United States Patent

Graham

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[54] **APPARATUS FOR FEEDING CAN ENDS**

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[73] Assignee: **Linear Machine Company Limited,** Lurgan, Northern Ireland

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[52] **U.S. Cl.** **221/11,** 221/119, 221/176

[51] **Int. Cl.** **B65g 59/06,** G07f 11/12

[58] **Field of Search**.....221/11, 103, 104, 106, 119, 221/121, 176, 107; 53/52, 64

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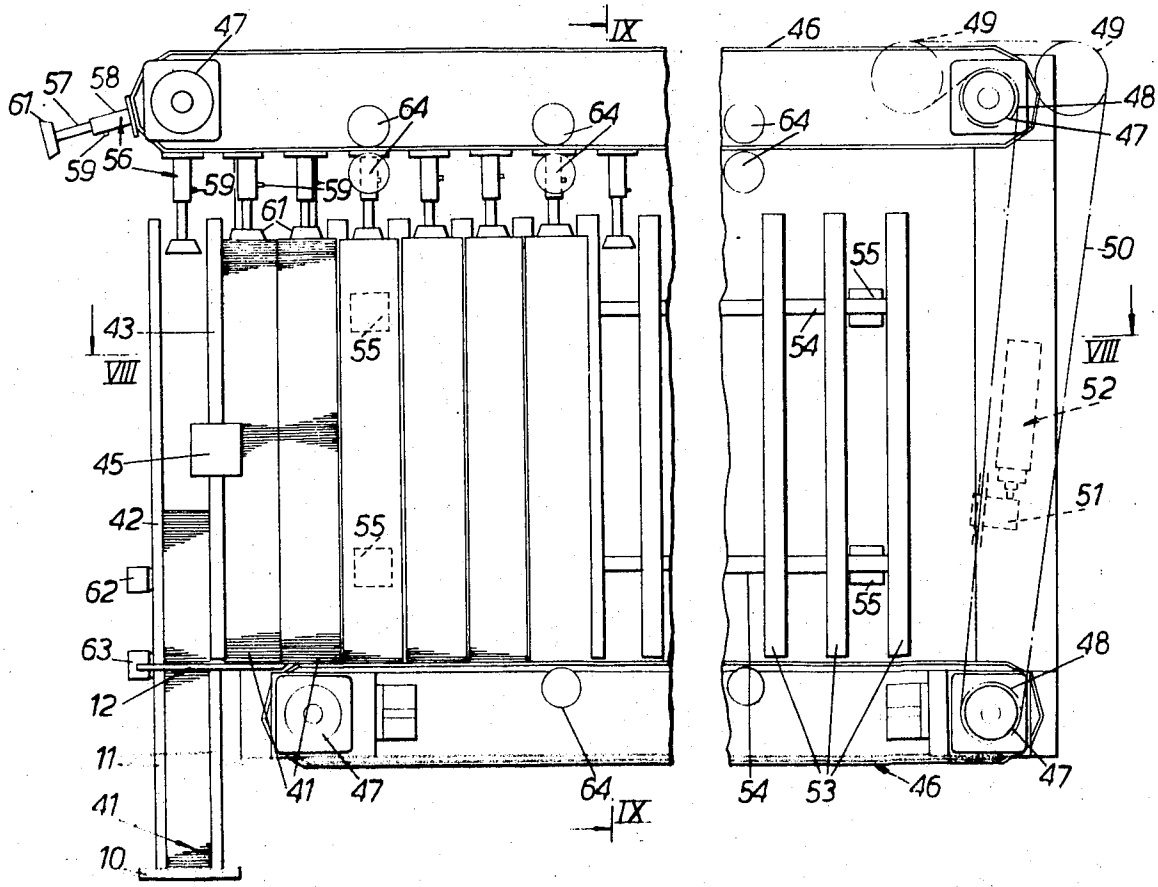
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[57] **ABSTRACT**

This invention relates to apparatus for feeding upright stacks of can ends to an upright column from the leading end of which column, can ends are fed one at a time in succession to, for example, a can seaming machine. The apparatus includes column-holding means for location of said upright column, conveyor means for carrying a supply of upright stacks of can ends for replenishing said column, said column-holding means being located below the level of said conveyor means, positioning means for positioning each stack in turn on top of the diminished column of can ends, and control means responsive to the height of the column for operating the conveyor means to feed a stack of can ends towards the column holding means to enable the positioning means to locate the said stack on the column and so replenish said column.

