

No. 704,173.

Patented July 8, 1902.

W. S. CASE.  
CAN BODY FORMING MACHINE.  
(Application filed Dec. 12, 1901.)

(No Model.)

2 Sheets—Sheet 1.

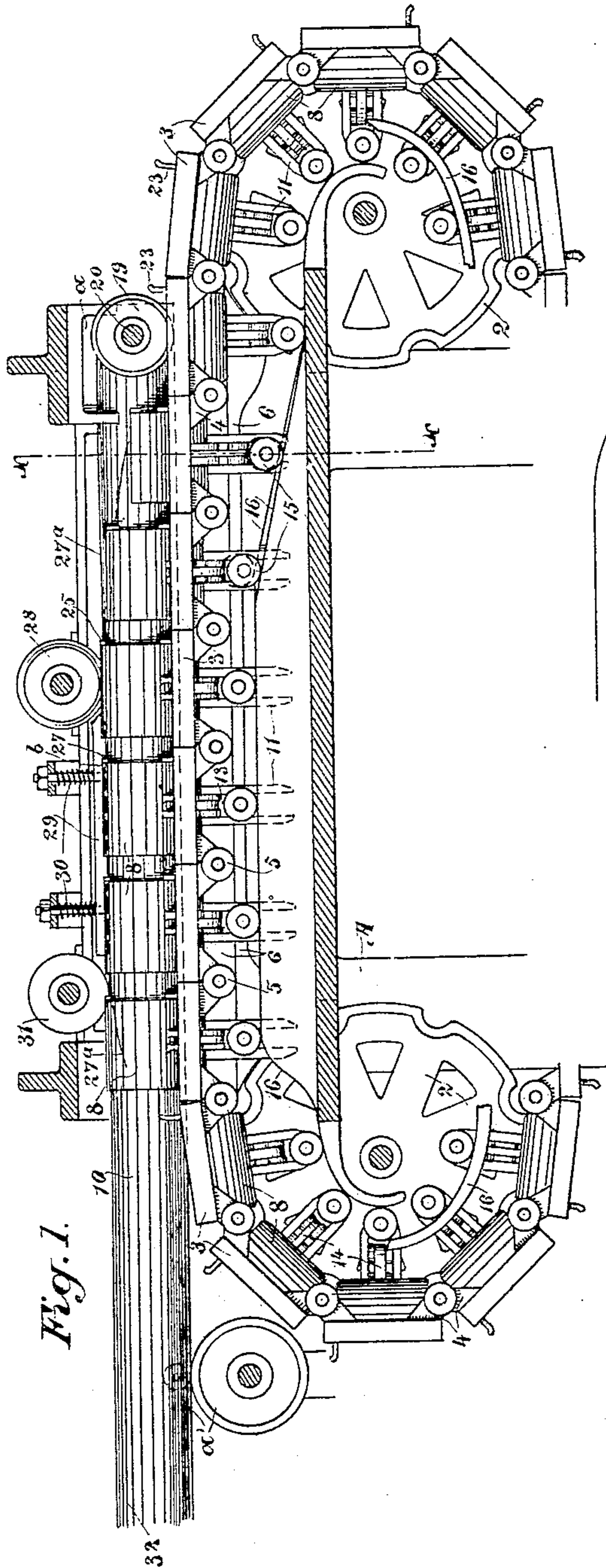


Fig. 1.

