

Dec. 30, 1952

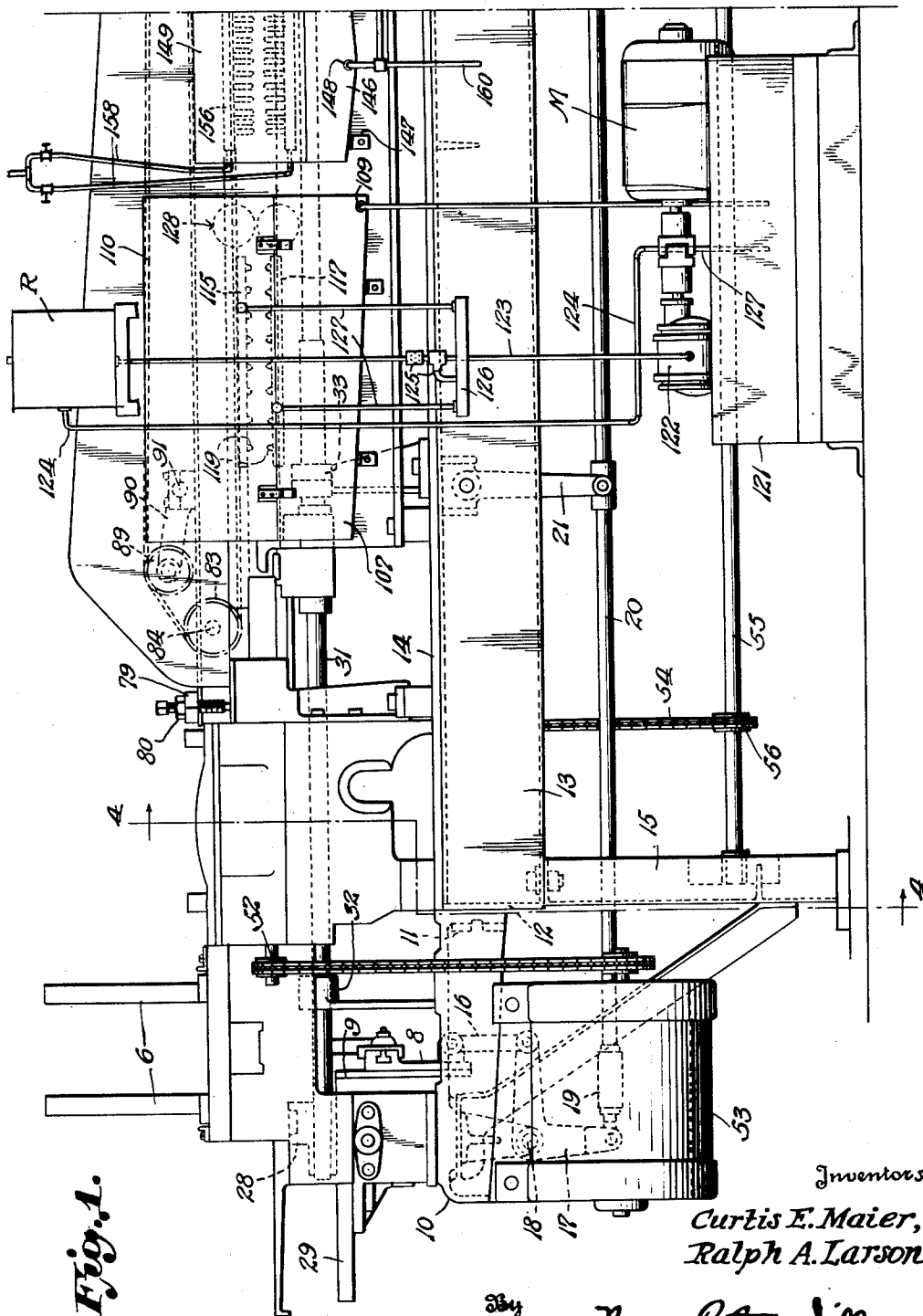
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2,623,233

APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

Filed Feb. 25, 1946

12 Sheets-Sheet 1



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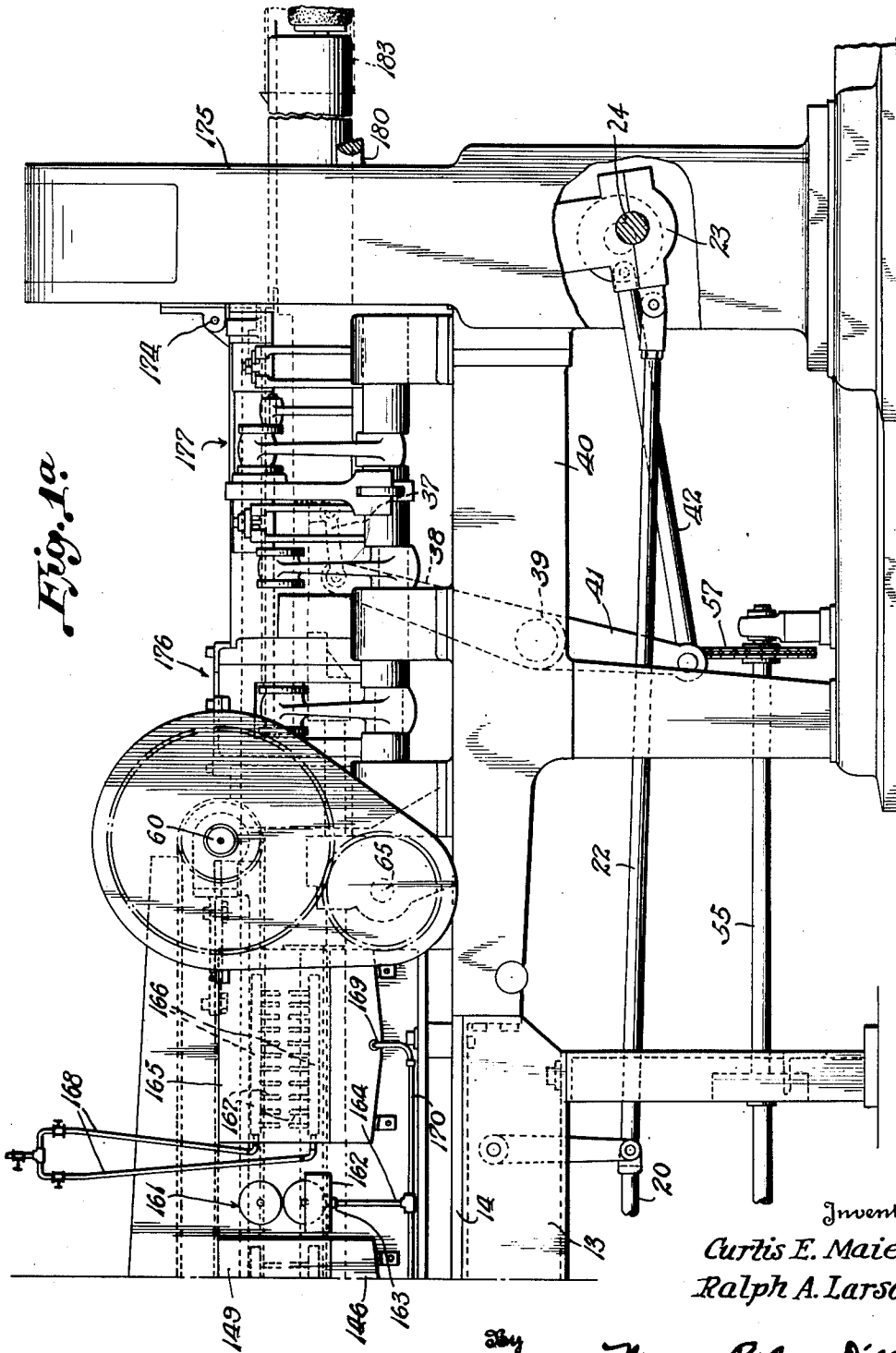
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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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12 Sheets-Sheet 2



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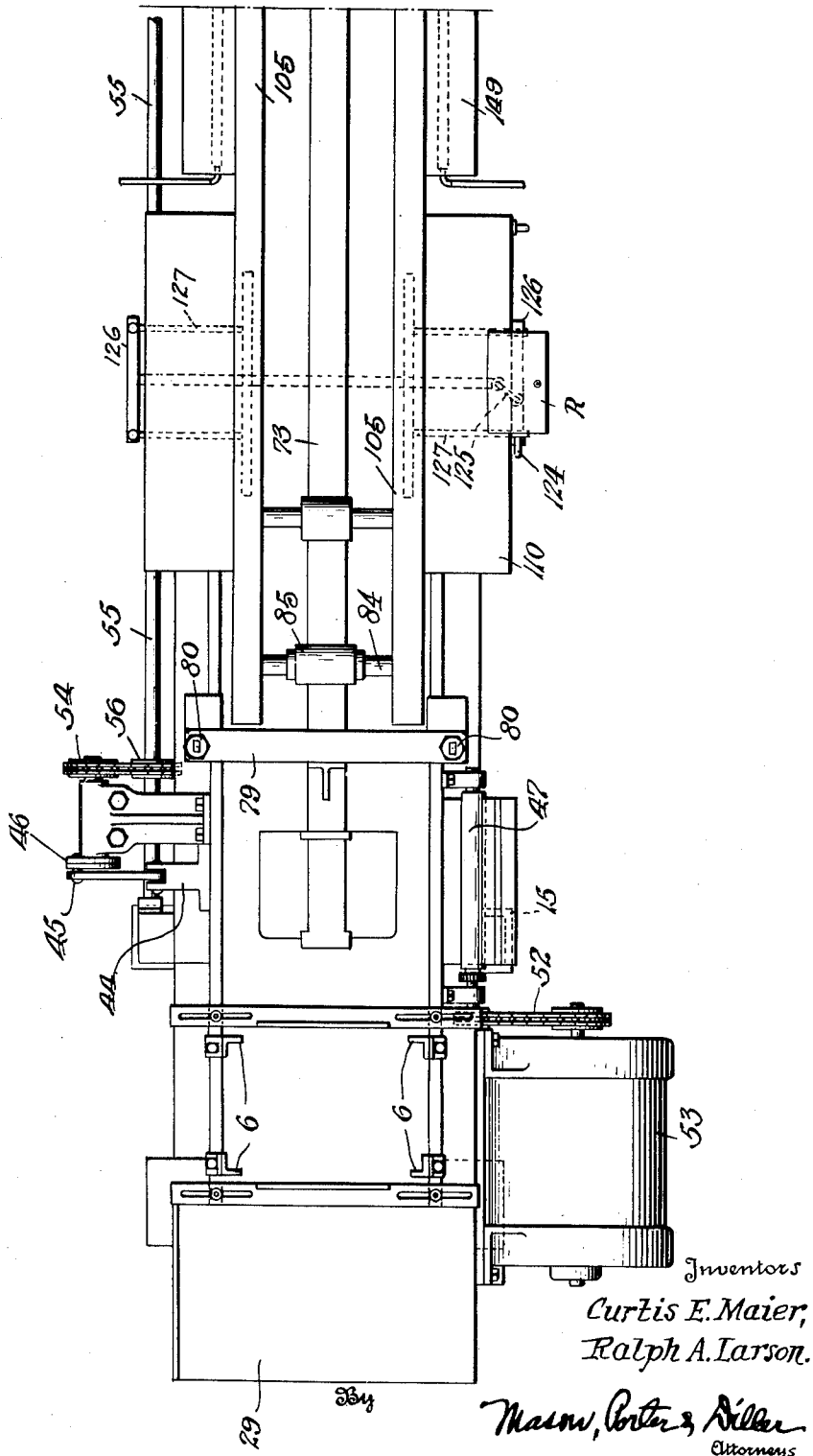
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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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12 Sheets-Sheet 3

