No. 653,467. Patented July 10, 1900.

W. D. BROOKS.

MACHINERY FOR SIDE SEAMING CANS.

(Application filed Dec. 9, 1899.)

(No Model.) 2 Sheets—Sheet 1.

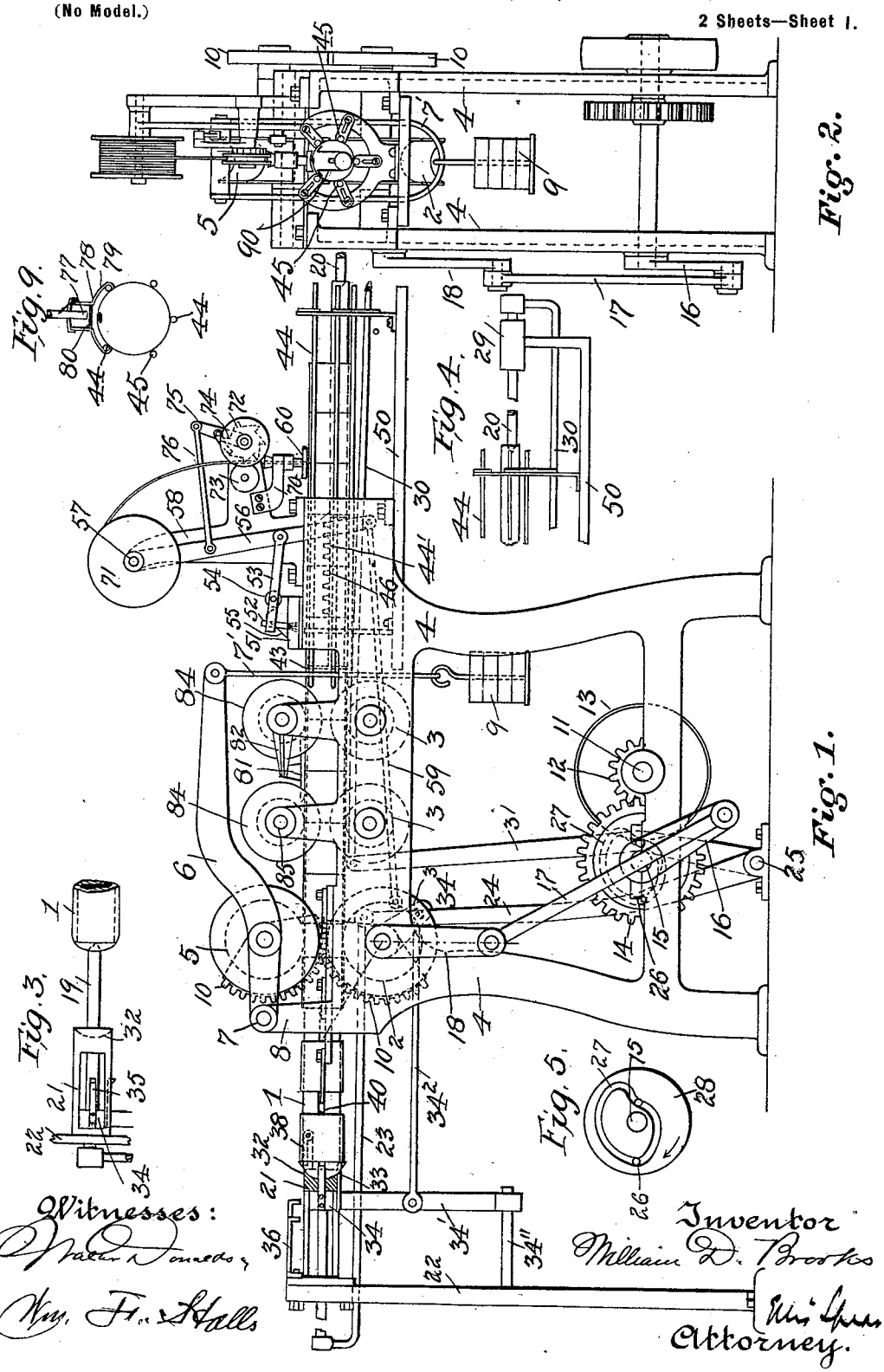


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 9.