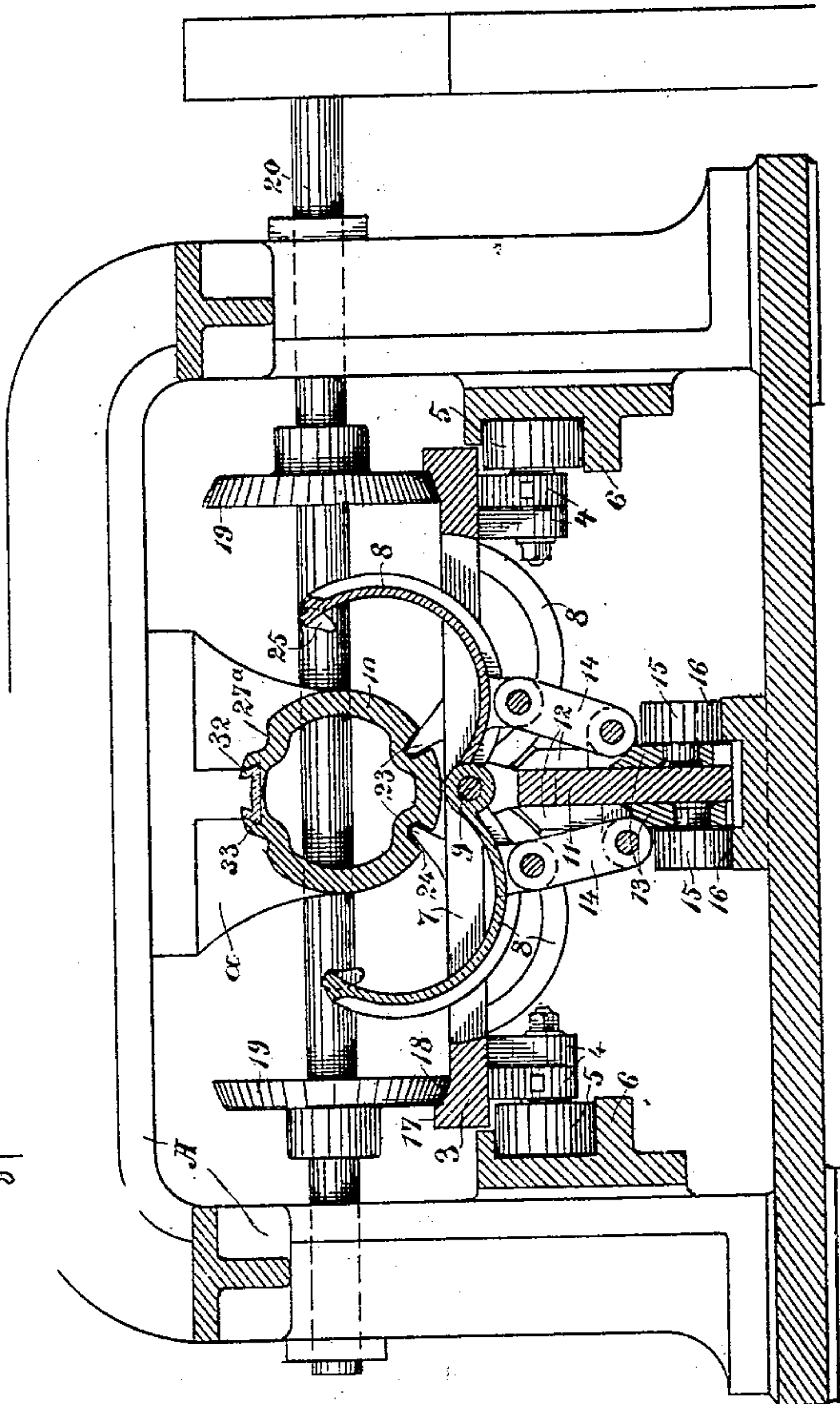


Fig. 2.

