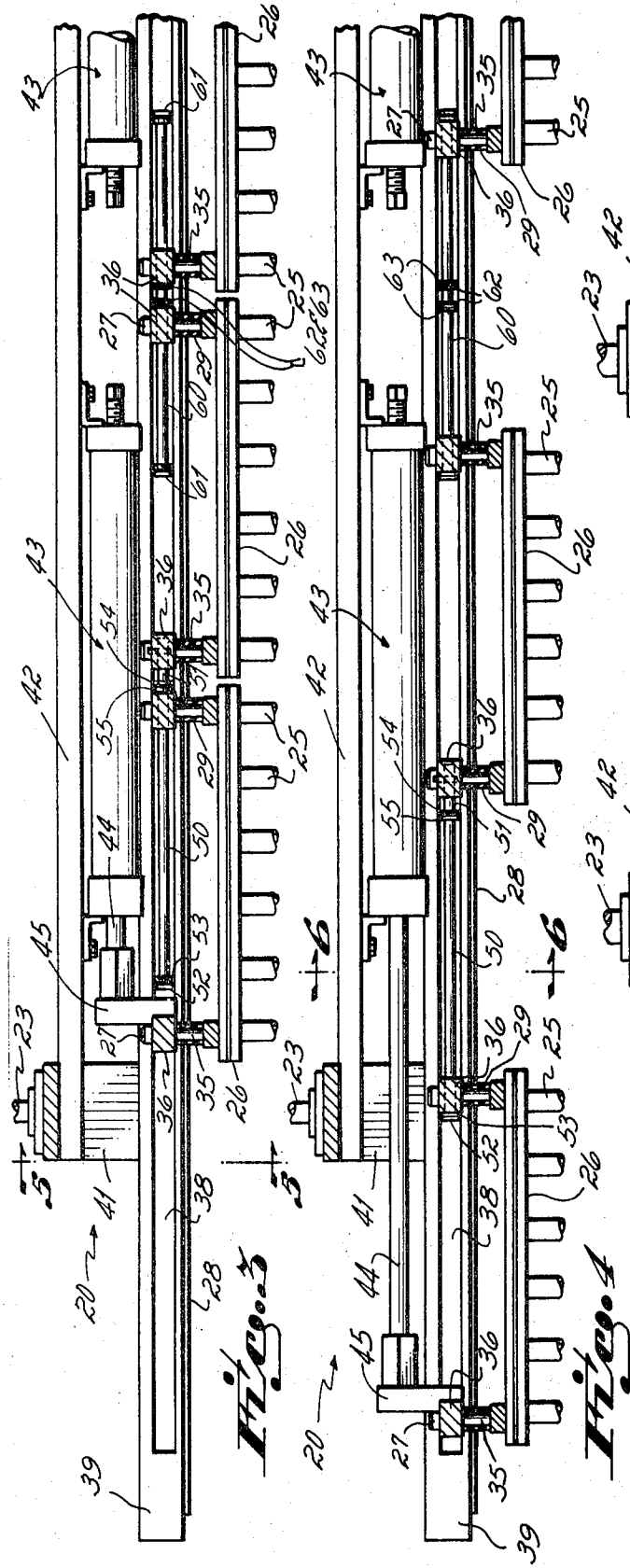


Fig. 3

Fig. 4

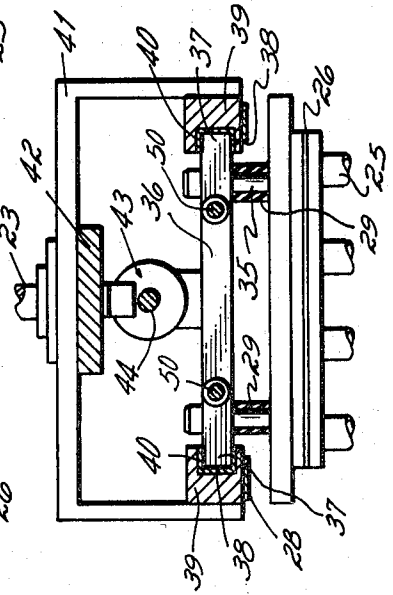


Fig. 6

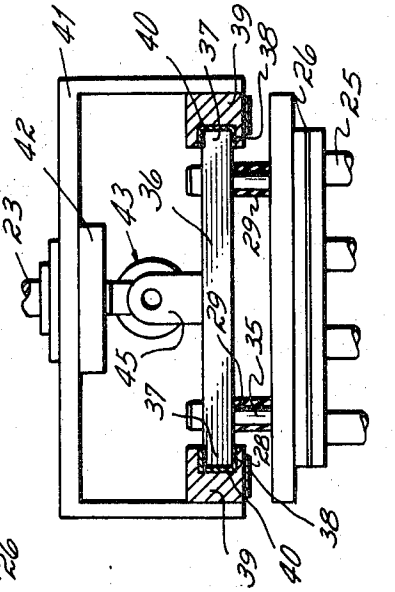


Fig. 5

INVENTOR.
Edward F. Rowekamp
BY
Wood, Herron & Evans
ATTORNEYS

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3,555,773

FOUR-HEAD CARRIAGE FOR CASE PACKER

Edward F. Rowekamp, Cincinnati, Ohio, assignor to The Lodge & Shipley Company, Cincinnati, Ohio, a corporation of Ohio

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Int. Cl. B65b 21/20
U.S. Cl. 53—166 12 Claims

ABSTRACT OF THE DISCLOSURE

A case packer in which an article conveyor runs parallel to case conveyor and a four-head transfer carriage lifts abutting articles from the conveyor, spreads apart, and deposits the articles into four spaced cases.

This invention relates to case packers and more particularly to case packers wherein articles are lifted from an article conveyor, are transferred laterally, and are deposited into cases. The invention is applicable to all types of articles, but particular reference herein will be made to the packing of bottles into cases.

In the copending application of Rowekamp, Ser. No. 794,610 filed Jan. 28, 1969, the basic apparatus to which the invention applies has been described. In that apparatus, cases are conveyed to a packing station and are halted momentarily in a spaced apart relation. A bottle conveyor runs parallel to an adjacent case conveyor and conveys bottles in abutting relation to a marshalling station where the flow of bottles is halted momentarily. During the monentary halt of the bottles and the cases, a transfer carriage having one or more lifting heads (each lifting head corresponding to a case) grasps the bottle and transfers them laterally from the marshalling station and deposits them in the cases. Where a plurality of heads are employed, the heads are spread apart during the transfer of the bottles from the marshalling station to the case packing station so that the heads are moved into alignment with the spaced apart cases.

The objective of the present invention has been to provide a four-head carriage for use in the apparatus described above wherein the heads are slidably mounted on a frame and wherein two pistons drive the respective outermost heads, lost motion connections being provided between the outer and inner heads to permit the outer heads to carry the inner heads upwardly.