*Fig. 2.*



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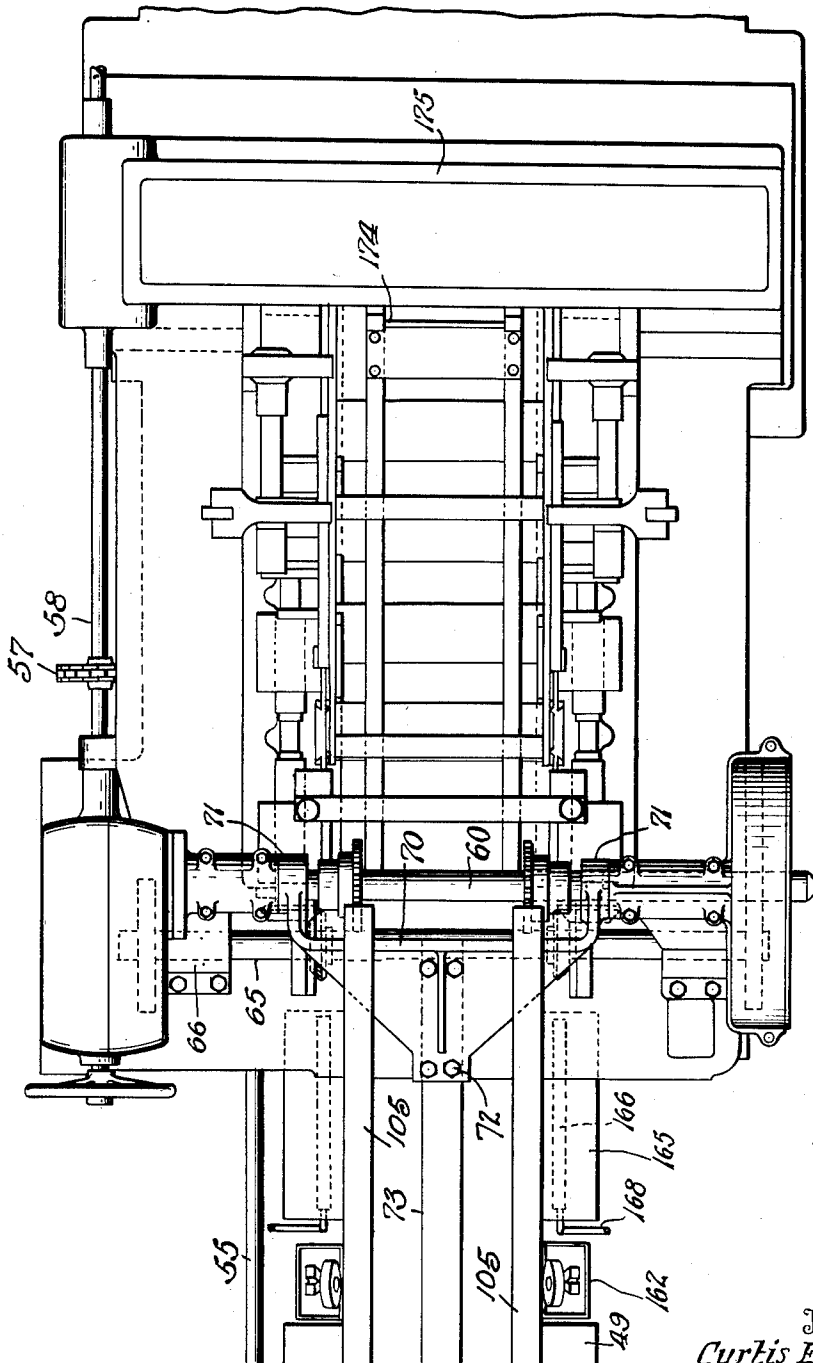
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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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*Fig. 2a*



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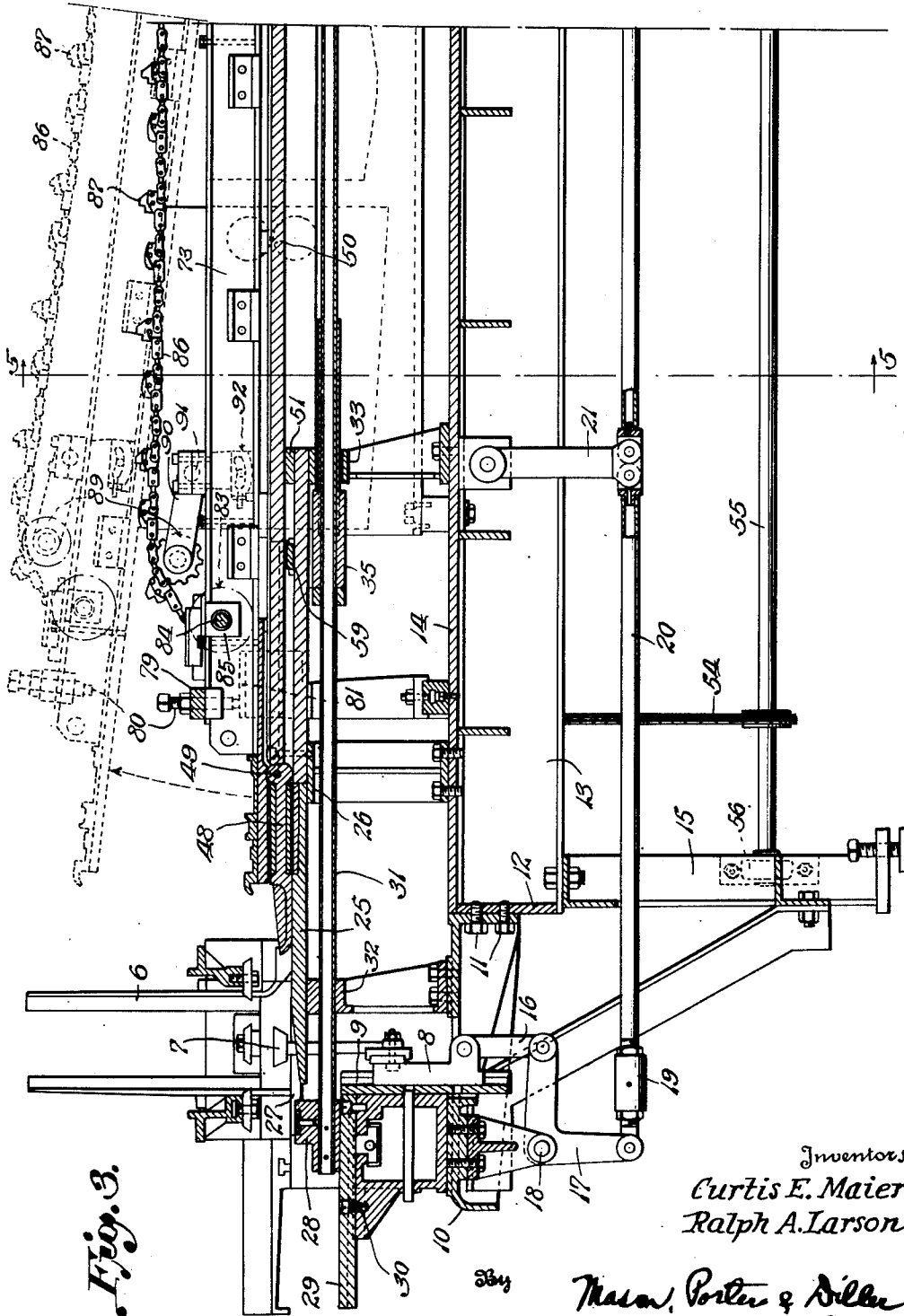
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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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12 Sheets-Sheet 5