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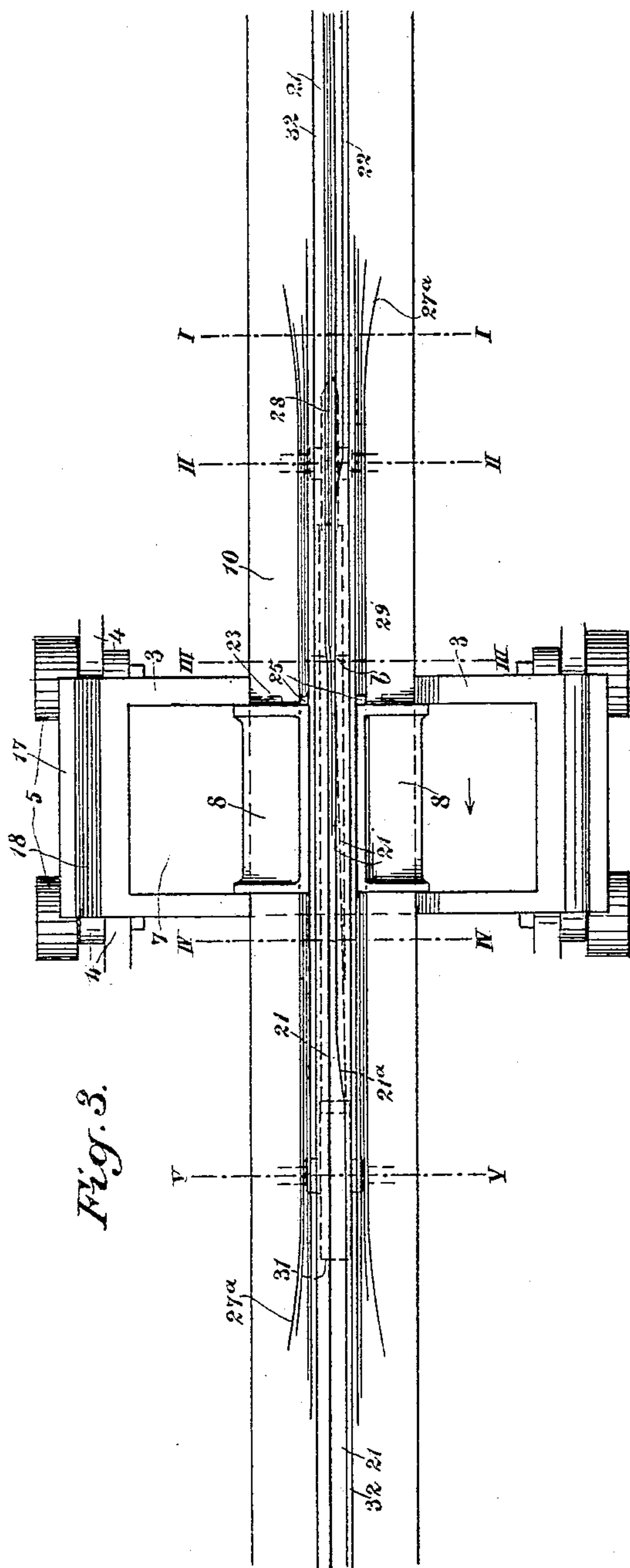


Fig. 3.

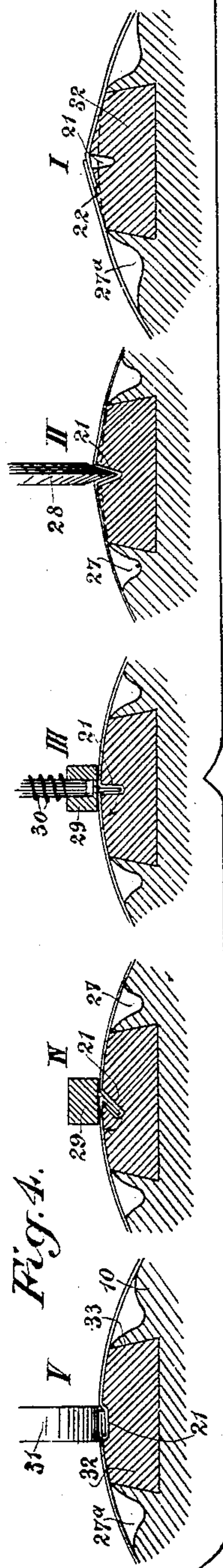


Fig. 4.

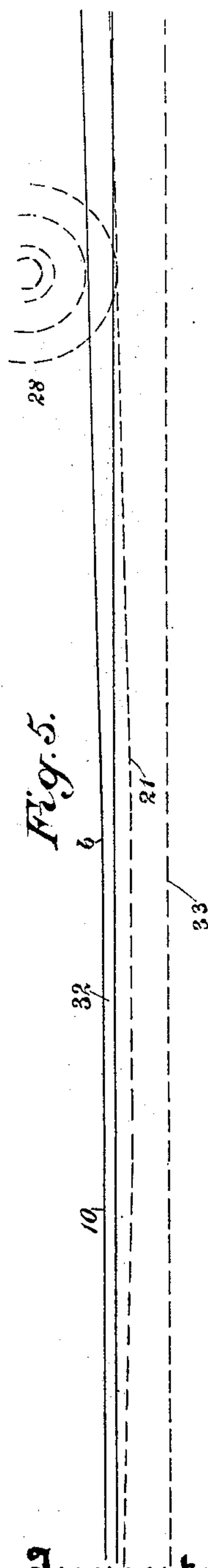


Fig. 5.