A further objective of the invention has been to provide, as the lost motion means referred to above, rods which are slidable with respect to the respective heads and which have stops which limit the outward or spreading movement of the heads and which determine the extent of inward movement of the heads.

It has been a further objective of the invention to provide rubber bumpers on the stops so as to cushion the impact of the heads against the stops as they are moved inwardly or outwardly.

These objectives of the present invention will become more readily apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of the apparatus employing the invention;

FIG. 2 is a perspective view, partly in section, illustrating the head spreading mechanism;

FIG. 3 is a fragmentary side elevational view of the head spreading mechanism;

FIG. 4 is a view similar to FIG. 3 illustrating the heads in spread apart relation:

FIG. 5 is a cross-sectional view taken along lines 5—5 of FIG. 3; and

FIG. 6 is a cross-sectional view taken along lines 6—6 of FIG. 4.

The apparatus with which the invention is used is illustrated generally in FIG. 1. A case conveyor **10** carrying cases **11**, in spaced apart relation, runs longitudinally of the apparatus in a first direction illustrated by the arrow **12**.

An article or bottle conveyor **13** carrying bottles **14** runs parallel to and in an opposite longitudinal direction as indicated by the arrow **15**. Means not shown are employed to halt the cases in the illustrated position which will be referred to as a case packing station **16**. Similarly, means are provided for halting the flow of bottles in the position indicated which is referred to as a marshalling station **17**. As illustrated, the bottles **14** at the marshalling station are in four files, the bottles in each file abutting each other. In the illustrated embodiment, the bottles will be packed into 24-cell cases of four rows with six bottles to a row.

The bottles are lifted from the marshalling station and deposited into the respective cases by a transfer carriage **20** having four lifting heads **21**. Each lifting head is mounted on a frame **22** in a manner which will be described in more detail below, the frame being carried on vertical posts **23** by a conveyor not shown. Each lifting head has twenty-four lifting devices or cups **24** which preferably are lifting cups of the type described n the Meierjohan Pat. No. 2,695,190 and McHugh Pat. No. 2,873,996. The lifting cups are mounted on flexible stems **25** which are in turn connected to manifolds **26**. The manifolds are connected through flexible hoses to a compressed air source for operating the lifting cups.