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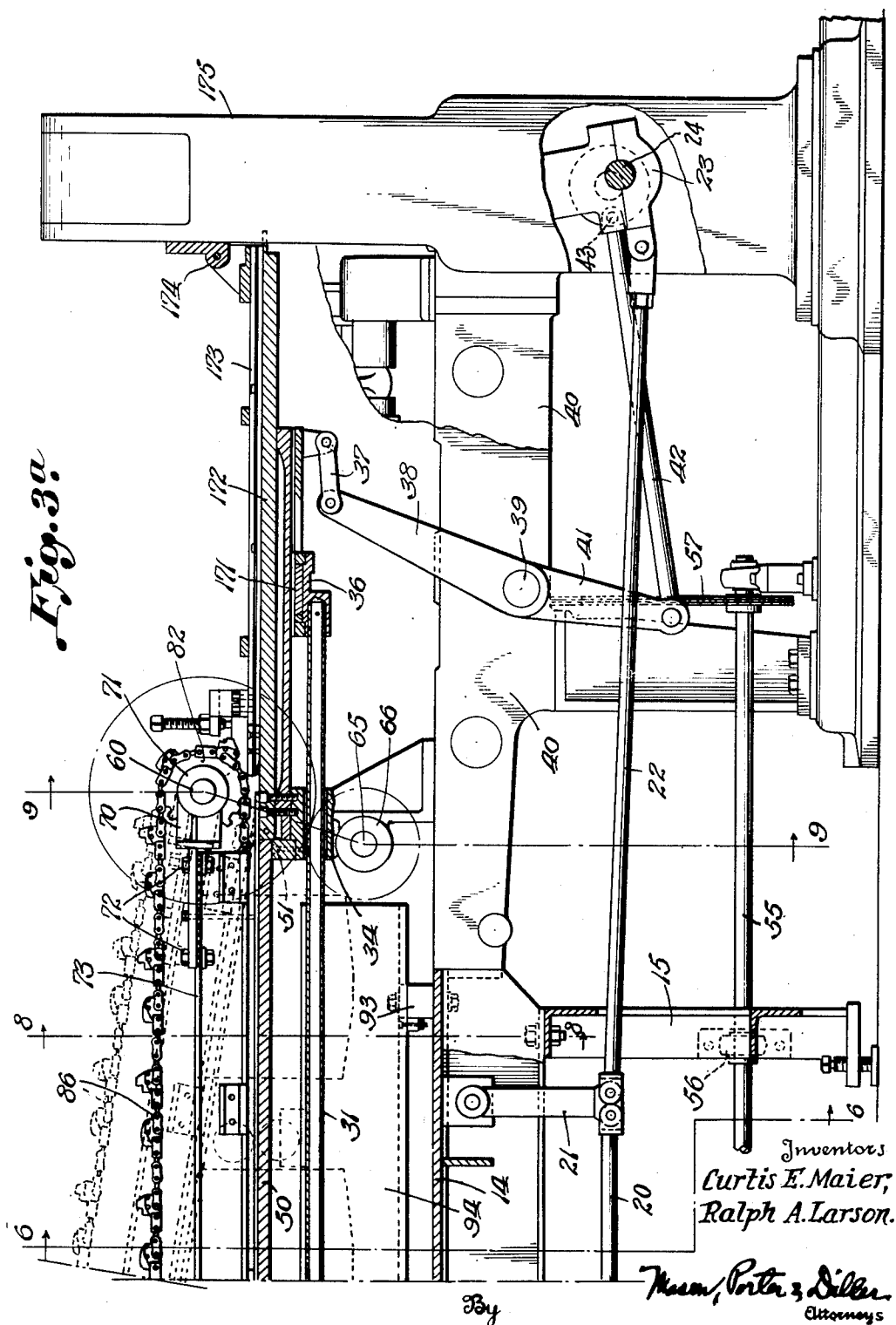
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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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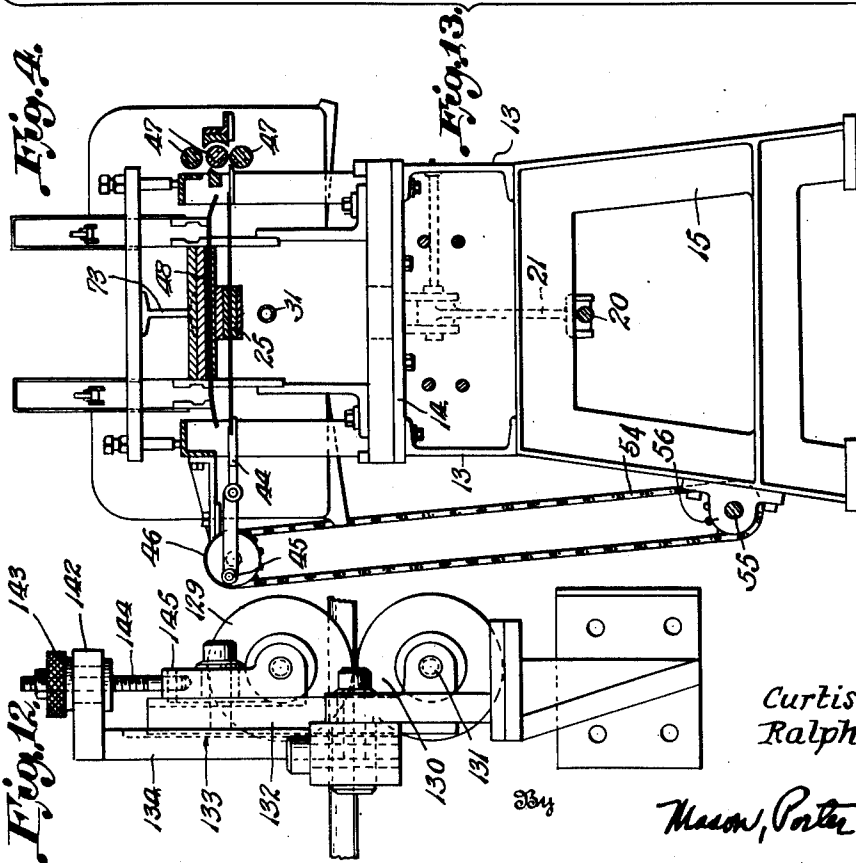
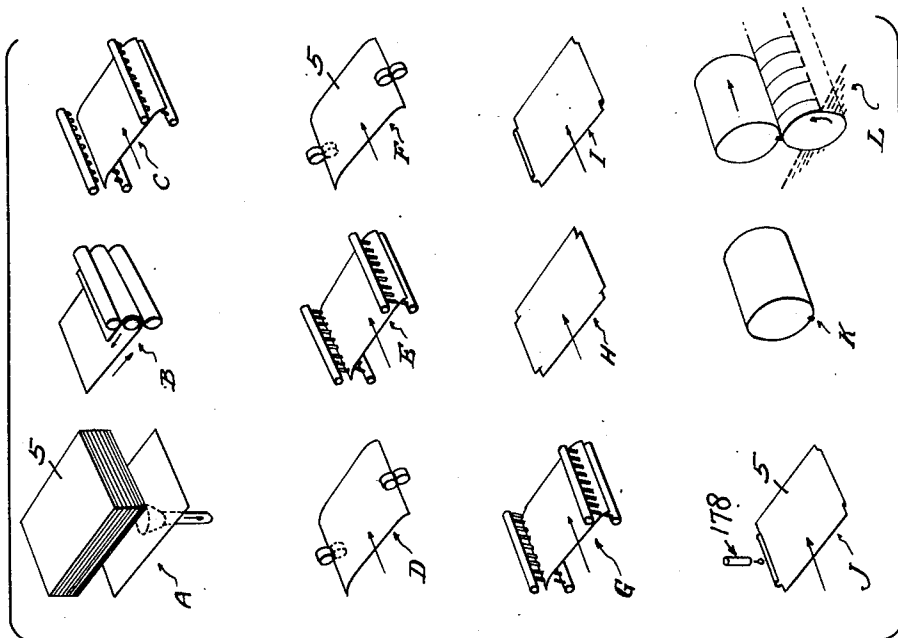
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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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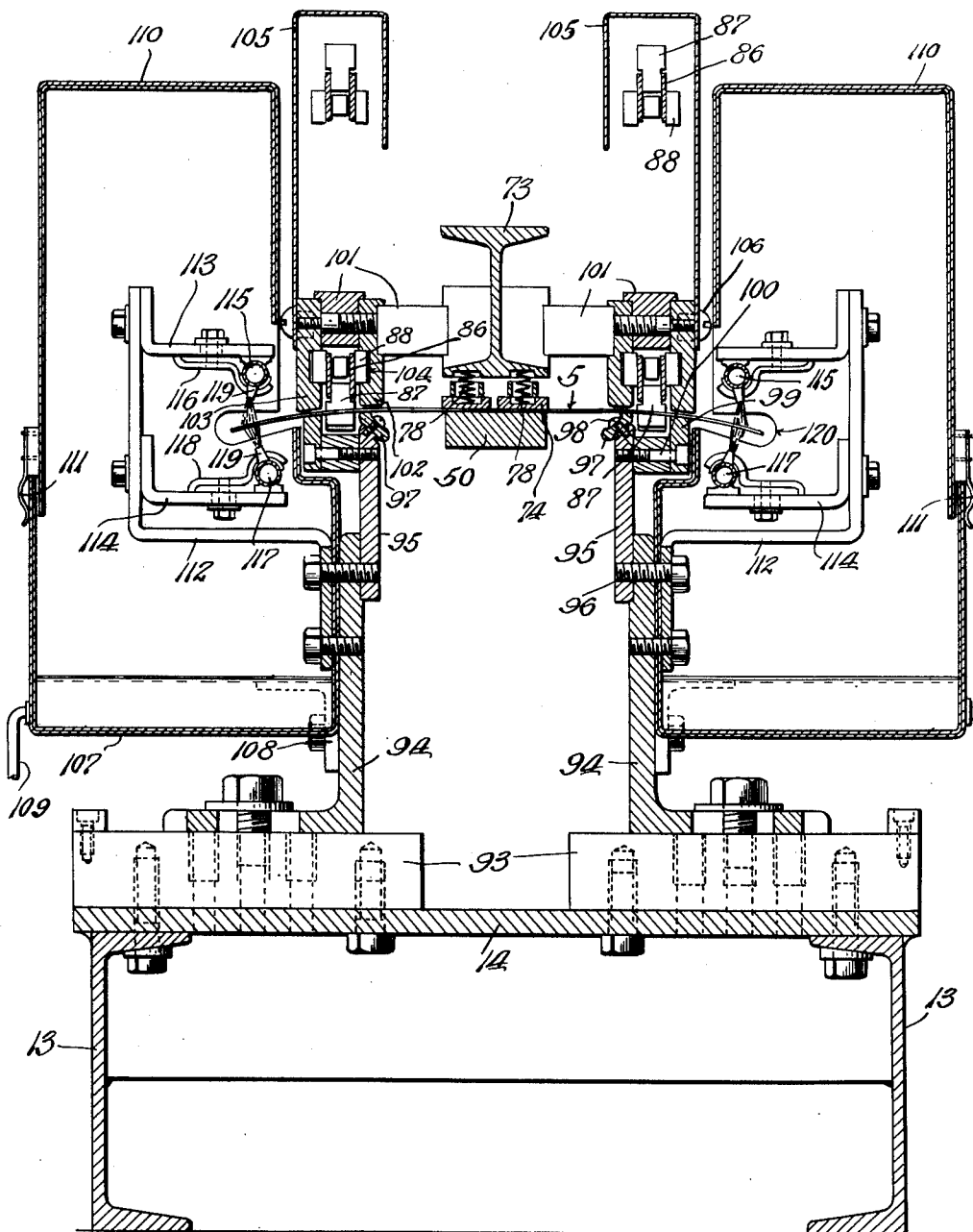


