

Nov. 9, 1948.

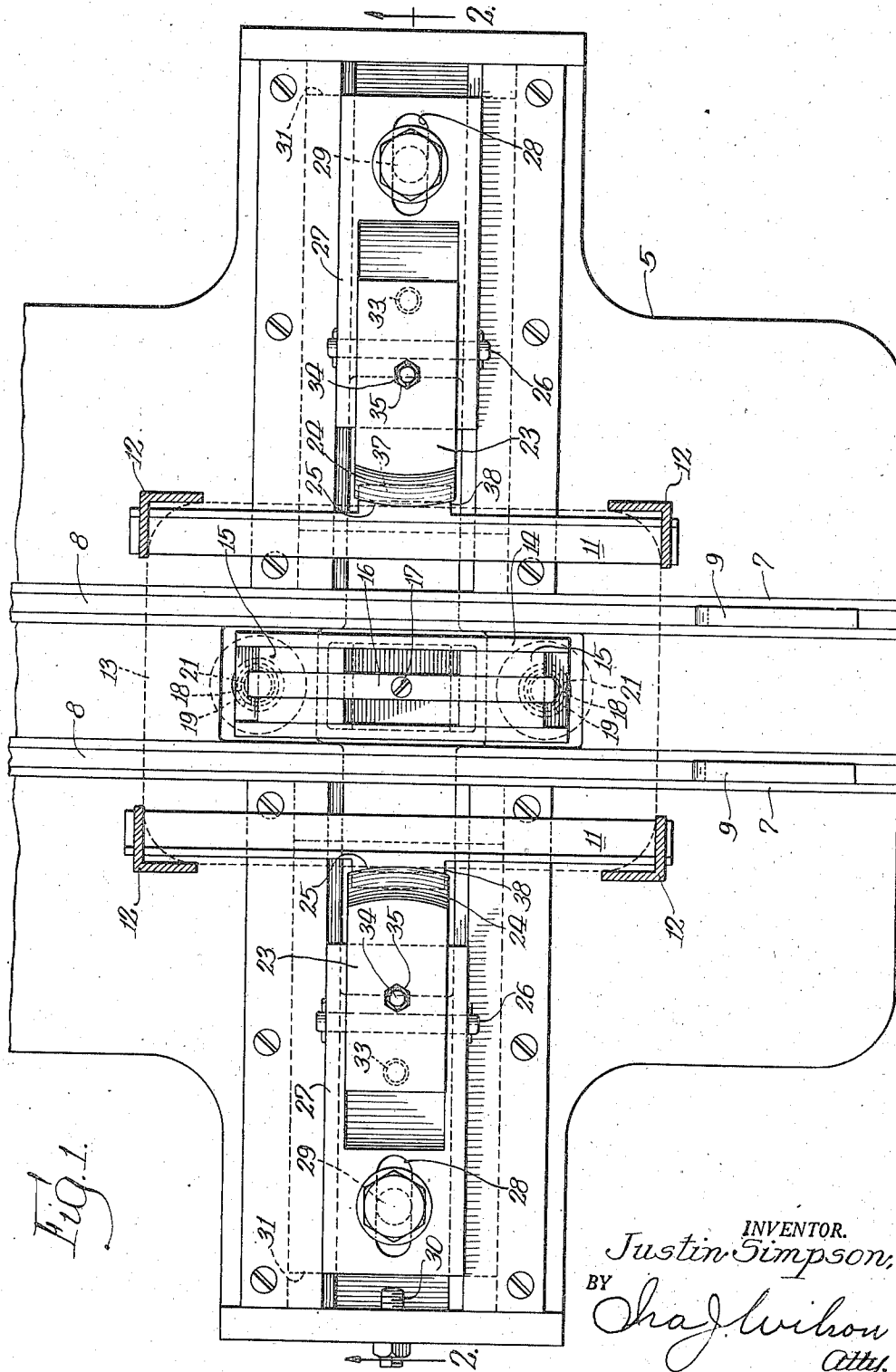
J. SIMPSON

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CAN END FEEDING MECHANISM

