No. 893,102. PATENTED JULY 14, 1908.

F. RUDOLPHI.

LOCK SEAM CAN BODY MAKING MACHINE.

APPLICATION FILED FEB. 25, 1907.

4 SHEETS—SHEET 1.

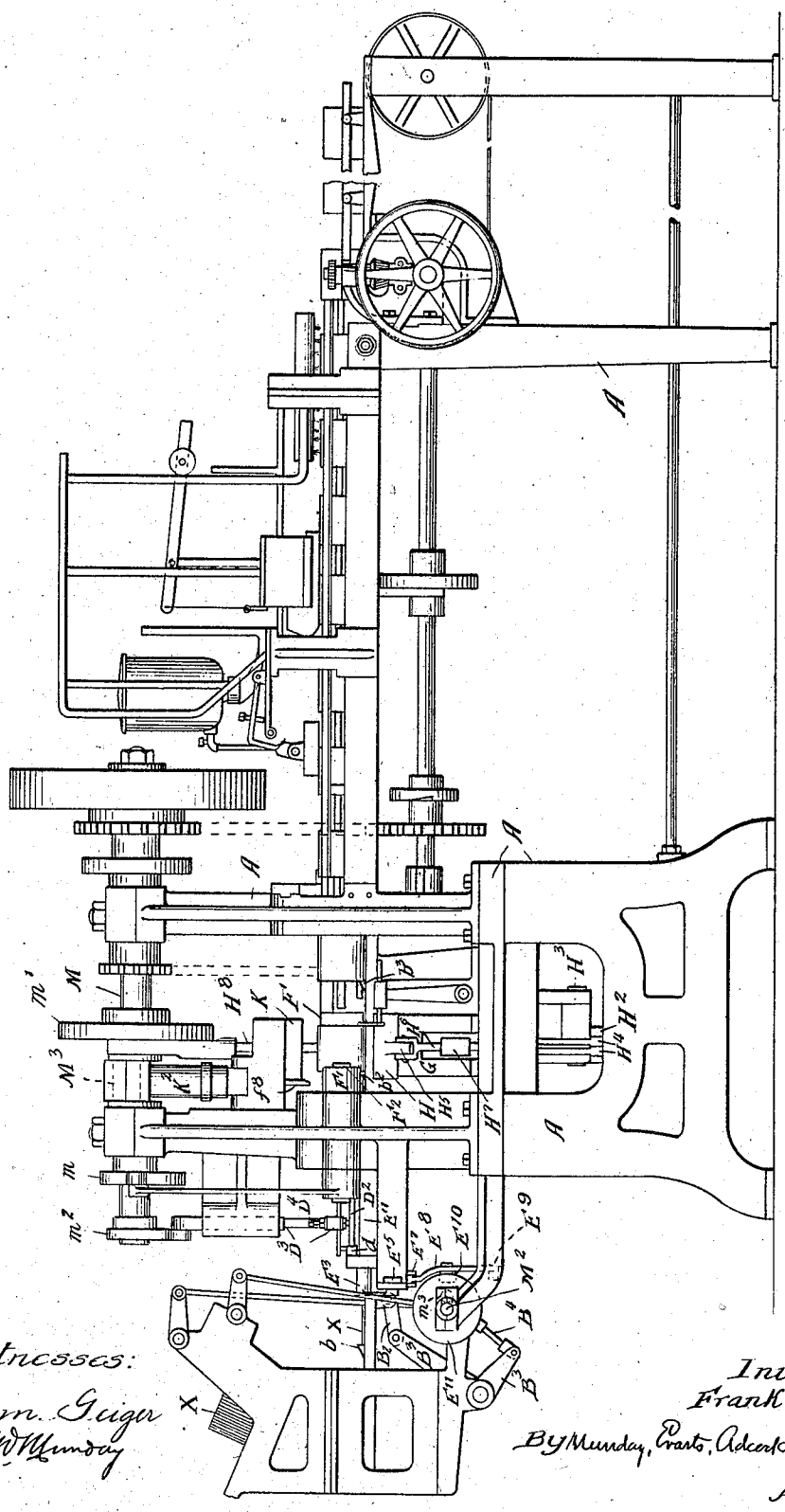


Fig. 1.