*Fig. 5.*

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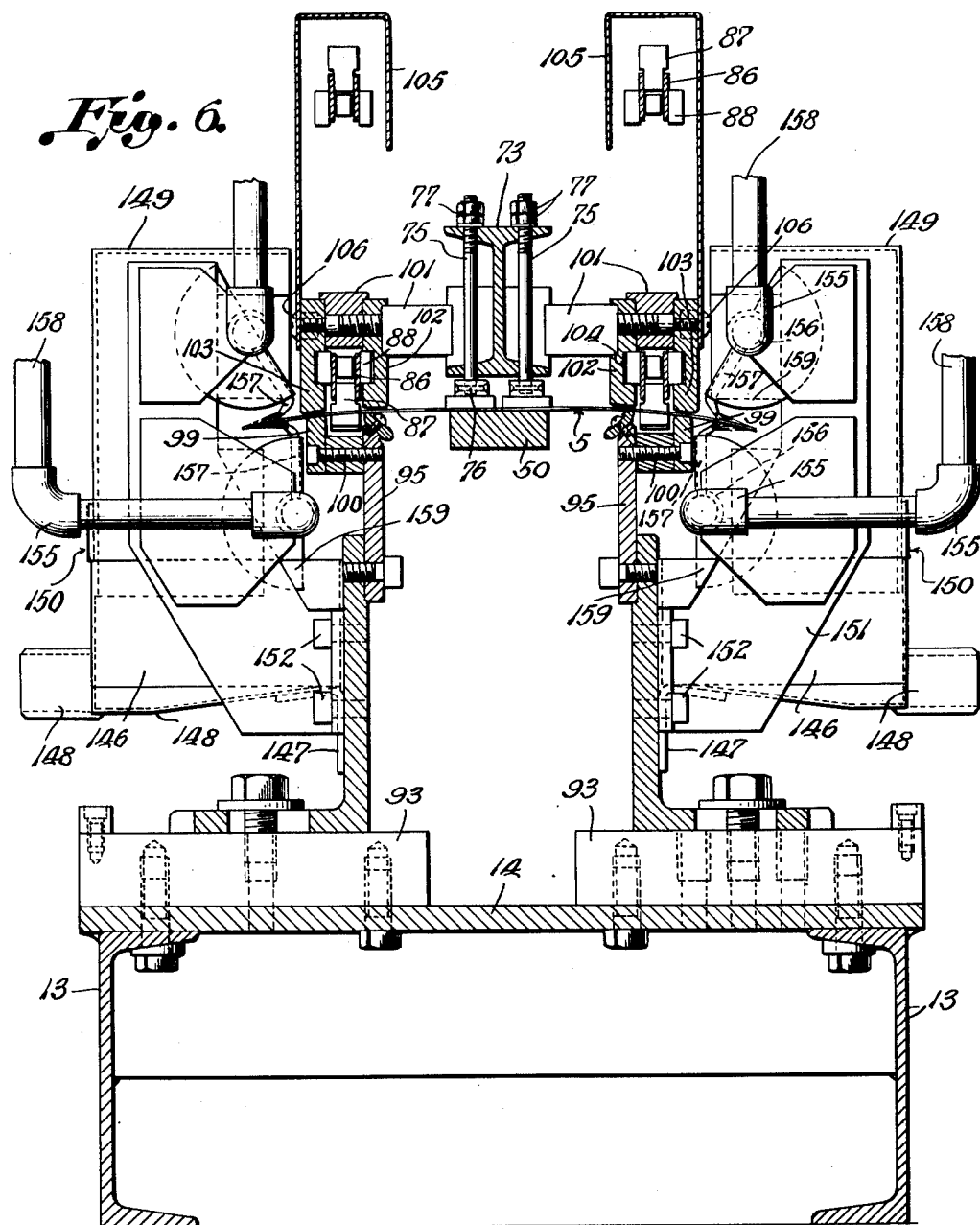
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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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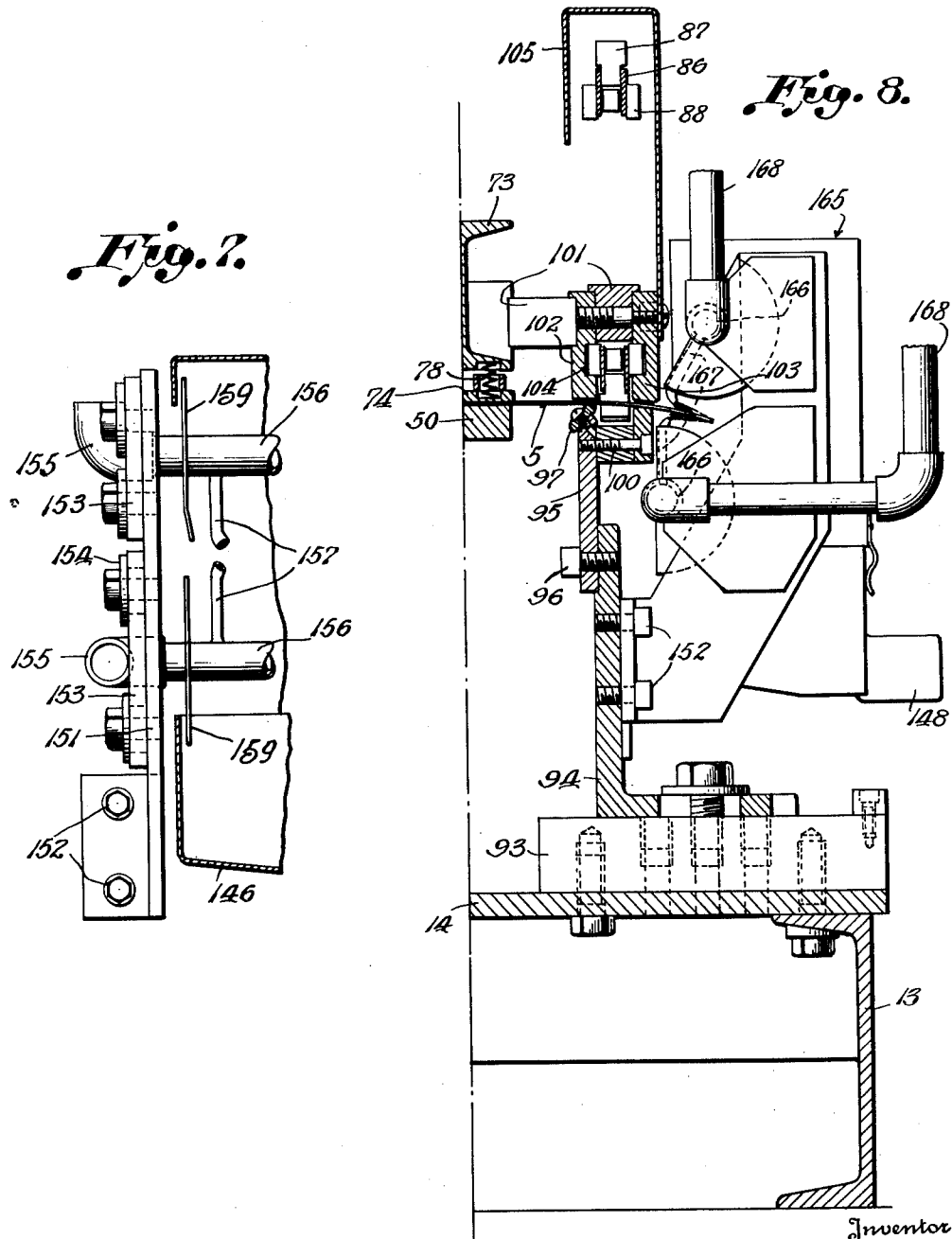
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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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12 Sheets-Sheet 10



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APPARATUS FOR CLEANING CAN BODY BLANK SEAM MARGINS

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*Fig. 10.*

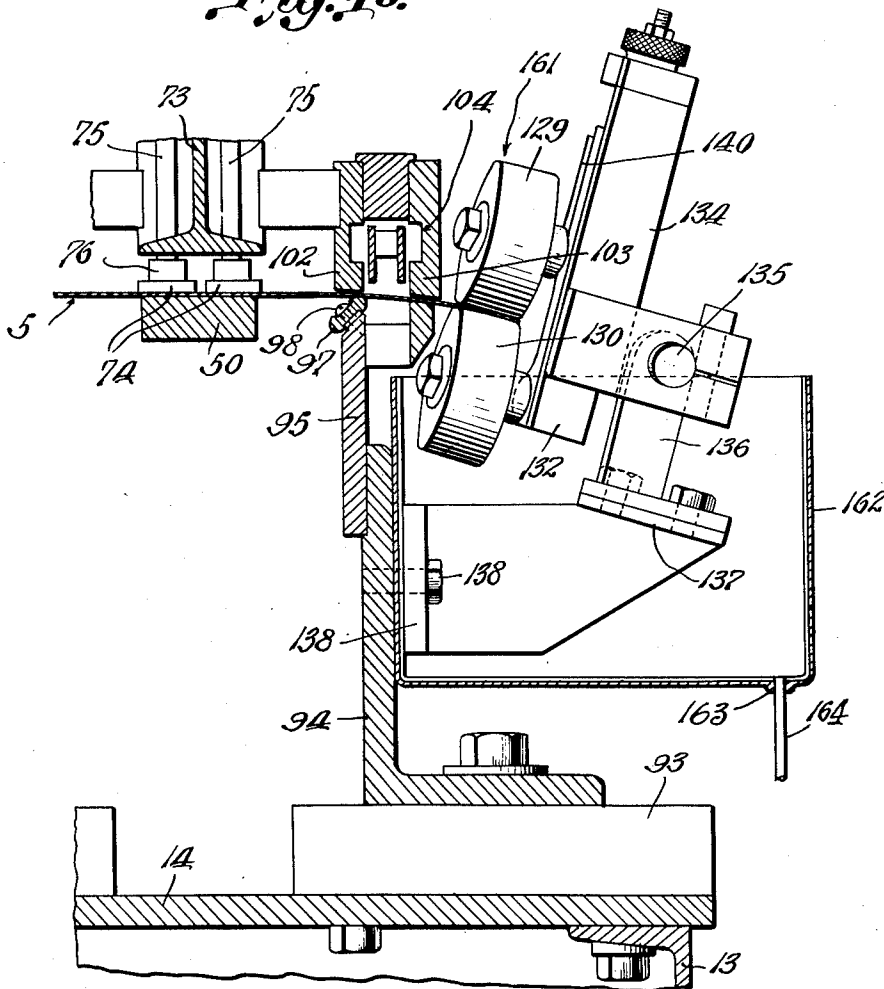
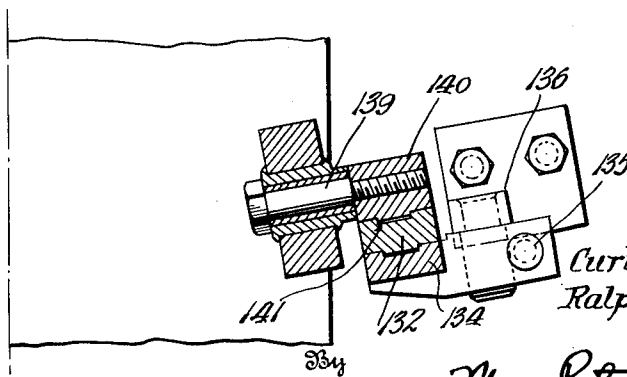


