

Aug. 30, 1949.

E. LAXO

2,480,192

APPARATUS FOR REGISTERING CAN BODY BLANKS

Filed April 29, 1947

3 Sheets-Sheet 1

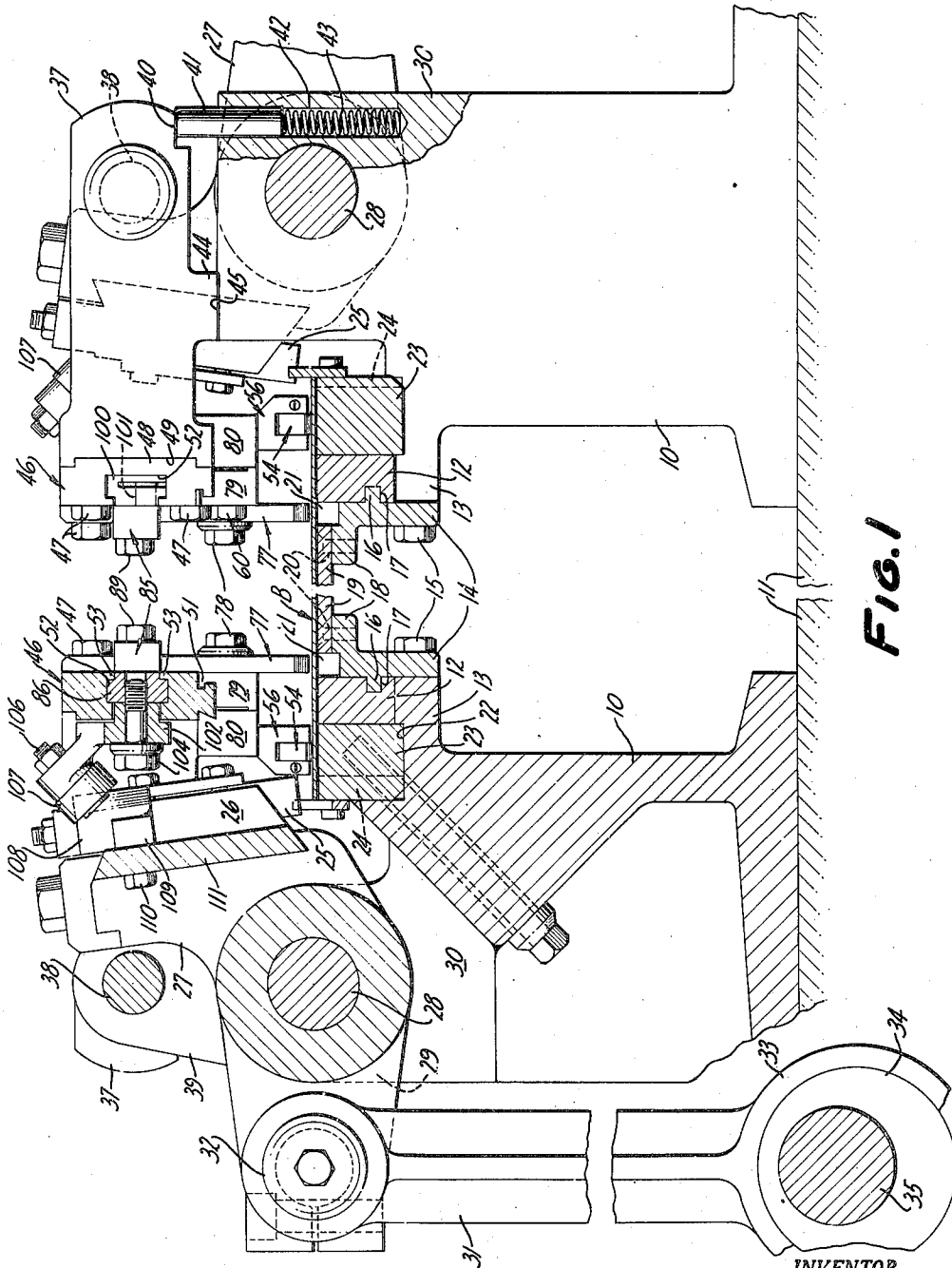


FIG. 1

INVENTOR.

ED LAXO

BY

Mellin + Houscom
ATTORNEYS

Aug. 30, 1949.

