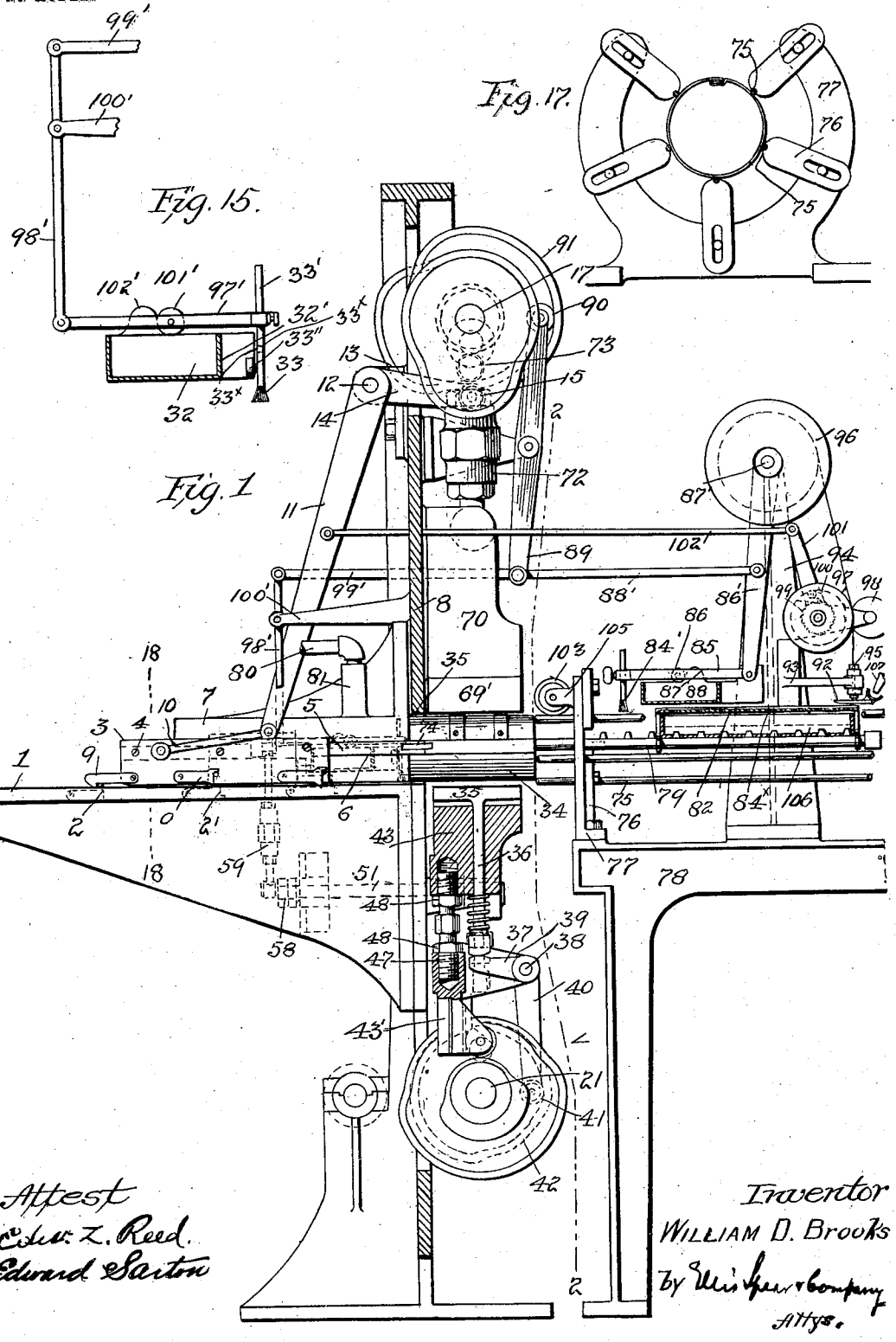
No. 741,620. PATENTED OCT. 20, 1903.

W. D. BROOKS.

CAN MAKING MACHINE.

APPLICATION FILED NOV. 20, 1902.

NO MODEL. 6 SHEETS—SHEET 1.