Witnesses:

Walter Dowdy

Wm. F. Stalls

Inventor

William D. Brooks

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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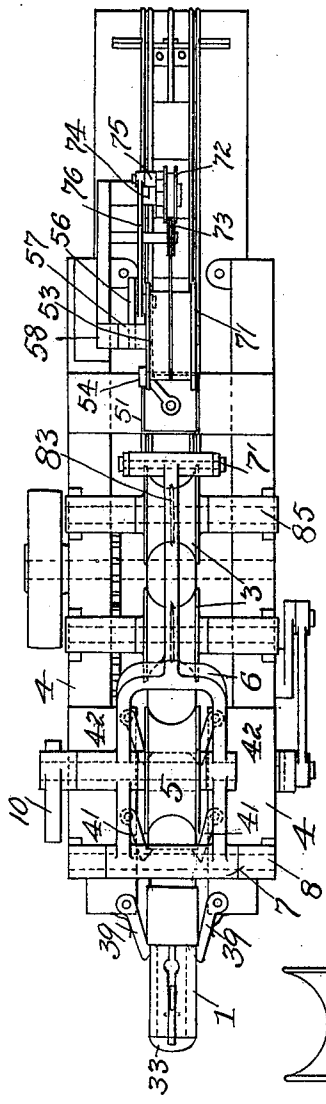


Fig. 6.

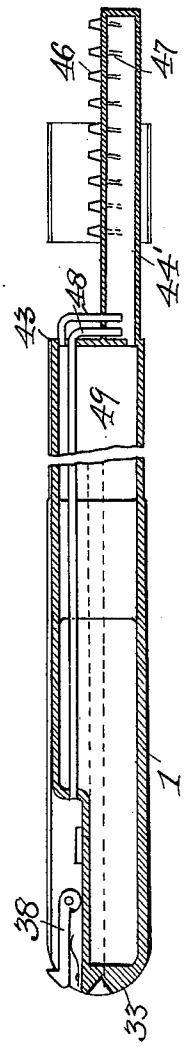


Fig. 7.

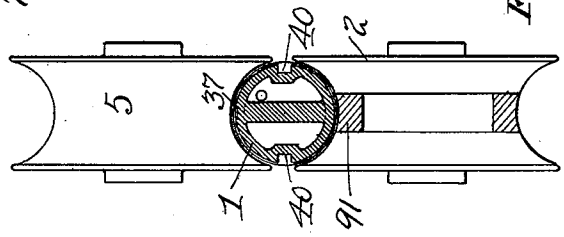


Fig. 8.

Witnesses:-
Walter Donaldson
Wm. H. Hall

Inventor:
William D. Brooks
Ellis Spear
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM D. BROOKS, OF BALTIMORE, MARYLAND.

MACHINERY FOR SIDE-SEAMING CANS.

SPECIFICATION forming part of Letters Patent No. 653,467, dated July 10, 1900.

Application filed December 9, 1899. Serial No. 739,832. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. BROOKS, a citizen of the United States, residing at No. 235 Carroll street annex, Baltimore, Maryland, have invented certain new and useful Improvements in Machinery for Side-Seaming Cans, of which the following is a specification.

My invention is an improvement in machinery for side-seaming cans.

My object is to provide a machine which will produce a can-body of perfect cylindrical form and free from all irregularities in its surface. I aim also to provide a machine which will carry on the work quickly and in which the cans may be rapidly cooled immediately after the application of the heat and solder and the formation of the seam, so that a perfect joint will be secured.

In the accompanying drawings, Figure 1 is a side elevation of the machine. Fig. 2 is an end elevation looking from the right-hand end of Fig. 1. Figs. 3 and 4 are detail views showing the extreme ends of the machine. Fig. 5 is a detail view of the cam for controlling the pushing-stops of the mandrel. Fig. 6 is a plan view of part of the machine. Fig. 7 is a detail sectional view of the mandrel. Fig. 8 is a detail view of the mandrel and roller-dies. Fig. 9 is a detail view showing how the flame may be made to impinge outside of the can-body.

In the drawings a mandrel 1 is shown supported upon a lower die-roller 2 and upon lower supporting-rollers 3, all of which have their bearings journaled in side frames 4. Above the die-roller 2 an upper die-roller 5 is employed, and these rollers have their peripheries of substantially-semicircular form in cross-section, so as to fit accurately the cylindrical surfaces of the mandrel and substantially all the way around the same.