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H. W. Munday

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4 SHEETS—SHEET 2.

Fig. 2

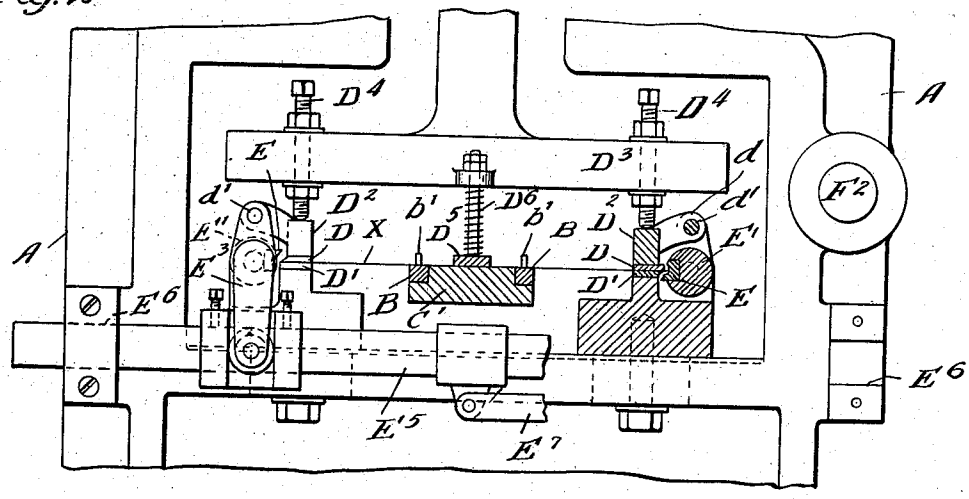
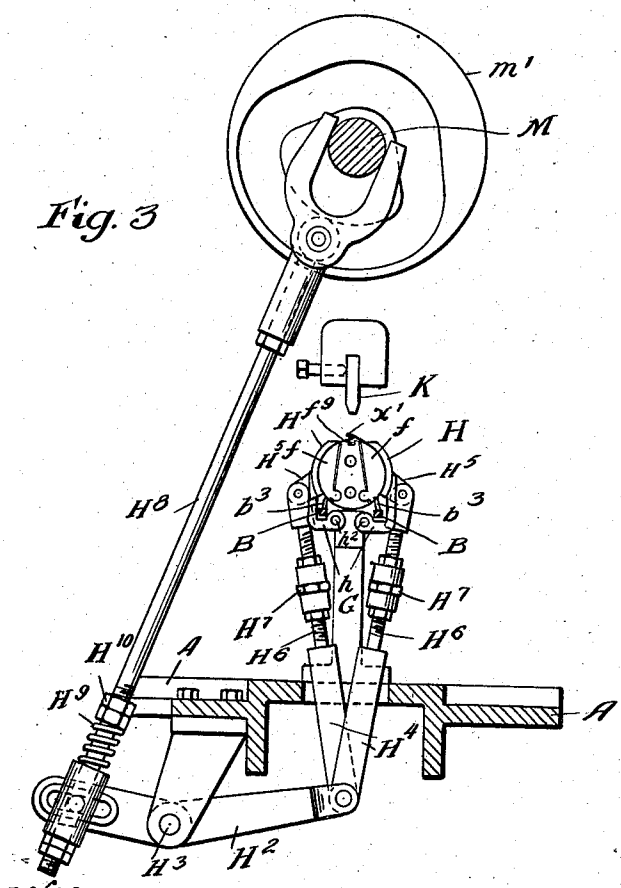


Fig. 3



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4 SHEETS—SHEET 3.