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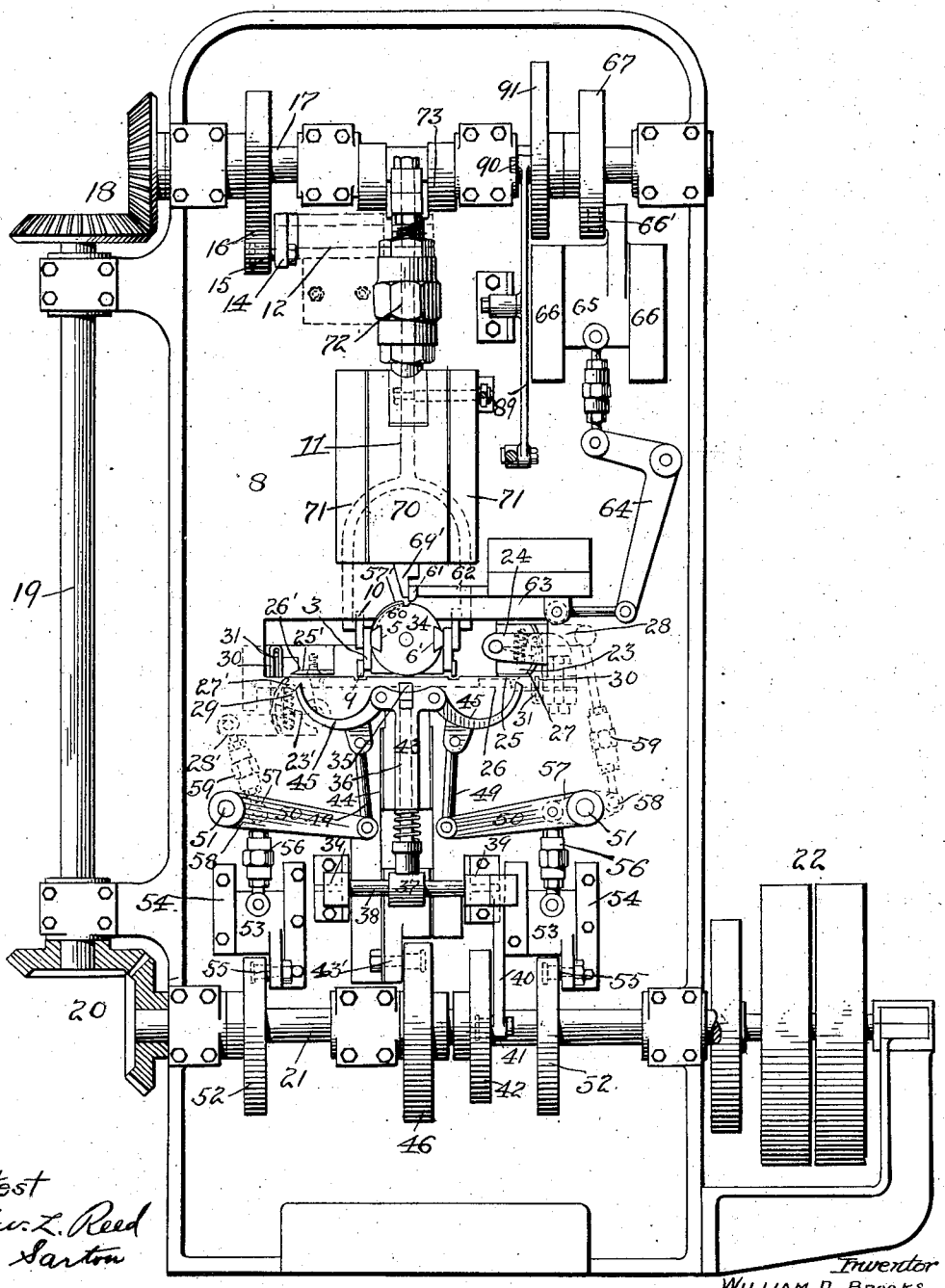
NO MODEL. 6 SHEETS—SHEET 2.

Fig. 2



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NO MODEL. 6 SHEETS—SHEET 3.

Fig. 3.

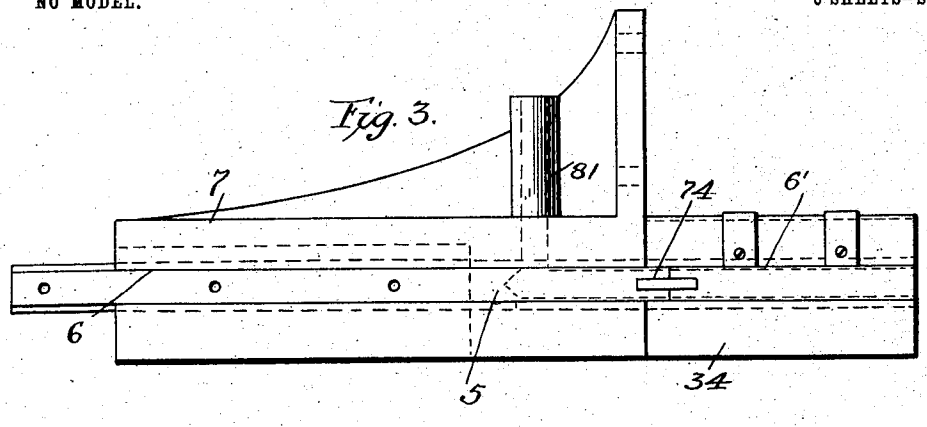


Fig. 4.

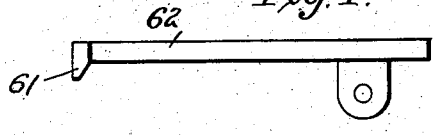


Fig. 5.

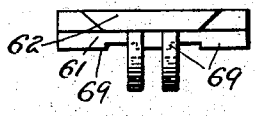


Fig. 6.

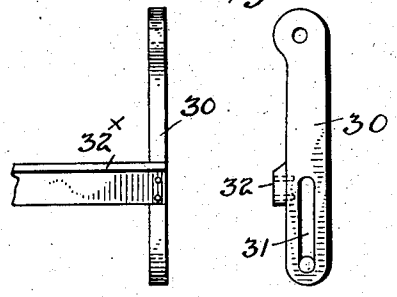
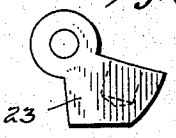


Fig. 7.