E. LAXO

2,480,192

APPARATUS FOR REGISTERING CAN BODY BLANKS

Filed April 29, 1947

3 Sheets-Sheet 2

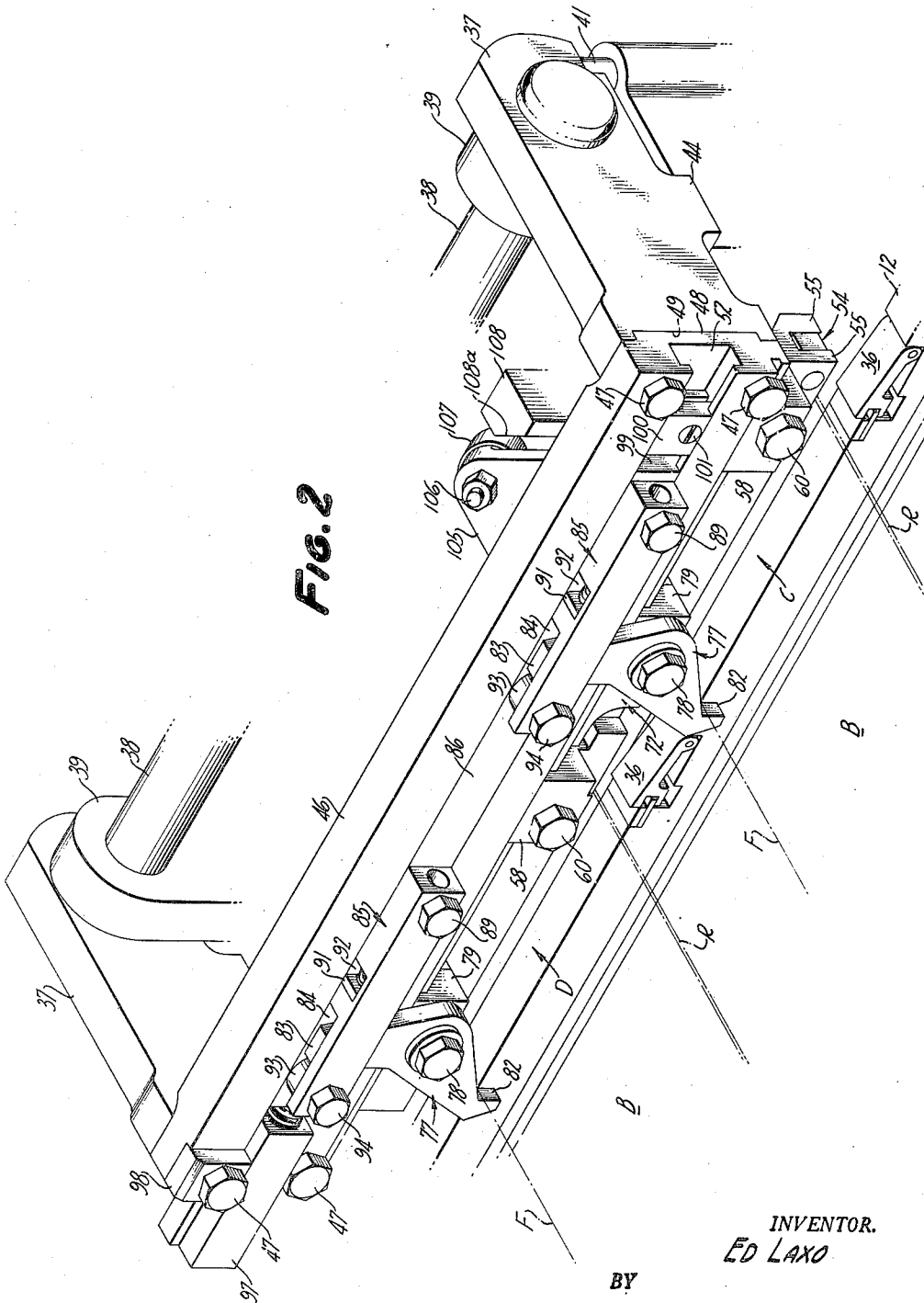


FIG. 2

INVENTOR.
ED LAXO

BY

Mellin & Hanson
ATTORNEYS

Aug. 30, 1949.