*Fig. 11.*



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## UNITED STATES PATENT OFFICE

2,623,233

APPARATUS FOR CLEANING CAN BODY  
BLANK SEAM MARGINS

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Application February 25, 1946, Serial No. 650,084

9 Claims. (Cl. 15—302)

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The invention relates generally to the art of manufacturing metallic receptacles and primarily seeks to provide a new and useful apparatus for deoxidizing the can body blank marginal edge portions intended to be formed into the side seams in can bodies.

It is well known that in order to solder black plate, the portions thereof to be soldered must be cleansed of oxidation and scale, for without such cleansing the solder will not properly adhere to the metal. It is also preferred that the soldering be performed immediately after the surface cleansing because reoxidation may take place very rapidly. Various methods have been tried in efforts to solve this problem, among them being that of applying protective coatings to previously cleansed portions of the plate, said coatings having the quality of facilitating, or at least not interfering with efficient soldering, and being intended to protect the cleansed surfaces against oxidation and scale accumulation prior to soldering. In some instances the sheets or blanks were given over-all protective coatings, as by bonderizing and passivating processes, and in these instances edge portions which are to be soldered must be rendered bare and clean before such soldering is performed. Such methods have partially solved the problem in that they permit storing of the treated plate before soldering, but obviously such procedure is not entirely satisfactory because of the labor and expense involved in special treatments of the plate which could be eliminated in a practical continuous process in which the cleansing of the plate and the formation of the can bodies and the solder bonding of the side seams thereof are carried out without intervention of any protective coating and storing of the blanks.

It is a purpose of the present invention to provide an improved apparatus effective for very rapidly and efficiently cleaning the edge portions of the blanks which are to be solder bonded, said apparatus being adaptable for cleaning said blank edge portions as a cleaning function complete in itself, or in combination in continuous operation with can body forming devices, thereby to permit production of can bodies from deoxidized steel or black plate or other known chemically treated can making plates at speeds in excess of 300 can bodies per minute, and in a manner assuring against the damaging of body maker parts by acid contact.

It is an object of the invention to provide an improved apparatus of the character stated which includes means for feeding the blanks from a stack supply, copiously spraying the marginal edge portions of the blanks with a cleaning acid, squeegeeing the acid treated marginal areas of the blanks for removing most of the acid adhering to the blanks and also for mechanically wiping

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ing away any oxide or scale which may remain after the acid treatment, washing said marginal blank areas with water for removing any residual acid film which may remain after the squeegeeing operation, squeegeeing the washed areas of the blanks for removing the water remaining thereon, and applying blasts of air to the acid treated, washed and squeegeed marginal portions of the blanks for drying them and removing any residual film of moisture remaining thereon.

Another object of the invention is to provide an apparatus of the character stated in which the blanks are fed in processional order over a feedway including laterally spaced rail portions disposed at a lower level than the intermediately placed portions of the feedways, and in which the blank feeding chain means are guided by rails including rail portions closely overlying said outwardly spaced rails in a manner for co-operating therewith in holding marginal edge portions of the blanks being fed in an outwardly and downwardly bent condition.

Another object of the invention is to provide an apparatus of the character stated in which the feeding chain means supporting and guiding devices include means for yieldably holding the blanks against the supporting devices over which they are fed and are swingably mounted so that they can be raised to a position for rendering the blank supporting and guiding devices comprising the feedway readily accessible.

Another object of the invention is to provide an apparatus of the character stated in which the treating acid is applied to the marginal edge portions of the blanks through suitably spaced batteries of spray nozzles, means also being provided for continuously recirculating the treating acid so that the same acid can be used over and over for a considerable period of time over which it retains the desired cleansing efficiency.

Another object of the invention is to provide in an apparatus of the character stated novel squeegee rolls which engage the upper and lower marginal surface portion of the blanks and are caused to rotate by frictional contact with the blanks in angular relation to the direction of travel of said blanks so as to drag over or mechanically work upon said marginal edge portions in a manner for assisting the acid in removing any dirt or scale in addition to the oxide, and also for assuring efficient squeegee removal of residual acid and moisture films from the blanks.

Another object of the invention is to provide an apparatus of the character stated in which the washing of the marginal edge portions of the blanks is accomplished by hot water delivered to said marginal edge portions by spray nozzles shaped and disposed so as to direct the water outwardly against the upper and lower marginal surfaces of the blank.

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Another object of the invention is to provide an apparatus of the character stated in which the drying of the marginal edge portions of the blanks is accomplished by air delivered in outwardly directed blasts from nozzle batteries between which the laterally extended and downwardly bent portions of the blanks are fed.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims, and the several views illustrated in the accompanying drawings:

In the drawings:

Figures 1 and 1a together comprise a somewhat diagrammatic right side elevation illustrating body maker structure embodying the invention.

Figures 2 and 2a together comprise a somewhat diagrammatic plan view of the parts illustrated in Figures 1 and 1a.

Figures 3 and 3a together comprise a vertical central longitudinal section through that portion of the body maker structure illustrated in Figures 1, 1a, 2 and 2a.

Figure 4 is a vertical cross sectional view taken on the line 4—4 on Figure 1.

Figure 5 is a vertical cross sectional view taken on the line 5—5 on Figure 3.

Figure 6 is a vertical cross sectional view taken on the line 6—6 on Figure 3a.

Figure 7 is a fragmentary longitudinal sectional view taken through an end portion of one of the water spray nozzle batteries.

Figure 8 is a fragmentary vertical cross section taken on the line 8—8 on Figure 3a.

Figure 9 is a vertical cross sectional view taken on the line 9—9 on Figure 3a.

Figure 10 is a fragmentary vertical cross section illustrating one of the squeegee roll sets.

Figure 11 is a horizontal section taken through the center of the upper roll of the squeegee roll set illustrated in Figure 10.

Figure 12 is a side elevation illustrating the squeegee roll set shown in Figures 10 and 11.

Figure 13 is a diagrammatic perspective view illustrating the general sequence of steps performed by the apparatus.

The improved apparatus is more or less diagrammatically illustrated herein as embodied in a body maker of the Troyer-Fox type which is well known in the art and illustrated in U. S. Letters Patent to Troyer 1,772,820 issued August 12, 1930. It is to be understood, however, that although the blank edge cleaning devices are herein disclosed as incorporated directly in a body maker, said devices may be incorporated in a separate blank treating apparatus or machine, or in an apparatus or machine designed as a unit attachment for use with a body maker.

From the Troyer patent disclosure above referred to, it will be apparent that in machines of this type, body blanks are drawn one by one from a supply stack at the supply station and are then fed step by step through an idle station, a grain breaking station at which the blanks are fed laterally off the feed line and curled so as to break the grain and facilitate subsequent shaping of the can bodies and then returned to the feed line at a higher level, after which they are advanced step by step through one or more idle stations, one or more slitting and notching stations, then through one or more folding stations at which hooks are formed at the lateral marginal edges of the blanks to subsequently engage in the formation of side seams, and then through another idle station to

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the shaping or forming station at which the can bodies are formed. The formed can bodies are then fed to the solder bonding station at which the side seams are solder bonded.

In Figures 9 of the Troyer Patent 1,772,820 the sequence of operations in advance of the solder bonding of the can bodies is diagrammatically illustrated, and in order to facilitate understanding of the present invention, a similar diagrammatic illustration of the method steps is made in Figure 13 herein. In this figure, the first step of the method or the feeding of the blanks from the supply stack is indicated at A. The blanks are fed first to the grain breaking station B at which they are pushed laterally to be flexed by the grain breaking rolls and returned to the feed line at a higher level. The feeding of the blanks to and past the grain breaking station is effected by a suction cup which removes the blanks one by one from the bottom of the supply stack, and by feeding fingers on well known reciprocating feed bars. Just beyond the grain breaking station B, the feeding of the blanks is taken over by endless chain means which impart continuous movement thereto. While being conveyed by the continuously moving feed chains, the lateral marginal edge portions of the blanks are held bent downwardly in a manner which will assure the running of treating liquid off said edge portions without danger of it getting onto the main body portions of said blanks inwardly of said edge portions. The blanks first pass through the acid cleaning station C at which the marginal edge portions of the blanks pass between acid sprays directed at a slight inclination outwardly so as to assure running of the acid off the edge portions of the blanks. The blanks are next passed through station D at which a squeezing action is performed effective to remove residual acid from the edge portions of the blanks and mechanically remove any remaining oxidation or scale. Thereafter the blanks are fed through the washing station E at which hot water is sprayed onto the edge portions for removing any residual cleaning acid therefrom. The blanks are then fed through a second squeegee station F at which a squeezing action is performed effective to remove residual washing water from the blank edge portions, and then the blanks are fed through station G at which the edge portions thereof pass between air blasts effective to remove residual water and thoroughly dry said blank edge portions. This completes the edge treatment or cleansing of the blanks and in an apparatus or machine designed solely for cleaning the blanks the operation would end here. When it is desired to perform the blank cleaning and can body forming operations in unbroken sequence as in the example of embodiment herein illustrated, the blanks proceed directly to the forming machine stations. At this time the feeding of the blanks is taken over by the feeding fingers of reciprocating feeders which feed the blanks through the notching and slitting station H, the hook forming station I, the fluxing station J and the body shaping or forming station K at which the blanks are shaped and have the hooks thereon brought into interengagement to form side seams. As the formed can bodies leave the forming station K, the feeding thereof is taken over by a continuously travelling feed chain which conveys the bodies through the solder bonding station L at which the side seams are solder bonded to complete the formation thereof.