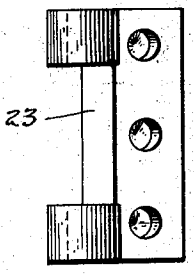
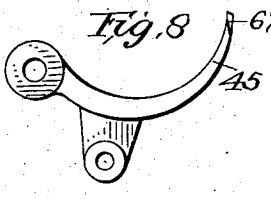


Fig. 7a

Fig. 8



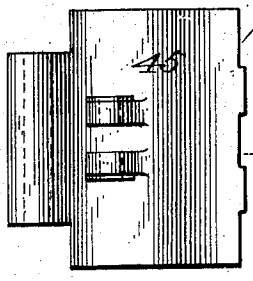
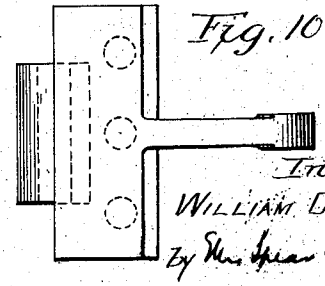


Fig. 9.

Fig. 10.



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W. D. BROOKS.

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NO MODEL. 6 SHEETS—SHEET 4.

Fig. 11

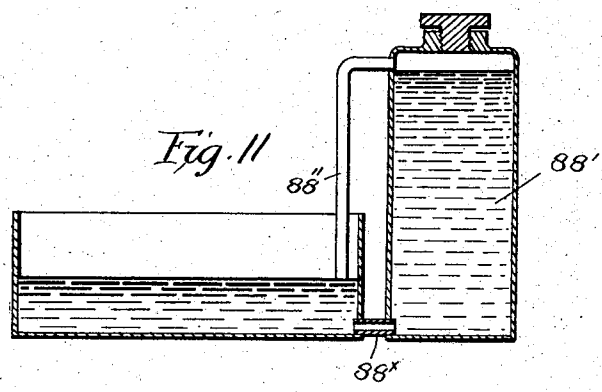


Fig. 12

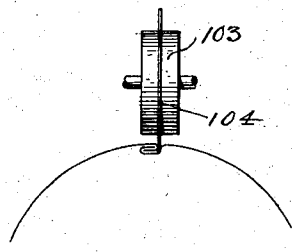


Fig. 13.

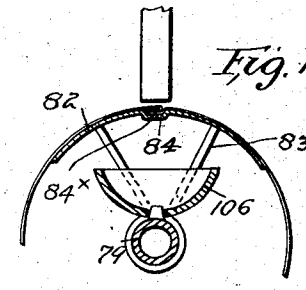
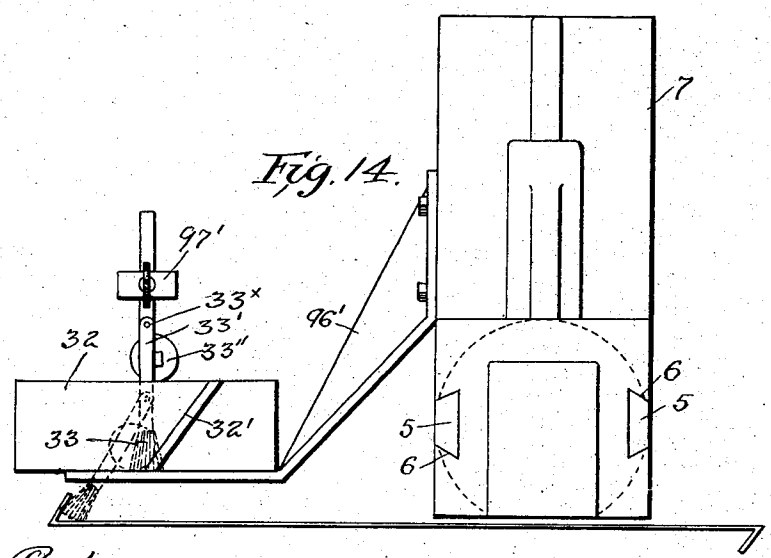


Fig. 14.



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No. 741,620. PATENTED OCT. 20, 1903.

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CAN MAKING MACHINE.

APPLICATION FILED NOV. 20, 1902.

NO MODEL. 6 SHEETS—SHEET 5.

