No. 702,167. Patented June 10, 1902.

H. B. WILLIAMS.

MACHINE FOR MANUFACTURING SOLDERED CANS.

(Application filed Mar. 27, 1900.)

(No Model.) 2 Sheets—Sheet 1.

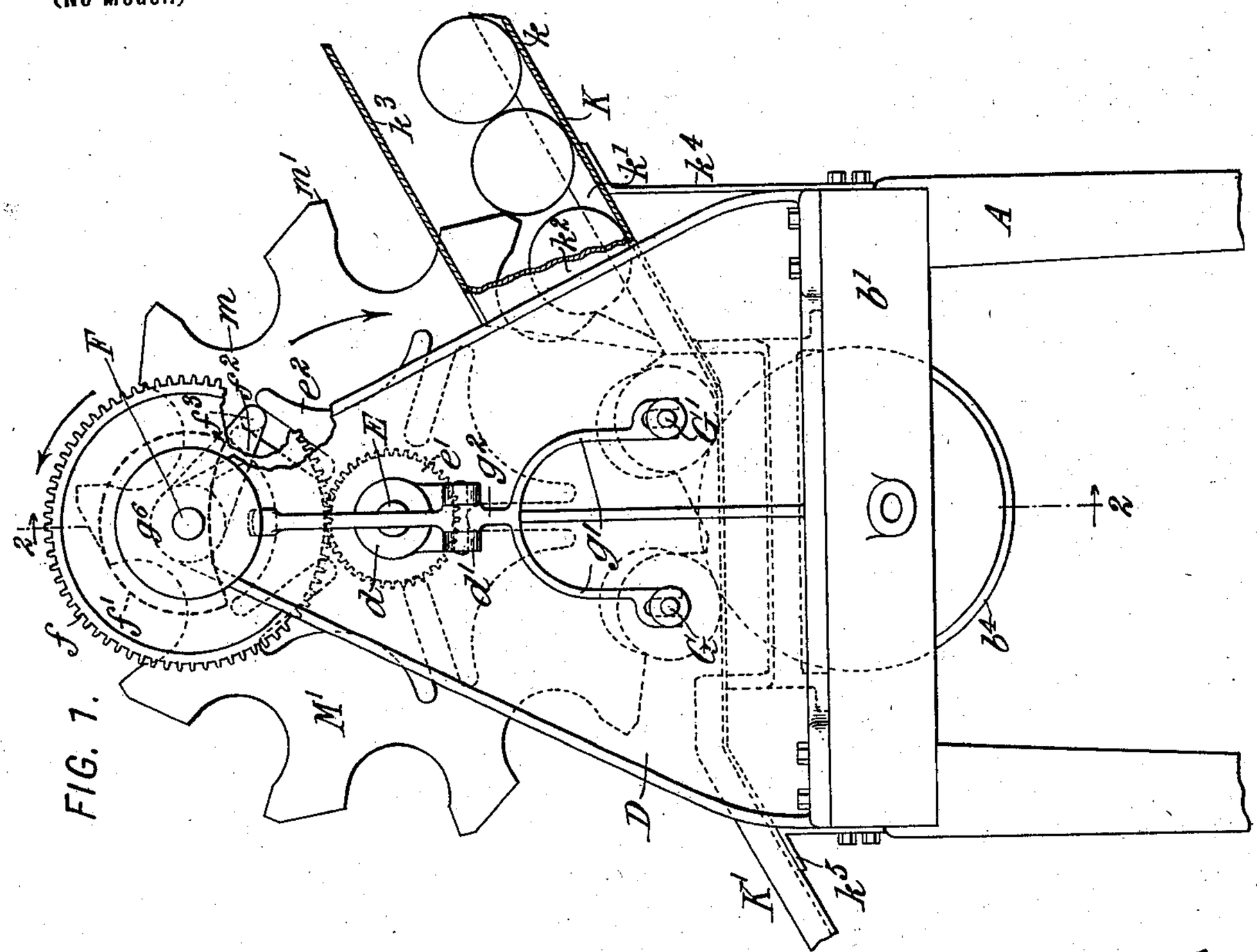

FIG. 1.

