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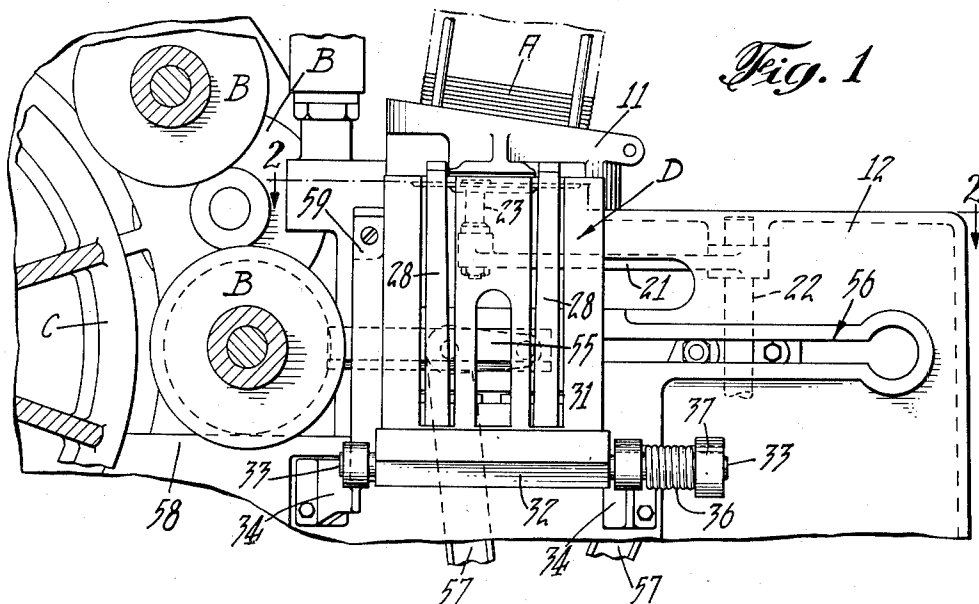
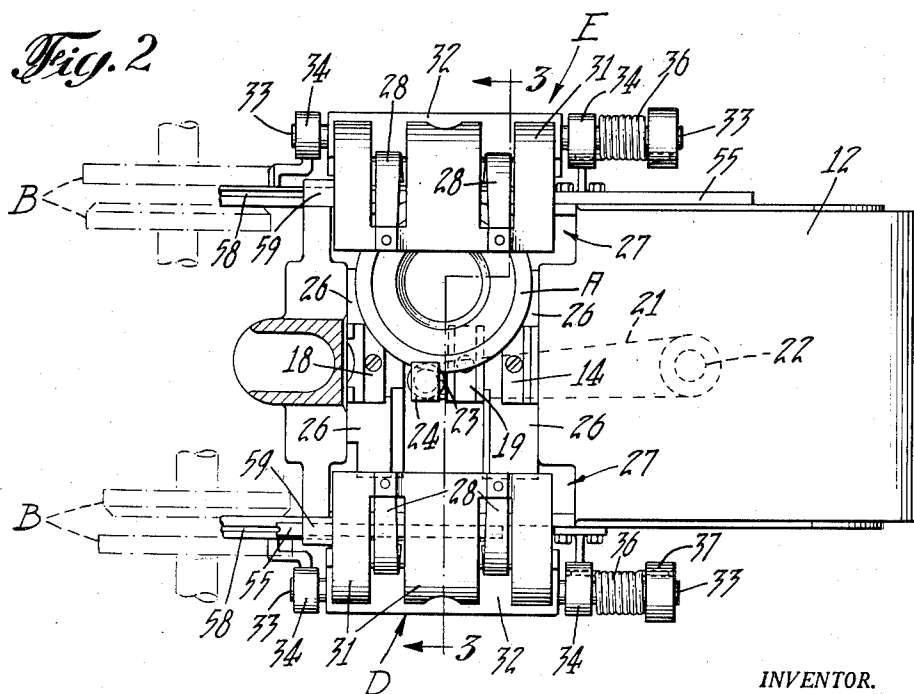
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FEEDING DEVICE FOR CAN END TESTING MACHINE