The upper die-roller 5 has its bearings in a lever 6, which is pivoted at 7 in standards 8 on the side frames, the said lever being forked at its forward end and having its rear end connected with a bail 7′, upon which is hung weight 9. This weight through the lever 6 causes the upper die-roller to press upon the mandrel and the can thereon with sufficient force to act as a die in the formation of a seam, as shown in Fig. 8. These die-rollers 2 and 5 are oscillated in unison by segments 10, connected therewith, the lower roller being operated from a main driving-shaft 11 through a belt-wheel 13 thereon, a pinion 12 meshing with a gear 14 on a shaft 15, which shaft has a crank-arm 16 connected by a link 17 with an oscillating arm 18 on the shaft of the lower die-roller, and this, through the segments, oscillates both the die-rollers. The mandrel reciprocates longitudinally, and its motion is uniform with that of the die-rollers, so that there will be no dragging of one part in relation to the other, and the action upon the seam and upon the whole can will be a rolling action, and this, together with the semicircular shape of the rollers' peripheries, will give to the can a perfect cylindrical shape and will produce a perfect lock at the seam. The mandrel is reciprocated by the traction resulting from the oscillation of the die-rollers, and in addition to this, in order to control the reciprocation of the mandrel and also to aid or effect its reciprocation, I employ pushing devices at the front and rear ends of the mandrel, and the action of these insures that the mandrel will receive its proper amount of movement in either direction, and there will be no tending of its creeping longitudinally in relation to the die-rollers and the other parts of the machine. These devices comprise rods 19 and 20 at the front and rear ends of the mandrel, respectively, arranged to coincide with the axis thereof, the front rod extending through a fixed block 21, forming part of the feeding device of the machine, and a standard 22 for holding said feed-block, the rod being guided in the block and standard and connected by a rod 23 with a lever 24, pivoted to the floor at 25 and having a pin or roller 26 entering a cam-groove 27 in a cam 28, fixed on the shaft 15. The rod 20 at the opposite end of the machine is guided in a bracket 29, fixed on the frame and connected by a pitman or rod 30 with a lever 31, which is similar to the lever 24, before described, and is similarly pivoted and operated by the cam 28, but in reverse order, and for convenience of illustration I have shown this lever operated by the same groove of the cam.

Supposing the parts to be in the position shown in Fig. 1, with the mandrel in its extreme forward position, the movement of the