Filed Jan. 13, 1945

3 Sheets-Sheet 1



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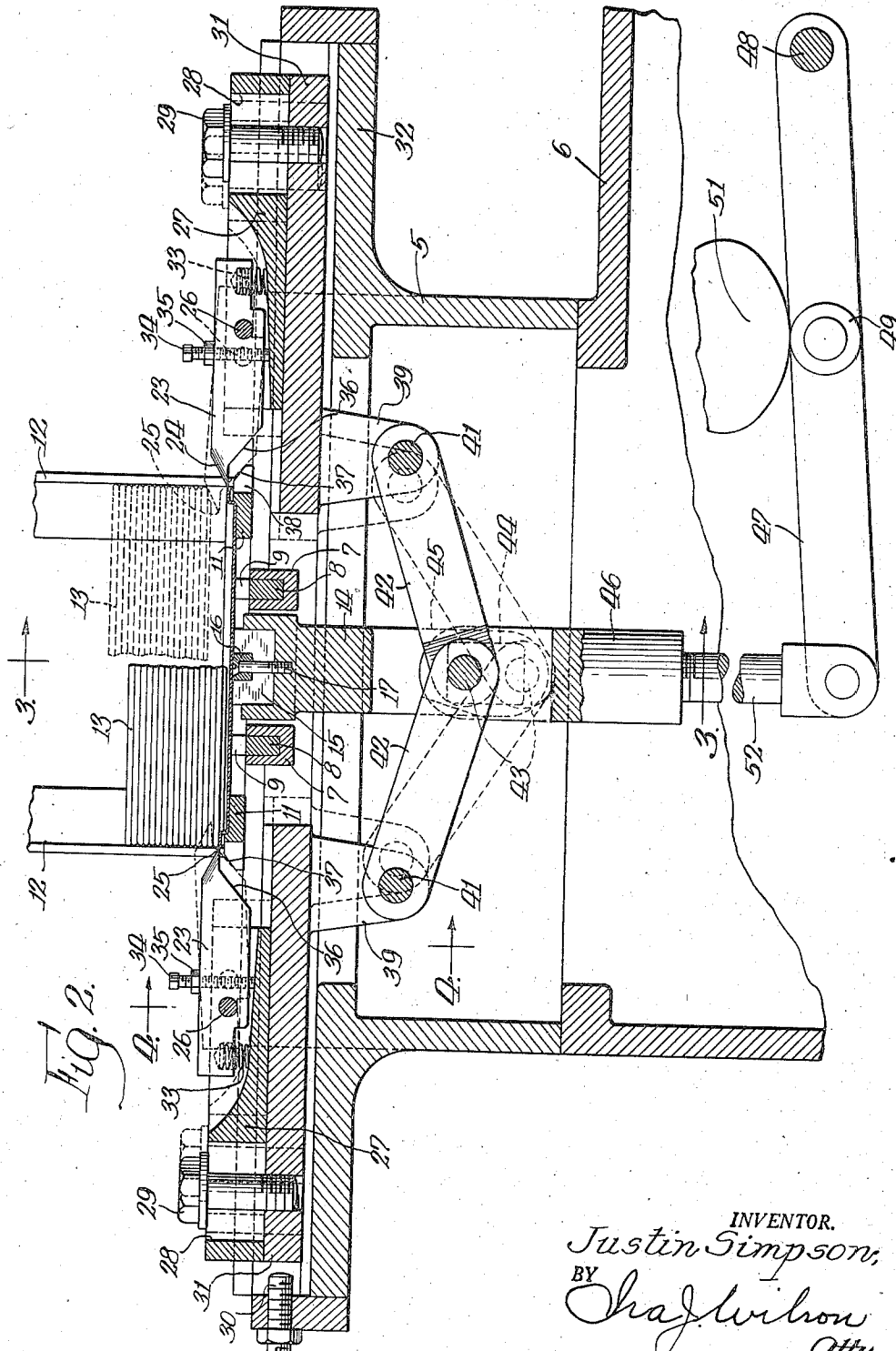