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2 Sheets-Sheet 1



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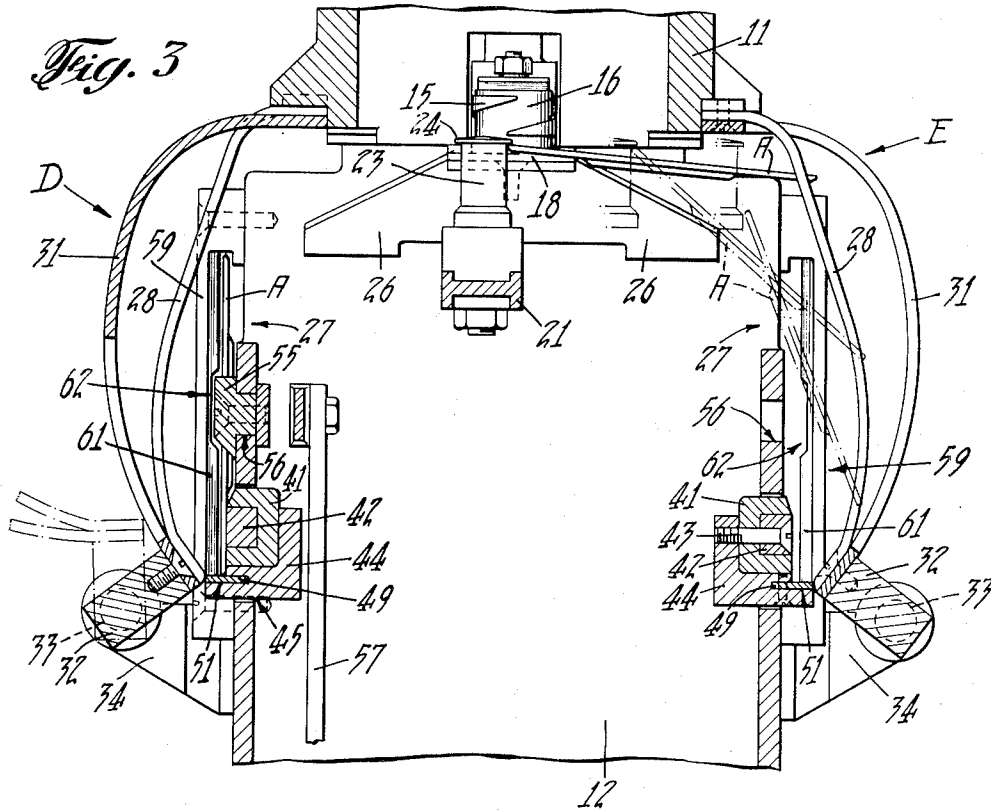
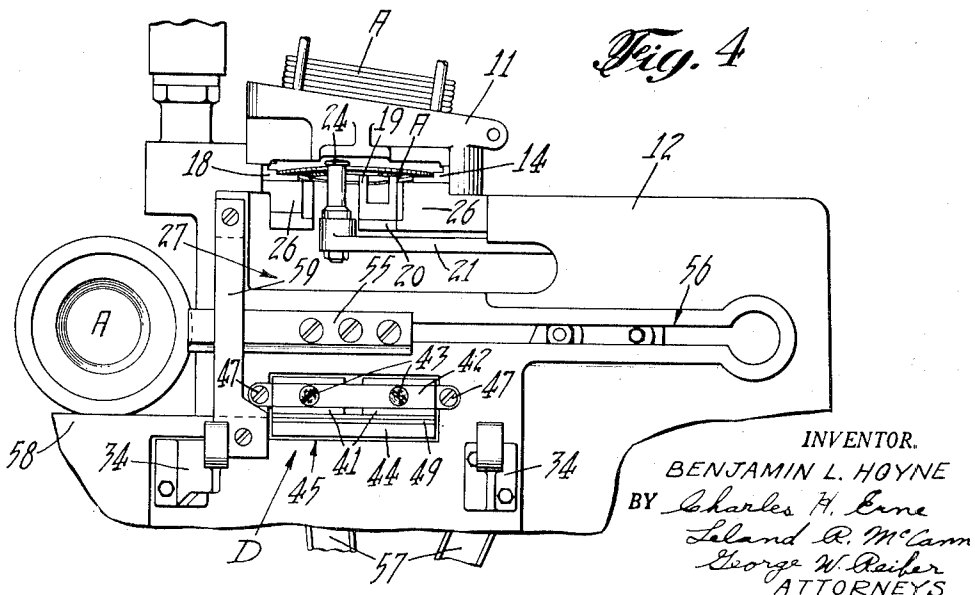
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FEEDING DEVICE FOR CAN END TESTING MACHINE

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11 Claims. (Cl. 73—45.2)

The present invention relates to a power operated can end testing machine for detecting perforations or other imperfections in the walls of can ends and has particular reference to improved feeding devices for feeding the can ends from a stack into the testing devices of the machine. This is an improvement on the machine disclosed in United States Patent 2,330,229 issued September 28, 1943 to W. W. Maher on Can End Testing Machine.