Fig. 4

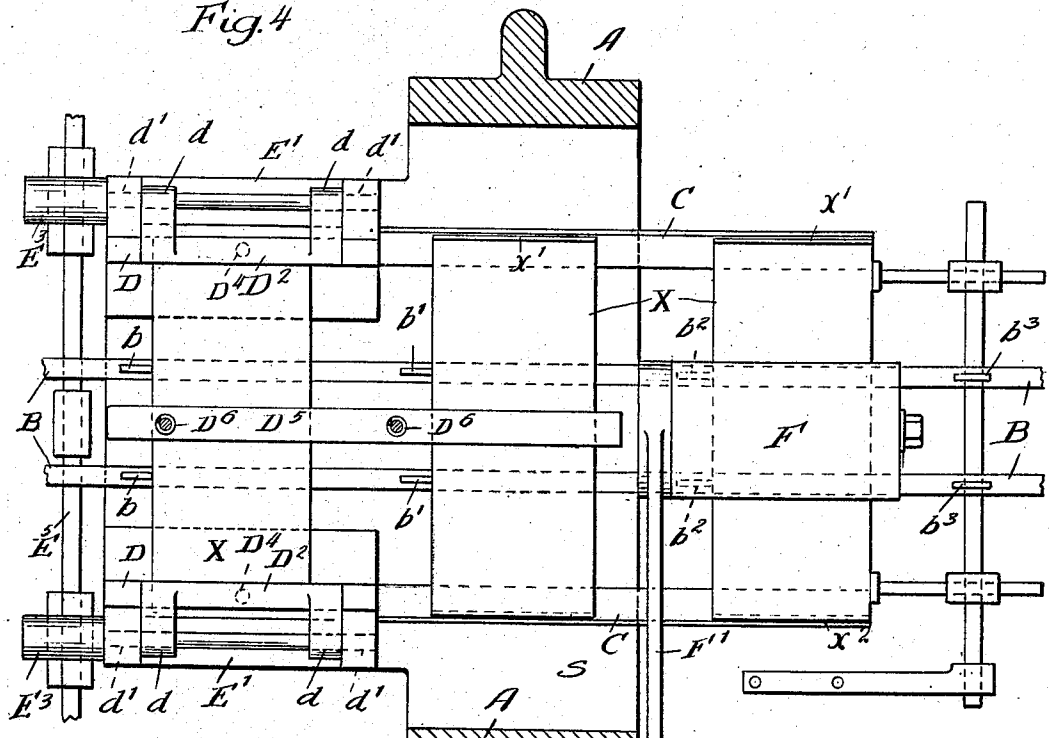
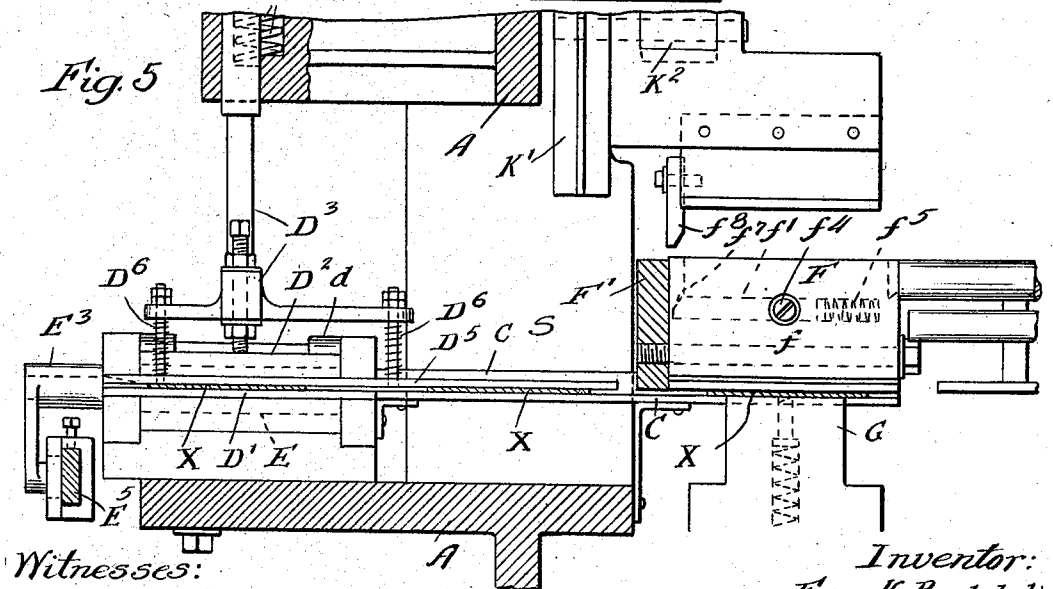


Fig. 5



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4 SHEETS—SHEET 4.

