

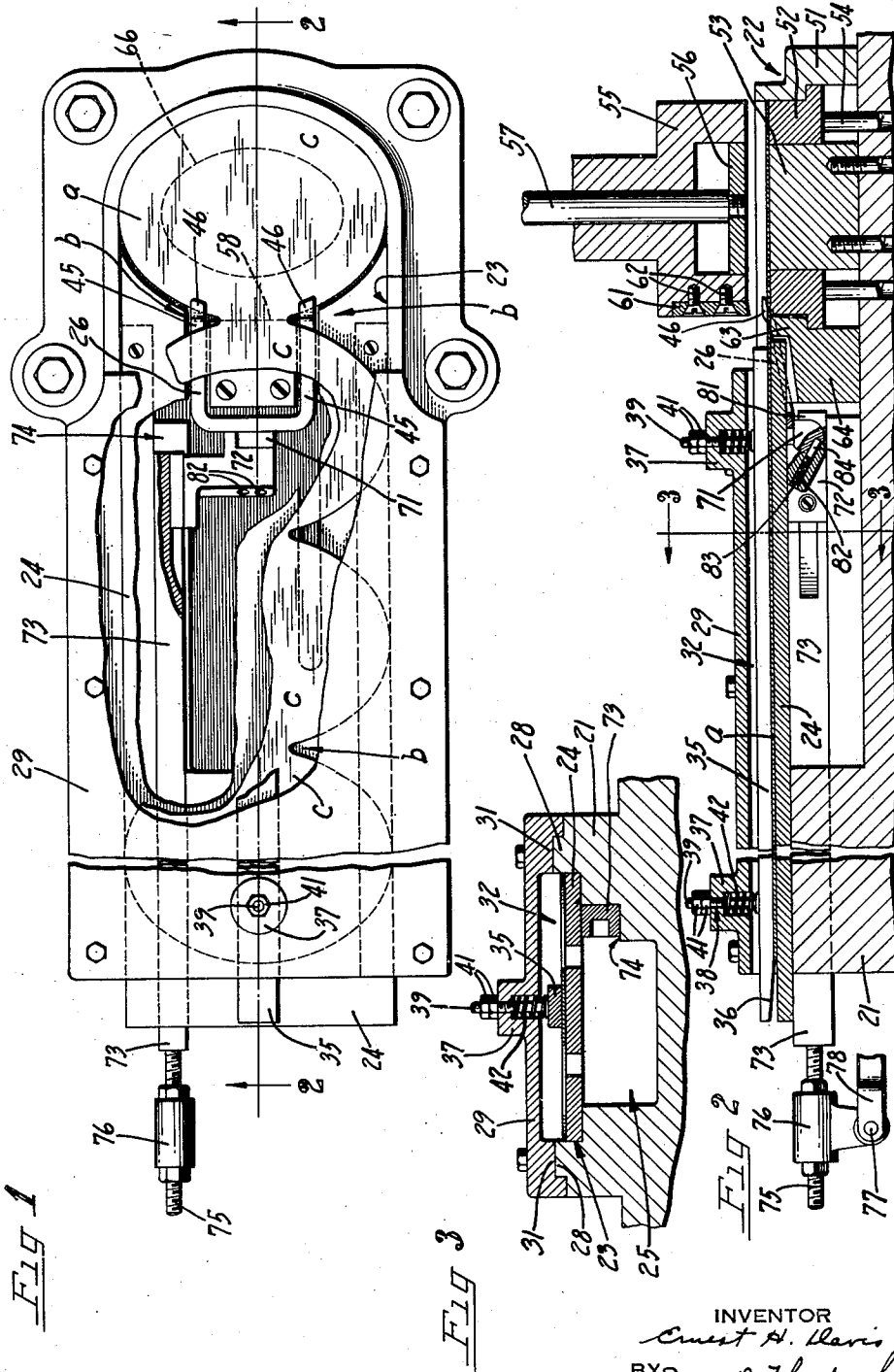
Oct. 21, 1941.

E. H. DAVIS

2,259,458

FEEDING MECHANISM

Filed July 3, 1940



INVENTOR
E. H. Davis
BY *Wm. R. Thibault*
Charles H. Cline
ATTORNEYS

UNITED STATES PATENT OFFICE

2,259,458

FEEDING MECHANISM

Ernest H. Davis, Los Angeles, Calif., assignor to
American Can Company, New York, N. Y., a
corporation of New Jersey

Application July 3, 1940, Serial No. 343,858

6 Claims. (Cl. 271—2.5)

The present invention relates to feeding mechanism and has particular reference to a reciprocable feeding device for engaging opposed undulating or recessed edges of a strip of flat sheet material such as a scroll strip whereby the same is advanced in a straight line of travel into a working station, as for press blanking or forming operations.