In the disclosures herein made of an example

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of apparatus adapted for the practicing of the improved method, the blanks 5 are supported in a supply stack 6 and are withdrawn one by one from the bottom of the stack by a suction cup 7 carried at the upper end of a plunger. See Figures 1 and 3. The plunger is secured to a slide 8 which is vertically slidable in guides 9 mounted on a bracket 10 which is secured as at 11 to a cross member 12 extending between parallel spaced channel members 13. The channel members 13 support a frame bed 14 and are in turn supported on frame standards 15.

The slide 8 is link-connected as at 16 with one arm of a bell crank lever 17 which is pivotally supported as at 18 on the bracket 10 and has its other arm adjustably connected as at 19 with thrust members 20. The thrust members 20 are pivotally suspended as at 21 from the bed 14 and are thrust-link-connected as at 22 with the pitman 23 which is attached to the crank shaft 24 and forms a part of the means for operating the can body seam bumping steel in a manner well known in the art and shown and described in the Troyer Patent 1,772,820.

The blanks 5 individually withdrawn from the supply stack are fed over a central support 25 which is mounted as at 26 above the bed 14. This endwise feeding of the blanks is effected by the feed fingers on reciprocable feed bars 27 connected to a slide 28 slidable in guides 29 which are mounted as at 30 on the bracket 10. The slide 28 is secured to one end of a thrust tube 31 which is reciprocable in bearings 32, 33 and 34 supported on the bed 14 in the manner best illustrated in Figures 3 and 3a. Intermediately of its ends the tube 31 is attached to a slide 35, and at the end thereof remote from the slide 28 said tube is secured to another slide 33. The slide 36 is link-connected as at 37 to one arm of a crank lever 38 which is pivoted intermediately of its ends as at 39 on the frame bed portion 40. The other arm 41 of the crank lever is connected by a pitman 42 with a crank 43 on the crank shaft 24 so that the rotary motion of the shaft 24 will be transmitted in the form of reciprocatory movement to the tube 31 and the slides 28, 35 and 36 secured thereon. The reason for reciprocating the slides 35 and 36 will become apparent as this description progresses.

The fingers of the feed bars 27 feed the blanks 5 to the grain breaking station whereat a pusher 44 link-connected as at 45 to a rotating crank disk 46 pushes said blanks laterally between the lower two curling or grain breaking rolls 47 to be flexed thereby in the manner well known in the art and returned by the upper two of said rolls onto the upper surface of the support member 48 at said station. The support member 48 preferably is pivotally mounted as at 49 in position for directing the body blanks onto the central bed plate 50 which is supported at 51 on the previously mentioned bearing members 33 and 34. The pivotal mounting of the member 48 as at 49 permits upward swinging of said member so as to render accessible the underlying surface of the support 25 at the grain breaking station.

The curling or grain breaking rolls 47 are driven as at 52 from a motor 53 suitably supported on the machine framing in the manner clearly illustrated in Figure 1. The crank disc 46 is driven through the medium of sprocket and chain connections 54 from the shaft 55 which is rotatable in frame bearings 56 and driven by

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sprocket and chain connections 57 from the drive shaft 58.

The previously mentioned slide 35 has secured thereto a cross head 59 to which feed bars such as are shown in U. S. Letters Patent No. 1,780,049 issued to Troyer on October 28, 1930 are secured, the fingers of which feed bars operate in a manner well known in the art to feed the blanks 5 step-by-step over the support member 48 and the central bed plate 50, or in other words away from the grain breaking station.

A cross shaft 60 is mounted in bearings 61 and 62 supported on the frame bed portion 40, and this shaft has a large spur gear 63 mounted on the end thereof. The gear 63 may be fixed on the shaft 60 if desired, but it is preferred that it be connected with the shaft through a suitable overload release means generally designated OR as indicated in Figure 9 so that in the event of a jam in the machine the plunger P of said means will be projected to the right as viewed in said figure to actuate a pivoted switch lever S in a manner for opening the switch W which may be connected in the main power circuit of the machine. Since power cut out means of this general character are well known in the art further detailed disclosure of said means is deemed unnecessary herein.

Rotation is imparted to the large spur gear 63 and the shaft 60 on which it is mounted by a small gear 64 which is adjustably secured on a cross shaft 65 mounted in bearings 66 supported on the frame bed portion 40, and in the central support in which the tube bearing 34 is provided. The shaft 65 is driven through transmission gearing generally designated 67 from the previously mentioned drive shaft 58 and also serves to drive the blank edge notching, slitting and folding means actuating cam shafts 68 through bevel gear couples 69 as shown in Figure 9.

A forked bracket 70 is journaled on the shaft 60 as at 71 and is secured as at 72 to one end of an I-beam 73 which extends along and above the central bed plate 50. See Figures 2, 3, 5 and 6 of the drawings. Two presser shoes or bars 74 are carried in parallel spaced relation beneath the beam 73, they being suspended from the beam on hanger bolts 75 which are pivoted as at 76 to the members 74 and extend upwardly through holes in the beam flanges at the respective sides of the beam. The bolts 75 which are placed at intervals along the beam 73 are equipped at their upper ends with adjustable abutment nuts 77, and compression springs 78 are interposed between the shoes 74 and the bottom of the beam 73 for yieldably pressing the shoes against the upper surface of the central bed plate 50 in the manner illustrated in Figures 5 and 6. By reason of the provision of the adjustable abutment nuts 77, the distance to which the shoes 74 can be depressed below the bottom surface of the beam by the springs 78 can be varied, and undesirable displacement of said shoes away from the beam when the same is swung upwardly about the axis of the shaft 60 in order to render the central bed plate 50 and adjacent parts accessible is prevented. A cross bar 79 is secured across the top of the beam 73 at the end thereof remote from its pivotal mounting, and said bar is equipped at its ends with adjustable rest screws 80 which are engageable with support brackets 81 for determining the position of the pivotally mounted beam 73 in the manner clearly illustrated in Figures 1, 2 and 3 of the drawings.

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Two sprockets 82 are secured on the shaft 80 in spaced relation in the manner illustrated in Figure 9, and a pair of idler sprockets 83 are mounted in similarly spaced relation on a shaft 84 mounted in a bearing 85 secured upon the beam 73 adjacent the free end thereof just beyond the grain breaking station. Two chains 86 pass over the sprocket sets 82, 83 and each said chain is equipped with equidistantly spaced feeder fingers 87 and guide members 88 which project laterally from opposite sides thereof. A tightener sprocket 89 is provided for each chain, and said tightener sprockets are carried by crank arms 90 rockably mounted as at 91 on the beam 73 and adjustably secured as at 92 to said beam.

A plurality of rest blocks 93 are mounted transversely upon the frame bed 14 and serve as supports for two angle beams 94 adjustably arranged in parallel spaced relation in the manner illustrated in Figures 3, 5 and 6 of the drawings. The angle members 94 extend above and along the frame bed 14 substantially the full distance between the chain supporting sprocket sets 82, 83 and each has a vertical rail 95 secured thereto at 96 for projecting upwardly therefrom, and each rail 95 has a hard metal blank slide rail 97 secured as at 98 along the upper edge extremity thereof in the manner clearly illustrated in Figures 5 and 6. A support rail 99 is secured as at 100 on and spaced outwardly from each rail 95 with its upper edge portion disposed at a slightly lower level than the blank supporting upper edge portion of the respective adjacent slide rail 97 and the upper face of the central bed plate 50 in the manner best illustrated in Figures 5 and 6.

Extending along each side of the beam 73 and secured thereto through spacers 101 are two sets of chain guide rails each including an inner rail 102 closely overlying the respective slide rail 97, and an outer rail 103 closely overlying the respective lower rail 99. It will be apparent by reference to Figures 5 and 6 that each outermost rail 103 has its lower edge portions disposed slightly lower than the lower edge portion of the adjacent companion rail 102, and thus when the beam and rail assembly 73, 102, 103 is lowered to its operative position illustrated in Figures 3, 5 and 6 the cooperative relation of the rail sets 102, 103 and 97, 99 will serve to bend the laterally extended portions of the blanks 5 downwardly in the manner clearly illustrated in said Figures 5 and 6. The rails of each set 102, 103 are provided with laterally aligned guide grooves 104 into which the chain guide members 88 extend in a manner for supporting and accurately guiding the lower flight of the chains 86 so that the feeder fingers 87 thereof will extend downwardly between the rails of the respective sets 102, 103 and into the longitudinal spaces between the respective rail sets 97, 99, thereby to engage and continuously feed the can body blanks 5 over the upper surfaces of the central bed plate 50, and the rail sets 97, 99 with the laterally extended portions of said blanks bent downwardly in the manner stated.

It is preferred that guards 105 be mounted over the blank conveying chains 86 in the manner clearly illustrated in Figures 1, 2, 5, and 6, and these guards may be secured as at 106 to the outermost rails 103.