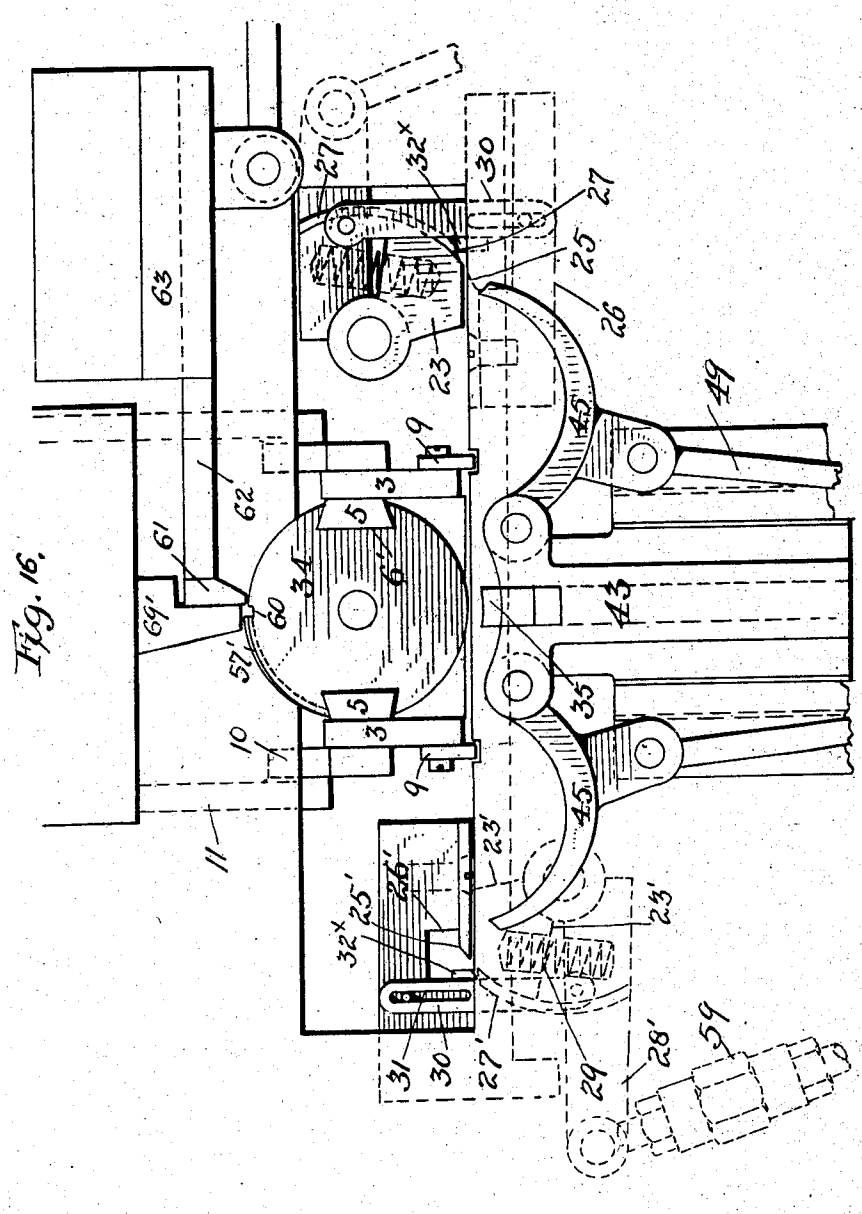

Fig. 16.

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CAN MAKING MACHINE.

APPLICATION FILED NOV. 20, 1902.

NO MODEL. 6 SHEETS—SHEET 6.

Fig. 18.