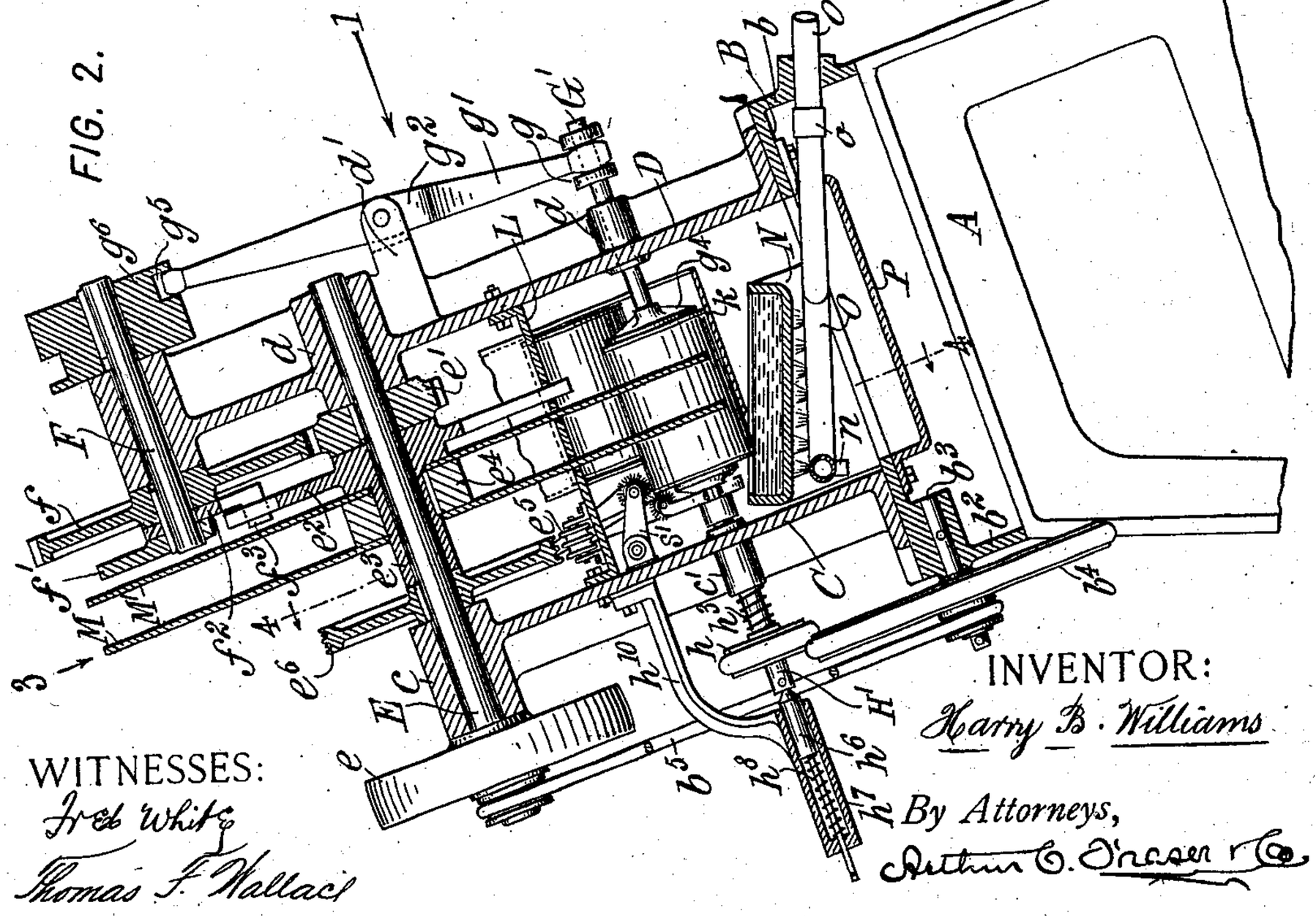

FIG. 2.

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(No Model.) 2 Sheets—Sheet 2.

FIG. 3.