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# UNITED STATES PATENT OFFICE.

WILMER S. CASE, OF HAYWARDS, CALIFORNIA, ASSIGNOR OF ONE-HALF TO  
JOSEPH H. HUNT, OF OAKLAND, CALIFORNIA.

## CAN-BODY-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 704,173, dated July 8, 1902.

Application filed December 12, 1901. Serial No. 85,582. (No model.)

*To all whom it may concern:*

Be it known that I, WILMER S. CASE, a citizen of the United States, residing at Haywards, county of Alameda, State of California, have invented an Improvement in Can-Body-Forming Machines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in machines for forming the bodies of cans.

My invention consists of the parts and the constructions, arrangements, and combinations of parts which I will hereinafter describe, and point out in the claims.

Figure 1 is a side elevation of my machine, a portion of the frame being cut away. Fig. 2 is a cross-section on line  $xx$ , Fig. 1, looking toward the right. Fig. 3 is a plan view of the horn and one of the links of the conveyer. Fig. 4 shows sections through the upper portion of the horn corresponding with lines I I, II II, III III, IV IV, V V of Fig. 3. Fig. 5 is a side elevation of the horn, showing taper of its upper surface and line of bottom of the seaming-groove.

A represents a suitable frame or support for my machine. At either end of this support are the drums 2, around which passes an endless conveyer. The links forming the conveyer consist of plates 3, pivotally conjoined, as at 4. The ends of these pivots carry rollers 5, which travel in the guides 6 and maintain the carrier in a horizontal line between the drums. The plates are of sufficient size as to take and carry the metal sheet from which the can-body is to be formed. These plates are slotted, as at 7, and in these slots the curved arms 8 operate at right angles to the direction of travel of the conveyer. The arms are pivoted centrally of these slots, as at 9, and are adapted to fold up and inclose the horn or form 10 in a manner to be described later. The horn 10 consists of a cylinder disposed above and parallel and just out of contact with the upper plane of the conveyer. At the forward end it is supported by means of the bracket  $a$ , and the rear end is supported on the rollers  $a'$  in such manner that can-bodies may be freely pushed along and off of the horn. The arms 8 are adapted normally to lie beneath the surface of the

plate and beneath the flat metal sheet that is to be placed upon the plate and from which the can-body is to be formed. Integral with but beneath each plate and between the members of each pair of hook-arms is an extension 11, provided with the vertical guides 12, in which the blocks 13 are slidable. A link 14 is pivoted to each block and to a corresponding arm, so that by raising the blocks of any set of arms the latter are also lifted and folded. Each block is movable independently of the other, so that one arm may be folded in advance of its companion, the purpose of which is to cause the edges of the tin to be properly lapped. The blocks are provided with rollers 15, and the operation of the arms is effected by the engagement of these rollers with the cam-surfaces 16, as will be described later. Each plate 3 is provided on its upper surface with the lateral flanges 17. The top of the plate and the lower edge of these flanges are joined by short inclined surfaces 18.

By suitable means a perfectly flat sheet of tin or other metal from which the can-body is to be formed is placed upon a plate 3, the edges to be united lying upon the inclines 18 of the plate and against the flanges 17. As the conveyer moves forward the sheet is brought beneath the rollers 19, suitably disposed above the conveyer, and fixed upon a shaft 20, journaled in the frame. These rollers have their peripheries beveled to correspond to the inclines 18. The effect of the sheet passing beneath these rollers and of the sheet being subjected to the pressure thereof is to bend slightly the edges of the sheet, so that when the latter is folded around the horn, as we shall shortly see, these bent portions lie essentially tangential to the arc of the periphery of the can-body. As a plate with its sheet in place passes from beneath the rollers 19 or preliminary crimpers, the rollers 15 come upon the cam-surfaces 16. These latter, however, are so disposed and differently pitched that one of these rollers, with its corresponding arm, will be raised slightly in advance of the other roller and arm, so that the first arm will lie flat against the horn before the other arm has finished its movement. The reason of this is obvious from the fact that if both were brought up together the two