Just beyond the position of the chain supporting idler sprockets 83 and at each side of the apparatus is mounted a trough-like housing portion 107, each said housing portion being secured as at 108 to the L-beam 94 at the particular side of the apparatus. Each housing portion 107 has a

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bottom which slopes toward a drain 109, and a cover portion 110 is removably mounted as at 111 on each said housing portion 107. Within each housing provided by the fixed and removable portions respectively designated 107 and 110 are provided mounting brackets 112, and it will be apparent by reference to Figure 5 that these brackets are secured to the respective L-beams 94. On each bracket 112 is secured an upper support arm 113 and a lower support arm 114. A spray manifold 115 is secured as at 116 on each top arm 113, and a similar spray manifold 117 is secured as at 118 on each bottom arm 114. Each set of manifolds 115, 117 extend longitudinally and parallel the adjacent rails 99 and 103, and each manifold is provided with a row of spray nozzles 119, the nozzles of the manifold 117 being placed so that spray therefrom will be directed upwardly and outwardly against the downwardly bent lateral portions of the travelling blanks in the manner clearly illustrated in Figure 5, and the nozzles of the upper manifold 115 being directed downwardly so that the sprays or jets emanating therefrom will engage in downwardly and outwardly angled relation to said downwardly bent blank portions. In travelling through the space between the manifolds 115 and 117 of the respective manifold sets, the downwardly bent lateral portions of the blanks 5 pass through end openings 120 provided in the housing side walls.

An acid storage tank 121 is mounted beneath the frame bed, and a motor driven pump 122 feeds acid through a supply line 123 into a vented, high level reservoir R connected by a return line 124 with the tank 121. The supply line is connected as at 125 with a manifold 126 at each side of the machine, and each said manifold is connected by supply lines 127 with the spray manifolds 115 and 117 at the respective side of the machine. It will be obvious that the high level reservoir R constitutes an equilibrium device which acts as a "head" to keep a uniform pressure on the cleaning acid delivering nozzles 119 and from which the surplus of pumped acid flows back into the supply tank 121.

It will be apparent that while the motor M is operating a continuous supply of blank edge cleaning acid will be directed through the nozzles 119 in slightly outward angled relation against the upper and lower marginal edge portions of the travelling blanks, the surplus acid being caught in the bottom of the housing and returned through the drains 109, and a connected drain line back to the storage tank 121 as shown in Figure 1. The copiously and continuously supplied acid will serve to cleanse the marginal edge portions of the blank of oxidation and scale or known chemical protective treatments on the blanks and will prepare said edge portions for efficient solder bonding. By reason of the manner of directing the acid sprays against the marginal edge portions of the blanks, and the downward bending of the laterally extended portions of said blanks, it is assured that the surplus acid will flow off the downwardly bent lateral portions of said blanks without danger of any acid getting onto the central or main body portions of the blanks intervening said marginal edge portions.

Within the confines of each of the previously described housings 107, 110 is mounted a squeegee roll set generally designated 128. The specific structure of these roll sets will be apparent by reference to Figures 10 and 12 of the drawings.

Each roll set comprises upper and lower rubber rolls 129 and 130.

The lower roll is rotatable about a shaft 131 secured to a hanger 132 which is vertically-adjustably mounted as at 133 on a bracket 134. The bracket 134 is secured as at 135 on a mounting bracket 136 which is in turn secured on a supporting bracket 137 attached as at 138 to the adjacent L-beam 94.

The upper roll 129 of each set of squeegee rolls is rotatable about a shaft 139 secured on a hanger 140 which is adjustably mounted as at 141 on the hanger 132. It will be apparent by reference to Figure 12 that each bracket 134 has an overhanging upper end 142 which is apertured to receive a captive sleeve 143 through which an adjuster stem 144 is threaded. The stem 144 is rotatably attached to the respective hanger 140 as at 145, and it will be apparent that by rotating the sleeve 143 upward or downward movement can be imparted to the hanger 140 to bring about separation or cooperative engagement of the rolls 129 and 130 of the respective set of squeegee rolls.

It will be apparent by reference to Figures 10 and 11 of the drawings that the rolls of the squeegee roll sets are mounted with their axes inclined outwardly and forwardly at a slight angle with relation to the direction of feeding movement of the can body blanks 5 so that the opposing portions of the rolls which engage the marginal edge portions of the blanks are outwardly and forwardly angled and provide a squeegeeing action contact with the can body blanks fed therebetween. By reason of this peculiar positioning of the rolls of the squeegee roll sets, rotation is imparted to the rolls by the frictional contact of the can body blanks fed therebetween, and the result is a scrubbing or squeegeeing contact which not only serves to remove substantially all of the residual acid which may remain on the marginal edge portions of the blanks, but also to drag off any oxidation or scale or surface treatment which has not been removed therefrom by the copious application of the cleansing acid.

Just beyond each of the previously described housings 107, 110 there is mounted a housing including a trough-like bottom portion 146 which is secured as at 147 to the adjacent L-beam 94. These housing bottoms include portions sloping toward a drain 148, and each said housing includes a cover portion 149 which is removably mounted as at 150 on the bottom housing portion. See Figures 1, 2, 6 and 7. At the rear end of each housing 146, 149 there is provided a supporting bracket 151 which is secured as at 152 to the respective L-beam 94. Upper and lower support plates 153 are vertically adjustably secured as at 154 to each bracket 151, and each plate 153 has an elbow 155 welded thereon, said elbows serving to support upper and lower manifolds 156 which extend longitudinally in parallel spaced relation to each other and to the adjacent upper and lower rails 103, 99. Each manifold 156 is equipped with a battery of water spray nozzles 157 and it will be apparent by reference to Figures 6 and 7 of the drawings that the ends of said nozzles between which the laterally extended and downwardly bent portions of the travelling can body blanks 5 are fed are bent outwardly and at a slight angle in a direction opposite the direction of travel of the blanks so as to direct the water sprays emanating therefrom outwardly and at said slight angle over the upper and lower edge portion of the blanks in the man-

ner clearly illustrated in Figure 6. The manifolds 156 are connected with valve controlled water supply lines 158 through which water, preferably at 180° F., is delivered to and through the nozzles 157 so as to thoroughly wash from the travelling can body blanks any residual acid remaining on the acid cleansed marginal edge portions thereof. By reason of the peculiar arrangement of the nozzles and the downward bending of the can body blank portions which pass therebetween, it is assured that no water will be directed onto the main central body portions of the can body blanks intervening the marginal edge portions thereof directly contacted by the wash sprays. Splash shields 159 may be provided at the housing ends for preventing longitudinal deflection of the portions of the spray out of the housings. A drain line 160 connects with each lower housing portion 146 for carrying away surplus washing water caught in the trough-like bottoms of the housings 146, 149. See Figures 1 and 1a.

Just beyond the front end of each of the previously described housings 146, 149 provided at the blank edge washing station is mounted a second squeegee roll set generally designated 161, and these roll sets are constructed and mounted and function in the same manner as the roll sets 128 previously described except for the provision of an individual collector trough 162 under each said roll set. The squeegee roll sets 161 serve to remove from the marginal edge portions of the travelling blanks any residual washing water remaining thereon, and the troughs 162 are equipped with drains 163 and are connected by drain lines 164 with the previously mentioned drain line 160 for carrying off any water which might be collected in the troughs 162.

Since all of the squeegee roll sets 128 and 161 are constructed in like manner, as previously stated, corresponding reference characters designating specific parts of the roll sets are applied in all illustrations of the roll sets.

Just beyond the second squeegee roll sets 161 are mounted housings generally designated 165, and these housings are constructed and mounted in the same manner as the housings mounted at the spray washing station. See Figures 6, 7 and 8. In these housings 165, however, there are provided upper and lower air manifolds 166 equipped with air blasts nozzles 167, and air under pressure is supplied to the manifolds through valve controlled air supply lines 168. The downwardly bent marginal edge portions of the can body blanks are fed between the upper and lower air blasts nozzle sets, and the nozzles directed outwardly and angularly as previously described direct blasts of air against said blank edge portions in a manner for driving off any residual moisture thereon and thoroughly drying the blanks without danger of driving any moisture onto the central or main body portions of the blanks intervening said marginal edge portions. Any moisture thus driven off the marginal edge portions of the blanks will be collected in the trough-like bottoms and housings and delivered through the drains 168 and the connected drain line 170 into the previously mentioned drain line 160.

The previously mentioned slide 36 has secured thereto a cross head 171 to which feed bars such as are shown in U. S. Letters Patent 1,780,049, issued to Troyer on October 28, 1930, are secured, the fingers of which feed bars operate in the well known manner to feed the blanks 5 away from the delivery ends of the continuously travelling

chains 86, over the center bar section 172 and under the rails 173 which are pivoted at 174 to the arch 175 beneath which the can body forming mechanism well known in the art operates, thereby making it possible to swing the rails 173 upwardly to render accessible the underlying can body blank feedways. At their free end the rails are supported by adjustable screw and bracket equipments comparable to those previously described in connection with the free ends of the chain supporting and guiding beams 73.

When the formation of the blanks into can bodies is carried out as a continuous operation with the marginal edge cleaning of the blanks, said blanks, while being fed step-by-step to the arch and the body forming mechanisms thereunder, pass through slitting and notching means well known in the art and generally designated 176, and hook forming and fluxing means generally designated 177 and 178 respectively. These mechanisms are all well known as to structure and function and are illustrated as to position in Figures 1a and 13. The fluxing means is illustrated only diagrammatically in Figure 14 and it is to be understood that any approved fluxing means may be employed. An example of mechanism that can be employed for applying the flux to the hook and lap portions of the blanks as they are fed along is shown in U. S. Letters Patent 2,344,303 issued to Henschert and Ball on April 5, 1943. Eureka salts, comprising 80% zinc chloride and 20% ammonium chloride, constitutes a satisfactory flux.

The shaped or formed can bodies 183 are fed from the forming station beneath the arch 175 by the usual reciprocating feeders into an outside horn or horse 180 and pass on to have their side seams solder bonded in the usual manner.

While the novel apparatus defined in the appended claims and herein described is not to be considered limited to the use of any particular blank edge cleaning solution, a 20% hydrochloric acid solution has been found practical and desirable. A preferred formulation may be made by dissolving 0.1 part of Triton NE (an aryl alkyl polyether alcohol) in 100 parts of 20% hydrochloric acid solution.