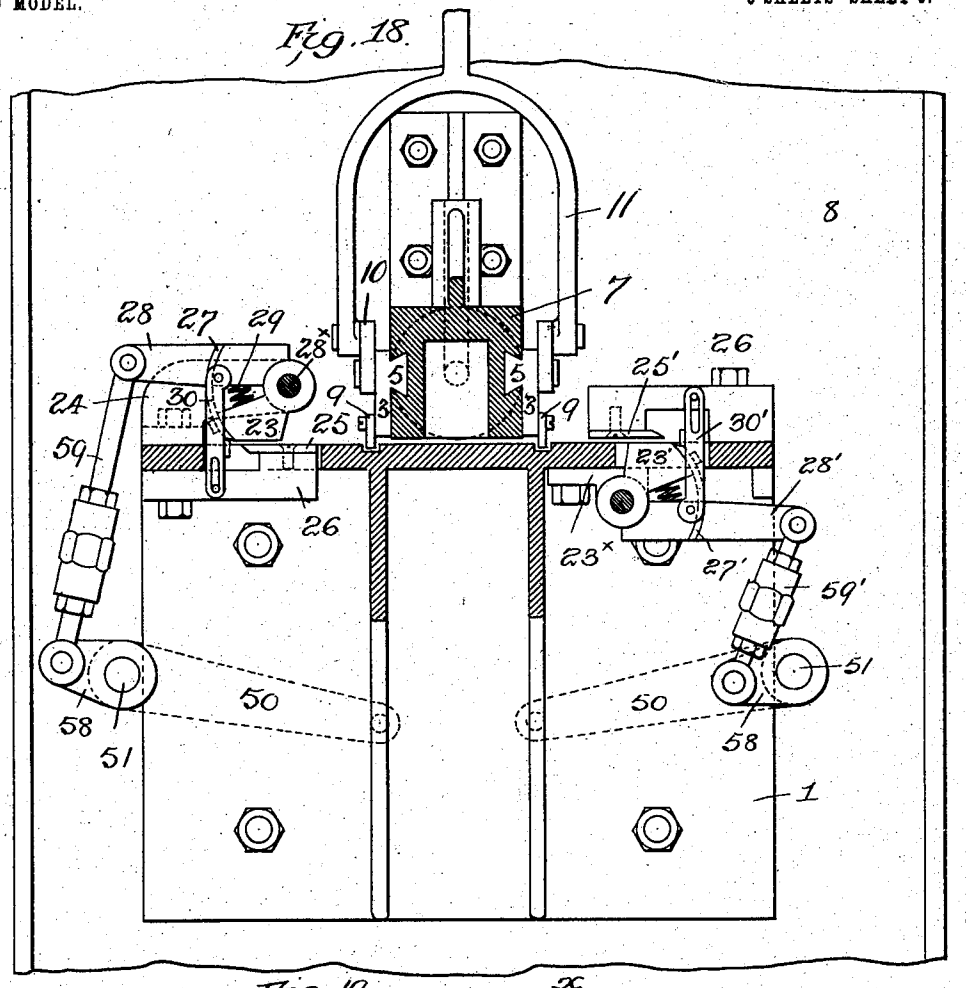


Fig. 19.

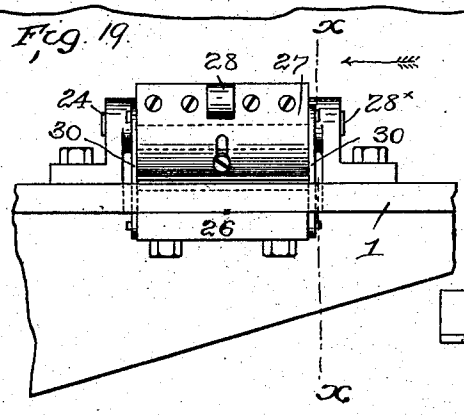


Fig. 20.

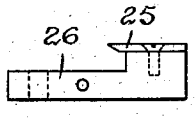
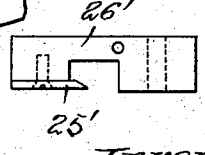


Fig. 21.



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Edward Santos

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William D. Brooks.
64. Ellis Spear & Company
Atty's.

No. 741,620. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM D. BROOKS, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO D. D. MALLORY, OF BALTIMORE, MARYLAND.

CAN-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 741,620, dated October 20, 1903.

Application filed November 20, 1902. Serial No. 132,128. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. BROOKS, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Can-Making Machines, of which the following is a specification.

My invention relates to can-making machinery, and particularly to means for bending sheet-metal blanks into cylindrical form for the can-bodies and to means for locking and soldering the side seam of the said bodies.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional view from front to rear of the machine with parts in side elevation. Fig. 2 is a view on the line 2 2 of Fig. 1 looking toward the left-hand side of said figure. Fig. 3 is a side view of the horn and bracket. Figs. 4 and 5 are side and end views of the register or gage bar. Fig. 6 shows a side and end view of another gage-bar. Fig. 7 is a side view of a presser-foot. Fig. 7ª is a plan view of Fig. 7. Figs. 8 and 9 are side and plan views of the folding-wings. Fig. 10 is a view of a lever. Fig. 11 is a view of a flux-tank. Fig. 12 is a detail view of a guide-wheel for the can. Fig. 13 is a view of the inner soldering-iron. Figs. 14 and 15 are detail views of a flux-bath. Fig. 16 is a detail view of the breaking mechanism. Fig. 17 is a detail view of the cage for receiving the can-bodies from the horn. Fig. 18 is a sectional view on line 18 18 of Fig. 1. Fig. 19 is a side view of one of the breaking-knives. Figs. 20 and 21 are detail views of the fixed breaking-knives.

The sheet-metal blank from which the can-body is to be formed is placed by the operator upon the table 1 and just in rear of a detent or detents 2, pivoted to the said table and projecting slightly above the same. From this position the sheet-metal blank is moved toward the rear by carrier means consisting of sliding plates or blocks 3, secured by screws 4 to dovetailed slide-bars 5, which move in guideways 6 in opposite sides of a bracket 7, secured to the face of the upright frame 8 of the machine, which frame also supports the table 1, as shown in Fig. 1. The plates 3 each carry a series of pawls 9, pivoted thereto, to feed the blank step by step rearwardly as said plates are reciprocated through the connections consisting of the links 10, a lever 11 carried by a rock-shaft 12 journaled in a bracket 13, the said shaft having an arm 14 provided with a projection or roller 15 entering a cam-groove in the face of the disk 16 on a shaft 17 journaled in bearings at the top of the frame, said shaft being rotated through beveled gearing 18 from a vertical shaft 19, which is driven through beveled gearing 20 from a main driving-shaft 21, which has the pulleys 22 thereon. The first rearward movement of the carrier means carries the blank beneath the bracket 7 to mechanism designed to break the edges of the blank, so that they may be interlocked for forming the side seams. In this position the blank is held by two of the detents 2′. The breaking means consist of presser-feet 23 23′, pivotally supported one on each side of the bracket 7. The presser-foot 23 is journaled in a bracket 24, and it is adapted to hold the blank by downward pressure upon the upper surface of a fixed breaking-knife 25, secured to a suitable bracket 26, suitably supported on the frame. The presser-foot 23′ for the opposite edge of the blank is pivoted to a bracket 23× and is adapted to press upwardly against a breaking-knife 25′, secured to a suitable bracket 26′, secured to the machine. With these fixed breaking-knives movable breaking-knives coöperate, one of these (marked 27) being carried by a lever or arm 28, pivoted on the same pin 28× with the presser-foot 23. This breaking-knife moves downwardly in the breaking operation, while for the other edge of the blank the breaking-knife 27′ moves upwardly. Each of these breaking-knives is of curved form, and when operated they bend the edge of the blank which projects over the adjacent fixed breaking-knife 25 or 25′, the one on the right of Fig. 2 bending the edge downwardly, while that on the left of Fig. 2 bends the edge upwardly. Between the levers 28 or 28′, carrying the movable breaking-knives, and the presser-feet springs 29 are interposed, so that as soon as the breaking-knives begin to move the springs will be compressed and the presser-feet will be forced with a yielding