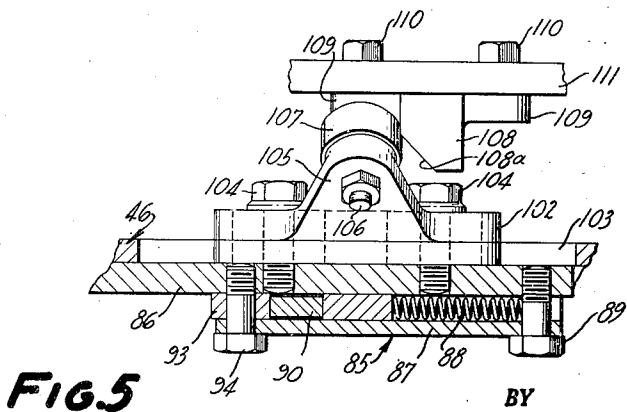
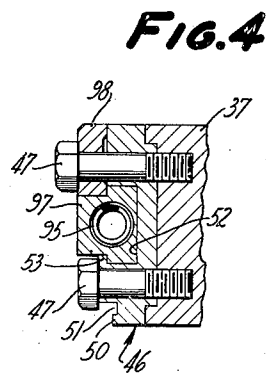
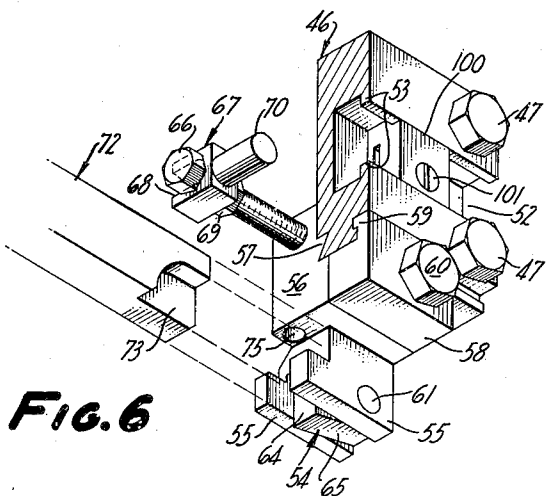
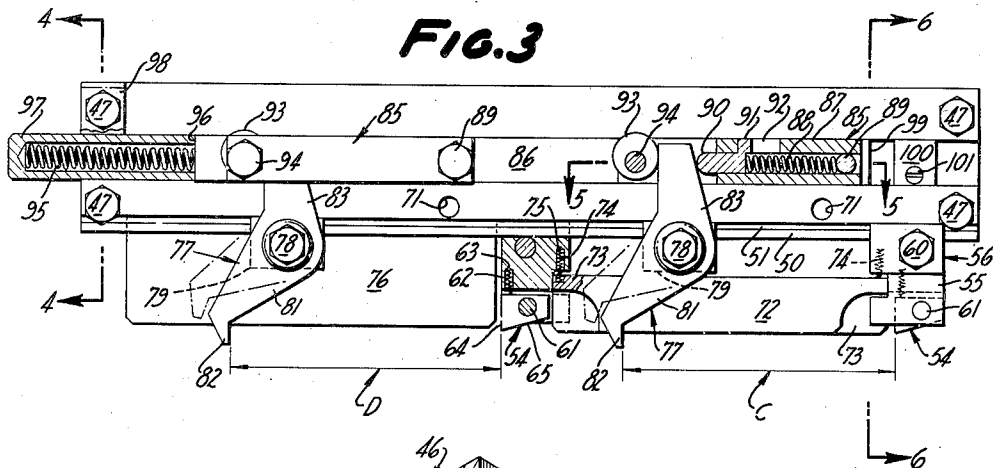
E. LAXO

2,480,192

APPARATUS FOR REGISTERING CAN BODY BLANKS

Filed April 29, 1947

3 Sheets-Sheet 3



INVENTOR.
ED LAXO

BY
Mellin & Hanson
ATTORNEYS

UNITED STATES PATENT OFFICE

2,480,192

APPARATUS FOR REGISTERING CAN BODY
BLANKS

Ed Laxo, Oakland, Calif., assignor to Atlas Imperial Diesel Engine Co., Oakland, Calif., a corporation of Delaware

Application April 29, 1947, Serial No. 744,682

4 Claims. (Cl. 113—113)

1

The present invention pertains to can body making machines, and more particularly to apparatus for registering can body blanks with tools at one or more work stations in such machines.