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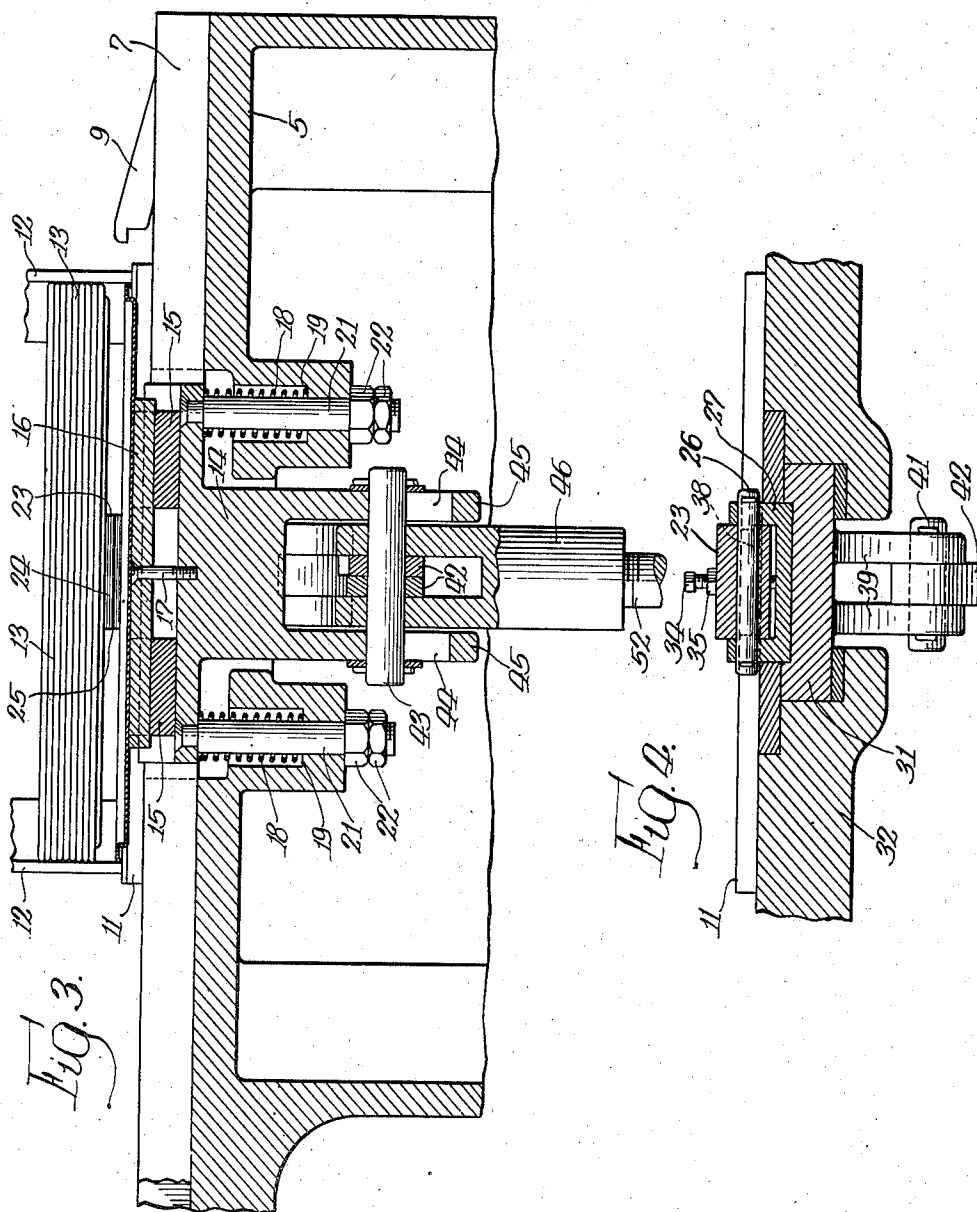
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CAN END FEEDING MECHANISM