10 Claims, 13 Drawing Figures



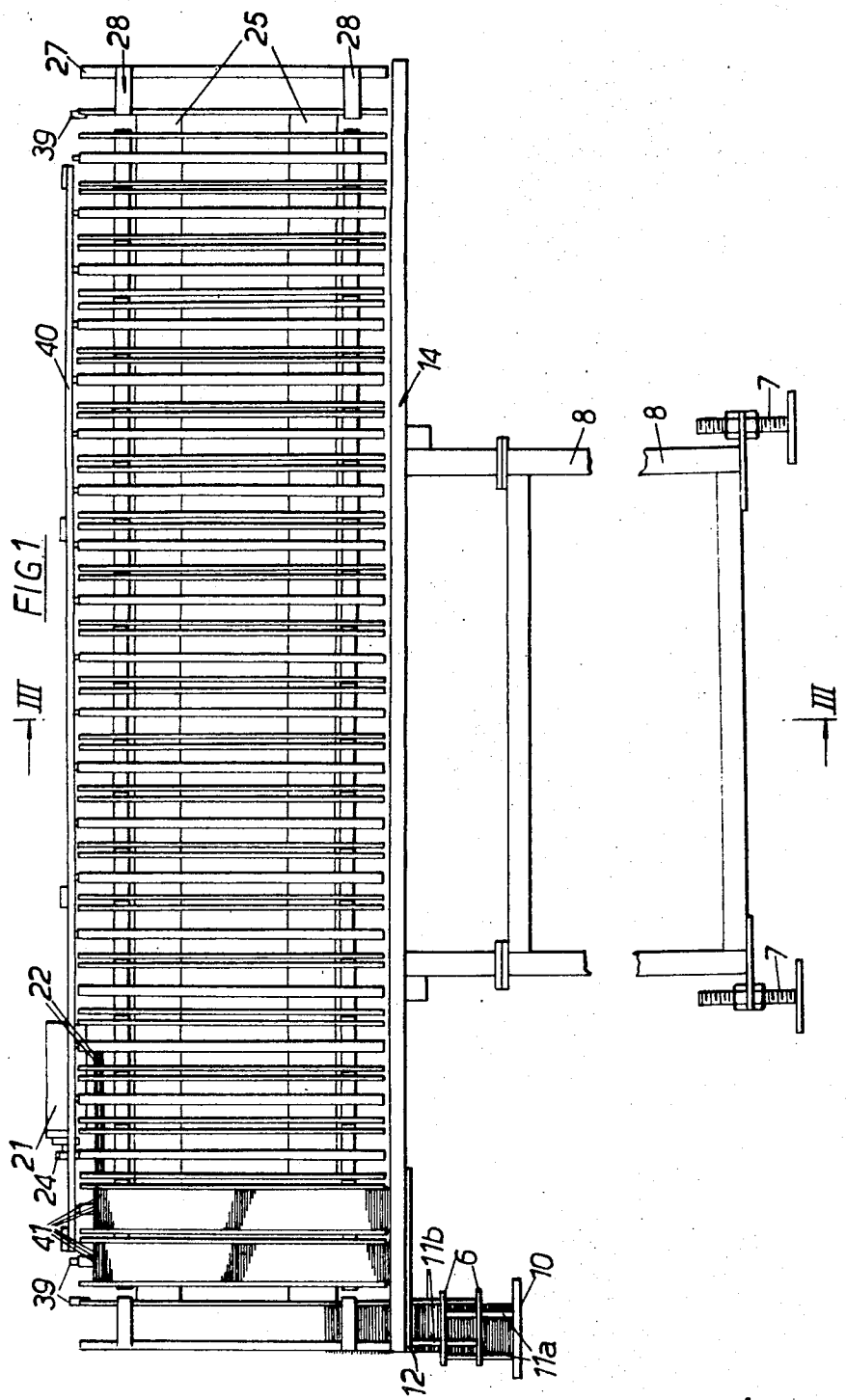


FIG 1

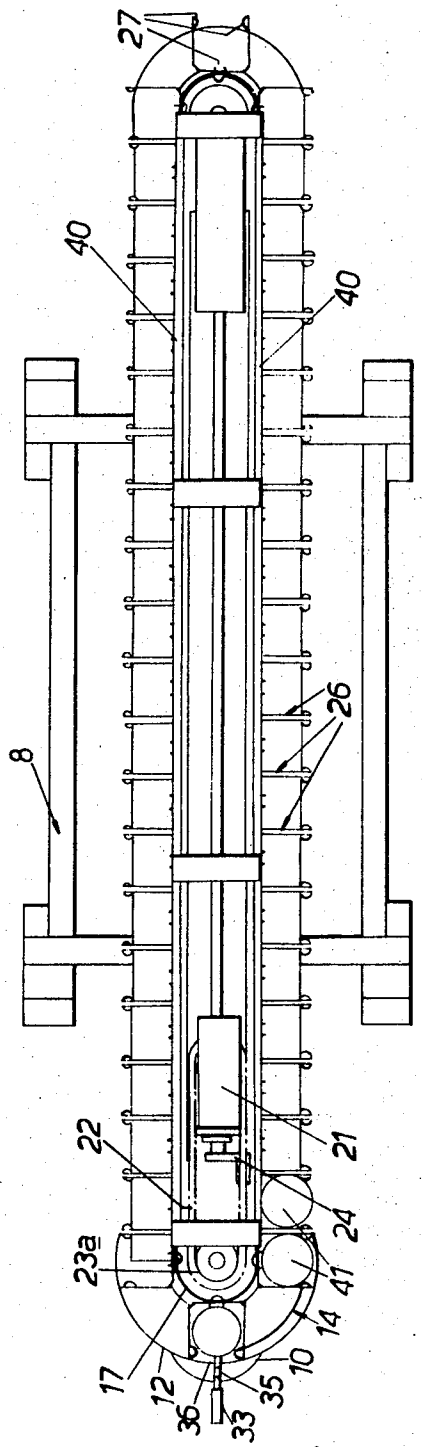
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FIG.2.



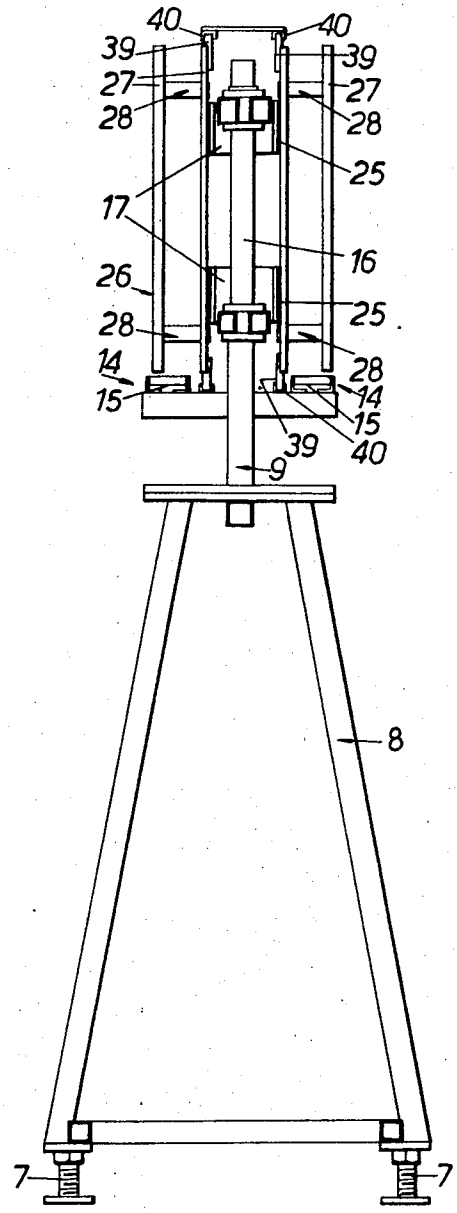
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FIG.3.



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FIG 4.