die-rollers, together with the movement of the rod 19, will cause the mandrel to move rearward or toward the right in Fig. 1, and in this movement the rod 19 will constantly press upon the mandrel and will serve to push it to the limit of its stroke. The cam is so formed that while the rod 19 at the front of the machine is aiding in moving the mandrel toward the rear the rod 20 at the rear of the machine will be given a more rapid movement, so as to recede from the end of the mandrel and leave a space between the same and itself in order to allow a can to be discharged from the extreme rear end of the machine. As the rollers move in the other direction to move the mandrel forward the rear pusher or stop rod 20 comes into action and follows up the movement of the mandrel and at the same time aids in this movement and insures that the mandrel moves its full movement forward, and while this is taking place the rod 19 is quickly withdrawn from the front end of the mandrel, leaving a gap between the same and the feed-block 21, so that the operator can place a can on the said block in position to be fed therefrom onto the mandrel when the same reaches its forward limit. The feed-block 21 is provided with a recess 32, of semispherical or cup shape, adapted to receive the rounded end 33 of the mandrel. The feed-block is adapted to guide a feed-slide 34, which has fingers 35, projecting rearwardly therefrom, adapted to push the can from the feed-block onto the forward end of the mandrel. A gage 36 is supported adjacent to the feed-block, and when the operator places the can on the feed-block, with the broken edges thereof interlocked, he can, by slightly turning the can-body, bring one edge of the same against the gage 36, and thus aline the interlocked edges with the groove 37 in the mandrel, which is adapted to receive a part of the seam. When the can is placed on the block, the slide 34, with its feed-fingers, is at the limit of its forward movement, leaving the rear end of the feed-block free for receiving the can-body, and then upon the rearward movement of the feed-slide the can-body is pushed onto the front end of the mandrel and in rear of a spring-catch 38, which is pivoted in a recess in the upper side of the mandrel. The feed-slide 34 is carried upon a cross head or arm 34′, which is guided at its lower end by a projection 34″ from the standard 22. The cross-head is reciprocated by a link 34^2, connected with an arm 34^3 on the shaft of the lower die-roller. After the mandrel has received the can-body it moves toward the rear far enough to carry the can past detents 39, pivoted to the fixed frames 4. These detents yield to allow a can to pass by and then they drop into engagement with the front end of the can, grooves 40 being provided in the sides of the mandrel to allow this action. Upon the forward stroke of the mandrel these detents hold the can, and thus the mandrel moves through them, and then upon the next rearward movement of the mandrel the can-body is carried back a step farther to be engaged by a second set of detents 41, and then upon the forward stroke of the mandrel the can is held so that its position relatively to the mandrel is changed toward the rear end thereof, and upon the next rearward movement of the mandrel this can is gripped by the seaming die-rollers and is pressed upon thereby throughout its extent, the movement of the rollers and the mandrel being sufficient to carry a can entirely through the rollers to be gripped by a third set of detents 42. It will be seen, therefore, that the reciprocation of the mandrel causes the can to be moved step by step from the front end thereof through the die-rollers to the rear of the machine. The cans are discharged from the rear end of the mandrel at 43 into an open cage 44, composed of a series of rods 45, disposed at different points around the can-body and forming a cage of cylindrical form. During its passage through this open cage the soldering of the seam is performed and the rapid cooling of the can is effected, as by reason of the open form of the cage and the fact that the air has access to both the exterior and interior parts of the can rapid cooling will immediately take place after the can leaves the soldering device. The flame for heating the can may be applied directly to the can from either the inner or outer side thereof after it leaves the mandrel and while it is in the cage, and for this purpose I provide a heater-pipe 44′, connected with the mandrel and extending rearwardly therefrom within the cage. This heater-pipe has a series of burner-jets 46, and wicks 47 extend down from these jets into a body of gasolene contained in the tube. The supply of gasolene may be maintained by means of air-pipes 48, which when the level of gasolene falls below a certain point will allow air to pass into the main reservoir 49 for the gasolene, which is provided in the interior of the mandrel. Instead of a gasolene-burner the flame may be fed by gas introduced in any suitable manner.

The cage, which receives the cans from the mandrel, is supported in a fixed position on a plate 50, secured to the main frame, and the rear end of the mandrel extends slightly within the forward end of this cage. Above the cage and near the rear end of the mandrel is supported a flux-pan 51, into which is dipped a brush 52, carried by an arm 53, which has a roller 54 running upon a cam 55, arranged adjacent to the flux-pan. The arm 53 is pivoted to a swinging arm 56, pivoted at 57 in standards 58, supported on the main frame. The arm 56 is operated by a rod 59, connected with one of the oscillating rollers, and the effect is to lift the fluxing-brush from the flux-pan and deposit the same on the seam of the can and then to return the flux-brush to the flux-pan, it being understood that the seam is moved longitudinally under the flux-brush.

Immediately in the rear of the position of the flux-brush the burner acts upon the can to heat the same, and after leaving the burner the seam passes under a soldering-iron 60, supported by an arm 70 on the standard 58, solder being fed to the iron from a reel 71 by means of feed-rollers 72 73, the former of which is turned step by step by a pawl and ratchet 74, operated by an arm 75 and a link 76 from the swinging arm or lever 56, and after leaving the soldering device the cans are pushed step by step along and within the cage to drop from the rear end of the cage.

It will be noticed that the can leaves the cage as the mandrel moves forward and while the rod 20 is in contact with the mandrel, and while the can cannot drop directly from the cage it rests upon the arm 20, and then upon the quick retraction of this rod 20 a can will fall through the space between it and the rear end of the cage.

It will be seen that the movement of the cans to the rear after leaving the die-rollers is caused by one can-body bearing against the other can-body. Instead of having the burner operate within the fixed cage it may be arranged outside of the same, as indicated in Fig. 9, where the burner is shown at 77, extending into a heating-chamber 78, which is formed by vertical walls supported by lateral portions 79 upon bars of the cage, the vertical walls being connected together by a cross-rod 80.

In order to prevent any circumferential displacement of the mandrel, I provide a shoe 81, of elongated form, adapted to enter the small groove left in the surface of the can-body at the seam, and, as the thickened part at the seam enters the groove 37 in the mandrel, it will be seen that the shoe by engaging the groove in the can-body will prevent the mandrel from turning, the said shoe being carried by an arm 82, extending from a fixed frame. For the same purpose a rib or ribs 83 may be formed on one or both of the upper guide-rollers 84 to enter the groove at the seam, these rollers being journaled in bearings 85 on the main frame. The solder passes down through an opening in the soldering-iron directly upon the heated joint of the can-body.

