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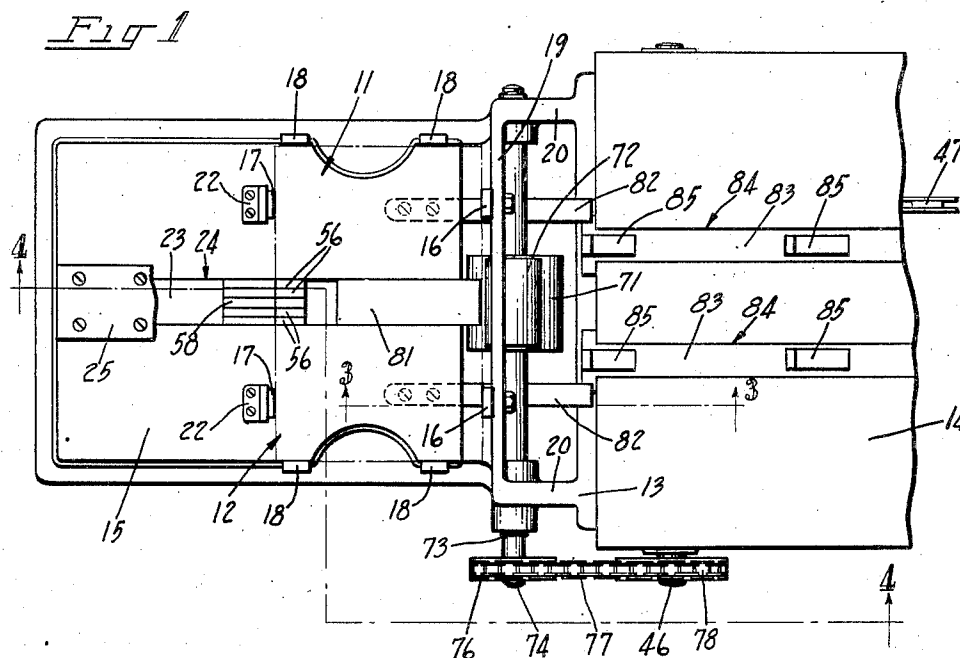
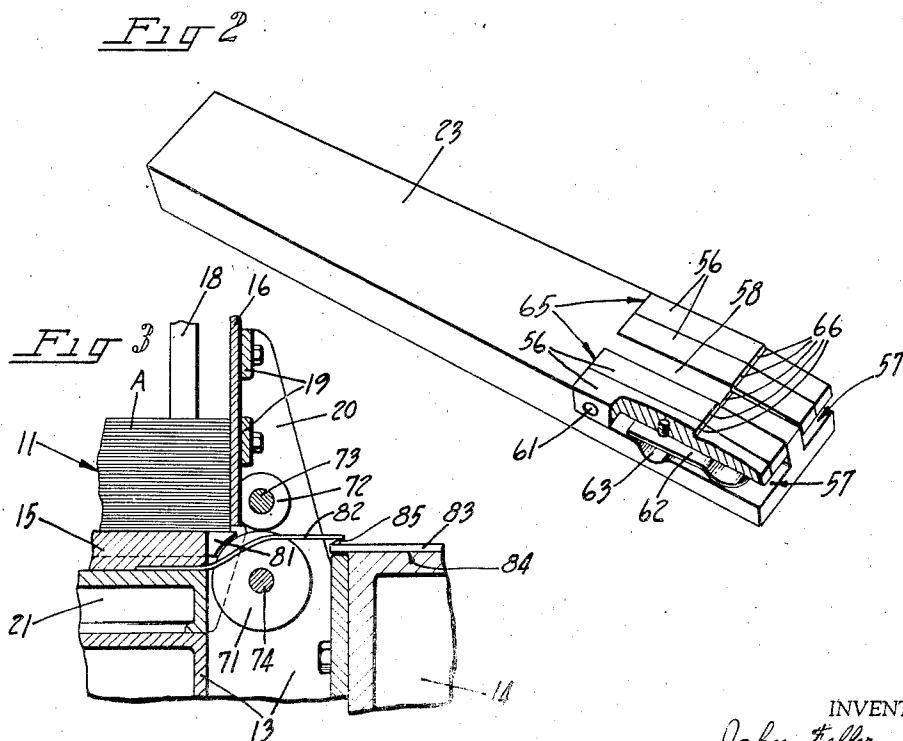
J. FELBER