An object of the invention is the provision in a can end testing machine of feeding devices which are simple in character and with as few moving parts as possible so as to provide accurate and efficient feeding with minimum wear and maintenance.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a fragmentary side elevation of a can end testing machine embodying the instant invention, parts being broken away and shown in section;

Fig. 2 is a top plan view taken substantially along the broken line 2—2 in Fig. 1, with parts shown in section, and parts shown in dot and dash lines;

Fig. 3 is an enlarged transverse sectional view taken substantially along the broken line 3—3 in Fig. 2, with parts broken away and with parts shown in different positions in dot and dash lines; and

Fig. 4 is a view similar to Fig. 1 with parts omitted.

As a preferred or exemplary embodiment of the instant invention the drawings illustrate principal parts of the can end testing machine disclosed in the above mentioned Maher Patent 2,330,229. In such a machine sheet metal can ends A are fed individually into a plurality of tester heads B carried on the peripheries of a pair of axially spaced and parallel, mechanically joined, vertically disposed and continuously rotated tester wheels C, with the tester heads on one wheel in staggered and confronting relation to those on the other wheel. The can ends received in the tester heads B are subjected preferably to air pressure as disclosed in the Maher patent to test the can ends for perforations or other imperfections, and are segregated in accordance with the results of this test.

The can ends A to be tested are fed horizontally from the bottom of a stack of such ends contained in a magazine 11 located intermediate the two tester wheels C adjacent their outer peripheries. The magazine 11 is mounted on top of a housing 12 which is part of the main frame of the machine. The stack of ends in the magazine is inclined slightly from the vertical in a direction away from the tester wheels so that the lowermost can end in the stack is tilted, with its edge nearest the wheels slightly higher than its opposite edge. The lower edge of the bottom can end rests on a horizontally disposed stepped support plate 14 (Figs. 2 and 4) secured to the housing 12 while the higher edge of the end initially rests on a helical thread 15 (Fig. 3) of a continuously rotating separator screw 16 of the character shown in the Maher patent above mentioned and mounted and driven in the same manner.

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As disclosed in the Maher patent, the rotation of the separator screw 16 lowers the higher edge of the bottom can end in the stack until the end is in a substantially horizontal position and thus separates this end from the end next above in the stack. The thus lowered edge of the separated can end is supported on a stepped support plate 18 (Figs. 2, 3 and 4) which is similar to and disposed opposite the support plate 14. The plate 18 is secured to the housing 12. These support plates 14, 18 are disposed at an elevation immediately below the bottom open end of the magazine so that the separated, horizontally disposed can end is clear of the magazine. The can end is held in this position temporarily by a short horizontally disposed horseshoe magnet 19 which is located adjacent the support plate 14 and rests on a shelf extension 20 of the housing 12. The magnet holds the separated can end rigid or steady for feeding from under the magazine.

As each can end A is individually separated from the stack, it is swept in a lateral direction from its horizontal position and precipitated into a guided fall to a vertical position in alignment with the tester heads B, one can end being swept toward the right as viewed in Fig. 3 for alignment with the tester heads on one wheel and the next can end being swept toward the left for alignment with the tester heads on the second wheel, the can ends being received at separate transfer stations D and E. This alternate feeding of the separated can ends in opposite directions into the two transfer stations D, E is effected by a horizontally oscillatable transfer arm 21 (Figs. 1, 2, 3 and 4) which is mounted at one end on a vertical shaft 22 carried in the housing 12. The shaft 22 is oscillated in time with the other moving parts of the machine as disclosed in the Maher patent above mentioned.