An object of the invention is to provide a mechanism for automatically and accurately disposing can body blanks in exact registry with the body making tools at one or more work stations, without nicking, bending or otherwise marring the relatively thin metal body blank stock.

A further object of the invention is to provide an improved mechanism for positively and accurately registering can body blanks with respect to tools at one or more work stations along the can body making machine.

Another object of the invention is to provide a mechanism for automatically and accurately disposing can body blanks in positive and exact registry with tools at one or more work stations, the mechanism being capable of high, sustained operating speeds.

Still a further object of the invention is to provide a registering mechanism for accurately disposing can body blanks relative to tools of a body maker, the mechanism being easily removable from its operating location to permit inspection, adjustment and other operations on the remainder of the body making machine, as well as on the registering mechanism itself.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a partial cross-section and end view of a body making machine taken generally through the body blank notching station;

Fig. 2 is a perspective view of the registering mechanism on one side of the body making machine.

Fig. 3 is a front elevation, with parts in section, of the registering mechanism disclosed in Fig. 2.

Fig. 4 is a cross-section taken along the line 4—4 on Fig. 3.

Fig. 5 is a longitudinal section taken along the line 5—5 on Fig. 3.

Fig. 6 is a partially exploded perspective view, as seen generally along the line 6—6 on Fig. 3.

The registering mechanism exemplifying the present invention in the drawings is located on opposite sides of a can body making machine, in which body blanks B are fed successively from station to station for the performance of certain operations thereon. As an example, the body blank may be fed to a blanking or impression station;

2

where certain operations are performed thereon; then to a notching station, where the four corners of the blank are notched and slit; and then to a folder station, where the hooks are formed, preparatory to feeding of the blank to the forming station, where the blank is formed into a cylindrical body.

A suitable mechanism may be provided for performing the above-noted operations. It is important, however, that the blanks be located accurately and exactly with respect to the tools at each work station, in order to produce proper cylindrical cans. It is to such registering mechanism that the present invention is directed.

As disclosed in the drawings, the body maker consists essentially of opposed portions for operating on each side of the body blank. Since these portions are essentially duplicates of one another, particular reference to one side of the machine throughout most of this description will suffice for both sides.

The body maker includes opposed side frames 10 adjustably mounted upon the base 11 of the machine, to allow movement of the side frames to and from one another, for the purpose of accommodating body blanks of different widths designed to form can bodies of various diameters.

As indicated above, a blanking or impression station may be provided in the device, and also a notching station C and folding station D. The mechanism for performing the notching of the corners of each body blank is specifically disclosed in the drawings, while the registering mechanism is shown as disposed along the folding station D, as well as along the notching station C. It is to be understood, however, that the elements of the registering mechanism could be duplicated to include a mechanism for accurately locating the body blanks at a blanking or impression station (not shown), if desired. For purposes of clarity, the registering mechanism has been shortened in extent to show the registering of the body blanks at two stations C and D only.

The body blanks B are movable from station to station by feed bars 12 slidably mounted on the bed portion 13 of each side frame 10. Each of such bars is guided in its movement by a side member 14 secured to the frame by cap screws 15 or the like, and having a longitudinal tongue 16 received within a companion groove 17 in the feed bar. The side member is also provided with an inwardly extending shoulder 18 on which a plate 19 is secured by means of countersunk screws 20. This plate extends across the ma-

chine, resting upon the shoulder 18 of the other side member 14 with its upper surface lying in the same plane as the upper surface of the feed bar 12. It is to be noted that there is a longitudinal groove or space 21 provided between the feed bar 12, plate 19 and side member 14 for the reception of part of the registering mechanism, as later described.

Fitting within a longitudinal channel 22 in each side frame at the notching and slitting station C is a die block 23 having appropriate die cavities 24 for receiving punches 25 suitably secured to punch holders 26 clamped to the rocker lever 27 of the punch actuating mechanism. This lever is mounted upon a shaft 28 extending between and secured to the upper bearing portions 29 of side frame uprights 30. The lever is oscillated by mounting the upper end of a connecting rod 31 on a stud or pin 32 secured to the lever, with the lower strap end 33 of the rod encompassing an eccentric 34 fixed to a drive shaft 35 rotatable by a suitable electric motor and gearing (not shown) at the proper speed. It is to be understood that the notching mechanism on the right side of the machine (as seen in Fig. 1) is a substantial duplicate of the notching mechanism just described, and that it is also operated through a drive shaft, eccentric and connecting rod train of mechanisms in synchronism with the rocker lever oscillating mechanism 31, 35 specifically described. Specific details of the notching and slitting apparatus may be found in my application executed on April 22, 1947, for Apparatus for notching can body blanks, Serial No. 744,681, filed April 29, 1947.