Fig. 6

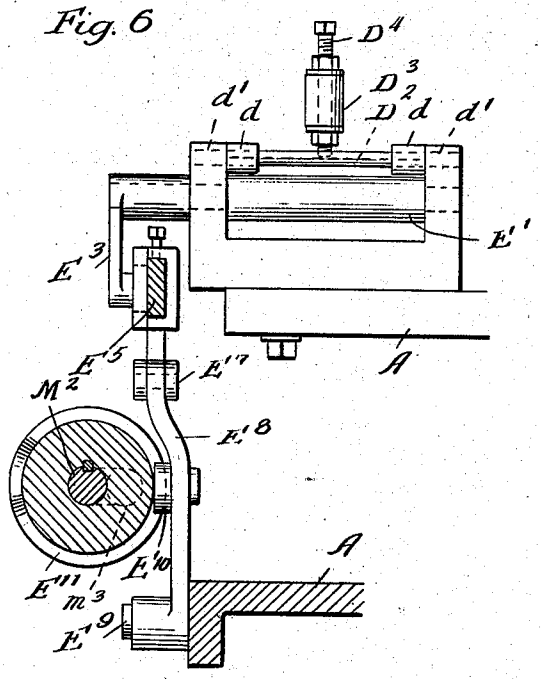


Fig. 7

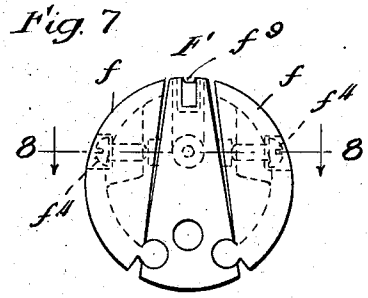


Fig. 8

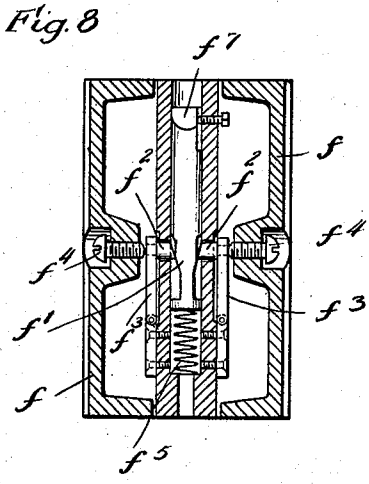


Fig. 9

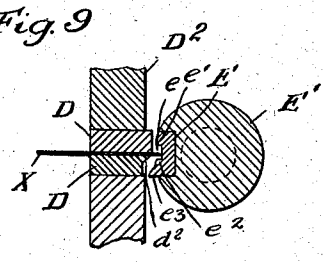


Fig. 10

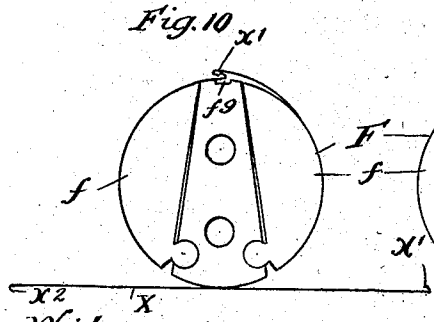


Fig. 11

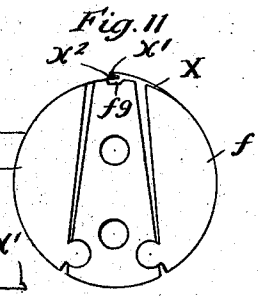
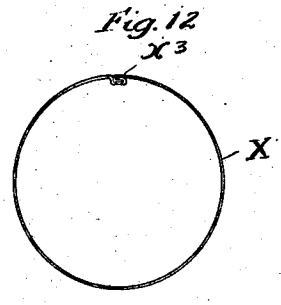


Fig. 12



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UNITED STATES PATENT OFFICE

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LOCK-SEAM-CAN-BODY-MAKING MACHINE.

No. 893,102. Specification of Letters Patent. Patented July 14, 1908.

Application filed February 25, 1907. Serial No. 359,050.

To all whom it may concern:

Be it known that I, FRANK RUDOLPHI, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Lock-Seam-Can-Body-Making Machines, of which the following is a specification.