The free end of the transfer arm 21 swings in an arc in a substantially horizontal plane transversely of the machine under the magazine 11 and carries a vertically disposed transfer pin 23 for engagement with the edges of the separated can ends A as best shown in Figs. 3 and 4. The top end of the transfer pin 23 is formed with a substantially flat rectangular shaped head or button 24 which projects beyond the outer face of the pin and provides a ledge or shoulder which engages over the edge of the can end being transferred to control the movement of the end.

During this lateral travel of a can end, it rides off the ends of the support plates 14, 18 and onto a pair of spaced and parallel downwardly sloping or declining support tracks (Figs. 2, 3 and 4). There are two pairs of these tracks. These tracks extend in opposite directions for can ends moving toward the right and toward the left as viewed in Fig. 3. The tracks are formed in the housing 12 and extend toward openings 27 in the side walls of the housing. Each pair of tracks is spaced apart a distance less than the outside diameter of the can ends so that each can end is supported at two spaced points on its periphery intermediate its rear or following edge and the middle of the end.

As a can end is propelled along the sloping tracks 26 it is projected through the adjacent opening 27 in the housing side wall and the upper portion of its leading edge engages against and rides along a pair of vertically disposed spaced and parallel curved guide rails 28 which are in substantial alignment with the support tracks 26 and which are located outside of and adjacent the outer face of the housing side wall. There is one set of these guide rails on each side of the machine and they extend downwardly from the outer regions of the bottom of the magazine 11 to the transfer stations D, E as shown in Fig. 3.

Each pair of these guide rails 28 is carried in a curved

guard casing 31 which is hingedly attached to the machine so that it may be opened when necessary. Normally the guard casing remains closed. In order to facilitate opening of the casing 31, it is secured to a horizontally disposed hinge bar 32 having trunnions 33 which are carried in bearing brackets 34 secured to the sides of the housing 12. One of the trunnions 33 is longer than the other and is surrounded by a tension spring 36 having one end secured in the adjacent bearing bracket 34 and the other end fastened in a collar 37 carried on the trunnion. The spring keeps the casing normally closed.

Hence as the can end A is swept laterally from the magazine 11 is supported adjacent the lower portion of its rear or following edge by the tracks 26 and guided adjacent the upper portion of its leading edge by the guide rails 28. Thus as the end is pushed forward it is turned or rotated about an axis transverse relative to its path and through an angle of 90 degrees from its horizontal position into a vertical or edgewise position as shown in the dotted line positions of the can end in Fig. 3, the can end near the end of this turning action dropping nearly vertically on its edge into its vertical position adjacent the outer face of the side wall of the housing 12 at one or the other of the transfer stations D, E.

A can end A thus fed into a vertical position at its transfer station is immediately attracted to and held in place by a pair of short horseshoe permanent magnets 41 (Figs. 3 and 4) located at each station. The magnets preferably are disposed in an end-to-end horizontal position with the legs of the magnets extending outwardly, the magnets being held in place by a bar 42 which extends between the legs of the magnets and is fastened by screws 43 into an elongated L-shaped bracket 44 which forms a supporting seat for the magnets. The bracket 44 is located in an opening 45 in the side wall of the housing 12 with the ends of the legs of the magnets 41 slightly projecting beyond the outer face of the housing side wall so as to readily attract and hold the can end in place. The outer end of the upper leg of each magnet is beveled inwardly toward the housing side wall to facilitate dropping of the can end into place adjacent the magnets. This complete magnet unit comprising the magnets 41, the holding bar 42 and the bracket 44 is held in place by screws 47 (Fig. 4) which extend through projecting ends of the holding bar 42 and are threadedly engaged in the side wall of the housing. There are two of these magnet units, one at each transfer station D, E and disposed in each side wall of the housing.

A can end held by a magnet unit, rests on a horizontally projecting shelf or stop plate 49 (Figs. 3 and 4) which is secured in a horizontal groove 51 in the magnet brackets 44. This plate 49 stops the can end when it falls into its vertical position and thus locates the can end vertically at its transfer station. In this position, a can end on either side of the housing 12 is in longitudinal alignment with the tester heads B on the tester wheels C and is ready for transfer from the magnet units into the tester heads.