I do not wish to limit myself to the means described for reciprocating the mandrel, it being only necessary that the mandrel and the die-rollers have a uniform motion, so as to secure a perfect rolling action and prevent any slipping of one part in relation to the other, and the mandrel may be driven positively in any suitable manner other than that shown. Neither do I wish to limit myself to the manner of feeding a can onto the reciprocating mandrel, nor to the manner of placing the can upon the feed-block through the opening between the feed-block and mandrel, nor to the form of feed-block.

The rods 19 20 have pointed ends, which are preferably right-angular in cross-section, and these engage corresponding sockets in the ends of the mandrels.

In Fig. 2 I show at 90 a chimney for the flame.

The lower die-roller, as shown in Fig. 8, may have a band 91 of any suitable material adapted to make a good frictional contact with the mandrel.

As before stated, the means shown herein are representations of any suitable means for reciprocating the mandrel positively.

While I have described and shown my invention adapted to operate upon can-body blanks, it will be understood that the invention is not limited in this respect, as it may be used for making bodies intended for other uses than that of forming parts of cans, and I have used the terms "can" and "can-bodies" for convenience, it being understood that these terms are meant to include any bodies which my machine may be adapted to make without regard to their shape in cross-section or the use to which they are put.

What I claim as my invention is—

1. In combination, the mandrel, a cage in rear of the same to receive the bodies from the mandrel, and a burner-tube extending from the rear end of the mandrel within the cage, substantially as described.

2. In combination, the mandrel, fluxing and soldering devices, and a burner-tube extending from the rear end of the mandrel, substantially as described.

3. In combination, a hollow mandrel having a reservoir therein and a burner-tube extending from the mandrel, substantially as described.

4. In combination, the solder-feeding devices, the fluxing device, the lever 56, means for oscillating said lever, and connections therefrom to the solder-feeding and fluxing devices, substantially as described.

5. In a can-making machine, a reciprocating mandrel and a die-face having movement with said mandrel with operating means, said mandrel having its opposite ends free for the feeding and discharge of the body-blanks, substantially as described.

6. In combination, a reciprocating mandrel and a die-roller having oscillating movement in unison with the movement of the mandrel with operating means, substantially as described.

7. In combination with a mandrel, a rotary die-roller operating upon the can-body on the mandrel with means for operating the die-roller positively, substantially as described.

8. In combination, the reciprocating mandrel, an oscillating die-roller and operating means whereby the oscillation of the roller will be in unison with the reciprocation of the mandrel, substantially as described.

9. In combination, the upper and lower die-rollers, a reciprocating mandrel between the rollers and operating means, said mandrel

having its opposite ends free for the feeding of the body-blanks and the discharge of the bodies, substantially as described.

10. In combination, the reciprocating mandrel, upper and lower die-rollers geared together and means for operating the parts, substantially as described.

11. In combination, a mandrel, means for feeding the bodies along the same, a die-roller, and means for applying pressure yieldingly to said roller, said mandrel having its opposite ends free for the feeding and discharge of the material, substantially as described.

12. In combination, a reciprocating mandrel, means for feeding the bodies along the same, the upper and lower die-rollers, and means for applying a yielding pressure to the upper roller, said mandrel having its opposite ends free for the feeding and discharge of the material, substantially as described.

13. In combination, a reciprocating mandrel, a die and the means for moving the cans along the mandrel through said die, said mandrel having its opposite ends free for the feeding and discharge of the material, substantially as described.

14. In combination, the mandrel, the die, said mandrel having reciprocating movement and a detent for moving the cans along the mandrel, said detent being fixed in relation to the movement of the mandrel, the can-bodies being fed at one end of the mandrel and discharged at the other end, substantially as described.

15. In combination, a mandrel, oscillating die-rollers and means for oscillating the die-rollers, the said mandrel being free to reciprocate between the rollers under the action thereof, substantially as described.

16. In combination, a mandrel, a die and means for moving the mandrel longitudinally, said means engaging the end of the mandrel at intervals, substantially as described.