The lifting cups **24** cooperate with a grid structure **30** having guide fingers **31** which project into the case cells and guide the individual bottles into the cells. The grid structure is operated by a piston and cylinder **32** at each end which raises the grid structure to permit the cases to pass underneath, and then lowers the grid structure to align the guide fingers with the case cells. The foregoing structure and its mode of operation has been described in copending application Ser. No. 794,610 and forms no part of the present invention, except insofar as the structure to be described hereinafter is combined with it.

The objective of the present invention has been to provide structure for mounting the four lifting heads and for causing them to be spread apart to align them with the spaced apart cases, and brought together to align them with the necks of abutting bottles. The structure by which this objective is attained is illustrated in FIGS. 2–6.

Each lifting head is supported from its manifold **26**, and each manifold is supported from four corner posts **35** having rubber sleeves **29**, the corner posts being slidably mounted from a pair of sliding bars **36**, the posts being capped as at **27** to fix the lowermost position of the heads with respect to the sliding bars. As shown in FIGS. 5 and 6, the bars **36** have their ends **37** slidable in channels **38** formed in longitudinal ways **39**. A plastic (Delrin or Hyfax) U-shaped insert **40** is attached to each bar **36** to provide a bearing surface for the sliding bars. An electrical signal tape **28** is secured to the full length of the undersurface of longitudinal ways **39**. The tape is engageable by any of the manifolds **26** if they slide upward with respect to the ways **39** as permitted by the sliding posts **35**. Thus, if any head engages an obstruction in its descent, the engagement of the manifolds **26** with the tape **28** will generate a signal transmitted to control, not shown, which will shut the appartus down until the fault is cleared. The longitudinal ways **39** are welded to two inverted U-shaped brackets **41**, the brackets **41** being supported from the posts **23**, whereby the whole assembly of heads and sup-

porting frame may be transferred between the bottle marshalling station and the case packing station.

An elongated plate **42** is secured to the brackets **41** and overlies the heads **21**. A pair of double acting pneumatic cylinders **43** are fixed to the underside of the plate **42** in back-to-back manner, with their pistons **44** projecting outwardly. Each piston is connected to a respective outboard head **21** by a depending arm **45** secured to the outermost sliding bar. It can be seen that when pressure is applied to the inner end of each cylinder, each piston **44** will be forced outwardly, carrying with it the outermost head attached to it. When pressure is applied to the opposite end of the cylinder, the piston will be driven in a direction to cause the heads to move inwardly.

Each outer head is connected to its adjacent inner head by a lost motion connection which comprises a pair of longitudinally extending rods **50**. The inner end **51** of each rod is secured to a sliding bar of the inner head, and the rod is slidable in a bore in the adjacent bar **36** of the outer head. An outer stop collar **52**, having a rubber bumper **53**, is fixed to the outer end of the rod **50**. A stop collar **54**, having a rubber bumper **55**, is connected to the inner end of the rod **50**. The stop collars **52** and **54** determine the limit of the outward and inward movement of the outermost heads, and the rubber bumpers mounted thereon serve to cushion the impact of the sliding bar **36** against the stop collar, thus reducing the jarring of the heads and the noise of the operation.

The innermost bars of the inner heads are interconnected by a lost motion means comprising a rod **60** having collars **61** on its free end and centrally positioned collars **62**. The collars also have rubber bumpers **63** for the reasons described above. The rods **60** are slidable in bores in the respective sliding bars, and the collars **61** determine the limit of the inward movement of the inner heads. The collars **62** determine the limit of the inward movement of the inner heads.

In operation, when the transfer carriage **20** overlies the abutting bottles, the pistons **44** are retracted, as shown in FIGS. 2 and 3, which pulls the outer heads inwardly until their sliding bars abut stops **54**. This force is in turn transmitted to the inner heads to move their sliding bars against the stops **62**, thereby closely positioning the heads for lifting engagement with the abutting bottles. After the bottles are lifted from the marshalling station, and during the excursion to a position overlying the case packing station **16**, the air to the cylinders **43** is reversed, causing the pistons **44** to move outwardly. As the pistons move outwardly, they carry the outermost heads outwardly until their sliding bars engage the stops **52**. At this point the spacing between the outer and its adjacent inner head is determined. Thereafter the two heads continue to move outwardly, the inner head being drawn by the rods **50** until the sliding bars and the inner head engage the stops **61**. Thus, the outward extent of movement of the heads is effected. At this point the heads are aligned with their respective cases, and the transfer carriage can begin its descent to deposit the bottles into the cases.