My invention relates to improvements in lock-seam can body machines.

Heretofore in automatic machines for making lock-seam can bodies, the flat can body blanks are first fed one by one to the hook formers or edge folding devices by which oppositely turned hooks or edge folds are formed on the opposite ends of the blank and then fed forward by the next stroke of the feed slide from the hook formers to the horn where the blank is wrapped or formed around the horn, the hooks interlocked and pressed together against the horn by the bumper or hammer. As the hook formers or edge folders are necessarily located considerably in advance of the horn and body forming and seam closing devices to give room for the mechanism, the feed slide which moves the blank from the hook forming station to the horn or body forming station necessarily has a long stroke and requires time, even though the hook forming mechanism and the horn and body forming and seam closing mechanism be crowded together as closely as possible, and such crowding renders the machine defective and inconvenient to adjust and repair, or to free from clogging in case a number of blanks get jammed together in the machine, all of which tend to materially restrict the practical daily capacity of the machine.

The object of my invention is to provide an improved construction of lock seam can body machine in which the hook forming and body forming mechanism will be properly accessible and separated from each other, and in which at the same time the blank feed slide may have a short stroke, and by which the capacity of the machine may be very greatly increased.

My invention consists in the means I employ to practically accomplish this object or result. That is to say, it consists in separating the hook formers or edge folders from the horn and body former and seam closing devices by an intermediate station or can body blank interval to which the blank is fed from the edge folders by one stroke of the feed slide and from which the blank is fed to the horn and body forming and seam closing devices by the next succeeding stroke of the feed slide, the feed slide being provided with an extra set or pair of blank pushing or feeding fingers or pawls for this purpose, and the stroke of the feed slide being correspondingly shortened, thereby at once materially increasing the capacity or rapidity of operation of the machine as a whole, and at the same time preventing any unnecessary crowding of the different mechanisms together and leaving all the parts of the machine readily ascessible for adjustment or repair or cleaning out from clogging.

My invention also consists in the novel construction of parts and devices and in the novel combination of parts and devices herein shown and described.

In the accompanying drawing forming a part of this specification, Figure 1 is a side elevation of an automatic lock seam can body machine embodying my invention. Fig. 2 is a vertical cross section through the hook formers or edge folders on one side and showing those on the other side in elevation. Fig. 3 is a vertical cross section through the frame and showing in elevation the horn, body forming and seam closing devices. Fig. 4 is a detail plan view partly in horizontal section showing the feed slide, the guides for supporting the blanks and the other parts. Fig. 5 is a detail central vertical longitudinal section partly in elevation. Fig. 6 is a detail elevation, partly in section, showing the edge holder. Fig. 7 is a detail end view of the horn. Fig. 8 is a detail section on line 7—7 of Fig. 7. Figs. 9, 10, 11 and 12 are detail views showing different parts hereinafter described.

In the drawing, A represents the frame of the machine. B is the feed slide by which the can body blanks X are fed or moved along one by one, first to the hook formers or edge folding devices, next to the intermediate station between the hook formers and the horn, and next to the horn and body formers and bumper or seam closer coöperating therewith. C C are the guides upon which the blanks rest as they are fed along from one station to another.

The feed slide B is provided with can body blank pushers *b*, preferably spring pawls or fingers for feeding the can body blanks X to the hook formers E, with pushers b^1 for feed-

ing or advancing the blanks to the intermediate station or portion S of the guides C which is interposed between the hook formers and the horn F, and with pushers b^2 which feed or advance the can body blanks from the intermediate station S to the horn F and the body formers H and bumper or seam closer K. The hook formers are thus separated from the horn and the parts that cooperate with the horn by an intermediate space or station the full width of the can body blank, so that the hook forming mechanism and the body forming and seam closing mechanism may all be freely accessible, while at the same time the stroke of the reciprocating feed slide B is materially shortened, thus enabling it to be operated more rapidly and thereby materially increasing the capacity of the machine as the speed of operation of the other devices of the machine can easily equal that of the feed slide, and the feed slide being by reason of its length of stroke and reciprocating movement the one part or element of the whole machine fixing or limiting its capacity.

The feed slide B is provided with a further set of pushers b^3 for discharging the completed can body from the horn F.