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6 Claims. (Cl. 113—114)

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This invention relates in general to feeding mechanisms and more particularly to the feeding of can ends or caps to an applying machine, such as a double seamer.

The feeding in succession of ends of this character from a magazine involves the separation of one of the ends from the remainder and the removal of such separated end from the magazine. The high speed operation of modern can making machinery has a tendency to impair the accuracy of the feeding operation, with the result that a miss not infrequently occurs. The principal cause of such misses is the tendency of an end to bounce in the magazine, particularly when the magazine approaches a state of exhaustion so that the end which should be fed is above, instead of in alignment with, the feed dog when such dog makes its feeding movement.

The primary purpose of my present invention is to provide a mechanism for feeding can ends which will accurately and with certainty control the position of an end to be fed and insure its engagement and feeding by the feed dog of the mechanism.

More specifically, my invention aims to eliminate the inaccuracies in feeding resulting from bouncing of the can ends in the magazine by positively holding the end to be fed in a predetermined position with respect to the feed dog. In this manner an end is properly positioned for feeding at each operation of the mechanism and is positively engaged and fed from the magazine with certainty and without liability of misses.

For the purpose of illustrating the principles of my invention, I have shown on the accompanying drawings a preferred embodiment thereof, although it will be obvious that the invention is capable of embodiment in apparatus differing substantially in structural details from that here shown for illustrative purposes.

Referring to the drawings,

Fig. 1 is a plan view of a can end feeding mechanism embodying my invention;

Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2; and

Fig. 4 is a fragmentary section on the line 4—4 of Fig. 2.

Referring to the drawings more in detail, reference character 5 indicates generally the frame structure carrying the feeding mechanism and which in turn is supported upon the frame 6 of a machine such as a double seamer. Extending longitudinally of such double seamer are the

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channel-shaped feed bar guides 7 in which the feed bars 8 are reciprocable. Each feed bar is equipped with feed dogs 9 which are yieldingly projected above the feed bars by springs, so as to engage and feed a can end upon movement in one direction and to pass beneath the magazine upon reverse movement, as is customary in the art.

The magazine in which the can ends are stored for feeding comprises the base plates 11 and the uprights 12. The magazine here shown for illustrative purposes is shaped to accommodate elongated sheet metal can ends 13 adapted to form the ends of can bodies commonly referred to as square cans. It should be understood, however, that my invention is not concerned with the shape of the ends to be fed, as its principles may be embodied in feeding mechanism for feeding round, square or other shaped ends.

Centrally beneath the magazine and between the feed bars there is disposed a vertically reciprocable head 14 carrying a pair of permanent horseshoe magnets 15 arranged in spaced apart relation and held in position on the head by the bar 16 of non-magnetic material which is secured to the head by a screw 17. The tips or upper faces of the magnets lie flush with the upper face of the bar 16.

The head is urged into its uppermost position, with the ends of the magnets disposed to contact the lower face of an end 13 resting upon the base plates 11 of the magazine, by a pair of coiled expansion springs 18 interposed between the head and the bottoms of sockets 19 formed in the frame structure 5. A pair of stops 21 in the form of bolts or rods riveted to and depending from the head 14 through openings in the sockets 19 and provided with adjustable nuts 22 serves to limit the upward movement of the head 14 under the influence of the springs 18. By adjustment of the nuts 22, one of which of each pair is a lock nut, the position of the magnets may be regulated to a fine degree of nicety, so that they will most effectively magnetically attract and hold a can end in position to be engaged and fed from the magazine by the feed dogs.

The lowermost end in the magazine is separated from the superposed ends by a pair of opposed separator blades 23 having curved and beveled margins, as indicated at 24, terminating in a knife edge 25 adapted to be inserted between the upper face of the lowermost end in the magazine and the lower face of the next superposed end.

Each separator 23 is pivotally mounted upon

a pintle 26 carried by a channel-shaped holder 27. The holders 27 are each provided with a longitudinally extending slot 28 to receive a lag bolt 29 extending through the slot and threaded into a slide 31 mounted to reciprocate upon the table 32 of the frame 5. The adjustability of the holders 27 on the slides enables the separators 23 to be accurately positioned with respect to the stack of ends. The extent of retraction of the slides 31 is determined by the position of the adjustable abutment 30.