I claim:

1. Apparatus for packing articles in cases comprising:
- a longitudinally extending case conveyor, means for stopping cases in spaced apart relation on said conveyor,
- a longitudinally extending article conveyor extending parallel to said case conveyor, means for stopping articles in abutting relation on said article conveyor,
- an article transfer carriage for transferring articles from said article conveyor to four cases on said case conveyor,
- said transfer carriage including:
- a frame,
- four lifting heads slidably mounted on said frame, and
- means for sliding said heads from an abutting relation to pick up articles to a spaced apart relation to deposit articles in said cases.

2. Apparatus according to claim **1** in which said sliding means comprises:
- a pair of back-to-back air cylinders having pistons connected to the outermost heads, said pistons being adapted to drive said heads to their most extended positions, and
- lost motion means connecting each outer head to its adjacent inner head to pull said inner head outwardly after the required spacing between the two heads is achieved.

3. Apparatus according to claim **2** further comprising:
- a second lost motion means connected between said inner heads to determine the spacing of said inner heads.

4. Apparatus according to claim **3** in which said second lost motion means comprises:
- at least one rod slidably mounted with respect to each said head, and
- collars on the outer ends of said rod to limit the extent of outward movement of said heads.

5. Apparatus according to claim **4** further comprising:
- collars on the central portion of said rod to limit the extent of inward movement of said inner heads.

6. Apparatus according to claim **5** further comprising:
- rubber bumpers on said collars to absorb the impact of said heads on said collars.

7. Apparatus according to claim **2** in which said lost motion means comprises:
- at least one rod fixed to each inner head and slidably connected to the adjacent outer head, and
- a collar on the outer end of each said rod adapted to be engaged by said outer head to limit the extent of its outward movement.

8. Apparatus according to claim **7** further comprising:
- rubber bumpers on said collars to absorb the impact of said heads on said collars.

9. Apparatus according to claim **2** in which said lost motion means comprises:
- a pair of rods fixed to each inner head and slidably connected to the adjacent outer head, and a collar on the outer end of each said rod adapted to be engaged by said outer head to limit the extent of its outward movement, and
- second lost motion means between said inner heads comprising:
- a pair of rods slidably mounted with respect to each said inner head, and
- collars on the outer ends of said rods to limit the extent of outward movement of said heads.

10. A transfer carriage for an article packing machine comprising:
- a pair of spaced ways,
- four lifting heads, each depending from a pair of sliding bars, said bars being slidably mounted in said ways,
- a pair of air cylinders fixedly mounted back-to-back with respect to said ways and intermediate the ends of said ways,
- pistons projecting from said cylinders and connected respectively to the sliding bars of the outermost heads,
- a pair of rods interconnecting the adjacent sliding bars of each pair of outer and inner heads, said rods being fixed to one bar and slidable in a bore through the other, a stop collar on the slidable end of each said rod,
- a second pair of rods slidably mounted through bores in the adjacent sliding bars of said inner heads, and stop collars on said second rods at its ends and between said sliding bars.

11. Apparatus for packing articles in cases comprising:
- a longitudinally extending case conveyor, means for stopping cases in spaced apart relation on said conveyor,
- a longitudinally extending article conveyor extending parallel to said case conveyor, means for stopping

articles in abutting relation on said article conveyor,
an article transfer carriage for transferring articles from said article conveyor to four cases on said case conveyor,
said transfer carriage including:
a frame,
a plurality of lifting heads mounted on said frame for longitudinal and vertical sliding movement,
means for sliding said heads with respect to said frame from an abutting relation to pick up articles to a spaced apart relation to deposit articles in said cases, and
electrical signal means on said frame engageable by any of said heads upon upward movement of said heads with respect to said frame to generate a signal operable to shut down said apparatus.

12. Apparatus according to claim **11** in which said frame includes longitudinal ways upon which said heads are slidably mounted and in which said electrical signal means comprises an electrical signal tape mounted on the undersurface of said ways.

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TRAVIS S. McGEHEE, Primary Examiner

U.S. Cl. X.R.

53—247, 248, 251