edges of the sheet which are intended to overlap would strike each other and be buckled or otherwise injured. A bar or wearing-plate 32 is removably secured along the length of the upper surface of the horn in such manner that its surface is substantially flush with the periphery of the horn except as hereinafter stated. Along the upper surface of the plate is formed a longitudinal seaming-groove 21, which varies in shape between its ends in a manner shortly to be pointed out. For a portion of the length of the horn this groove is V-shaped, with the axis of the V substantially perpendicular.

The process of forming the can-body by the means herein employed may be considered for convenience to cover six steps, one gradually merging into the other. The first step was bending the edges of the sheet by the rollers 19. The second step was the folding of the arms, by which the sheet was pressed around the form or horn 10. The action of the rollers 19 allowed the edges of the sheet to lie perfectly flat upon one another when the sheet was so folded, the horn having a shallow depression 22 adjacent to the groove to accommodate the undermost edge. The advancement of the sheet or "body," as it may now be termed, along the horn is accomplished by means of projections 23 on the plate engaging the rear end of the can-body and said projections moving in corresponding guide-grooves 24 on the horn. The can is engaged on the upper surface of the horn by similar projections 25 on the hook-arms 8, and said projections are movable in corresponding guide-grooves 27. These latter grooves are flared, as shown at 27<sup>a</sup>, at either end of the horn to permit the proper entry and release of the projections 25. The width of the arms is approximately equal to the height of a can to be formed, so that the latter is held at all points tightly and evenly against the horn. By means of the projections 23 and 25 the can is readily pushed along over the horn. After the sheet is bent about the horn and given the desired can-body form it is carried, by means of the hook-arms, under a roller 28, having a V-shaped or beveled tread and extending into the groove 21 and acting to press the lapped edges of the can into the groove. This constitutes the third step. The fourth and fifth steps pertain to the drawing in and the turning of these bent edges over upon the inside of the can. This is done by gradually contracting the groove-opening, as shown in section III, Fig. 4, and then causing the line of the bottom of the groove to approach gradually the surface of the horn, the groove all the time maintaining the same depth and the opening of the groove serving as an axial line about which the line of the bottom has assumed a segment of a spiral. As indicated in Fig. 4, sections I and II, corresponding to the second and third steps, the groove is a V shape. In the next step (III) the opening of the V has gradually contracted till the walls

are nearly perpendicular. The spiral character of the groove is indicated by section IV. During this part of the operation the can travels beneath the pressure-plate 29, whereby the can is held tight against the horn and the seam prevented from creeping out of the groove. The plate may be resiliently supported by means of the springs 30, by which the plate can readily adapt itself to any variation in the thickness of the lapped edges of the can. In the fifth and sixth steps the groove assumes the form of a channel 21<sup>a</sup>, with gradually-diverging sides and growing shallower toward the rear end of the horn. The seam while undergoing turning in the fourth and fifth steps is gradually being compressed beneath the plate 29 and passes thence under the roller 31 for the sixth and concluding step of finishing or completing the rolling of the seam. The bar or plate 32, containing the seaming-groove, is removably secured to the horn, as in a dovetailed mortise 33. This is for the purpose of rendering convenient and economical the replacement or renewal of the parts in case the walls of the seaming-groove become unduly worn; otherwise the seaming-groove might be formed in the horn itself. In order to compensate for the gradual contraction of the groove from the form shown in sections I and II, Fig. 4, to that indicated by III, Fig. 4, or, what amounts to the same thing, the decreasing diameter of the can as its outer lapped edges are drawn together, the perimeter of the horn must be correspondingly reduced. This is most conveniently effected by tapering the surface of the plate, so that from a point indicated approximately by sectional line III III, Fig. 3, or *b*, Fig. 5, where it is flush, it is gradually though almost imperceptibly inclined upward toward the head of the horn. From point *b* and through the succeeding steps the horn corresponds to the size of the finished can-bodies. Passing beneath the roller 31 the process of seaming is completed and the bodies are delivered over the end of the horn ready for the soldering-machine.