The feed bars 12 are reciprocated along the body maker in timed relation to the operation of the impression, punch and folder mechanisms. A spring pressed feeding finger 36, of known construction, is mounted at longitudinally spaced intervals on each feed bar 12 (see Fig. 2), being designed to engage the rear edge R of a body blank B and feed it from station to station at the proper time. Because of the character of the registering mechanism to be described herein, the feed bars 12 move each body blank a distance slightly greater than the actual movement required to shift each blank from the desired registered location on one station to the desired registered location on the other station. It is to be understood that various other known manners of feeding the blanks from station to station may be employed, since the precise feeding mechanism forms no part of the present invention.

The registering mechanism is disclosed as extending across two work stations, such as the notching and slitting station C and the folder station D. This mechanism includes, on each side of the machine, a pair of spaced arms 37 pivotally mounted upon studs 38 secured to lugs 39 extending upwardly from the side frame 10 of the machine. As is best seen in Fig. 1, a lower surface 40 on the outer end of each arm 37 engages a plunger 41 received within a bore 42 in a frame upright containing a spring 43 engaging the end of the plunger for urging it in an upward direction for the purpose of maintaining the arm 37 generally horizontally in proper position over the notching and folder stations C, D and in position for registering blanks thereat. This position is determined by engagement of a depending lug 44 on each arm with a ledge 45 on the upright 30. The arms, however, may be swung upwardly to elevate the entire registering mechanism about the axis of the studs 38 against the action of the

plungers 41, which will merely be depressed in their bores or sockets 42 against the force of the springs 43.

A longitudinal bar 46 extends between the inner portions of the arms 37, and is secured thereto by suitable cap screws 47 extending through the ends of the bar for threaded reception within the arms. Each end of the bar 46 is formed to provide a tongue 48 received within a companion groove 49 in each arm for the purpose of preventing relative vertical movement therebetween.

The lower end of the bar is also provided with a longitudinally extending shoulder 50 forming a longitudinal groove or channel 51 for the reception of other parts of the mechanism, to be referred to hereinafter. At this point it is also to be noted that the longitudinal bar 46 has an intermediate inwardly disposed longitudinal groove or channel 52 having upper and lower flanges 53 directed toward each other, in effect providing a modified dove-tailed or T-shaped cross-section.

The longitudinal bar carries one or more stop fingers 54 adapted to engage the rear edges R of body blanks B as they are shifted backwardly to a slight extent during the registering operation. These stop fingers extend between the depending legs 55 of a holder 56, which is secured to the lower portion of the bar 46 by engagement of its intermediate tongue 57 within a companion groove on the outer, lower portion of the bar (see Figs. 1 and 6). A bracket 58 has an upper tongue 59 received within the longitudinal bar groove 51 and serves to clamp the holder 56 to the bar by means of a screw 60 extending through the bracket and threaded into the holder.

The stop finger 54 is mounted upon a screw pin 61 extending between the holder legs 55 and supported thereby. This finger has its forward portion urged in a downward direction by a spring 62 engaging its upper side forwardly of its pivotal axis on the screw or stud 61, which spring is received within a socket 63 in the holder 56 (see Fig. 3). The stop finger 54 is so arranged as to be forced by the spring 62 down against the surface of the machine over which the body blanks B travel. As illustrated in Fig. 1, one opposed pair of stop fingers 54 normally engages the die blocks 23 inwardly of the punches 25, with the forward stop or working face 64 of each finger substantially at right angles to the surface of the machine or die block when its forward corner engages the same. The under surface 65 of each finger is inclined forwardly and downwardly to provide a heel against which the body blanks B may bear for the purpose of elevating the stop fingers above the machine surface from the path of movement of the body blanks and allow the latter to be fed by the feed bars 12 and feed fingers 36 therebeyond. Immediately upon the body blanks B passing the stop fingers 54, their springs 62 will re-engage them with the machine surfaces.