2,270,871

FEEDING DEVICE

Filed Oct. 12, 1940

2 Sheets-Sheet 1



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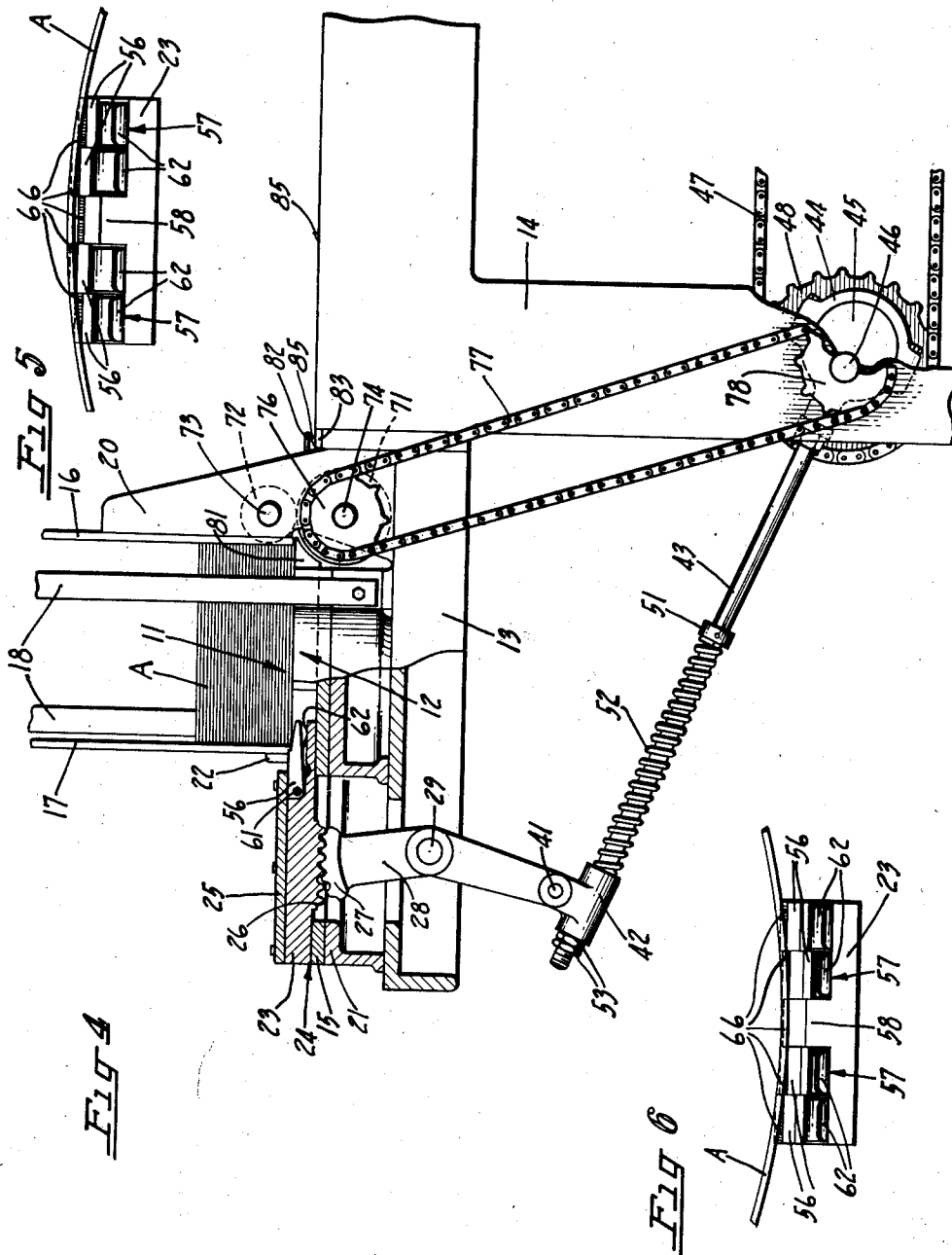
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FEEDING DEVICE

Filed Oct. 12, 1940.

2 Sheets-Sheet 2



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2,270,871

FEEDING DEVICE

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5 Claims. (Cl. 271—44)

This invention relates to feeding devices for advancing sheets or flat blanks from which container parts are made along a predetermined path of travel and has particular reference to the separation and initial movement of such sheets from a supply magazine when the sheets are curved or flexed out of their flat condition. This is an improvement on the Can Body Maker disclosed in United States Patent 2,169,311, issued August 15, 1939, to M. E. Widell.