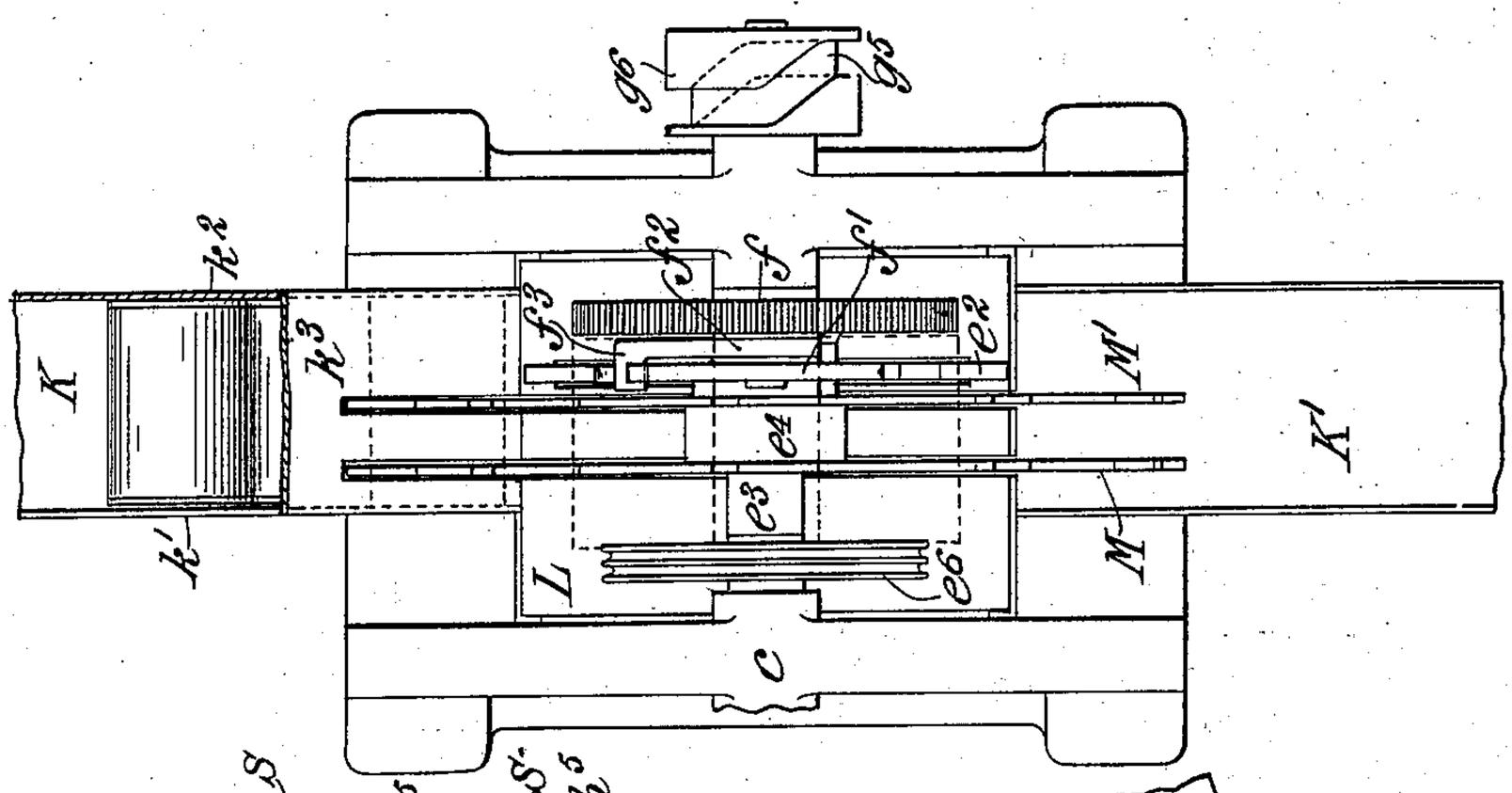


FIG. 5.

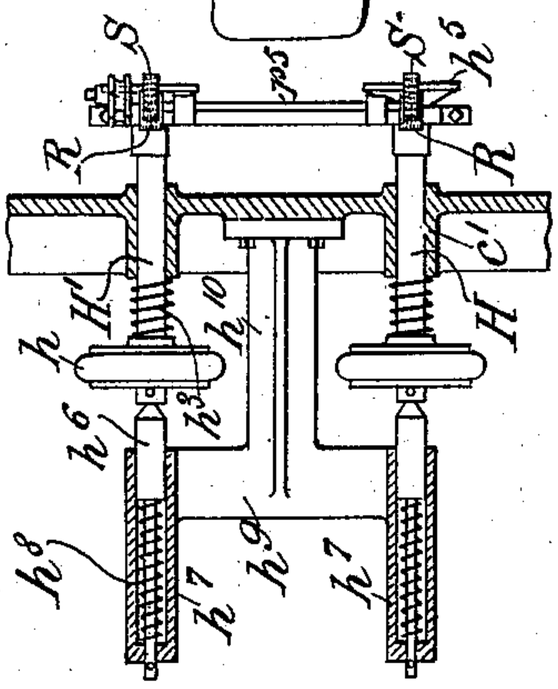


FIG. 6.