The stop fingers 54 may be located accurately at the rear of each work station simply by loosening the cap screws 60 and sliding the bracket 58 and holder 56 along the bar 46, whereupon the screw 60 may again be tightened to clamp the parts in position. Accurate movement to an exceedingly small or fine extent may be obtained by means of an adjusting screw 66 threaded into the holder 56 and having its head bearing against one face of a stationary head 67 having a U-shaped slot 68 through which the screw shank extends, there being a lock nut 69 on the other side of the head 67 (see Fig. 6). A pin 70 extends from the head and is received within a

companion hole 71 in the bar 46 above its longitudinal groove 51, in order to prevent longitudinal movement of the head. The screw 66 is threaded into the holder 56 and upon being turned it will alter the distance between its head and the holder, whereupon the lock nut 69 may be tightened against the head 67 to shift the screw and holder, and also to clamp the screw 66 to the head 67, preventing subsequent inadvertent movement of the holder along the bar.

The stop fingers 54 are located at the rear of each work station and determine the position of the body blank B when it is moved backward thereagainst. The longitudinal movement of the body blank may be resisted by a pressure bar 72 located on each side of the machine at each work station and consisting of a longitudinal member whose ends 73 are recessed in order that the member may be received between the holder legs 55 (see Figs. 3 and 6). A spring 74 engages each end of the pressure bar and is located within a socket 75 in the holder 56 in order to urge the bar 72 downwardly against the body blank B moving thereunder. Downward movement of the pressure bar is limited by engagement of the upper ends of its recessed portions 73 with the holder legs 55.

Pressure bars 72 at only one station are indicated in the drawings for purposes of clarity, whereas, it is to be understood that a pressure bar may be located at other stations, if desired. As disclosed in Fig. 3, the bar 76 at the left station is merely secured to the longitudinal bar 46 with its lower end elevated above the machine surface in order to serve as a guide for the body blanks as they pass thereunder.

After a body blank B has been moved forwardly to a position slightly beyond its desired position in registry with the tools at a particular station, it is then pushed back against the stop fingers 54 by a push-back device located at each station on opposite sides of the machine. As illustrated in the drawings (see Figs. 1, 2 and 3), such push-back device consists of a lever 77 pivotally mounted upon a stud 78 extending into a bracket 79 on one side of the longitudinal bar and threaded into a clamp 80 on the other side of the longitudinal bar 46, the bracket and clamp being essentially the same as the bracket 58 and holder 56 for each stop finger 54. Tightening of the screw 78 serves to clamp the bracket 79 and the clamp 80 on the other side of the bar firmly to the supporting bar 46 of the mechanism, but does not clamp the lever 77 thereto, which is free to swing about the stud axis.

Each push-back lever 77 has a forwardly and downwardly extending arm 81 terminating in a finger 82 adapted to engage the forward edge F of the body blank by swinging into the longitudinal groove 21. The lever also has an arm 83 extending upwardly from its pivot 78 and engaged within a slot 84 in a slidable lever operating device 85, which is secured to a longitudinal slide 86 complementary to and slidable within the groove 52 in the longitudinal bar 46. Each device 85 includes a spring holder portion 87 adapted to receive a compression spring 88 in its bore, one end of which engages a stud 89 serving to secure the device to the slide 86 and acting as a stop or abutment for the spring 88. The other end of the spring engages a plunger 90 having a rounded forward nose portion contacting the rear face of the upper lever arm 83. The plunger is guided for slidable movement without rotation in the holder 87 by an upwardly extending

key 91 thereon received within a slot 92 in the holder.

The forward face of the upper lever arm 83 engages a cam 93 mounted on another stud 94 securing the operating device 85 to the slide 86. This cam 93 is rotatable to determine the position of the lever 77 with respect to the machine frame and body blank, and may be moved to properly adjust the lever on its pivot 78 and then clamped in such adjusted position by tightening the screw 96, which prevents its further rotation.