It is understood that oval or polygonal can-bodies may also be made by this machine, simply using a horn to conform to the shape of can desired and providing corresponding hook-arms, the principle in all cases being essentially the same.

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

1. The combination in a can-body-forming machine of a horn about which the can is formed, a channel made longitudinally in the horn, clamps, or jaws and devices for opening and closing them about the horn, means for holding the metal sheet within the jaws and bending it about the horn with the edges overlapping and crossing the channel, and a folding edge depending into the channel, beneath which the overlapping edges of the blank are carried and folded into the channel.



2. In a can-body-forming machine an endless traveling carrier, said carrier consisting of a series of flexibly-connected tables, with surfaces adapted to receive the blanks, folding-clamps centrally pivoted beneath the upper surface of the tables, open channels formed in the tables in line above the clamps, mechanism by which the clamps are closed about their pivots, and a stationary horn about which the blanks are folded by the clamps.

3. The combination in a can-body-forming machine of an endless traveling carrier composed of a series of flexibly-connected channeled tables having surfaces adapted to receive the blanks and upturned ledges at the sides with inclined surfaces between said ledges and the flat central portion of the table, rollers with the peripheries beveled to travel upon said inclines, a horn located above the line of travel of the tables, clamps centrally hinged beneath the upper surface of each table and mechanism by which the clamps are closed to fold the blank about the horn.

4. The combination in a can-body-forming machine of a series of flexibly-connected channeled tables with inclined edges and upturned guides to receive the blanks, rollers having the peripheries beveled to bend the edges of the blanks between said rollers and the inclines, a horn located above and in the line of travel of the tables, clamps hinged beneath the upper surface of the tables, and mechanism by which they are actuated to fold the blanks about the horn, a longitudinal groove in the top of the horn over which the edges of the blank are lapped, and a folding device beneath which said overlapping edges are passed and by which they are bent into the groove.

5. The combination in a can-body-forming machine of an endless traveling carrier composed of a series of flexibly-connected open-centered tables adapted to receive the blanks, a horn located above the line of travel of the carrier, folding jaws or clamps centrally hinged below the upper surface of each table, vertically-guided slidable blocks, links connecting said blocks with the jaws, and stationary inclines over which the blocks pass during the forward movement of the carriers and by which the jaws are closed.

6. The combination in a can-body-forming machine of an endless traveling carrier composed of a series of flexibly-connected open-centered tables adapted to receive and carry the blanks, folding jaws or clamps centrally hinged below the upper surface of the tables, a horn located above the line of travel of the carrier, vertically-guided independently-slidable blocks, links connecting each of said blocks with one of the jaws, and inclined surfaces of different pitch, over which the jaw-actuating blocks move whereby the jaws are closed successively.

7. The combination in a can-body-forming

machine of an endless traveling carrier composed of flexibly-connected tables, adapted to receive and advance the blanks, centrally-hinged jaws or clamps on each table, a horn located above the line of travel of the carrier with a longitudinal groove upon the upper side, having a shallow depression upon one side of said groove, vertically-guided slides connected with the folding-jaws, and cams or inclines of different pitch over which the slides pass, whereby one jaw moves in advance of the other to fold one edge of the blank across the groove and into the depression of the horn, with the succeeding edge overlapping said first edge.

8. The combination in a can-body-forming machine of an endless traveling carrier composed of flexibly-connected tables adapted to receive and advance the blanks, a horn located above the line of travel of the carrier having a groove made in its upper surface, and a shallow depression made upon one side of said groove, folding-jaws centrally hinged beneath the upper surface of each table, mechanism whereby said jaws are actuated, one in advance of the other whereby one edge of the blank is folded across the groove into the depression of the horn, and the other edge is folded above the first one, and just above the groove, and a wheel or folder located above the groove and acting to bend the overlapping edges of the blanks into the groove as they pass beneath the folder.