The transfer of a can end A from its magnet unit into a tester head B is effected by a horizontally disposed pusher bar 55 which operates in a slide or slot 56 formed in each of the side walls of the housing 12. There is one pusher bar 55 in each side wall and they are reciprocated alternately toward and away from the tester heads B by link connection with rocker arms or levers 57 in the manner fully disclosed and explained in the above mentioned Maher patent. As a pusher bar 55 moves forward through a feeding stroke toward an aligned tester head B, it engages behind the magnet held can end A and pushes the can end edgewise toward the tester head, stripping the can end off the magnets 41 and advancing it along a horizontal support rail 58 which forms a continuation of the stop plate 49.

After leaving the magnets 41, the can end is guided

by the outer face of the side wall of the housing 12 and the inner face of a vertically disposed guide post 59 which is disposed in spaced relation to the housing side wall. The ends of the guide post 59 are secured to the housing side wall to hold the post in place, sufficient clearance being provided between the side wall and the post to permit the can end to readily pass between them. The pusher bar 55 advances the can end directly into place in the tester head B for testing as disclosed in the Maher patent and then moves back through a return stroke to its original position in readiness for a subsequent can end feeding operation. In order to facilitate advancement of the can end A past the guide post 59, the post is beveled as at 61 (Fig. 3) and is provided with a clearance notch 62 for the pusher bar 55.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a power operated can end testing machine having a plurality of vertically disposed tester heads movable in a predetermined path for receiving can ends to be tested, the combination of a magazine for holding can ends in stacked formation, a substantially horizontal can end support under said magazine, means for separating the lowermost can end from said magazine and laying it on said support, means for propelling said separated can end along and from said support, a pair of spaced tracks leading from said support to a transfer station, a pair of vertically disposed curved guide rails aligned with and in spaced relation to said tracks for guiding the leading edge of said can end and thus cooperating with said tracks in receiving said separated can end in a substantially horizontal position from said propelling means and for guiding and turning said can end about an axis in transverse relation to its downward path as it drops from said support to a substantially vertical position at said transfer station, means disposed at said transfer station for locating the can end in alignment with a said tester head, and means for advancing the can from said station in said tester head for testing.

2. In a power operated can end testing machine having a plurality of vertically disposed tester heads movable in a predetermined path for receiving can ends to be tested, the combination of a magazine for holding can ends in stacked formation, a substantially horizontal can end support under said magazine, means for separating the lowermost can end from said magazine and laying it on said support, means for propelling said separated can end along and from said support, a pair of vertically disposed curved guide rails leading downwardly from said support for engaging the leading edge of said separated can end as it is precipitated from said support by said propelling means and for guiding and turning said can end about an axis in transverse relation to its downward path as it drops from said support to a substantially vertical position, and means disposed adjacent the terminal ends of said guide rails for supporting said can end in alignment with a said tester head for transfer thereto.

3. In a power operated can end testing machine having a vertically disposed tester head for receiving can ends to be tested, the combination of a magazine for holding can ends in substantially vertical stacked formation, a substantially horizontal can end support under said magazine, means for separating the lowermost can end from said magazine and laying it on said support, means for propelling said separated can end along and from said support, a pair of vertically disposed curved guide rails disposed adjacent said magazine and terminat-

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ing downwardly in alignment with the path of said tester heads for guiding the leading edge of said separated can end as it is precipitated from said support by said propelling means and thereby guiding and turning said can end about an axis in transverse relation to its downward path as it drops from said support to a substantially vertical position in edgewise alignment with said tester head, a hinge mounting for said rails to facilitate swinging of said rails out of operative position for inspection, and means disposed adjacent the terminal ends of said guide rails for supporting said can end in alignment with said tester head for transfer thereto.

4. In a power operated can end testing machine having vertically disposed tester heads movable in a predetermined path for receiving can ends to be tested, the combination of a magazine for holding can ends in substantially vertical stacked formation, horizontally disposed support plates under said magazine, means for separating the lowermost can end from said magazine and laying it on said support plates, means for propelling said separated can end along and from said support plates, a pair of tracks adjacent to and leading downwardly from said support plates, a pair of vertically disposed curved guide rails aligned with and in spaced relation to said tracks for guiding the upper portion of the leading edge of said can end and thus cooperating with said tracks in receiving said separated can end from said propelling means and to guide said can end so that it is turned about an axis in transverse relation to its downward path as it drops from a horizontal position on said support plates into a vertical position in edgewise alignment with a said tester head, a stop plate disposed at the lower end of said tracks and rails for terminating the vertical fall of said can end, and a magnet disposed adjacent said stop plate for attracting and holding said can end in edgewise alignment with a said tester head for transfer thereto.