In feeding devices for sheets or container blanks and the like arranged to be fed into a machine, the sheets or blanks are usually separated individually from the stack or supply source and are then engaged by feed fingers or dogs carried by feeding elements and are advanced along a path of travel to the initial working station of the machine.

When blanks are cut from a substantially continuous web or strip of material which has been rolled up for some time and are then to be fed, individual blanks have a tendency to keep the curved shape of the roll instead of becoming flat. This is especially true of fibre or the like material. Hence when such curved blanks are stacked into a magazine of a blank feeding device, the usual feed dogs may pass by the blanks without feeding them from the magazine or sometimes only a corner of the dogs engage and nick or otherwise damage a blank in feeding it from the magazine.

The invention contemplates overcoming such difficulties by providing a feeding device having a plurality of flexible feed fingers arranged so that they will conform to the curvature of the blanks to be fed and thereby fully engage each blank along a line sufficient to advance it without damage.

An object therefore of the invention is the provision of a sheet or container blank feeding device having a plurality of feed fingers carried by movable elements and adapted to engage and feed curved or flexed sheets along a predetermined path of travel from the magazine.

Another object of the invention is the provision of a feeding device which is adaptable for curved sheets or container blanks, i. e., those not entirely flat, wherein the feeding elements are provided with a stationary and with a plurality of yieldable fingers in juxtaposed relationship so that the front portion of the fingers may pass beneath an individual sheet or supply of sheets to be fed, allowing the fingers to yield and to conform to the curvature of the sheet when engaging an edge thereof thus more accurately

feeding the sheets along a predetermined path of travel.

A further object of the invention is the provision of such a sheet or container blank feeding device wherein the feeding elements are of a reciprocating character and have a plurality of yieldable feed fingers which operate beneath a supply magazine and are arranged to engage an edge of the lowermost sheet and advance it along a predetermined path, the yieldable fingers being adapted to conform to the sheet curvature to insure their engagement with the sheet edge and thereby increase the line of engagement along the sheet edge to prevent nicking or deforming the edge thereof.

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 plan view of a feeding device embodying the present invention, with parts broken away;

Fig. 2 is an enlarged perspective view of the feed bar of the device illustrated in Fig. 1, the view showing stationary and yieldable feed fingers;

Fig. 3 is a vertical section taken substantially along the line 3—3 in Fig. 1, with parts broken away;

Fig. 4 is a longitudinal view partly in elevation, taken substantially along the line 4—4 in Fig. 1, with parts broken away and parts shown in section;

Fig. 5 is an enlarged end view of the feed bar shown in Fig. 2, illustrating the yieldable fingers engaging the edge and conforming to the curvature of a fragmentary part of an upwardly curved sheet; and

Fig. 6 is a view similar to Fig. 5 and showing the yieldable fingers conforming to the curvature of a downwardly curved sheet.

As a preferred embodiment of the invention the drawings illustrate the principal parts of a can body making machine of the character disclosed in the above mentioned Widell patent.

In such a machine fibre container body blanks or sheets which are curved, as hereinbefore mentioned and as indicated by the numeral A (Fig. 4), are fed individually from the bottom of a stack of such blanks retained in a supply magazine 11 (Figs. 1, 3 and 4). The magazine is mounted on top of a container body blank feed-

ing device 12 which is supported on a sub-frame 13 bolted to a machine main frame 14.

The supply magazine 11 comprises a support plate 15 having vertically disposed front, rear and side feed guide posts 16, 17 and 18 respectively. The front guide posts 16 are fastened to horizontal cross bars 19 (Figs. 1 and 3) which are integral parts of a pair of upright brackets 20 which extend up from the sub-frame 13. The side guide posts 18 are fastened to the sides of an intermediate frame 21 which is mounted upon the frame 13. The rear posts 17 are secured to angle blocks 22 which in turn are fastened to the support plate 15.

The stack of blanks in the magazine rests on the support plate 15, the line of curvature of the blanks extending transversely of the device. The support plate 15 also carries a reciprocating feed bar 23 which operates in a horizontal slideway 24 formed in the support plate 15 and is held down in the slideway by a cover plate 25 which is secured to the top of the support plate. A gear rack 26 on the bottom of the feed bar 23 (Fig. 4) meshes with a segment gear 27 formed on the upper end of a rock lever arm 28. The lever 22 extends down through an opening in the intermediate frame 21 and is mounted on a pivot pin or rocker shaft 29 carried in the sub-frame 13.