It is to be noted that there is a push-back lever 77 on each side of the machine at each station mounted forwardly of the stop finger 54 for that station. Reciprocation of the slide 86 will correspondingly rock the levers 77 simultaneously on their pivot pins 78 and move the depending fingers 82 through an arcuate path in a downward and rearward direction when the slide is moved forwardly, and in the reverse direction when the slide is moved rearwardly. Such rearward movement is produced by a return spring 95 engaging the forward end 96 of the slide 86 within the longitudinal bar groove 52 and received within a retainer 97 which is clamped to the longitudinal bar 46 by a clamp piece 98 which engages the bar and retainer, being forced against the latter by a screw 47 extending through the clamp 98 and longitudinal bar 46 into the forward main supporting arm 37 of the mechanism. As a matter of fact, this last mentioned screw 47 serves the double purpose of clamping the retainer to the bar and securing the end of the bar to the arm. The extent of movement of the slide 86 under the influence of the return spring 95 is limited by engagement of its rearward end 99 with a stop 100 mounted within the slot or groove 52 in the bar and held in any position of longitudinal adjustment therein by a set screw 101 threaded through the stop and adapted to engage the base of the groove 52. Tightening of this screw 101 will force the stop against the oppositely directed flanges 53 of the bar, thus holding the stop 100 in the position in which it may have been placed.

The slide 86 is shiftable forwardly, for the purpose of swinging the fingers 82 to positions pushing back the body blanks B against the stop fingers 54, by a cam device which includes a bracket 102 extending through an outer longitudinal slot 103 through the base of the longitudinal bar 46 into its groove 52. This bracket is substantially shorter in length than the length of the longitudinal slot 103 and is attached to the slide by cap screws 104 extending through the bracket and threaded into the slide 86. This bracket has an upward and outwardly directed inclined support 105 to which is affixed a bolt 106 on which a cam follower roller 107 is rotatably mounted. This roller is engaged by a cam 108 which is suitably secured to the rocker lever 27 of the punch operating mechanism. As specifically disclosed, the cam 108 has a pair of oppositely directed ears 109 receiving the threaded ends of cap screws 110 extending through a holder 111 clamped to the rocking lever 27.

As the lever 27 moves downwardly to perform the notching operation on the corners of a body blank B, the cam surface 108a on the cam engages the follower roller 107 and shifts it longitudinally to move the slide 86 longitudinally against the action of the return spring 95, thus moving the upper arms 83 of the push-back lever 77 forwardly and the lower arms 81 and fingers 82 rearwardly to cause their engagement with

the forward edge F' of the body blank **B** and push the latter backward to a position limited by engagement of the rear blank edges **R** with the stop fingers **54**.

It is to be noted that the fingers **82** of the push-back levers occupy a position disposed substantially above the surface of the machine and above the plane in which the upper surface of the body blank lies when the cam **108** is not rocked inwardly to shift the slide **86** forwardly. That is, the return spring **95** shifts the slide rearwardly to cause the fingers **82** to occupy the positions disclosed in dotted lines on Fig. 3, with their lower ends elevated above the surface of the machine so as not to interfere with the movement of the body blanks.

The body blanks **B** are fed by the spring pressed fingers **36** pivotally mounted on the feed bars **12** to a position in which the rear edges **R** of the body blanks are slightly in advance of the stop fingers **54**, the stop fingers moving upwardly against their springs **62** to permit such feeding action to occur. Thereafter, the inner ends of the rocking levers **27** move downwardly so that the cams **108** shift the slides **86** forwardly, in order to rock the push-back levers **77** in a counter-clockwise direction (as seen in Fig. 3), causing the fingers **82** to engage the forward edges F' of the blanks and shift them back until their rear edges **R** engage the stop fingers **54**, in which position the blanks are accurately registered with respect to the tools at the different work stations.

In the event that there is any tendency for the fingers **82** to continue moving on their pivots **78** to a slight extent after the rear edges **R** of the blanks have engaged the stop fingers **54**, such movement will be resisted by the blanks and will not occur, since the plungers **90** will merely yield backwardly against the springs **88**, allowing the slide **86** to move in a forward direction without correspondingly moving the fingers **82**.

The various mechanisms of the body making machine are so timed with respect to each other as to feed the body blanks forwardly while the tools are in their ineffective positions. For example, the punches **25** will be in their upward position, with the push-back levers **77** in their upward positions, whereupon the commencement of a working stroke on the tools first causes the fingers **82** on the push-back levers to move the blanks **B** back against the stop fingers **54** into accurate registry with the tools, holding the blanks in such position until the work has been performed at the particular stations, as, for example, the notching and slitting of the corners by the punches **25**, and the folding of the side margins at the folder station **D**.