An object of the present invention is the provision of a two-prong feed dog for a feeding device which is brought into feeding engagement with a strip having recessed side edges such as a scroll strip so that the strip is advanced along a straight line as an incident to reciprocation of the feeding device.

Another object of the invention is the provision of such a two-prong feed dog in a feeding device of the character described which is pivotally connected to a reciprocating feed bar and which is spring-held so that on a return stroke of the feed bar the feed dog backs off and descends from its feeding engagement with the strip passing back from the engaged set of recesses to an adjacent set to the rear so as to be in feeding position for the next feed stroke of the feed bar.

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 drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a plan view partially broken away of a feeding device embodying the present invention;

Fig. 2 is a longitudinal sectional view taken substantially along the line 2—2 in Fig. 1; and

Fig. 3 is a transverse sectional view taken substantially along the line 3—3 in Fig. 2.

In can manufacture scroll strips are used in great numbers in automatic feed, blanking and forming presses for producing circular or oval articles. In the feeding of scroll strips which have been blanked out previously to provide sections or areas for drawn body parts, for example, there are a number of recesses along the scroll edges which are arranged, usually in diametrically opposed pairs which extend along the two side edges of the strip. This sort of strip is more flexible than a strip which does not have the side recesses and presents feeding difficulties since it is preferable that the strip be fed an exact distance for each of the feeding strokes of the feeding mechanism. This precision in feeding is to insure that a definite area of the strip

is properly presented to the dies of the press for each blanking or forming operation.

The feeding device of the present invention operates in a table frame 21 (Fig. 2) on which may be mounted a lower die of a forming mechanism broadly indicated by the numeral 22. The table frame 21 is recessed as at 23 (Fig. 3) to provide for a strip support plate 24 which extends for a substantial distance longitudinally of the table but which terminates short of the forming mechanism 22. The table centrally of the recess portion 23 is further countersunk as at 25 and this provides a space beneath and centrally of the plate 24. This space is utilized to allow for movement of a two-prong feed dog 26 (Figs. 1 and 2) for advancing the work through the machine.

Such work is designated in Fig. 1 as a strip *a*, the side walls of which are so formed as to include a series of recesses *b*, these recesses being symmetrically arranged relative to the longitudinal axis of the strip *a*. The particular strip *a* shown in the drawing by way of example is of a shape to include oval can blank containing sections or areas *c*. Such a strip *a* is moved longitudinally over the support plate 24 and passes between wall extensions 28 of the table 21. A top or cover plate 29 is preferably bolted onto the top of the table, the cover plate being formed with depending projections 31 which engage directly with the extensions 28 of the table. This leaves a space 32 beneath the cover plate and which is above the table. The space allows for passage of the strip *a* across the table and into the forming press being advanced by the feeding device.

A spring-pressed retaining bar 35 is mounted centrally of the recess 32 for holding the strip in feeding position. At the entrance end of the recess, this bar is provided on its under surface with an inclined wall 36. This permits easy entrance of a strip into the recess for feeding purposes. The cover plate 29 is formed with two upwardly projecting bosses 37 each of which is bored at 38 to provide clearance for a bolt 39 which is secured to the bar 35. There are thus two of these bolts 39 and each one extends above its associate boss 37. Locknuts 41 are threaded on each bolt to provide for support of the bar 35 at a given height.

By this construction the bar is supported from the two bolts 39 which are arranged near the two ends of the bar. A spring 42 surrounds each bolt 39 and is disposed within its associated boss 37. This yieldingly holds the bar 35 so that it

just clears or lightly presses against the upper surface of the strip *a* as the latter is fed forward by the feeding devices.

The feed dog 26 is bifurcated or U-shaped as illustrated in Fig. 1 and includes two transversely spaced arms 45 rigidly connected together at their rear ends, the forward end of each arm being notched or indented at 46 to provide for and insure engagement of the forward or feeding ends of the arms with the strip. The two arms 45 are so spaced as to allow for engagement of their notched ends within diametrically opposed recesses *b* on opposite sides of the strip *a*, as best shown in Fig. 1. This engagement with the curved sides of the strip takes place for a feeding movement just to the rear of the foremost can body section or area *c* in the strip. After each feeding stroke the notched ends 46 of the feed finger are withdrawn from engagement with the strip and are moved back to engage the adjacent pair of recessed sides for the can body space or area *c* directly to the rear. This will be more fully discussed as the description proceeds.