The operating end of each separator is urged downwardly by a spring 33 interposed between the tail of the separator and the bottom of the holder 27. The entering edge of each separator is adjusted as to height so as to penetrate between the lowermost and the next superposed end by an adjustable abutment 34 threaded through the separator into engagement with the bottom wall of the holder 27 and adapted to be retained in adjusted position by a lock nut 35.

The lower forward portion of each separator has an inclined surface 36 adapted to engage a similar inclined or cam surface 37 formed on a fixed rail 33, so that when the separator is moved inwardly it will ride up the inclined surface 37 from the full line to the dotted line position shown in Fig. 2, thereby elevating the stack of ends so as to provide ample clearance for the entrance of the feed dogs 9 beneath the stack, whereby the lowermost end is fed from the magazine.

Each slide 31 is provided with a pair of spaced apart ears 38 connected by a pin 41 with links 42, the links being connected by a pin 43 which extends through elongated slots 44 in the depending extensions 45 of the head 14. The pin 43 extends also through the bifurcated upper portion of the operating member 46. It will be apparent that by this construction the operating member 46 has a pivotal connection with the links 42 and a lost motion connection with the head 14. Vertical reciprocatory motion is imparted to the member 46 by a lever 47 fulcrumed at 48 and carrying a cam follower 49 adapted to be actuated by a cam 51. A link 52 threaded at its upper end into the member 46 and pivotally connected at its lower end to the lever 47 serves to pull the member 46 downwardly upon actuation of the lever 47. Upward movement of the head is limited, as previously stated, by the adjustable nuts 22, while outward movement of the slides 31 is limited by an adjustable abutment screw 30.

The operation of my improved mechanism is substantially as follows:

Assuming the parts to be in the position shown in full lines in Fig. 2, the lowermost end in the magazine is resting upon the cross-rails 11 and in engagement with the permanent magnets 15 by which it is held in that position. The separators 23 are supported by the adjustment screws 34 so that their edges are positioned to enter the stack between the lowermost and the next superimposed end. Movement of the lever 47 under the influence of cam 51 will pull the member 46 downwardly, thereby, through the links 42, pulling the slides 31 and the separators 23 mounted thereon toward each other to insert the separators into the stack above the lowermost end. The bevels 24 on the separators raise the stack as the separators are inserted, and when the inclines 36 of the separators are brought into engagement with their respective cam surfaces 37, an additional upward movement is im-

parted to the separators so that the stack is lifted a substantial amount, as shown in dotted lines at the right in Fig. 2, providing thereby a substantial clearance between the separated end and the remainder of the stack for the entrance of the feed dogs 9.

The reciprocation of the feed dogs is so timed with respect to the operation of the separators that the dogs enter the magazine substantially at the time when the stack has been raised by the separators the maximum amount, thus providing maximum clearance for the entrance of the dogs.

Just before the feed dogs enter the magazine, the pin 43 is brought by the operating member 46 into engagement with the lower ends of the slots 44, so that the final downward movement of member 46 pulls the head 14 downwardly to disengage the magnets from the end to be fed, thereby releasing the end from the magnetic attraction of the magnets. The end is held by the magnets in the path of the feed dogs until just prior to engagement of the dogs with the end, whereupon the end is released from the magnets.

When the lowermost end has been fed from the magazine, the feed dogs 9 and the operators 23 are withdrawn from beneath the stack, thereby permitting the stack to drop by gravity to the bottom of the magazine. In modern high speed operations, the movements of the feed dogs and the operators are so rapid that any bouncing of the lowermost end in the magazine when it is dropped will cause it to be engaged by or caught between the separators, thereby producing a jam or resulting in breakage of the machine. My present apparatus is so designed that when the stack drops in the magazine the head carrying the magnets has been restored by the springs 18 to normal elevated position, so that the lowermost end, upon withdrawal of the separators from beneath it, drops into engagement with the magnets, whereby it is magnetically held against any bouncing or rebound and is maintained in feeding position below the plane of the operating edges of the separators. In this manner danger of jams or breakage resulting from improper positioning of the end to be fed is eliminated and accuracy and positiveness of operation are insured.