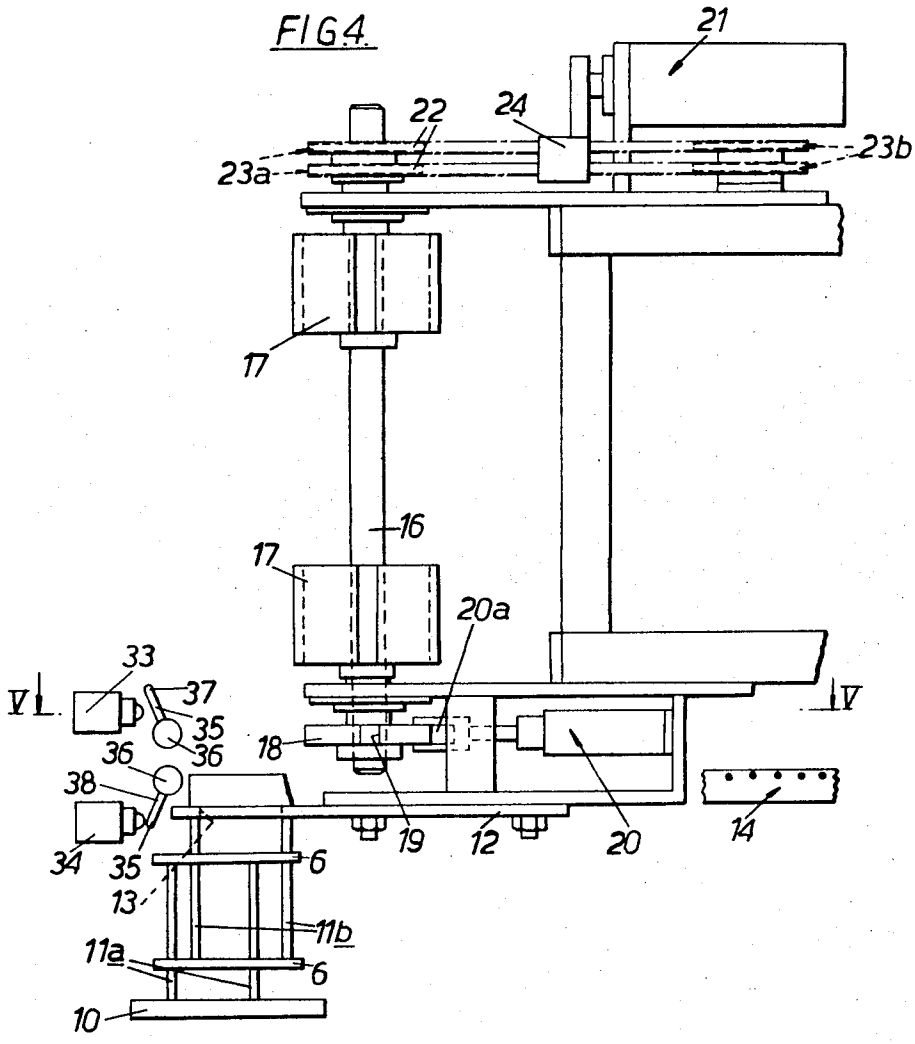
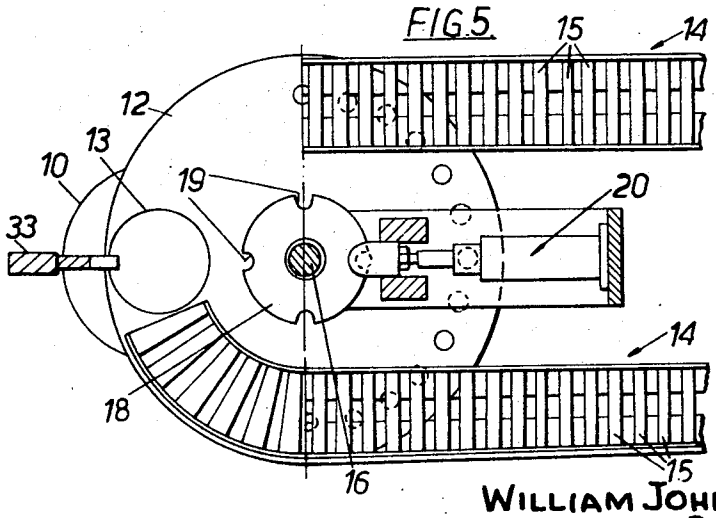


FIG 5.



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FIG. 6a

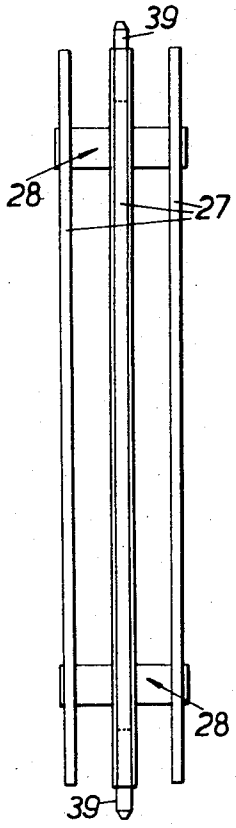


FIG. 6b

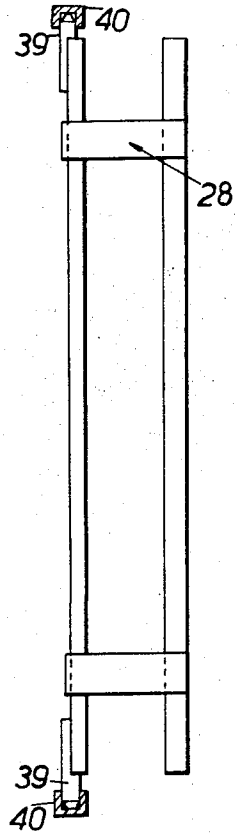


FIG. 6c

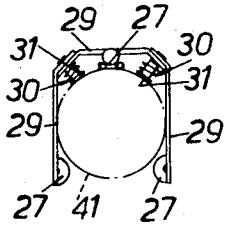
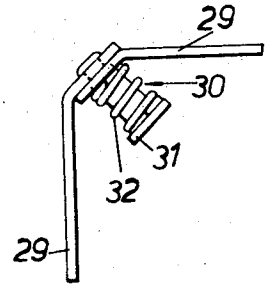


FIG. 6d



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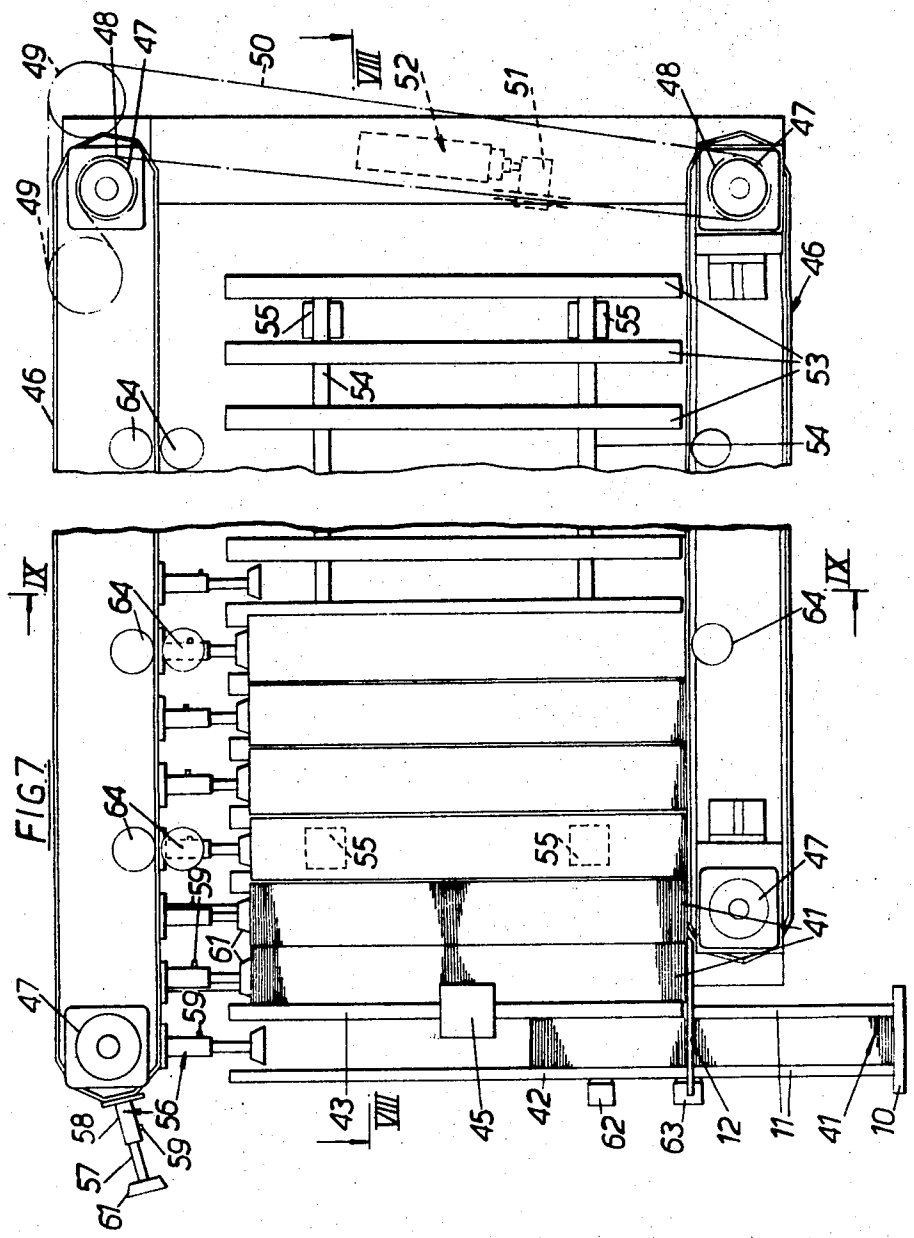