The opposite or lower end of the lever 28 is connected by a pivot pin 41 to a slide bracket 42. One end of an operating link or connecting rod 43 is carried in the slide bracket 42. The opposite end of the link 43 (Fig. 4) is secured to an eccentric yoke 44 mounted on a rotating eccentric 45. The eccentric may be an integral part of a jack shaft 46 or may be suitably fastened to it.

Shaft 46 is journaled in bearings mounted in the frame 14. The shaft is rotated by a drive chain 47 through a chain sprocket 48 mounted on the shaft. The chain 47 is driven in any suitable manner in time with the other moving parts of the machine. Hence as the jack shaft 46 rotates, it actuates the eccentric 45 and link 43 and this through the rocker arm 28 shifts the feed bar 23 through a forward or feeding stroke and thence through a backward or return stroke.

Provision is made for preventing damage to the machine parts in case the feed bar 23 becomes jammed. For this purpose the link 43 carries a fixed collar 51 and a compression spring 52 is mounted on the link and is interposed between the collar and the bracket 42. The spring is held under compression by locknuts 53 which are threaded on the outer end of the link and which normally seat against the bracket 42. It is this spring that permits the link connection to yield in the event of an obstruction or undue resistance that may occur in the feeding mechanism.

The lowermost blank A of the stack of blanks in the magazine 11 is fed from the bottom of the magazine by yieldable feed fingers 56 which are carried on the inner end of the feed bar 23. There are preferably four of these yieldable feed fingers, two being disposed in pockets 57 located on each side of a stationary finger 58 formed integrally with the feed bar. The yieldable fingers are pivotally carried on a pin 61 which is secured in the feed bar 23.

The yieldable fingers 56 are adapted to rock on the pivot pin 61 and are normally held in an upward position by leaf springs 62 (Figs. 2, 4, 5 and 6) one spring being secured to the bot-

tom of each finger. The free end of each spring rests against the bottom surface of its pocket 57 and a clearance channel 63 cut across this bottom wall provides clearance space for the screws which hold the springs to the fingers.

The rear edge of each finger 56 is flat and is engageable with a flat surface 65 which defines the back of the respective pocket 57 and this surface forms a stop to limit the upward movement of the forward end of the finger. Intermediate its length the top surface of each finger 56 is formed with a step or feed shoulder 66 which in height or depth is preferably equal to the thickness of a sheet or blank A to be fed from the magazine 11. The base of the step, i. e., the top surface of the finger forward of the step, slopes or is inclined or tapered downwardly toward the inner or front end of the finger so that its forward end is thinner than the outer or rear end.

Hence as the feed bar 23 moves through a forward or feeding stroke, the inner or forward tapered ends of the spring held feed fingers 56 move under the stack of blanks A in the magazine 11 and the rear edge of the lowermost blank is engaged by the sloping top surface of the feed fingers. The lowermost blank depresses the free forward ends of the fingers against the resistance of their springs 62 and this arranges the different fingers to conform to the curvature or other disposition of the blank. When the feed bar has advanced far enough, the steps or shoulders 66 on the feed fingers engage the rear edge of the lowermost blank and thereupon advance the blank for a predetermined distance.

The described arrangement of the spring operated fingers 56 to yield and to conform to the curvature of a curved sheet upon engagement with the edge of the sheet increases or elongates the line contact over that which would normally be engaged by stationary fingers. This increased contact on the edge of the sheet distributes the feeding pressure over a broader region and prevents nicking or deforming of the edge of such a fed sheet.

When the blanks in the magazine are convexly curved as shown in Fig. 5 the centrally disposed stationary finger 58, which may be an integral part of the feed bar 23, does not come into use. However, when the blanks are concavely curved, as shown in Fig. 6, this stationary finger comes into play to assist in feeding the blank from the magazine. It will of course be understood that flat blanks, which are between the convex and the concave forms, are efficiently handled by this feeding finger unit.

If desired the blank or sheet may be entirely removed from the magazine 11 by actuating the feed bar 23 and the feed fingers 56 carried thereon on a long stroke. However, for high speed feeding of the blanks the drawings show a feeding device having a short stroke. In such a device the blank is only started along its path of travel by the feed fingers 56 and is preferably picked up by a pair of rapidly rotating blank advancing rollers between which the blank passes.