The die mechanism 22, as best illustrated in Fig. 2, comprises a die block 51 which is mounted directly on the table 21 at the forward end of the feeding device. Such a die block encloses a draw ring 52 in the center of which is a stationary anvil block 53. The anvil 53 and the draw ring 52 are of a shape desired for the drawn can body to be made from the can body area *c* in the forward end of the strip. It is this part of the strip that is positioned into the die mechanism by the feeding device. The draw ring 52 may be mounted on pins 54 which extend through openings in the table 21 and which may be backed up by springs or draw rubbers in the usual manner.

The forming die mechanism also includes a drawing punch 55 which is adapted to cooperate with the draw ring 52 for forming the drawn body in the die mechanism. A work holding disc 56 is mounted inside of the punch 55 and may be threadedly engaged to the lower end of a rod 57 which extends vertically through the punch. Both the rod 57 and the punch 55 are suitably actuated independently of each other so that the strip when properly positioned for the drawing operation may first be clamped by the disc 56 onto the anvil 53 after which the punch 55 further descends to fulfill the drawing operation.

Prior to drawing the can body area formed in the forward section *c* of the strip *a* this foremost part is severed from the rest of the strip, being cut along the dotted line 58 (Fig. 1). This cutting operation is effected by a shearing blade 61 which is secured by screws 62 to one side of the punch 55. This blade cooperates with a stationary shear edge 63 formed on a die part 64 which is mounted on the table 21. By means of this construction the strip *a* is first clamped by the disc 56, the drawing elements 55, 52 coming against the strip from above and below. Just prior to the drawing operation the foremost area *c* of the strip is severed along the dotted line 58 and this action conditions the severed strip section for the drawing operation.

For the particular drawing action exemplified in the drawing the anvil 53 is oval shape, as indicated by the dotted line 66 in Fig. 1, and the area enclosed within the dotted line is held while the remaining part of the severed section of the strip is drawn down over the anvil by the descending punch 55 with the help of the receding draw ring 52. It is while this drawing action

is taking place, that the feed finger 26 is withdrawn from engagement with this strip section and is brought back into position for the next advancement of the strip. The next feeding of the strip will bring the succeeding or adjacent portion or area *c* into the die mechanism for the next subsequent drawing operation.

Feed finger or dog 26 at its rear end is formed with a depending boss 71 (Fig. 2) which is shaped so as to have a pivotal or rocking connection in a block 72 (see also Fig. 1). The block 72 is bolted to the side of a feed bar 73 at the forward end of the bar.

Bar 73 has reciprocatory movement within a notch or auxiliary recess 74 cut in the side wall of the recess 25, as best illustrated in Fig. 3. This feed bar is moved back and forth in timed relation with the other operations of the machine in any suitable manner. For this purpose, the feed bar at its rear end is engaged, by means of its threaded shank 75, with a connecting block 76. This provides for pivotal mounting of a pin 77 which is connected to one end of the actuating link 78. This link may be moved or actuated in any suitable manner in time with the other moving parts of the machine including the drawing press or forming mechanism 22.

The forward extension 81 (Fig. 2) of the block 72 adjacent the pivotal connection of the feed finger 26, is formed with a pair of parallel inclined bores 82 (Fig. 1) each of which provides space for a spring 83. Each spring 83 engages a pin 84 at its lower end. The two pins 84 are carried in the pivotal connection section of the feed finger 26. This normally holds the feed finger 26 in raised position (Figs. 1 and 2) so that the notched or recessed ends 46 of the feed finger arms 45 are in opposed recesses in the rear of the rounded edges of a strip section *c*.

When the feed bar 73 is drawn back, the spring-held pivoted feed finger 26 is allowed to rock relative to the block 72 and the feed finger arms move down against the tension of springs 83 and pass back and under the held strip *a* which it will be recalled is held down on the support plate 24 by the bar 35. When the forward notched ends 46 of the feed finger arms are directly back of the curved edges of the next adjacent strip section *c* the stored tension of springs 83, acting upon the feed finger, rock it into its raised position whereupon the notched ends 46 snap in place for the next forward feeding stroke. This raised position is the position of the feed finger during its next forward movement.

A forward feeding movement takes place after the drawing and forming operations have been performed in the die mechanism 22 and after the drawn work has been removed in the usual manner. It is at that time that the die mechanism is ready to receive its next work, i. e., the adjacent or succeeding fed strip section *c*. Such a section is properly positioned within the die mechanism by the next advancement of the strip *a*, under the forward feeding action of the feed finger 26.