pressure against the sheet-metal blank to hold it while the breaking operation is being performed. In order to provide means for gaging the position of the blanks in relation to the breaking-knives, I provide bars 30, pivoted to the arms 28 28′ and slotted at 31 to receive pins for guiding the arms in their movement. There is a pair of these arms for each breaking device, and the arms of each pair are connected by a cross-bar 32×, which lies with its face at a slight distance from the edge of the fixed breaking-knife, so that the projecting edge of the blank will bear thereagainst to be properly positioned. It will be noticed that these gage-bars move away from in front of the fixed knives as soon as the movable knives begin the breaking operation, so that said operation will not be interfered with. After this breaking operation has been performed the carrier means, through one of the pawls thereon—the intermediate one in this instance—will cause the blank to be moved rearwardly one step, where it will be retained by one of the detents on the table 1, and while in this position flux will be applied under the broken or upturned edge of the blank, so that when the broken edges are interlocked and hammered down, as will be hereinafter described, the flux will lie well within the joint, so that the solder will find its way to the innermost parts of the said joint. This flux-applying device consists of a bath 32, suitably supported, and a brush 33, operated through suitable mechanism to dip into the bath and apply the flux under the upturned edge as the blank passes by the brush. After this fluxing of the edges has taken place the carrier means move the blank another step rearwardly, this action being due to the last of the series of carrier-pawls acting on the blank. The blank now lies beneath a former 34 of cylindrical form, which projects rearwardly through an opening 35 in the main frame and forms a cylindrical prolongation to the rear of the said bracket 7. At this point the flat blank is bent up into cylindrical form, so that its broken edges will interlock. When the blank has arrived under the cylindrical horn or former, a block or plunger 35 rises and grips the blank against the under side of the horn or plunger. This plunger is carried by a stem 36, operated by an arm 37 on a rock-shaft 38, journaled in bearings 39, secured to the frame, the said rock-shaft being operated by an arm 40, having a roller 41 entering a cam-groove in the disk 42 on the shaft 21, before described. Immediately after the blank is gripped by this block or plunger 35 a carriage 43 is moved upwardly in its guides 44, secured to the frame, so as to bring a pair of wings 45, pivoted to the said carriage, into position to fold the blank around the cylindrical former, the said vertical movement of the carriage being effected from a cam 46 on the shaft 21, which has a groove receiving a roller on the lower part 43′ of the carriage, the upper and lower parts of the carriage being connected adjustably, as shown in Fig. 1, by the screw-threaded bolt 47 and nuts 48. These wings are operated by links 49, connected with levers 50, fixed on rock-shafts 51, suitably journaled in the frame, the said rock-shafts being operated from cams 52 on the shaft 21 through blocks 53, arranged to slide in ways 54 on the frame, said blocks having rollers 55 entering the groove in the face of the cam 52 and being connected by links 56 and arms 57 with the rock-shafts 51. Through this mechanism the wings are folded up around the horn or former and the ends of the blank interlock with each other. One wing may move slightly in advance of the other, as in ordinary practice. The horn or former is provided with a spring portion 57′, so that the end of the blank on that side will be held slightly away from the horn or former, with its bent flange extending inwardly, so that the other end of the blank may be passed under the same to interlock therewith. I utilize the connections 52, 53, 56, and 51, just described, for operating the breaking mechanism, and for this purpose the rock-shaft 51 has arms 58 connected by links 59 with the arms 28 28′. By this mechanism while the folding operation is being done at the horn or former the breaking operation is being done at the breaking mechanism.

After the blank has been folded and its ends interlocked I register the interlocked edges directly over the groove 60 in the top of the horn for the hammering operation, and for this purpose I provide a registering-bar or gage 61, carried by a slide 62, moving in a bracket 63, secured to the upright frame or plate of the machine, the said slide being operated through a lever-and-link connection 64 from a slide 65, moving in guideways 66, secured to the face of the said vertical plate or frame, the said block having a roller 66′ connected therewith entering a cam-groove in the face of a disk 67 on the shaft 17, before described. The register-bar or gage is normally retracted away from the groove in the former while the folding is being done, and it is advanced after the edges are interlocked, so as to accurately register the interlocked edges with the groove and against the end of the spring 57′.