5. In a power operated can end testing machine having a plurality of staggered and confronting tester heads for receiving can ends to be tested, the combination of a housing having opposing side walls in substantial alignment with said tester heads, said side walls having openings therein for the passage of can ends therethrough, a magazine mounted on said housing intermediate said confronting tester heads for holding can ends in substantially vertical stacked formation, a substantially horizontal can end support under said magazine, means for separating the lowermost can end from the stack of ends in said magazine and laying it on said support, feeding devices disposed within said housing for feeding the separated can ends alternately in opposite directions from said support and precipitating them through said openings in said housing, a plurality of vertically disposed curved guide rails disposed outside of said housing in spaced relation to said side walls for guiding the leading edges of can ends passed through and precipitated from said openings to turn each fall can end about an axis in transverse relation to its downward path and from a horizontal into a vertical position adjacent a said side wall, magnets in said side walls adjacent the lower ends of said guide rails for holding said can ends in edgewise alignment with said tester heads, means for advancing said can ends alternately from said magnets into the tester heads, and vertically disposed guide means disposed adjacent and in spaced relation to said housing side walls for guiding said can ends as they are thus advanced to the tester heads.

6. A device for feeding can ends into a machine for treatment, the combination of a magazine disposed adjacent said machine for holding can ends in stacked formation, means for separating the lowermost can end from the stack of ends in said magazine, a stationary magnet disposed adjacent the bottom of said magazine for attracting and holding the separated can end in position adjacent the bottom of said magazine, means for propelling said can end along and from said magnet, tracks leading

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downwardly from said magnet to a transfer station, said tracks being adapted to receive said separated can end from said propelling means and to guide said end so that it is turned about an axis in transverse relation to its downward path as it falls from said magnet into said station, and means for advancing said can end from said station into said machine for treatment.

7. A device for feeding can ends into a machine for treatment, the combination of a magazine for holding can ends in stacked formation, a stationary can end support under said magazine, means for separating the lowermost can end from said magazine and laying it on said support, a stationary magnet adjacent said support for attracting and holding said separated can end, means for propelling said separated can end along and from said support and magnet, tracks leading downwardly from said support to a transfer station, said tracks being adapted to receive said separated can end from said propelling means and to guide said end so that it is turned about an axis in transverse relation to its downward path as it falls from said support to said transfer station, a lower magnet disposed at said transfer station for attracting and holding the can end, and means for stripping and advancing the can end from said lower magnet and station into said machine for treatment.

8. A device for feeding can ends into a machine for treatment comprising in combination, means for supporting a can end in a substantially horizontal plane, a substantially vertical transfer station disposed below said horizontal plane, a curved guide member extending from said horizontal plane downwardly along and in outwardly spaced relationship to said transfer station, the upper portion of said guide member extending downwardly and outwardly away from said supporting means and the lower portion of said guide member extending downwardly and inwardly toward and terminating adjacent the bottom of said transfer station, means for propelling said can end laterally of said supporting means into contact with and downwardly along said guide member, means in said transfer station for stopping the downward movement of said end along said guide member, said guide member deflecting the leading edge of said can end downwardly to turn said end about an axis in transverse relation to the downward path of said end and to direct the leading edge of said can end against said stop means in said transfer station, holding means disposed at said transfer station for maintaining said turned can end in substantially vertical position in said transfer station in inwardly spaced relationship to said guide member, and means for advancing said can end from said station into said machine for treatment.

9. The device of claim 8 wherein said propelling means comprises a horizontally reciprocating pusher member which is provided with an overhanging ledge which contacts the upper surface of the rear edge of said can end to prevent upward movement of said rear edge as the leading edge of said can end is deflected downwardly by said guide member.

10. The device of claim 8 wherein said transfer station includes a substantially vertical wall against which said can end is held by said holding means, said vertical wall being disposed in a vertical plane which extends in substantially chordal relationship to said curved guide track.

11. The device of claim 8 wherein said holding means comprises a magnet disposed in said transfer station adjacent said stop means.

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