While the particular kind or construction of the hook formers E, coöperating clamps D D^1 for holding the blank, horn F, horn support G, body formers H and bumper or seam closer K constitutes no part of my present invention, and while my invention is independent of the particular kind of such devices employed in the machine for forming the hooks or edge folds of the blank and wrapping the blank around the horn and closing the seam, and may be employed or embodied in a machine whatever may be the construction of these devices, I have illustrated in the drawing one suitable kind of each of these devices, the same being that which I prefer to employ in practicing my invention, and I will now described the same.

The clamps D D^1 of which two pairs are employed, grasp the can body blank X near its ends and hold the same firmly while the hook formers E E form oppositely turned edge folds or hooks x^1 x^2 on the opposite ends of the blank, one hook being turned upward and the other downward as the flat blank rests horizontally.

The lower clamp D^1 of each pair is preferably mounted on the stationary frame of the machine, the upper clamp D of each pair being preferably the movable member. The movable clamps D D are preferably moved up and down as required, to receive, clamp and release the blank X by the movable member D^2 having arms or lugs d pivotally connected at d^1 to the stationary frame of the machine.

One clamp of each pair is provided with a hook forming lip d^2 over which the hook or edge fold is formed or bent, the hook forming lip d^2 being on the upper clamp D to form the upturned hook x^1 and on the lower clamp D^1 at the opposite end to form the downturned hook x^2.

The rocking hook formers or edge folders E E are secured to rocking holders E^1, by or through which the necessary rotary or rocking movement is imparted to the hook former. The two formers E are preferably alike and reversely mounted or disposed so that one will form an upturned hook and the other a downturned hook. Each hook former E has a recess or groove e to receive the projecting end of the blank X and serve as a guide therefor in adjusting the position of the blank between the two hook formers. Each hook former E also has a projecting shoulder or bead e^1 which engages the projecting end of the blank and bends it at right angles to the plane of the blank when the hook former is rocked in one direction; and each hook former E is also provided with a shoulder or bead e^2 and projecting lip e^3 which serves when the hook former is rocked in the return or opposite direction to complete the formation of the hook x^1 or x^2 over the forming lip d^2 of the clamp D or D^1 as the case may be. After the formation of the hook is thus completed, the hook former E returns to its central or normal position.

The upper or movable clamps D rest normally with their own weight and with that of their operating bars or holders D^2 on the blanks X as they are fed or conveyed forward beneath the same by the blank feeder or slide B, and serve not only to straighten, smooth and flatten the blanks, but also to prevent danger of the blanks being overcarried by the feeder or slide B in its quick or rapid reciprocating movement, thus insuring the blanks being always properly presented to the edge folders and to the horn. The upper or movable clamps D D are given their necessary slight downward movement to cause them to firmly grip the blanks against the lower clamps D^1 D^1 by means of a movable presser-foot D^3, which is furnished with adjusting screws D^4 to engage the clamp bars or holders D^2. To further insure the blanks X being maintained in a straight flat position, the presser-foot D^3 is provided with a clamp bar D^5 which engages the blank at its middle, and which is furnished with a spring D^6 to force the same yieldingly against the blank. The central guide C^1 on the frame of the machine opposes the spring clamp bar D^5.

The body former horn F is preferably an expansible and collapsible one, or provided with movable segments or wings f, hinged to the main portion of the horn and adapted to be expanded after the hooks or edge folds x^1 x^2 are carried past each other so as to interlock or draw the hooks together before the seam is bumped or compressed by operation

of the bumper or seam closer K. The wings or segments $f\,f$ of the horn are preferably thus expanded or spread apart by means of a wedge f^1 mounted to reciprocate in the main portion of the horn, and which engages wedge blocks f^2 on hinged arms f^3, and which bear against adjusting screws f^4 on the movable wings or segments f of the horn. A spring f^5 returns the wedge to position. The wedge f^1 is provided with an inclined face f^7 so that it may be operated by a wedge finger or projection f^8 carried by the bumper or seam closer K by which the interlocked hooks or edge folds x^1 x^2 are compressed together, and into the longitudinal groove f^9 in the upper side of the horn, thus forming the lock seam x^3 which is thus caused to project on the inner surface of the can body.