FIG.7

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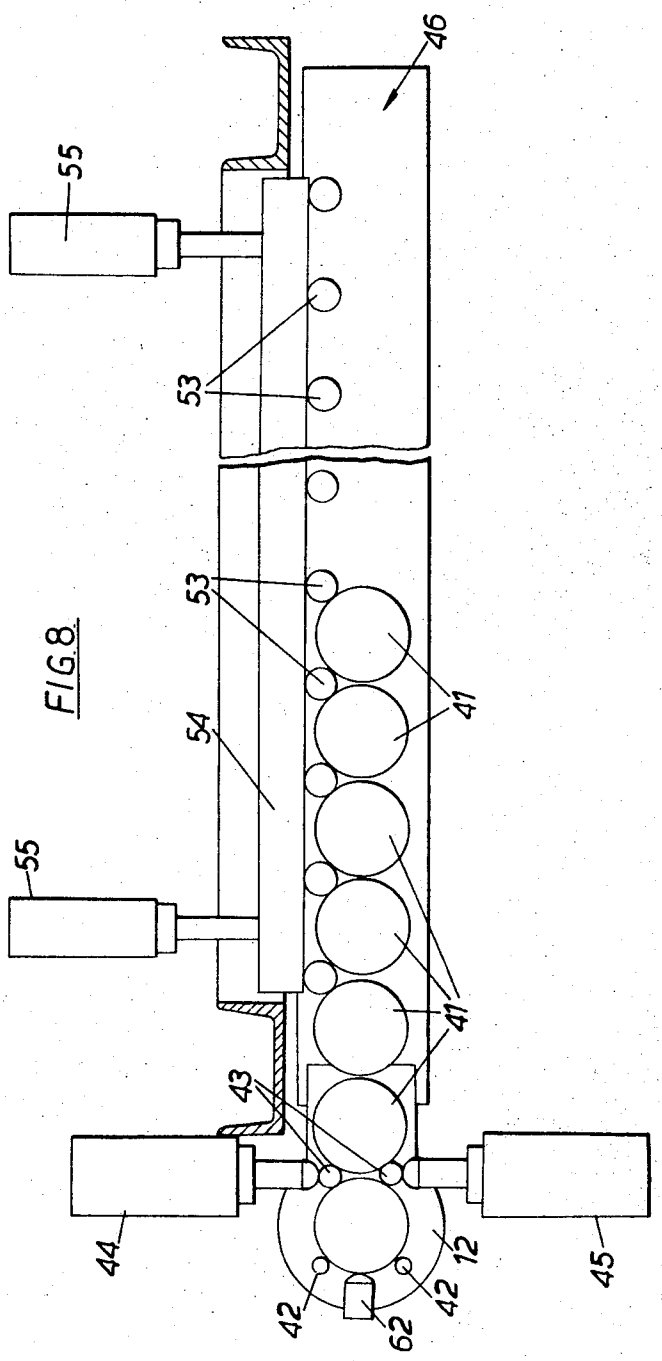


FIG 8

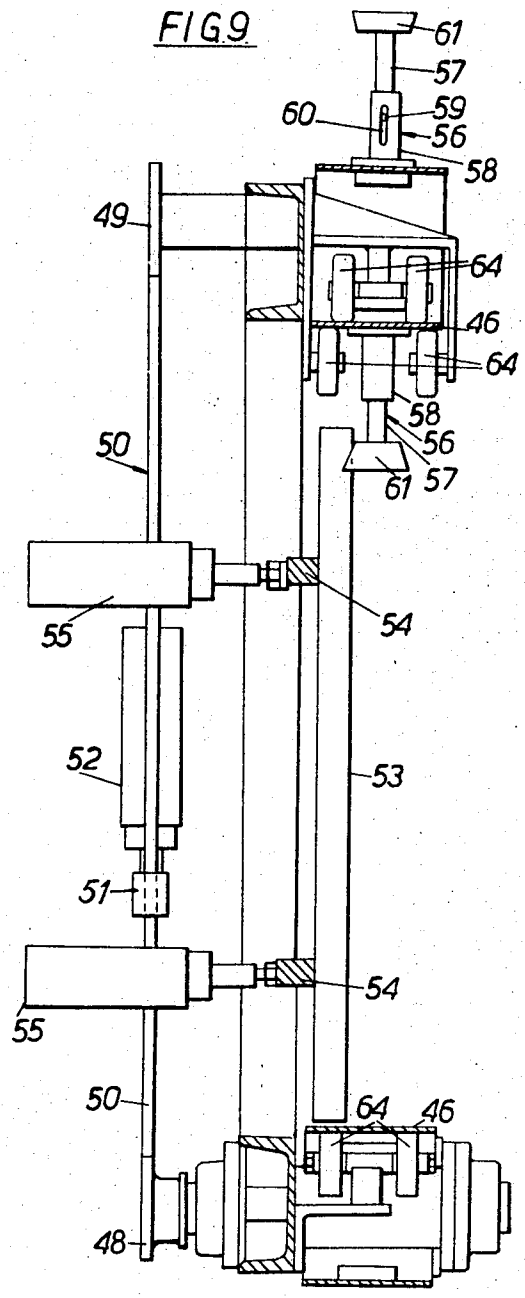
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FIG 9