17. In combination, the mandrel, a die, and means for pushing the mandrel, said means being located at opposite ends thereof and engaging and disengaging the same, substantially as described.

18. In combination, a mandrel and die, a pushing device at the end of the mandrel with means for operating the same toward and from the mandrel, substantially as described.

19. In combination, a mandrel and die, a pushing device at each end of the mandrel, and means for operating said pushing device toward and from the mandrel to allow the feed and discharge of the can-bodies, substantially as described.

20. In combination, a reciprocating mandrel, a device for acting on the can-body while on the mandrel, means for reciprocating the mandrel and a feed-block opposite the front end of the mandrel adapted to receive the can-body to be placed on the mandrel, substantially as described.

21. In combination, a reciprocating mandrel, a device acting on the can-body thereon, a feed-block at the front end of the mandrel, and means for moving the can-body from the feed-block onto the mandrel, substantially as described.

22. In combination, a reciprocating mandrel, a device acting upon the can-body thereon, and a fixed feed-block at the front end of the mandrel upon which the can-body is placed to be taken by the mandrel, substantially as described.

23. In combination, a reciprocating mandrel, a die, through which the mandrel passes, and means for holding the mandrel against circumferential displacement, said mandrel being free at both ends for the feeding and discharging of the blanks and bodies, substantially as described.

24. In combination, a mandrel, means for acting upon the can-body thereon, said mandrel being free to reciprocate and means engaging the groove at the seam of the can to prevent the mandrel from turning, said mandrel having a groove to receive the thickened part at the seam, substantially as described.

25. In combination with a mandrel, a cage to receive within it the can-body and means for acting upon the can-bodies while in the cage, the cans being forced through the cage by the movement of the preceding cans, substantially as described.

26. In combination, a mandrel, a support for the cans at the end of the mandrel adapted to receive the can-bodies within it and means for acting upon the can-bodies while in said support, the cans being forced through the cage by the movement of the preceding cans, substantially as described.

27. In combination, a reciprocating mandrel, a fixed support to receive the can-bodies therefrom, and means for acting upon the can-bodies while sustained by said fixed support, substantially as described.

28. In combination, a reciprocating mandrel, a fixed support adapted to receive the can-bodies within it as discharged from the mandrel and means for acting upon the can-bodies while in said support, substantially as described.

29. In combination, a reciprocating mandrel, a cage independent thereof and of open form adapted to receive within it the can-bodies, substantially as described.

30. In combination, a reciprocating mandrel and a fixed support of open form to receive the can-bodies therefrom, substantially as described.

31. In combination with the reciprocating mandrel, the fixed cage, the flux-pan, the brush controlled by the cam, a roller and soldering means, substantially as described.

32. In combination in a can-soldering machine, the soldering-iron having an opening through which the solder is fed, means for feeding the solder-wire through the iron and means for supporting a can, substantially as described.

33. In combination, a hollow mandrel,

means for acting upon the can-body, a burner-tube extending from the hollow mandrel, and air-controlling means for regulating the feed of gasolene to the burner-tube, substantially as described.

34. In combination, a mandrel, means for operating upon the can thereon, and a feed-block with means for separating the feed-block and mandrel, substantially as described.

35. In combination, a reciprocating mandrel and means acting upon the can-bodies thereon, said mandrel having its opposite ends free, substantially as described.

36. In combination, a reciprocating mandrel, means acting upon the can-bodies thereon and means for moving the can-bodies along the mandrel, said mandrel having its opposite ends free, substantially as described.

37. In combination, a mandrel free at its ends, means for acting on the cans while on the mandrel and means for preventing the mandrel from turning, substantially as described.

38. In combination with a mandrel, means for feeding the material along the same, a die acting on the material as it passes thereunder, a cage at the rear of the mandrel to receive the bodies as discharged from the mandrel and means for acting on the bodies while in the cage, substantially as described.

39. In a can-making machine, a reciprocating mandrel and a die moving in unison with said mandrel, operating means, and soldering means, substantially as described.

40. In combination, the fixed frame, the upper and lower die-rollers, a mandrel reciprocating between said die-rollers and means for feeding the blanks past the die-rollers, said rollers having contacting surfaces embracing substantially all of the surface of the mandrel, substantially as described.

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

WM. D. BROOKS.

Witnesses:
GEO. E. TAYLOR,
WM. TEGELER.