The advancing rollers include a lower or feed roller 71 and an upper or pressure roller 72 disposed adjacent the front of the magazine 11. The pressure roller is mounted on a cross shaft 73 journaled in suitable bearings formed in the brackets 20. The feed roller is mounted on a drive shaft 74 journaled in bearings formed in the sub-frame 13. This drive shaft is rotated through the medium of a sprocket 76 which is

carried thereon and which is driven by an endless chain 77 or other driving instrumentality. This chain also operates over a sprocket 78 carried on the jack shaft 46, which shaft it will be recalled, is the main source of power for operating the feeding device.

As a blank A is advanced from the magazine its forward edge is gripped by the rotating rollers 71, 72 and the blank is thus fed further along its path of travel. Delivery of the blank into the rollers is facilitated by a central horizontally disposed guide member 81 (Figs. 1 and 3) and by a pair of spaced guide bars 82. The guide member 81 is located in a continuation of the feed bar slideway 24 and is secured to the support plate 15.

The guide bars 82 are fastened to the lower surface of the support plate 15, and are spaced apart being located on opposite sides of the center guide 81. These bars 82 slope upwardly and extend horizontally forward over the top of the body maker frame 14. These guide bars support the advancing sheets as they are delivered by the rollers 71, 72 to the body making machine.

The sheets are received on the horizontal frame 14 where they are advanced therealong in a step-by-step manner by a pair of spaced and parallel longitudinally reciprocable slide bars 83. The bars 83 reciprocate in grooves or T slots 84 formed in the frame 14 and these bars carry a plurality of equally spaced feed dogs 85. The sheets are thus advanced through the machine.

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. A feeding device for curved sheets and sheet material, comprising a support for a sheet, feeding means movable adjacent said support, and a plurality of yieldable fingers pivotally mounted in edge to edge contact on said feeding means for engaging an edge of the sheet to advance the sheet along said support, yieldable means for respectively pressing said fingers against the bottom surface of said sheet, whereby said fingers are adapted to conform to the sheet edge in an elongated line of contact to insure proper feeding without nicking or damage to the curved sheet.

2. A feeding device for sheets and the like of curved configuration, comprising a magazine for retaining a stack of sheets, a feed bar movable adjacent said magazine, a non-yieldable feed finger carried by said feed bar, a plurality of yieldable fingers carried by said feed bar on opposite sides of said first mentioned feed finger and adapted to engage a curved edge of the low-

ermost sheet to separate the sheet and advance it along a predetermined path of travel, and resilient means carried by said feed bar for pressing said yieldable fingers into engagement with said lowermost sheet in a line contact conforming to the curved sheet edge to prevent nicking and deforming of the edge of the engaged and fed sheet.

3. A feeding device for curved sheets and sheet material can parts, comprising a support for a sheet, feeding means movable adjacent said support, a non-yieldable feed finger on said feeding means, a plurality of movable fingers on said feeding means on opposite sides of said non-yieldable feed finger and adapted to engage an edge of the sheet for advancing the sheet along said support, and springs carried by said feeding means for respectively pressing against said movable fingers to render the same yieldable so that they will conform to the curvature of the sheet in an elongated line of contact to prevent nicking and deforming the edge of the engaged and fed sheet.

4. A feeding device for curved sheets, body blanks and the like, comprising a feed support, a magazine on said support for holding in stacked formation a supply of curved sheets to be fed, a feed bar movable in said support and having a centrally disposed integral non-yieldable feed finger for feeding a sheet from said magazine, a plurality of movable fingers mounted on said feed bar, and a spring carried by said feed bar engaging each of said movable fingers to render the same individually yieldable, whereby to conform said yieldable fingers to the curvature of the sheet prior to being engaged and fed by said fingers to insure a line contact with the curved sheet edge and preventing nicking and deforming of the sheet.

5. A feeding device for curved sheets, body blanks and the like, comprising a feed support, a magazine on said support for holding a supply of curved sheets in stacked formation, a feed bar movable in said support and having an integral non-yieldable feed finger for feeding the lowermost sheet from said magazine, a plurality of yieldable fingers carried by said feed bar on opposite sides of said non-yieldable feed finger, spring means for respectively moving said yieldable feed fingers into engagement with said lowermost sheet in conformity to the curvature of the latter, said fingers having shoulders formed to engage an edge of said sheet to be fed for separating and advancing the sheet along said support, said yieldable fingers engaging the sheet edge in an elongated line of contact, a pair of receiving and feeding rollers located at the end of said support, and guide members disposed adjacent said rollers to insure the delivery of a fed sheet to between said rollers.

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