9. The combination in a can-body-forming machine of an endless traveling carrier composed of flexibly-connected tables adapted to receive and advance the blanks, curved jaws centrally hinged beneath the upper surface of the tables, mechanism by which said jaws are closed, one in advance of the other, a horn located above the line of travel of the carrier about which horn the blank is closed by the jaws, said horn having a groove longitudinal upon its upper side with a depression at one side of the groove whereby one edge of the blank is carried across the groove to lie in the depression, and the other edge is laid upon the first-named portion and above the groove, and a roller journaled above the groove with its edge adapted to bend the overlapping edges into the groove and form a double bend of the inner fold, and a single bend of the outer one embraced by the two sides of the inner fold.

10. The combination in a can-body-forming machine of an endless traveling carrier composed of flexibly-connected tables adapted to receive and advance the blanks, a horn located above the line of travel of the carrier having a groove formed in its upper side, the first portion of said groove being essentially radial to the axis of the horn and the subsequent portion being gradually turned in a spiral manner until it is brought to the surface as shown, jaws hinged to each of the tables, mechanism by which said jaws are moved to fold the blank about the horn with



one of its edges in advance of the other, and overlapping the groove on the upper side of the horn and the other edge laid above said groove, a wheel journaled above and adapted  
 5 to fold the overlapping edges into the groove of the horn so that the double bend of one edge incloses the single bend of the other, projections upon the table and upon the folding-jaws, channels formed in the sides of the  
 10 horn into which the projections enter whereby the advance of the carrier and jaws impels the folded blank along the horn and causes the interlocked edges to follow the changing direction of the groove into which they are  
 15 folded.

11. The combination in a can-body-forming machine of an endless traveling carrier composed of flexibly-connected tables adapted to receive the blanks from which the body is to be  
 20 formed, a horn located above the line of travel of the carrier having a groove formed in its upper side, the first portion of said groove being essentially radial to the axis of the horn, and the subsequent portions being gradually  
 25 ually turned in a spiral manner so that the bottom of the groove finally arrives at the surface of the horn, clamps or jaws hinged centrally to each table, mechanism by which the jaws are closed as the tables advance and  
 30 the blank is folded about the horn with one edge crossing the groove and the other overlapping it and terminating in line above the groove, a wheel journaled above the groove adapted to press the overlapping edges of the  
 35 blank into the groove so that the inner edge has a double bend inclosing the single bend of the outer edge, lugs projecting from the table and from the folding-arms so as to contact with the rear edge of the blank when  
 40 folded, channels made in the horn in the line of travel of the lugs whereby the folded blank is evenly advanced from one end to the other of the horn.

12. The combination in a can-body-forming machine of an endless traveling carrier composed of flexibly-connected tables adapted to receive and advance the blanks, jaws hinged  
 45 beneath the upper surface of said tables, mechanism by which said jaws are closed and a blank folded during the forward movement of the carrier, a horn located above the carrier having a groove in its top about which  
 50 horn the jaws fold the blank with one edge in advance of the other and overlapping the groove, a wheel journaled above the horn so that its periphery acts to bend the overlapping edges of the blank into the groove, and  
 55 a pressure plate or bar beneath which the partially-united edges pass after leaving the roller.

13. The combination in a can-body-forming machine of an endless traveling carrier composed of flexibly-connected tables adapted to receive and advance the blanks, jaws hinged  
 60 beneath the upper surface of said tables, mechanism by which said jaws are closed and a blank folded during the forward movement of the carrier, a horn located above the carrier, having a groove in its top about which  
 65 horn the jaws fold the blank, with one edge in advance of the other and overlapping the groove, a wheel journaled above the horn so that its periphery acts to bend the overlapping edges of the blank into the groove, a  
 70 pressure plate or bar beneath which the partially-united edges pass after leaving the roller, and a roller journaled above the terminal end of the groove whereby the interlocked seam is compressed and finished.

In witness whereof I have hereunto set my hand.

WILMER S. CASE.

Witnesses:

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 JESSIE C. BRODIE.