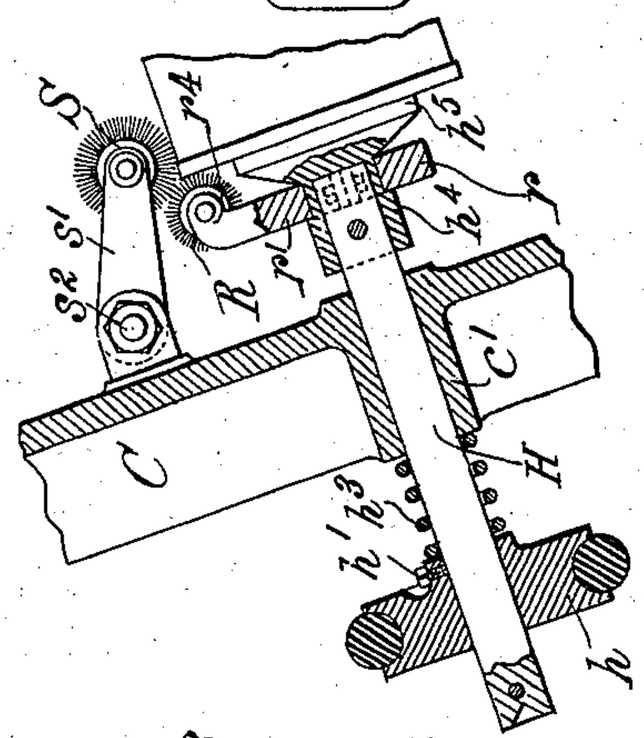


FIG. 7.

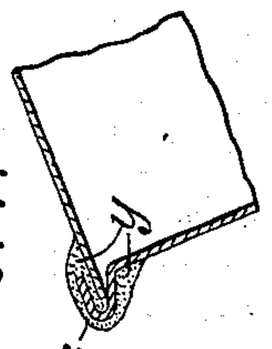


FIG. 4.

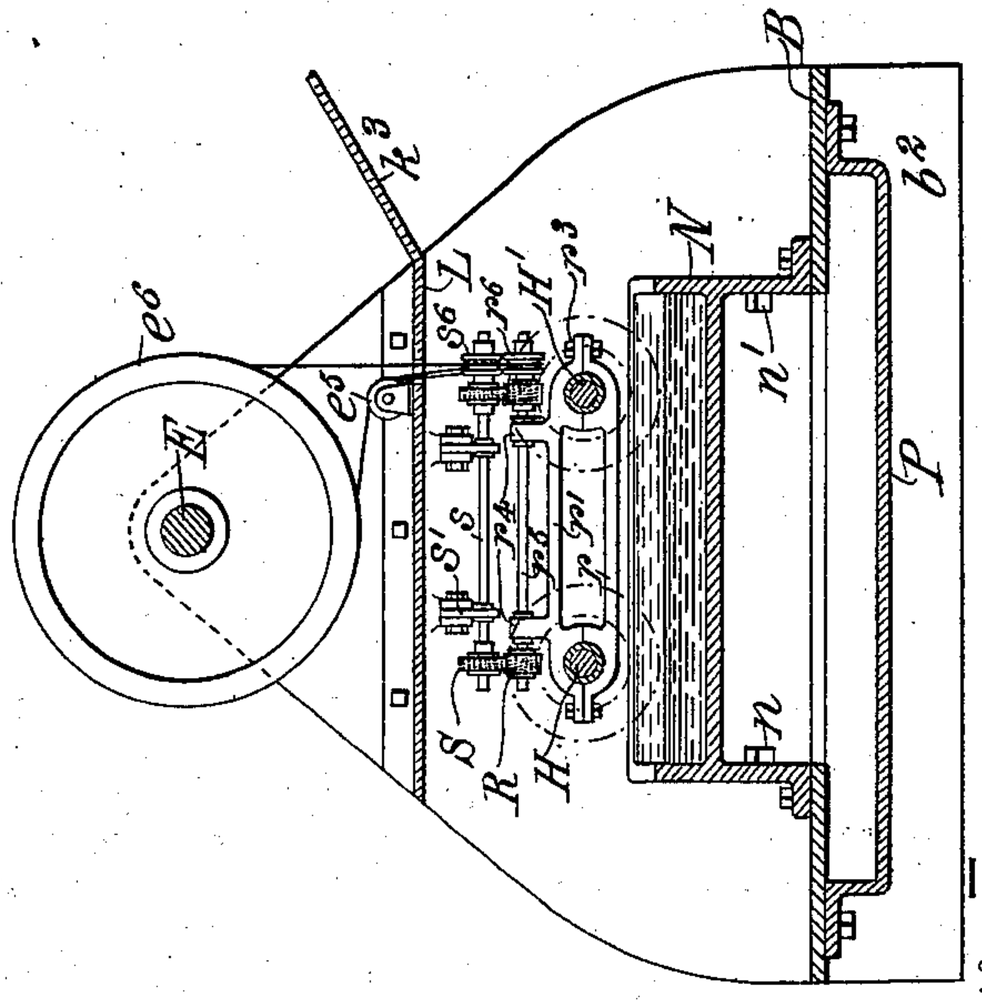
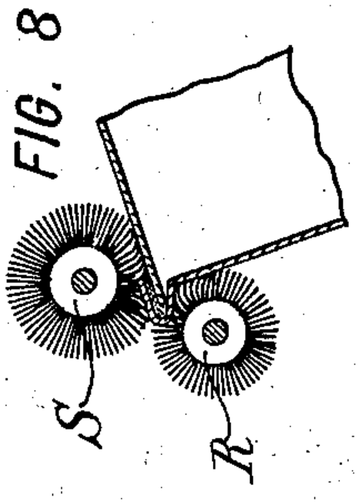