In order that the gage or register bar may advance while the wings are still in their folded position, I cut away the wings at the points 67′, Figs. 8 and 9, so that the fingers or projecting portions 69 of the register-bar may pass through these recesses and get in registering position. While the interlocked edges are thus held properly registered, a hammer 69′ descends and presses the interlocked edges together to make the seam. This hammer is carried by a block or carriage 70, sliding vertically in ways 71 on the vertical plate or standard of the machine, the said sliding block or carriage being operated through an adjustable link 72 from a crank 73 of the

shaft 17. The cylindrical body is now moved from off the horn or former by a pawl or pawls 74, carried by the slides 5, which are adapted to move in the prolongations 6′ of the groove 6, said prolongations being formed in the sides of the horn.

The cylindrical body is received from the horn in a cage or holder made up of a series of parallel bars 75, carried by arms 76, secured to brackets 77, supported on a frame 78 in rear of the main frame of the machine. A burner-tube 79 extends from the rear end of the horn into this cage, so as to heat the can-body blank. This tube is supplied with gas from a pipe 80, connected with a passage 81, extending vertically from the bracket 7 and thence horizontally to the rear end of the horn. On this burner-tube and within the cage I support a soldering-iron 82 by means of arms 83, said iron consisting of a plate having a groove 84 extending therein longitudinally and centrally. As the can-body passes through the cage flux is applied to the seam by a brush 84′, carried by an arm 85, having a roller 86 moving over a camway 87 on the receptacle 88, containing the bath of flux. The arm 85 is reciprocated by a lever 86′, pivoted at 87′ and connected by a link 88′ with a lever 89, which is operated by a roller 90 thereon entering a cam-groove in a disk 91 on the shaft 17. After passing the flux-brush the can-body passes beneath a soldering-iron 92, supported by an arm 93 on the standard 94, the said soldering-iron having an opening 95 extending therethrough for the passage of the solder-wire, which is fed from the reel 96, supported on the standard 94, through feed-rolls 97 98, the former of which is provided with a ratchet-wheel 99, operated by a pawl 100, carried by a lever 101, operated by a link 102 from the lever 11, before described.

The groove in the internal soldering-iron is tinned, and as the can-body passes over this iron it is heated, so that it is in proper condition to receive the solder fed through the outer soldering-iron at 95.

The groove in the inner soldering-iron receives the seam and guides the same, the said seam thus remaining uppermost and being properly directed to the outer iron to receive the solder.

Below the internal iron a trough 106 is supported on the burner-tube to catch any particles of solder or tin which may drop, the said internal iron having openings in the bottom of its groove, as at $84^{\times}$.

The outer soldering-iron may be heated by a jet 107.

It will be noticed from the above that the main frame of the machine comprises an upright plate or standard, with the horn projecting on one side thereon and the bracket 7 on the other side, together with the breaking mechanism. It will be noticed also that various connections are made to the operating elements from two cam-shafts, one at the top and the other at the bottom of the machine, and these various connections are supported on the main frame.

The flux-bath 32 is supported, as shown in Fig. 14, by a suitable bracket 96′ from the bracket 7. The flux-brush 33 is carried by an arm 97′, pivoted to a lever 98′, which is pivoted to a bracket 100′, operated from the lever 89 through a rod 99′. This mechanism is representative of any which may be found suitable for the purpose.

The arm 97′ has a roller 101′, which works over a cam projection or track 102′ on the tank of the bath to raise and lower the brush into and away from the tank as the arm 97′ is reciprocated. This mechanism acts in unison with and in a similar manner to that described in connection with the flux-brush 84′.

On the rear side of the tank 32 a cam or incline 32′ is placed. The stem 33′ of the brush is jointed at $33^{\times}$, and below the joint it is provided with a roller 33″, which as the brush descends engages the incline and causes the lower end of the brush-stem to be turned laterally, so that the brush will enter beneath the upturned flange of the blank.

In Fig. 14 the parts are in the position assumed by them when the brush 33 is within the tank, and it consequently appears in dotted lines in said figure. The position of the brush when applying the flux under the broken edge of the blank is also indicated in this figure, this latter position being the lowermost one that the brush assumes.

After leaving the horn the can-body is engaged by a guide wheel or roller 103, having a flange or edge 104 to enter the crease at the seam, and thus guide the can-body, so that its side seam will be held uppermost. This guide-wheel is arranged at the front end of the cage, being supported in a bracket 105. Before leaving the guide rim or flange of this wheel the seam of the can engages the groove in the internal iron, to be guided thereby.

Each flux-tank may be provided with a reservoir 88′, Fig. 11, adapted to feed the flux automatically, for which purpose it is connected with the tank at $88^{\times}$ and has an air-pipe 88″ reaching down to the level it is intended to maintain the flux.

It will be noticed that the pivots of the breaking-knives are arranged back from the edge of the fixed knives, so that as the curved knives swing on their pivots they will describe arcs passing close across the edges of the fixed knives, the concave sides of said arcs being toward the edges of the fixed knives.

I claim as my invention—

1. In combination, a table, a bracket arranged above the table, carrier means guided in the said bracket, breaking mechanism arranged on opposite sides of the bracket comprising members one of which bends the edge of the blank upwardly while the other bends the opposite edge downwardly, a horn in line with the bracket forming a continuation of the same and to which the carrying means

move the blank and folding mechanism at the horn, substantially as described.