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 feeding apparatus for advancing sheet material having opposed recessed side edges, the combination of a support for maintaining such material in a feeding plane, a feed bar having longitudinal movement in said support, and a bifurcated double arm feed finger element including transversely spaced sheet feeding arms rigidly connected together at their rear ends, said finger element being movably mounted on said feed bar and having a position with its two arms engaging the sheet material in transversely opposed recesses whereby the material is advanced in the direction of its longitudinal axis and in a straight line of travel with each feeding stroke of the said feed bar.

2. In a feeding apparatus for advancing sheet material having opposed recessed side edges, the combination of a horizontal support for maintaining such material in a horizontal feeding plane, a feed bar having horizontal longitudinal movement in said support, means for yieldingly holding the material down on said support, and a bifurcated double arm feed finger element including transversely spaced sheet feeding arms rigidly connected together at their rear ends, said finger element being pivotally mounted on said feed bar and having a raised position with its two arms engaging the said sheet material in opposed recesses whereby the material is advanced in a straight line with each forward feeding stroke of the said feed bar and a lowered position with its said arms disposed beneath the held sheet material whereby the arms of said feed finger element may be moved into adjacent opposed recesses of the material.

3. In a feeding apparatus for advancing a strip of sheet material having a series of opposed recesses formed in its side edges, the combination of a support for maintaining a said strip in a feeding plane, a feed bar having reciprocable longitudinal movement in said support, and a bifurcated double arm feed finger element including transversely spaced sheet feeding arms rigidly connected together at their rear ends, said finger element being pivotally mounted on said feed bar and having raised feeding and lowered non-feeding positions, said transversely spaced connected arms when in raised strip feeding position engaging on both sides of said strip and within opposed recesses and holding the strip in a straight line of travel during the forward feeding stroke of said feed bar, said feed finger element moving down to remove its said arms from the said opposed recesses and into non-feeding position when the said feed bar moves back thereby bringing said feed finger element into position to insert its two connected arms into adjacent opposed recesses for the next succeeding feeding stroke of said feed bar.

4. In a feeding apparatus for advancing a scroll strip having a series of opposed recesses formed in its side edges which set off contiguous sections, the combination of a support for maintaining a said strip in a horizontal feeding plane, a

feed bar having reciprocable longitudinal movement in said support, a spring-pressed retaining bar mounted in said support and above the path of travel of said strip for holding the strip onto said support, and a bifurcated double arm feed finger element including transversely spaced sheet feeding arms rigidly connected together at their rear ends, said finger element being pivotally mounted at the forward end of said feed bar and having raised feeding and lowered non-feeding positions, said connected finger arms when in raised feeding position extending up above the feeding plane of said strip and engaging on both sides and within transversely opposed recesses of the strip thus holding the strip in a straight line of travel during the forward feeding stroke of said feed bar, said feed finger element moving down to disengage said arms from the said opposed recesses of the spring pressed strip and into non-feeding position when the said feed bar moves rearwardly, said feed finger element then passing beneath an adjacent section of said strip and into position in the rear of said strip section for the next succeeding feeding stroke of said feed bar.

5. In a feeding apparatus for advancing to a die mechanism scroll shear strips having a series of contiguous sections set off by opposed recesses for a series of forming operations, the combination of a support for maintaining the strip in a feeding plane, a feed bar having longitudinal movement in said support, means for holding the strip in said feeding plane as it is advanced over said support and as its forward end section is presented to said die mechanism, a double prong feed finger pivotally mounted on said feed bar having a raised position with its two prongs engaging the said strip in opposed recesses to the rear of a said section, whereby the strip is advanced in a straight line with each feeding stroke of said feed bar, and cutting means cooperating with said feed bar for severing the forward end section of said strip when it has been brought into said die mechanism.

6. In a feeding apparatus for advancing to a die mechanism scroll shear strips having contiguous sections set off by opposed recesses for a series of drawing operations, the combination of a support for maintaining the strip in a horizontal feeding plane, a feed bar having longitudinal movement in said support for advancing said strip, means for holding the strip on said support and in said feeding plane as its forward end is presented to said die mechanism when advanced by said feed bar, a double prong feed finger pivotally mounted on said feed bar for engaging the said strip in opposed recesses to advance the same in a straight line with each feeding stroke of said feed bar, and cutting means actuated in timed relation to the movement of said feed bar for severing successive forward end sections of said strip as the same are brought into said die mechanism.

ERNEST H. DAVIS.