FIG. 8



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UNITED STATES PATENT OFFICE.

HARRY B. WILLIAMS, OF BROOKLYN, NEW YORK, ASSIGNOR TO AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MACHINE FOR MANUFACTURING SOLDERED CANS.

SPECIFICATION forming part of Letters Patent No. 702,167, dated June 10, 1902.

Application filed March 27, 1900. Serial No. 10,338. (No model.)

To all whom it may concern:

Be it known that I, HARRY B. WILLIAMS, a citizen of the United States, and a resident of the borough of Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Machines for Manufacturing Soldered Cans, of which the following is a specification.

My invention provides an improved can-machine adapted more particularly for use in the manufacture or subsequent manipulation of sheet-metal cans and covering especially the combination of mechanisms for applying solder thereto, removing superfluous solder, and manipulating the cans either during these operations or at any other time. It also provides improvements in the separate mechanisms, as fully stated in the following description.

In the accompanying drawings, illustrating one embodiment of my complete invention, Figure 1 is an oblique side view looking in the direction of the arrow 1 in Fig. 2. Fig. 2 is a central vertical section on the line 2 2, Fig. 1. Fig. 3 is an oblique plan in the direction of the arrow 3 in Fig. 2. Fig. 4 is a section on the line 4 4 of Fig. 2, the cans being omitted. Fig. 5 is a plan of the brushes, the spindles which support them, and adjacent parts, the bearings of the upper brushes being omitted for the sake of clearness. Fig. 6 is a vertical section approximately through one of the pairs of brushes and the corresponding spindle; and Figs. 7 and 8 are views, exaggerated for clearness, of the location of the solder on the cans before and after removal of the superfluous solder by my solder-removing mechanism.

Referring to the drawings, A is a main support of any suitable character having its top inclined laterally and carrying thereon a base-plate B, on which are supported opposite side frames C and D, all the principal parts and the operating mechanism being inclined laterally, as shown in Fig. 2, for a purpose which will be made clear in the description of the operation of the machine. Carried by said frames is a main shaft E. Carried by the frame D are a second shaft F and a pair of longitudinally-movable spindles G and G′. Carried by the frame C are a pair of spindles H and H′, immediately opposite the spindles G and G′ and also movable longitudinally or axially, but immovable laterally—that is to say, in the direction of the length of the runway. Chutes K and K′ conduct the cans into and out of the machine, the chute K merging as it enters the machine into merely a lower plate *k* and an upper plate L.