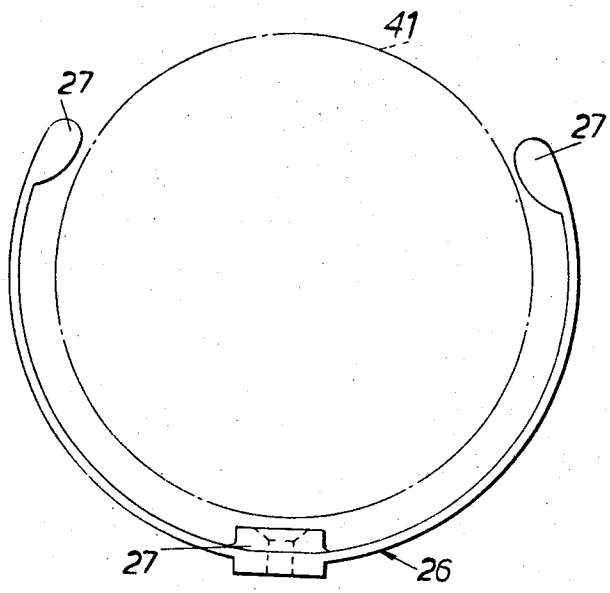
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FIG 10



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APPARATUS FOR FEEDING CAN ENDS

This invention relates to apparatus for feeding can ends, bottle tops, jam jar lids and like articles (hereinafter referred to simply as "can ends") in upright stacks of about 250 can ends by replenishing an upright column of can ends, from the leading end of which column, can ends are fed one at a time to, for example, a can, a bottle, a jam jar closing machine or to a scoring or lining machine or press for applying, for example, wording in the form of instructions to the upper surface of a can end (hereinafter and in the claims referred to simply as "machinery for the purpose aforesaid").

According to the present invention, feeding apparatus includes a column-holding means for location of an upright column of can ends from the leading end of which column can ends are fed one at a time in succession to machinery for the purpose aforesaid, conveyor means for carrying a supply of upright stacks of can ends for replenishing said column, positioning means for positioning each stack of can ends in turn on top of the diminished column from the conveyor means, and control means responsive to the height of said column for operating the conveyor means to feed a stack to enable the positioning means to locate the said stack on the column.

Preferably, the conveyor means includes an outwardly projecting track mounted around a frame, and around which frame at least one endless belt is mounted above the level of the track, the belt or belts having thereon a series of upright stack supports, the lower end of each support terminating above the track, the belt or belts being indexed by the positioning means for predetermined movements around the track to bring each stack support in turn into alignment with the column-holding means which is located below the track to allow a stack of can ends located in a stack support to be transferred through an opening in the track to the column-holding means.

Alternatively, the conveyor means includes two vertically spaced conveyors projecting out from one side of a frame, the column-holding means being located at the delivery end of the conveyors, the top conveyor having a series of outwardly projecting biased members, each for location, when depending from the lower flight of the top conveyor, at the top of a stack of can ends located between the two conveyors and serves to assist in keeping the stack of can ends together, support means being provided along one longitudinal side of the frame and positioned between the two conveyors to support and position the upright stacks of can ends and including a series of upright members mounted on supports and adapted for lateral movement between an inboard and an outboard position relative to the conveyors in which positions the members respectively support the stacks, and are withdrawn from the stacks to allow movement of the stacks and conveyors towards the delivery end thereof.

An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a side elevation of feeding apparatus according to a first embodiment of the present invention,

FIG. 2 is a plan view of the feeding apparatus of the first embodiment,

FIG. 3 is a section on the line III — III of FIG. 1,

FIG. 4 is a side elevation of a fragmentary detail of the feeding apparatus of the first embodiment showing a delivery end with parts removed for the sake of clarity,

FIG. 5 is a sectional plan view on the line V — V of FIG. 4.

FIG. 6(*a*) is a front elevation view of a stack support of the feeding apparatus of the first embodiment,

FIG. 6(*b*) is a side elevation view of a stack support of the feeding apparatus of FIG. 6(*a*),

FIG. 6(*c*) is a plan view of the stack support of FIG. 6(*a*),

FIG. 6(*d*) is a fragmentary detail of a clip of the stack support of FIG. 6(*a*),

FIG. 7 is a side elevation of feeding apparatus according to a second embodiment,

FIG. 8 is a section on the line VIII — VIII of FIG. 7,

FIG. 9 is a section on the line IX — IX of FIG. 7; and

FIG. 10 is a sectional plan view of an alternative stack support.

Feeding apparatus and according to the first embodiment includes a frame **9** (FIG. 3) mounted on a stand **8** with height adjustable feet **7** and at one end of which, hereinafter called the delivery end, column-holding means are located comprising an annular flange **10** adapted for mounting on a feed magazine through which can ends are passed to a machine for the purpose aforesaid. Three rods **11***a* upstand from the flange **10** and three rods **11***b* depend from a plate **12**, the rods **11***a*, **11***b* being equi-spaced. The rods **11***a* and **11***b* are interconnected by annular plates **6** to allow the rods **11***a* to be movable relative to rods **11***c*. Plate **12** has an aperture **13** of same diameter as the aperture in the flange **10**.

Conveyor means includes a horizontal track **14** of substantially annular shape in plan mounted around the frame **9**, the track **14** having a series of freely-rotatable, frictionless rollers **15** transversely mounted between two stationary members. The frame **9**, at each end, is provided with an upright spindle **16** journalled in bearings for rotation and on each of which are mounted two vertically spaced grooved pulley wheels **17**. The spindle **16** at the delivery end of the frame **9** is driven and is provided, at its lower end, with positioning means constituted by an indexing plate in the form of a disc **18** with four equi-spaced notches **19**. An air-cylinder and piston arrangement **20** is provided, the outer end of the piston of which has a roller **20***a* adapted to enter into each notch **19** in turn to secure the indexing plate in position after each rotational movement of the spindle **16** in a manner to be described hereinafter. Adjacent to the upper end of the spindle **16**, there is provided a second air cylinder and piston arrangement **21**. The outer end of the piston of the arrangement **21** is secured by a lug **24** to two chains **22** arranged around two pairs of sprocket wheels **23***a* and **23***b*, the cylinder of the arrangement **21** being secured to the frame **9**. One pair of the sprocket wheels **23***a* is secured to the upper end of the spindle **16** and the other pair of sprocket wheels **23***b* is mounted on the frame **9** for free rotational movement. On actuation, the piston and cylinder arrangement **21** extends to move the chains **22** towards the spindle **16** and in so doing rotates the spindle **16** a predetermined rotational distance. The sprocket wheels **23***a* are each provided with a reverse free wheel movement so that after the