I claim:

1. In a can end feeding mechanism, the combination of a can end magazine having a stationary bottom, a vertically reciprocable head beneath the magazine, a magnet carried by said head, means for normally positioning said head beneath the magazine so that said magnet will attract an end disposed upon the bottom of the magazine, means positively reciprocated transversely of the magazine for separating said magnetically attracted end from the remaining ends in the magazine, means for operating said separating means and said head, said operating means being linked to the separating means and having a lost motion connection with the head so that downward movement is imparted to the head to withdraw the magnet from said end subsequently to the separating action of said separators, and means for feeding said separated end from the magazine.

2. In a can end feeding mechanism, the combination of a can end magazine including stationary base plates upon which the lowermost end in the magazine rests, a pair of horizontally reciprocable separators movable transversely of the magazine, a magnet vertically movable be-

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neath the magazine, and means for moving said separators and said magnet in timed relation, including a vertically reciprocable operating member, a link connection between said member and the separators and a lost motion connection between said member and the magnet, whereby the magnet is withdrawn downwardly away from the magazine subsequently to the separating action of the separators.

3. In a can end feeding mechanism, the combination of a magazine, a pair of opposed tapered separators, slides for positively and simultaneously moving said separators transversely of the magazine to separate the lowermost end therein from the remainder, a head vertically reciprocable beneath the magazine, a magnet carried thereby and below the position of the lowermost end in the magazine, means including a lost motion connection for reciprocating said head, and a pair of links connecting said last mentioned means with said slides whereby the separators are actuated to separate the end engaged by said magnet from the remaining ends in the magazine in timed relation with the withdrawal of the magnet from cooperative relation with said end to permit feeding of the same from the magazine.

4. In a can end feeding mechanism, the combination of a magazine, a pair of permanent magnets vertically reciprocable beneath the magazine, spring means for yieldably urging said magnets toward the magazine, adjustable stops whereby the position of said magnets under the influence of said springs may be regulated so as to magnetically hold against bounding upwardly an end dropped in said magazine within the magnetic zone of said magnet, means for separating the superimposed ends in the magazine from said magnetically held end, means for feeding said held end from the magazine, and means for withdrawing said magnets against the force of said springs to release said magnetically held end for feeding purposes.

5. In a can end feeding mechanism, can end stack supporting plates, can end stack guide up-
rights rising above said plates, a feedway over
which the can ends are fed one by one from the
stack, reciprocable feed means engageable with
can ends resting on said plates for feeding can
ends onto said feedway, separators movable in-
wardly and outwardly between the uprights in
timed relation to the feed means and in position
for engaging between the lowermost can end in
the stack and the can end thereabove on each
inward movement to separate the lowermost can
end from the stack and lift the remainder of the
stack clear of the same, magnet means disposed

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beneath the stack, and means for vertically reciprocating the magnet means in timed relation to the movement of the separators and feed means for presenting the magnet means approximately at the level of the can end supporting surface of the plates during each retraction of the separators and falling of the can ends onto said plates to prevent bouncing of can ends on the plates as they are allowed to fall thereonto, and for lowering the magnet means to break the magnetic attraction of the separated lowermost can end of the stack just prior to each can end feeding movement of the feed means.

6. In a can end feeding mechanism, can end stack supporting plates, can end stack guide up-
rights rising above said plates, a feedway over
which the can ends are fed one by one from the
stack, reciprocable feed means engageable with
can ends resting on said plates for feeding them
onto said feedway, separators movable laterally
inwardly and outwardly between the uprights in
timed relation to the feed means and in position
for engaging between the lowermost can end in
the stack and the can end thereabove on each
inward movement to separate the lowermost can
end from the stack and lift the remainder of the
stack clear of the same, magnet means disposed
beneath the stack, and common means for moving
the separators laterally and the magnet
means vertically in timed relation to each other
and the feed means for presenting the magnet
means approximately at the level of the can end
supporting surface of the plates during each re-
traction of the separators and falling of the can
ends onto said plates to prevent bouncing of can
ends on the plates as they are allowed to feed
thereonto and for lowering the magnet means to
break the magnetic attraction of the separated
lowermost can end of the stack just prior to each
can end feeding movement of the feed means.

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