Keyed on the shaft E is a driving-pulley *e*, which is belted to any suitable source of power. Also keyed on said shaft is a pinion *e′*, which meshes with a gear *f*, keyed on the shaft F. Also keyed on the shaft F are a segment f' and an arm f^2, carrying at its end a pin f^3. Loosely mounted on the shaft E is a star-wheel e^2, adapted to be engaged by the pin f^3 and, with said pin and the segment f', constituting the well-known Geneva-stop movement. The hub e^3 of the star-wheel e^2 is a sleeve which extends a considerable distance along the shaft E, as shown, and has keyed to it a second hub e^4, carrying two disks M and M′. These disks are formed with coincident notches *m* in their peripheries of a diameter equal to that of the cans to be handled and preferably of a depth slightly greater than said diameter. Between the adjacent notches *m* the periphery of the wheel is pointed, as shown at m', the point being immediately in the rear of the preceding notch, so as to enter easily between the cans, as shown in Fig. 1. I prefer making the number of notches some even multiple of the number of points in the star-wheel *m*, whereby a plurality of cans can be forwarded at one movement of the star-wheel, the valuable function of which arrangement will appear later on. The operation of these parts will evidently be as follows: Starting from the position of Fig. 1, the gear *f* is rotated in the direction of the arrow, and the segment f' enters the concave portion of the star-wheel and locks it in the position shown until the pin f^3 enters the next point of the star-wheel in the rear of the one from which it has just emerged. The segment f' at the same time leaves the concave portion of the star-wheel, and the latter is rotated until the star-wheel is advanced one step—that is to say, one-fifth of a revolution beyond the position shown in

Fig. 1. The effect of the locking of the star-wheel was to hold the compound wheel, composed of the disks M and M′, stationary, thereby holding the two cans (shown in dotted lines in Fig. 1) rigidly in their position as regards any lateral movement. The forward movement of the star-wheel then carries these cans to the exit-chute K′ and replaces them by the two succeeding cans in the entrance-chute K.

The chute K is composed of a bottom plate k, extending continuously through the machine and forming the bottom also of the outlet-chute K′, a pair of side flanges k' and k^2, the latter preferably extending from the base to the top of the chute, so as to close its side entirely, (see Figs. 1 and 3,) and a top plate k^3. The flanges k' and k^2 thus form a fixed guard to prevent lateral displacement of the cans while they are being carried forward in the notches of the disks M M′. The top plate k^3 widens at the entrance to the machine proper, as shown best in Fig. 3, into a plate L, supported from the side frames C and D in any suitable manner, as by flanges and bolts, as shown in Fig. 2. The side flanges k' and k^2 extend nearly to the lowest position of the cans, as shown by dotted lines in Fig. 1, whereby the cans are held from endwise movement until they are brought into said lowest position. The chutes K and K′ may be supported in any suitable way. I have shown uprights k^4 and k^5 at opposite sides of the machine for carrying the weight of the chutes to the main support. The short flange k' is on the lower side of the chute. The chute K is used to feed the cans after the can-heads have been crimped onto the can-bodies to my machine, where the heads and bodies are soldered together and the superfluous solder removed, or it may be used to feed cans which have already been soldered to my machine, in which case the solder-bath of my machine would be omitted and the mechanism for removing superfluous solder alone would be used. In the latter case it is desirable to retain the solder on the cans in as hot a condition as possible, and for this reason it is advisable to cover the chute K, which connects my machine with the soldering-machine, and in any case it is desirable to cover the chamber in which the superfluous solder is being removed.

The soldering-machine to be used with my solder-removing machine may be of any well-known type.

The solder-tank of my machine is shown at N and is supported on the plate B in any suitable manner, preferably as shown in Fig. 4. By reason of the fact that the cans are held stationary while the solder is being applied thereto this tank need only be of a length to accommodate the number of cans which are simultaneously soldered—in the present case two. Also by reason of the fact that the cans are held stationary a smaller solder-bath is permissible, and the amount of heat necessary to maintain the solder in a liquid condition is less than in those machines in which the cans are moved along in the bath as well as rotated therein in applying the solder. For the purpose of keeping the solder in a liquid condition I use any well-known means, but preferably a coil O, carrying heating gas. Said coil is adapted to be uncoupled at o from the outer pipe O′, the latter being then withdrawn and the coil O being removed by the removal of the bottom plate P, Fig. 2. When in place, the coil O is supported on a pair of lugs n n' on the inner side of the supporting-flanges of the tank N. The solder-tank N is of course always held in a horizontal position and is so placed that when the tank is nearly full of solder, as shown, it slightly submerges the corner of the can when the latter is in the position of Fig. 2, somewhat extended axially beyond the side of the lower plate k of the chute. The tank, as well as the heating apparatus, is adapted to be removed endwise from the machine, as will appear from Fig. 4, in the case in which the machine is used in connection with some other type of soldering-machine and merely for the purpose of removing superfluous solder.