predetermined rotational movement has been completed they can free wheel back to their initial position without rotating the spindle **16** as the piston of the piston and cylinder arrangement **21** retracts. Around each corresponding pair of wheels **17** is located an endless belt **25**. A series of upright stack supports **26** (FIG. **6**), in this instance 44, are mounted on the belts **25** and each stack support terminates above the track **14**. Each stack support **26** is of a substantially U-formation in plan view and comprises three uprights **27**, one of which is located mid-way of the web and is secured to the two endless belts **25**, and one at each of the outer ends of the limbs. The upright **27** located mid-way of the web of each support **26** is secured to a tooth positioned on the other side of the belts from the upright, these teeth **27***a* meshing with the grooves on the wheels **17** to prevent slip and maintain the pitch between each of said uprights **27** of the web. The uprights **27** are secured together by a clip **28** at two places, one adjacent to the top and one adjacent to the bottom of the uprights **27**. Each clip **28** is of U-shape and comprises three straps **29** of metal, one strap for the web which has both ends bent inwardly, and two straps, one for each limb, these two straps having only one bent end. The straps **29** are secured together at their two abutting bent ends by means of an elongate rivet **30**, the inside of the head **31** of each rivet **30** being abutted by one end of a helical spring **32**, the other end of the spring **32** abutting the inside face of the respective bent end of the web strap **29**. Each rivet **30** terminates on the outside of the bent end straps **29**. The upright **27** located mid-way of the web of each stack support **26** is provided at its top and bottom ends with a peg **39** each of which is engageable in a channel of a U-shaped rail **40**, the channels of which rails are inwardly directed; the pegs **39** and rails **40** serving to hold the stack supports **26** upright and to prevent lateral movement.

Control means responsive to the height of a column in the column-holding means **10 – 12** are provided in a compressed air circuit with the piston and cylinder arrangements **20, 21**. The control means includes two valves **33, 34**, valve **33** being located vertically above valve **34**. Each valve **33, 34** has a movable member **35** terminating at its outer end in a roller **36**. The movable member **35** of the valve **33** is pivoted at **37** i.e. at its inner end, and the movable member **35** of valve **34** is pivoted at **38** i.e. at a point mid-way of its length. When a column of can ends is located in the column-holding means **10 – 12**, both rollers **36** abut against the sides of the can ends. When in this position, member **35** and valve **33** is closed as is also valve **34**. Valve **33** is positioned before valve **34** in an air circuit such that no air can pass to valve **34** until valve **33** is opened. The air circuit includes a supply of compressed air which is fed first to valve **33** then to valve **34** the piston and cylinder arrangement **21** and then to arrangement **20**.

In use, the feeding apparatus is positioned with the column-holding means **10 – 12** feeding into machinery for the purpose aforesaid with the flange **10** secured thereto. The means **10 – 12** can be raised or lowered by position adjusting the rods **11***a*, **11***b*. The height-adjustable feet **7** are adjusted if necessary to raise or lower the frame relative to the machinery. Stacks, each of about **250** can ends, are placed in each of the stack supports **26**. The can ends can either be placed in the stack supports **26** loose, bagged or wrapped, the wrapper being removed after the stack is located in the respective stack support **26**. The stacks can be positioned in any of the stack supports **26** located about the frame but preferably in supports at a position on the side opposite to the side feeding along to the delivery end. The stacks of can ends can be positioned in the stack supports **26** either by pushing them into the support from the front or by feeding them down from the top. The valves **33, 34** and arrangements **20, 21** are connected to the supply of air. A column of can ends is manually located in the column-holding means. The machinery for the purpose aforesaid is started and can ends are fed, one at a time, from the leading end i.e. the lower end, of the column via a feed magazine to the machinery for the purpose aforesaid. As the can ends are so fed, the column diminishes in height. When the top of the column passes below roller **36** to valve **33**, air is fed to the valve **34**. When the top of the column passes below roller **36** of valve **34**, air is fed through the valve **34** to the arrangement **21**, and then to the arrangement **20** to respectively extend the piston of arrangement **21** and extend the piston of arrangement **20**. This causes respectively the chains **22** to be moved to rotate the spindle **16** which causes movement of the belts **25**, the roller **20***a* to abut and roll along the circumference of the indexing plate. When the roller **20***a* enters the next groove, stopping rotational movement of the spindle **16**, a stack support **26** full of can ends is in position over the aperture **13** of plate **12** so that the can ends therein can move theredown to fill the column-holding means and in doing so resetting the valves **33, 34**. When the valves **33, 34** are reset, the arrangements **20, 21** are respectively retracted. This sequence of events is repeated each time the valves **33, 34** are opened. This sequence of events takes place for as long as the apparatus is required to function; emptied stack supports **26** being re-stacked during operation so that the sequence need not be interrupted.

The plate **12** is preferably radially position-adjustable on the frame **9** by means of bolts and nuts **5** engaging in holes **4** on the plate and a hole in the frame **9** so that the plate **12** can be positioned relative to the track **14** so that the column-holding means can be positioned-adjusted, if necessary, to enable it to be located over the feed magazine, necessitating, of course, the indexing plate being radially position-adjusted relative to the spindle **16**.

In a modification, the stack support may be of plastics or other suitable material extruded or moulded to a shape in cross-section as shown in FIG. **10**, the plastics having a very high melting point to withstand the temperature of steam normally used to clean the apparatus.

In a second embodiment, like parts are denoted by the same numerals used in the first embodiment. A frame **9** is mounted on a stand (not shown) with height-adjustable feet, one end of which frame **9** is hereinafter called the delivery end at which column-holding means are located comprising the annular flange **10** adapted for mounting on a feed magazine (not shown) through which can ends **41** are passed to a machine for the purpose aforesaid. Four rods **11** upstand from the flange **10**, and are equi-spaced around the inner peripheral edge thereof. The top of the rods **11** carry a plate **12**

having the aperture **13** therein of the same diameter as the inner diameter of the flange **10**. A first pair of extension rods **42** are mounted to upstand on the plate **12** and are in axial alignment with two corresponding subjacent rods **11**. Positioning means are provided and comprise a second pair of upstanding extension rods **43** serving as a gate, each rod **43** being carried by the outer end of a piston of first and second piston and cylinder arrangements **44**, **45** respectively, each arrangement being mounted laterally of its corresponding extension rod **43**. Each of the second pair of the extension rods **43** is adapted under the influence of its corresponding arrangement to be located, in its extended position, in axial alignment with a corresponding rod **11** of the other two subjacent rods **11**.