It is thus apparent that a registering mechanism has been provided which assures the positive and accurate location of the body blanks at each station, since the blanks are accurately positioned between the fingers **82** on the push-back levers and the stop fingers **54**. Moreover, the body blanks are not bent or dented since they are fed forwardly to a maximum extent without their forward edges F' engaging any element. It is after such forward motion has been arrested and the feed bars **12** have started on their return movement that the push-back levers **77** move the blanks **B** backward against the stop fingers **54** in a comparatively gentle fashion. The force exerted by the push-back fingers against the blanks, being limited by the springs **88** bearing against the plungers **90**, in effect operate as over-

load release devices, assuring against damage to the body blanks.

The mechanism is capable of operation at a high sustained speed in excess of 350 can body blanks per minute, producing accurate registering of each can body blank at each station along the body making machine. When it is desired to move the registering mechanism, in order to perform inspection or adjustment operations on other parts of the machine, it may be swung bodily out of the way on each side of the machine, simply by swinging the longitudinal bar **46** and its arms **37** on the studs **38** against the force of the spring pressed plungers **41**, which then hold the mechanism in the inoperative position to which it has been moved.

While I have shown the preferred form of my invention, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A machine of the character described comprising a feed table, a plurality of tools disposed therealong, each defining a work station, means for feeding can body blanks or the like in succession along said table to a position beyond each station, a stop member disposed rearwardly of each station adapted to abut the trailing edge of a can body blank and thereby register the same with a work station, and rearwardly shifting means comprising a single reciprocable member, means operable in timed relation to operation of said tools to reciprocate said member, and a separate adjustable lever mounted on said frame for each work station actuated by reciprocation of said reciprocable member and pivotable into engagement with the leading edge of a can body blank to shift the same rearwardly against the corresponding stop member, said levers being relatively adjustable with respect to each other and to said reciprocable member.

2. A machine of the character described comprising a feed table, a plurality of tools disposed therealong, each defining a work station, means for feeding can body blanks or the like in succession along said table to a position beyond each station, a stop member disposed rearwardly of each station adapted to abut the trailing edge of a can body blank and thereby register the same with a work station, and rearwardly shifting means comprising a single reciprocable member, means operable in timed relation to operation of said tools to reciprocate said member, and a separate adjustable lever mounted on said frame for each work station yieldably connected to and actuated by reciprocation of said reciprocable member, each such lever being pivotable into engagement with the leading edge of a can body blank to shift the same rearwardly against the corresponding stop member, said levers being relatively adjustable with respect to each other and to said reciprocable member.

3. A machine of the character described comprising a feed table, a plurality of tools disposed therealong, each defining a work station, means for feeding can body blanks or the like in succession along said table to a position beyond each station, a stop member disposed rearwardly of each station adapted to abut the trailing edge of a can body blank and thereby register the same with a work station, and rearwardly shifting means comprising a single reciprocable mem-

9

ber, positive means operable in timed relation to operation of said tools to impart the forward stroke to said member, resilient means for effecting the return stroke thereof, and a separate adjustable lever mounted on said frame for each work station actuated by reciprocation of said reciprocable member and pivotable into engagement with the leading edge of a can body blank to shift the same rearwardly against the corresponding stop member, said levers being relatively adjustable with respect to each other and to said reciprocable member.

4. A machine of the character described comprising a feed table, a plurality of tools disposed therealong, each defining a work station, means for feeding can body blanks or the like in succession along said table to a position beyond each station, a stop member disposed rearwardly of each station adapted to abut the trailing edge of a can body blank and thereby register the same with a work station, and rearwardly shifting means comprising a single reciprocable mem-

10

ber, means operable in timed relation to operation of said tools to reciprocate said member, and a separate lever mounted on said frame for each work station yieldably connected to and actuated by reciprocation of said reciprocable member, each such lever being pivotable into engagement with the leading edge of a can body blank to shift the same rearwardly against the corresponding stop member.

ED LAXO.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,110,810	McDonald -----	Sept. 15, 1914
1,917,359	Cameron -----	July 11, 1933
2,015,987	Bayer -----	Oct. 1, 1935
2,387,766	Moore -----	Oct. 30, 1945