The horn F is preferably an up and down movable horn, the same having a slight upward movement to lift it slightly off the anvil or horn support G in order to permit the can body blank X to be fed or slipped under the horn and between it and said anvil or support G upon which the horn normally rests, and which firmly supports the horn against the thrust or blow of the bumper or seam closer K in bumping or closing the seam. This slight up and down movement of the horn also causes the blank X to be firmly clamped at its middle portion between the anvil or block G and the horn, while the blank is being folded or formed around the horn by the can body formers H H, thus insuring the proper registry of the two ends of the blank and the hooks or edge folds thereon together, and preventing the can body from being formed irregularly or askew, and thus insuring the regularity, uniformity and perfection in the formed can bodies, while permitting the work to be done rapidly. To give the necessary slight up and down movement to the horn F, I mount it on a lever F^1 pivoted to the frame at F^2 and operated by a cam m on the cam shaft M. The can body formers H H by which the can body blank is wrapped or formed around the horn F are preferably segmental in form and conform to the surface of the horn, each being preferably somewhat less than a semi-circle in extent. Each of these body formers H is provided with a hinged arm h by which it is hinged at h^2 to the horn support or anvil G or other stationary portion of the machine. The body formers H are opened and closed around the horn preferably by means of a vibrating lever H^2 pivoted to the frame at H^3 and connected by pivoted links H^4 to arms or lugs H^5 on the formers H. Each of the links H^4 is furnished with an adjustable member H^6 and an adjusting screw or turn buckle H^7 to properly adjust the movement of the body formers H. These links are so adjusted that one of the formers H closes slightly before the other so as to cause the outer hook or edge fold x^1 to overlap the inner hook or edge fold x^2. The lever H^2 is operated by a cam m^1 on the cam shaft M through a connecting link H^8, which is furnished with a spring H^9 and an adjustable nut H^{10}, so as to impart a yielding movement to the body formers H.

The bumper or seam closer K is given an up and down movement to cause the same to bump or compress the folds of the seam together, preferably through a reciprocating slide or cross head K^1 operated by an eccentric M^3 on the cam shaft M through the connecting link K^2.

The presser foot D^3 by which the upper or movable clamps D D are caused to firmly clamp the blank against the lower clamps D^1 D^1 is preferably operated by a cam m^2 on the cam shaft M, the presser foot operating arm or slide D^3 having a spring D^7 to move it in the opposite direction.

The can body blank feeder or carrier B is reciprocated as required to feed or advance the blanks forward first to the hook formers, then to the intermediate station S and then to the horn F, and finally off the horn by means of a link B^2, lever B^3, link B^4, and crank M^3 on the shaft M^2.

The hook formers E are preferably rocked as required to form the oppositely turned hooks or edge folds on the opposite ends of the can body blank by means of arms or levers E^3 on the hook former holders E^1, connecting bar E^5 reciprocating in guides E^6, link E^7 connected to a lever E^8 which is pivoted to the frame at E^9, and carrying a roller E^{10} which engages a cam E^{11} on the shaft M^2.

I claim:—

1. In a lock seam can body machine, the combination with a body former horn, body formers and bumper, of hook formers separated from the body former horn by an intermediate station for the can body blank, of an intermittently moving feeder or carrier furnished with pushers for advancing simultaneously a plurality of blanks, and each blank successively to the hook formers, to the intermediate station between the hook formers and the horn, and to the horn, whereby the speed and capacity of the machine is materially increased and the parts rendered accessible, substantially as specified.

2. In a lock seam can body machine, the combination with a body former horn, of hook formers separated from the horn by an intermediate station, and means for intermittently advancing simultaneously a plurality of blanks, and each blank first to the hook formers, then to the intermediate station and then to the horn, whereby the speed and capacity of the machine is materially increased and the parts rendered accessible, substantially as specified.

3. In a lock seam can body machine, the combination with hook formers for forming

oppositely turned hooks or edge folds on the opposite ends of the can body blank, of a horn separated therefrom by an intermediate space or station for the blank, and a reciprocating blank feeder for advancing simultaneously a plurality of blanks, and each blank successively from the formers to the intermediate station and from the intermediate station to the horn, whereby the speed and capacity of the machine is materially increased and the parts rendered accessible, substantially as specified.

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