Conveyor means comprises two vertically spaced conveyors, **46** located on one side only of the frame **9**, each being of the slatted band chain type, and each arranged around two horizontally spaced sprockets **47** suitable for use with slatted band chain type of conveyors **46**. The positioning means is located adjacent to the delivery end of the conveyors **46**. The sprocket **47** at the loading end of the conveyors **46** each have a free-wheel sprocket wheel **48** mounted axially therewith. Two idling sprocket wheels **49** are mounted adjacent to the free-wheel sprocket wheel **48** on the upper conveyor **46**, one on each side thereof in side elevation. A conventional chain **50** is fed around the lower arc of the free-wheel sprocket wheel **48** on the lower conveyor **46**, over the upper arc of one of the two idling sprocket wheels **49**, around the second of the idling sprocket wheels **49**, over the upper arc of the free-wheel sprocket wheel **48**, of the upper conveyor **46**, and back to the free-wheel sprocket wheel **48**, of the lower conveyor **46**. A lug **51** is mounted on the chain **50** between the two free-wheel sprocket wheels **48** and is connected to the outer end of a piston of a third piston and cylinder arrangement **52**, the cylinder of which is stationary mounted. When the piston is extended, the chain **50** moves a predetermined amount, rotating the wheels **48**, **49** and thereby the sprockets **47** and conveyors **46** in a direction towards the delivery end and when this move has been completed, the piston of the arrangement **52** is retracted and the two free-wheel sprocket wheels **48** return to their original position under their free-wheel thereby not causing the conveyors **46** to correspondingly move. The chain **50** may be re-positioned, at frequent time intervals, around the sprocket wheels **48**, **49** to prevent excessive wear to one part of the chain **50**. The amount of forward movement of the conveyors **46** is determined by the amount of forward movement required to move a stack of can ends **41**, from a supply of upright stacks of can ends **41** located between the two conveyors **46**, to a position to enable the positioning means to position said stack on top of the diminished column.

Support means for the stacks between the conveyors **46** are provided along one longitudinal side of the conveyors **46**, and therebetween. The support means comprise a series of, in this embodiment, 25, upright bar members **53** mounted equi-distantly on two vertically spaced horizontal supports **54**. Four laterally mounted fourth piston and cylinder arrangements **55** are located one at each end of each horizontal support **54**. In the extended position of their corresponding pistons, the bar members **53** are located immediately above a marginal longitudinal edge of the lower conveyor **46** and under the corresponding marginal longitudinal edge of the upper conveyor **46**. In this position of the support means, a stack of can ends **41** is located between each adjacent pair of bar members **53**, and is supported in its upright position by said bar member **53**. In a retracted position of their corresponding pistons, the bar members **53** are located away from the conveyor **46**. The pistons of the arrangements **55** are in the retracted position when the conveyors **46** move forward. The upper conveyor **46** is longer than the lower conveyor **46** and extends over the top of the column-holding means **10** – **12** and positioning means **43**–**45**. In the present embodiment, each second slat of the upper conveyor **46** has an outstanding biased member **56**, at right angles thereto. Each biased member **56** comprises a spindle **57** to-axially located in a tube **58** for sliding movement therewith, and adapted for non-rotational movement relative thereto by a stop **59** radially carried by the spindle and projecting out through a longitudinal slop **60** in the wall of the tube **58**. The outer end of the spindle **57** has a cap **61** of truncated conical shape in cross-section. A tension spring not shown is located around the spindle, one end thereof abutting the tube and the other end thereof abutting the top of the cap.

Control means responsive to the height of a column in the column-holding means are provided and comprise two sensors; a first sensor **62** located above the plate **12** and a second sensor located vertically below the first sensor **62** and level with the plate **12**. The first sensor **62** is operatively connected to the first and second piston and cylinder arrangements **44**, **45** to operate the gate formed by the second pair of extended rods **43**. The second sensor **63** is operatively connected to the fourth piston and cylinder arrangement **55** of the support means and the third piston and cylinder arrangement **52** of the conveyor means.

Because of the use of slatted band chain conveyors **46**, it is necessary to have a series of support rollers **64** under the upper flight of the lower conveyor **46** and under and above the lower flight of the upper conveyor **46**. A deck (not shown) may also be provided under the upper flight of the lower conveyor **46**.

In a modification, the column holding means and positioning means may be positioned at right angles at the delivery end to the conveyor means. In this case, the positioning means includes a further piston and cylinder arrangement mounted on the other side of the conveyor means from the column-holding means and adapted to move a loading stack from the delivery end of the conveyor means in a direction at right angles thereto, to a position in which a second pair of extension rods can move together by the extension of the respective pistons to position the stack on top of the diminished column.

In use, the feeding apparatus of the second embodiment is mounted above existing machinery for the purpose aforesaid, as in the first embodiment. Stacks each of about **250** loose can ends **41**, are placed between the two conveyors **46**. The cap **61** of each biased member **56** abuts the upper surface of the top can end **41** of each stack and pressurizes the can ends **41** together, under the influence of the spring, to form as solid a stack as is possible with loose can ends. The number of

stacks in the supply of stacks on the conveyor means depends on the length of the conveyors **46**, in this instance, twenty-four stacks. The various piston and cylinder arrangements **44**, **45**, **52**, **55** and the two sensors **62**, **63** are connected up to a reservoir of air. A column of can ends **41** is located manually in the holding means, the column to extend up beyond the first sensor **62**. The machine for the purpose aforesaid is started and can ends **41** are fed, one at a time, from the leading end, i.e. the lower end, of the column via a feed magazine to the machinery for the purpose aforesaid. As the can ends **41** are so fed, the column diminishes. When the top of the column passes below the first sensor **62**, this first sensor **62** responds by sending a signal to operate the positioning means to open the gate, i.e. to move the second pair of extension rods **43** away from each other. When the top of the column passes below the second sensor **63**, this second sensor **63** then sends a signal to withdraw the bar member **53** of the support means from between the conveyors **46**, and activates the third piston and cylinder arrangement **52** to move the conveyors **46** in the manner hereinbefore described to feed the leading stack, i.e. that stack adjacent to the delivery end, forward to a position to enable the positioning means to position the stack on the column. After the conveyors **46** have moved forward the predetermined distance, the first and second piston and cylinder arrangement **44**, **45** extend to move the second pair of extension rods **43**, together i.e. to close the gate. As the second pair of extension rods **43** move together, they abut the wall of the stack, i.e. the edges of the can ends **41** and by their further movement together cause the stack to move onto the top of the diminished column. The bar members **53** of the support means are then returned to their position between the conveyors **46**. This sequence of events repeats itself whenever the top of the column falls below the first and second sensors **62**, **63**.

In the modification of the second embodiment, the sequence of events are as before with the addition that a further piston and cylinder arrangement (not shown) moves the stack, once positioned by the conveyors **46**, to a position transverse of the conveyors **46**, at which the second pair of extension rods **43** can abut the wall of the stack.

Rods **11** in FIG. **7** and rods **11***a*, **11***b* in FIGS. **1** and **4** are telescopic to allow built-in height adjustment of the column-holding means when the machinery for the purpose aforesaid is used to seam can ends to large cans and then to small cans or vice versa.