2. In combination, an upright frame, the horn projecting on one side thereof, a forward extension or bracket projecting on the other side, a table or plate having a passage between it and the bottom of the extension for the passage of the blank in flat form, breaking mechanism on each side of the extension comprising members one of which bends the edge of the blank upwardly while the other member bends the other edge downwardly and means for moving the blank therefrom to the horn, substantially as described.

3. In combination in can-forming machinery the movable breaking-knives, the fixed breaking-knives and a movable presser-foot for holding the can-blanks against the fixed knives, said presser-foot being moved toward the fixed knife by the movement of the movable knife and positively gripping the blank for the breaking action, the said movable breaking-knife having movement independent of the presser-foot.

4. In combination, a presser-foot for holding the blank, a fixed part over which the edge of the blank is broken, a movable part and a spring interposed between the movable part and the presser-foot, substantially as described.

5. In combination, means for breaking the edges of the blank, means for applying flux to the broken edge before the same is interlocked with the other edge and means for folding the blank and interlocking the edges, substantially as described.

6. In combination, means for breaking the edges of the blank and means for applying flux to one of the broken edges before folding, substantially as described.

7. In combination a horn having a projecting stop, folding means adapted to fold the blank about the horn, a gage movable laterally in respect to the horn toward the said stop, a hammer, means for operating the same and means for moving the gage into gaging position after the blank has been folded and its edges interlocked.

8. In combination with a horn, folding elements to fold the blank about the horn, one of the same having a cut-away portion and a registering device adapted to enter the cut-away portion and means for operating the registering device, substantially as described.

9. In combination, a horn, a stop carried thereby, folding elements, a registering device, a laterally-sliding support for said registering device and means for operating the said sliding support after the folding elements have operated, substantially as described.

10. In combination, a fixed part over which the blank is to be broken, a movable part and a movable gage device moving with the movable part, substantially as described.

11. In combination, a fixed part over which the blank is to be broken, a movable part and a movable gage device moving with the movable part, said gage device comprising the bars pivoted to the movable part and slotted to receive a guide-pin, substantially as described.

12. In combination, a horn or former, folding-wings, a spring part in the horn, a movable registering device or gage for registering the interlocked edges in position for hammering and a hammer, substantially as described.

13. In combination, a former with folding mechanism thereat, a cage or holder in rear of the former and a soldering-iron and burner-tube within the cage, substantially as described.

14. In combination, a horn with folding mechanism thereat, a cage or holder in rear of the horn, a soldering-iron in the cage having a groove extending longitudinally of the same and a burner-tube within the soldering-iron, substantially as described.

15. In combination, a horn with folding mechanism at the same, a cage or holder in rear of the horn, a soldering-iron and heating means within the cage and a soldering-iron outside of the cage, substantially as described.

16. In combination a horn, folding-wings associated therewith, breaking mechanism, a cam-shaft extending transversely of the horn, a rock-shaft 51 extending parallel with the horn, connections from the cam-shaft to the rock-shaft and connections from the rock-shaft to the folding and breaking mechanism, an upright frame, the said rock-shaft extending from front to rear of the said frame and the connections to the breaking and folding mechanism being located respectively at the front and rear ends of the said rock-shaft, substantially as described.

17. In combination with a horn, folding means, a movable gage and a relatively fixed shoulder against which the movable gage registers the seam, said gage operating after the folding means, substantially as described.

18. In combination with a horn, a spring part therein presenting a shoulder to engage the seam and a movable gage for registering the seam against the said shoulder, substantially as described.

19. In combination, the horn, soldering means and means engaging the seam for guiding the can-body thereto, substantially as described.

20. In combination, the horn, soldering means and means engaging the seam for guiding the can-body thereto, said means consisting of a roller having a flange to enter the seam, substantially as described.

21. In combination, soldering means and an iron having a guide-groove to receive the inner side of the seam, and heating means for the inner side of the can, substantially as described.

22. In combination with the horn and folding mechanism, a spring extending partly

around the horn and ending at the groove of the horn which is adapted to receive the seam, substantially as described.

23. In combination with soldering means, a flux-bath and a reservoir with means for feeding the flux automatically from the reservoir to the bath, comprising a pipe 88″ extending from the surface of the bath to the top of the reservoir, substantially as described.

24. In combination, an outer soldering-iron, an inner iron having a groove to receive the seam, means for heating the inner iron, and a guide-wheel to engage the seam and direct the same to the groove in the inner iron, substantially as described.

25. In combination in a can-making machine fixed breaking-knives and curved breaking-knives pivotally supported back from the edge of the fixed knives with means for operating the curved breaking-knives, said curved knives describing arcs passing close to and across the edge of the fixed knives and moving in opposite directions, substantially as described.

26. In combination in a can-making machine a horn, folding mechanism associated therewith, a cage located in the rear of the horn to receive within it the can after leaving the horn and a soldering-iron inside of the cage, substantially as described.

27. In combination a horn, folding means associated therewith, a spring-stop on the horn, a gage movable laterally of the horn and operating toward the stop after the folding means have been operated and a hammer with means for operating the same after the gage is operated, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM D. BROOKS.

Witnesses:
V. BOND MAUPIN,
M. F. KAIN.