Any non-oxidizing solution of a strong inorganic acid may be used with or without an acid stable wetting agent such as the Triton NE used in the above formula. The acid strength required depends upon the speed of operation, or more directly, upon the time the surface to be cleaned is exposed to the action of the cleaning solution. For example, for operating at 350 cans a minute, a 20% hydrochloric acid is preferred, but a 10% hydrochloric acid solution can be used satisfactorily. The 20% acid solution is preferred because it provides a good safety factor. Lower concentrations of hydrochloric acid are entirely satisfactory where a longer contact time is provided, as for example, where the speed of operation is less than 350 cans a minute. As the strength of the cleaning solution decreases, the required contact time increases. Thus, hydrochloric acid in concentrations from as low as 1% up to as high as 37% will work when the contact time is sufficient for the particular strength of acid used.

As pointed out above, the wetting agent is not essential, but has the advantage when present of increasing the latitude and consistency of the cleaning. For example, where a particular body blank to be cleaned is not wetted readily the wetting agent is of assistance and serves to insure that such an odd blank will be cleaned. Any acid

stable wetting agent can be used in place of the Triton NE employed in the above mentioned preferred formula. Usually amounts of wetting agent approximating 0.1%, by weight, based on the weight of the cleaning solution give results equalling those obtained with higher concentrations. Lower amounts are effective, however. For example, 0.05% Triton NE on the same basis produces a noticeable improvement in the latitude and consistency of the action of the cleaning solution.

The amount of acid used is many times the amount necessary for cleaning. This use of a super-abundance of acid in the system eliminates necessity for checking the concentration of the acid at frequent intervals. Thus, the ordinary operator in a busy season can run the body maker with the same speed and continuity as he could a regular body maker which did not have the blank cleaning apparatus incorporated therein.

The removal of oxidation and scale from the marginal edge portions of the blanks by the acid solution is materially aided by the squeegee rolls which not only perform a true squeegee function in removing residual acid and water, but also a mechanical scrubbing action effective to remove all remaining oxidation and scale. Actual colorimeter tests made on blanks passed through the apparatus herein have shown that said blanks, or rather the treated marginal edge portions thereof, were chemically clean.

It is also important to note that the width of marginal edge portions of the blanks treated by the washing water and the drying air are greater than the marginal widths treated by the cleaning acid solution. This feature and the feature of downwardly bending the laterally extended portions of the blanks assures against flowing of any treating acid solution onto the central or main body portions of the blanks where it might remain for an interval of time sufficient to impair protective coatings and possibly be carried into the body maker and damage parts thereof.

It is to be understood that the references herein made to marginal edge portions are not to be construed as necessarily limited to marginal edge extremities since in some instances, as in the cases of blanks from which tongue cans are to be formed, the marginal edge portions to be cleaned and later to be included in and adjacent can body side seams may be spaced a distance inwardly from one or both marginal edge extremities.

As has been explained hereinbefore the invention comprehends the treatment of various forms of can making plate blanks such as deoxidized steel, black plate, chemically treated or passivated plate, with or without lacquer or lithographed coatings thereon, and when such plate includes such lacquer or lithographed coatings it is to be understood that they will be so placed as to define and restrict the limits of the marginal edge portions to be cleaned.

From the foregoing description taken in connection with the accompanying drawings, it is thought that the novel apparatus will be fully understood by those skilled in the art to which the invention relates. It is to be understood that the apparatus herein disclosed is but an example of embodiment of the invention and may be variously modified without departing from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. In a can body blank seam margin cleaning

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apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering a surface cleansing acid laterally and outwardly onto and over said marginal edge portions of the blanks so as to remove from said edge portions oxidation and scale or other surface covering which would interfere with efficient solder bonding, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering water laterally and outwardly onto and over said marginal edge portions for washing acid therefrom, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering air blasts laterally and outwardly over said marginal edge portions for drying the same, and means for bending the lateral marginal edge portions of the blanks downwardly while they are being fed between the upper and lower nozzles through which acid, water and air are delivered thereonto so as to assure against the dispersion of acid or water onto the central or main body portions of the blanks.

2. In a can body blank seam margin cleaning apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering a surface cleansing acid laterally and outwardly onto and over said marginal edge portions of the blanks so as to remove from said edge portions oxidation and scale or other surface covering which would interfere with efficient solder bonding, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering water laterally and outwardly onto and over said marginal edge portions for washing acid therefrom, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering air blasts laterally and outwardly over said marginal edge portions for drying the same, a set of squeegeeing devices disposed at each side of the feedway between the first and second mentioned nozzle sets and between the second and third mentioned nozzle sets for wiping off acid and water respectively from said blanks, each said squeegeeing device set comprising an upper and a lower wiper member between which the marginal edge portions of the blanks are dragged and which are disposed in forwardly and outwardly angled relation to the marginal edge portions of the blanks with which they engage in drag-wiping contact to wipe the acid or water outwardly therefrom, and means for bending the lateral marginal edge portions of the blanks downwardly while they are being fed between the upper and lower nozzles through which acid, water and air are delivered thereonto so as to assure against the dispersion of acid or water onto the central or main body portions of the blanks.

3. In a can body blank seam margin cleaning apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in

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generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering a surface cleansing acid laterally and outwardly onto and over said marginal edge portions of the blanks so as to remove from said edge portions oxidation and scale or other surface covering which would interfere with efficient solder bonding, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering water laterally and outwardly onto and over said marginal edge portions for washing acid therefrom, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering air blasts laterally and outwardly over said marginal edge portions for drying the same, a set of squeegeeing devices disposed at each side of the feedway between the first and second mentioned nozzle sets and between the second and third mentioned nozzle sets for wiping off acid and water respectively from said blanks, each said squeegeeing device set comprising an upper and a lower wiper roller between which the marginal edge portions of the blanks are dragged, said rollers being disposed with their axes in forwardly and outwardly angled relation to the marginal edge portions of the blanks with which they engage in drag-wiping contact to wipe the acid or water outwardly therefrom, and means for bending the lateral marginal edge portions of the blanks downwardly while they are being fed between the upper and lower nozzles through which acid, water and air are delivered thereonto so as to assure against the dispersion of acid or water onto the central or main body portions of the blanks.

4. In a can body blank seam margin cleaning apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering a surface cleansing acid laterally and outwardly onto and over said marginal edge portions of the blanks so as to remove from said edge portions oxidation and scale or other surface covering which would interfere with efficient solder bonding, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering water laterally and outwardly onto and over said marginal edge portions for washing acid therefrom, laterally and outwardly directed nozzles disposed both below and above the travelling blanks in position for delivering air blasts laterally and outwardly over said marginal edge portions for drying the same, and means for bending the lateral marginal edge portions of the blanks downwardly while they are being fed between the upper and lower nozzles through which acid, water and air are delivered thereonto and including continuous opposed upper and lower rails which lie close against the travelling blanks inwardly of the nozzles and prevent splashing of acid or water onto central or main body portions of said blanks.

5. In a can body blank seam margin cleaning apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in

generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, means for holding the blanks with their laterally extended marginal edge portions bent slightly downwardly as they are being fed, and means for applying a surface treating fluid to said downwardly bent marginal edge portions and including an upper and a lower manifold extending along each side of the feedway in position for having the downwardly bent marginal edge portions of the fed blanks move between them, and laterally and outwardly directed nozzles projecting from each manifold for delivering the surface treating fluid from the respective manifold laterally and outwardly onto and over the passing upper or lower downwardly bent marginal edge portion surfaces of said blanks.

6. In a can body blank seam margin cleaning apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, means for holding the blanks with their laterally extended marginal edge portions bent slightly downwardly as they are being fed, means for applying a surface treating fluid to said downwardly bent marginal edge portions and including an upper and a lower manifold extending along each side of the feedway in position for having the downwardly bent marginal edge portions of the fed blanks move between them, and laterally and outwardly directed nozzles projecting from each manifold for delivering the surface treating fluid from the respective manifold laterally and outwardly onto and over the passing upper or lower downwardly bent marginal edge portion surfaces of said blanks, and a set of squeegeeing devices disposed at each side of the feedway just beyond said manifolds in the direction in which the blanks are fed for wiping off treating fluid from the downwardly bent marginal edge portions of the blanks, each said squeegeeing device set comprising an upper and a lower wiper member between which the marginal edge portions of the blanks are dragged and which are disposed in forwardly and outwardly angled relation to the marginal edge portions of the blanks with which they engage in drag-wiping contact to wipe the acid or water outwardly therefrom.

7. In a can body blank seam margin cleaning apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, means for holding the blanks with their laterally extended marginal edge portions bent slightly downwardly as they are being fed, means for applying a surface treating fluid to said downwardly bent marginal edge portions and including an upper and a lower manifold extending along each side of the feedway in position for having the downwardly bent marginal edge portions of the fed blanks move between them, and laterally and outwardly directed nozzles projecting from each manifold for delivering the surface treating fluid from the respective manifold laterally and outwardly onto and over the passing upper or lower downwardly bent

marginal edge portion surfaces of said blanks, and a set of squeegeeing devices disposed at each side of the feedway just beyond said manifolds in the direction in which the blanks are fed for wiping off treating fluid from the downwardly bent marginal edge portions of the blanks, each said squeegeeing device set comprising an upper and a lower wiper roller between which the marginal edge portions of the blanks are dragged, said rollers being disposed with their axes in forwardly and outwardly angled relation to the marginal edge portions of the blanks with which they engage in drag-wiping contact to wipe the acid or water outwardly therefrom.

8. In a can body blank seam margin cleaning apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, means for holding the blanks with their laterally extended marginal edge portions bent slightly downwardly as they are being fed, and means for directing a surface treating fluid outwardly onto and over the passing upper or lower downwardly bent marginal edge portion surfaces of said blanks.

9. In a can body blank seam margin cleaning apparatus, a can body blank feedway arranged and dimensioned to support can body blanks in generally horizontal position with their lateral marginal edges extending laterally beyond the supporting feedway, means for feeding blanks over said feedway in processional order, means for holding the blanks with their laterally extended marginal edge portions bent slightly downwardly as they are being fed, and means for directing a surface treating fluid outwardly onto and over the passing upper or lower downwardly bent marginal edge portion surfaces of said blanks, said blank holding means including continuous opposed upper and lower rails which lie close against the travelling blanks inwardly of the fluid directing means and prevent splashing of the surface treating fluid onto central or main body portions of said blanks.

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