Can ends **41** of any type of metal, foil or plastics, or a combination thereof may be used with this apparatus, and the can ends **41** may be of any shape in plan or in cross-section. The above description relates to conventional circular can ends **41** of one diameter, and the apparatus can easily be modified to use ends of greater or lesser diameter. Other shapes of can ends **41** can be used on the apparatus of the present invention by making suitable adjustments.

Means for stopping the machinery for the purpose aforesaid may be provided so that, if for some reason, a stack of can ends is not fed to replenish the column within a predetermined time, the means operate to stop open topped cans being fed under the feed magazine.

The sensors **62**, **63** may be replaced by valves as used in the first embodiment.

Indexing means may be provided for the second embodiment.

The apparatus of both embodiments although described as being operated pneumatically may be operated electrically or electronically.

I claim:

1. A feeding apparatus including column-holding means for location of an upright column of can ends from the leading end of which column can ends are fed one at a time in succession to can end seaming machinery, conveyor means for carrying a supply of upright stacks of can ends for replenishing said column and including a frame, an outwardly projecting track mounted around said frame and an opening therein communicating with said column-holding means which is located under the opening below the level of the track, two endless belts mounted around said frame above the track and vertically spaced apart, each belt being arranged between two spaced grooved pulley wheels, one corresponding wheel for each belt being mounted on an upright spindle carried at each end of the frame, each belt having teeth on its inner surface to mesh with the grooves on the wheels, at least one spindle being driven, and a series of upright stack supports carried by said belts, the lower end of each support terminating above the track, positioning means for positioning each stack of can ends in turn on top of the diminished column by indexing the belts for predetermined movements around the track to bring each stack support in turn into alignment with the column-holding means to allow a stack of can ends located in a stack support to be transferred through said opening in the track to the column-holding means, the positioning means including an indexing plate mounted on the lower end of the driven spindle, the plate being a disc having a plurality of notches cut in its circumference and into each notch in turn the outer end of a piston of a first piston and cylinder arrangement is adapted to be located after each rotational movement of the spindle caused by driving means including at least one endless chain arranged around a sprocket wheel, having a free wheel reverse movement, located on the upper end of the driven spindle and a freely rotatable sprocket wheel located above the frame, the outer end of a piston of a second piston and cylinder arrangement being secured through a lug to one side of the chain whereby on extension of said second piston and cylinder arrangement, the chain is moved to rotate the sprocket wheel and spindle a predetermined rotational distance and on retraction the pulley wheel rotates with the chain but the spindle is prevented from movement by the action of the positioning means and the free wheel on the sprocket wheel, and control means responsive to the height of said column for operating the conveyor means to feed a stack to enable the positioning means to locate the said stack on the column.

2. Apparatus as claimed in claim **1**, wherein said control means includes two valves vertically spaced above the column-holding means and in circuit with a supply of compressed air and the first and second piston and cylinder arrangements, the valves each having a movable member the outer end of which is a roller adapted to abut the side of a stack of can ends when located above the column-holding means, the upper valve being actuated to allow air to pass from the air supply to the lower valve, when the top of the stack of can

ends passes below its level, the lower valve being actuated to extend the piston of each of the first and second piston and cylinder arrangements respectively, when the top of the stack of can ends passes below its level, the valves being reset and the pistons of the arrangements being returned to their initial position on location of a stack of can ends above the column-holding means.

3. Apparatus as claimed in claim 1, wherein said column-holding means includes an annular flange, four equi-spaced rods upstanding from the inner periphery of the top face of said of said flange, and a plate supported by the upper ends of said rods and having a circular aperture of same periphery as the inner periphery of the flange.

4. Apparatus as claimed in claim 1, wherein each stack support is of a substantially U-formation in cross-section, the limbs of the support being resilient for relative movement apart to allow the stack support to be front-loaded with a column of can ends.

5. A feeding apparatus including a column-holding means for location of an upright column of can ends from the leading end of which column can ends are fed one at a time in succession to can end seaming machinery, conveyor means for carrying a supply of upright stacks of can ends for replenishing said column and including two vertically spaced conveyors each located around two sprocket wheels projecting out from one side of a frame, the column-holding means being located at the delivery end of the conveyors, the top conveyor having a series of outwardly projecting biased members, each for location, when located depending from the lower flight of the conveyor, at the top of a stack of can ends located between the two conveyors and serving to assist in keeping the stack of can ends together, support means being provided along one longitudinal side of the conveyors between the two conveyors to support and position the upright stacks of can ends, positioning means for positioning each stack of can ends in turn on top of the diminished column from the conveyor means, and control means responsive to the height of said column for operating the conveyor means to feed a stack to enable the positioning means to locate the said stack on the column.

6. Apparatus as claimed in claim 5, wherein said support means includes a series of upright members mounted on supports and adapted for lateral movement between an inboard and an outboard position in which respectively the members support the stacks, and are withdrawn from the stacks to allow movement of the stacks and conveyors towards the delivery end thereof.

7. Apparatus as claimed in claimed in claim 5, wherein said column-holding means includes an annular flange, four equispaced rods upstanding from the inner periphery of the top face of said flange, a plate supported by the upper ends of said rods and having a circular aperture of same periphery as the inner periphery of the flange, and a first pair of extension rods upstanding from the plate and co-axial with two of the subjacent rods on the side of the column-holding means remote from the frame.

8. Apparatus as claimed in claim 7, wherein said positioning means includes a second pair of extension rods located above the plate, and each movable by extension and retraction of a piston of a piston and cylinder arrangement to an inboard position in which the rods are co-axial with the other two subjacent rods and to an outboard position, a stack of can ends fed from the conveyor to the column-holding means being positioned by the movement of the rods for the stack to be located above the aperture of the plate to allow can ends to be fed on to the top of the column of can ends in the column-holding means.

9. Apparatus as claimed in claim 8, wherein said control means includes two vertically spaced sensors, an upper sensor spaced above and a lower sensor spaced level with the plate of the column-holding means, the sensors being in circuit with a supply of air and with a piston and cylinder arrangement of the driving means, each sensor being actuated on the level of the stack of can ends passing below its level, the upper sensor being actuated to retract the piston and cylinder arrangements of the positioning means to place the extension rods in an outboard position, and the lower sensor being actuated to extend the piston and cylinder arrangement of the driving means, the sensors being reset and the movements of all the piston and cylinder arrangements reversed when a further stack of can ends is located on top of the column of can ends in the column-holding means.

10. Apparatus as claimed in claim 9, wherein said driving means includes an endless chain located around four sprocket wheels, two of which have a free wheel reverse movement, one of each of these two wheels being located at the loading end of the two conveyors and mounted axially with the corresponding sprocket wheel, the other two sprocket wheels being idling wheels, the piston of the piston and cylinder arrangement being secured by a lug to the chain, extension of the piston causing movement of the conveyors towards the column-holding means, and retraction of the piston causing no movement to the conveyors due to the free-wheel reverse movement of the sprocket wheels.

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