For the purpose of protruding the cans beyond the side of the chute and rotating them while they are held against lateral movement by the notched wheel, composed of the disks M M′, I provide the following mechanism: Supported in the flange b^2 of the base is a shaft b^3, and on said shaft a pulley b^4, having a tire of rubber or similar frictional material. This wheel b^4 is connected by belt b^5 to the main shaft E, so as to be constantly rotated. Each of the shafts H H′ carries a friction-wheel h, set thereon at a desired point, as by the set-screw h'. A coiled spring h^3 is inserted between said friction-wheel h and the bearing c', in which the spindle operates. Fastened onto the end of said spindle by any suitable means, as a pin, is a head h^4, on the end face of which is a pad h^5. The opposite end of the shaft H is pressed inward by a plunger h^6, guided in a cylinder h^7 and pressed outward by a spring h^8, Fig. 5. The two corresponding cylinders h^7 are united by a bar h^9, which is supported from the frame C by an arm h^{10}. (See especially Figs. 2 and 5.) The spring h^8 is stronger than the spring h^3, the latter forming a yielding abutment when the pressure on the spring h^8 is withdrawn, and the wheel is forced toward the casing by the action of said spring h^8. It is apparent now that when a can is pressed with its head against the head h^5 of one of these spindles H H′ the first movement is to slide the spindle outward until the wheel h bears against the wheel b^4. The latter being constantly in motion then turns the wheel h, and with it the spindle H and the can which is frictionally held against the end of the spindle. The position of the wheels b^4 and h is such that this turning movement takes

place just as the corner of the can enters the bath of melted solder to a required depth. After a few turns of the can in the solder the pressure is then released. The spring h^8 throws the wheel h out of engagement with the wheel b^4, and the spindle gradually comes to rest.

For the purpose of pressing the can against the spindle H or H′, I provide spindles G and G′ with heads g^4, having faces similar to the face h^5 of the spindles H and H′. These spindles G G′ slide in bearings d of the end frame D and have a pair of collars g near their outer ends. Straddling the spindles between the collars g are a pair of forks g' of a lever g^2. This lever is pivoted at about its center in a boss d', integral with the frame D. The upper end of the lever g^2 operates in a cam-groove g^5 in the periphery of a cam g^6, which is keyed onto the shaft F. The cam is so constructed and so positioned on the shaft F that when the pin f^3 is leaving the slot in the star-wheel, Fig. 1, the upper end of the lever g^2 is leaving its innermost position and moving to its outer position, as shown in Fig. 2. While the segment f' is locking the star-wheel against further rotation, the cam-groove is straight and holds the upper end of the lever in the position of Fig. 2, throwing it, however, to the inner position just before the segment leaves the locking position of the star-wheel and the pin enters the slot thereof. While the pin is in contact with the star-wheel, the lever is held with its upper end in the inner position. The result of this movement is the pressing forward of the spindles G and G′ as soon as the notched wheels M M′ have moved a pair of cans laterally to the position of Fig. 1 and have become locked against further movement in either direction. As the spindles G and G′ are pressed forward, being in a position directly opposite the ends of the cans, they force the cans axially out of the chute and downward into the soldering-bath until their corners are slightly submerged. The final movement of the cans, carrying with them the spindles H and H′, brings the wheels b^4 and h into frictional contact and revolves the wheels h and the spindles H and H′, which in turn revolve the cans and the spindles G and G′. Though my mechanism is not limited to any particular speed of rotation of the cans, yet I design to give them not more than about three revolutions. It will be seen, however, that by increasing the relative rates of rotation of the shaft E, wheel b^4, and pinion h I may get so high a speed as even to throw off some solder by centrifugal action during the rotation of the can. For the purpose, however, of surely removing the superfluous solder and of removing it accurately and evenly I provide a brush, preferably a revolving brush, which bears against the point of the can at which the superfluous solder is most apt to accumulate. As a preferred form of brushing mechanism for removing the solder, I provide one brush which acts near the outer edge of the end of the can and another which acts near the lower edge of the can-body, each revolving in a direction toward the corner of the can, so as to throw the solder removed free from the can. Figs. 7 and 8 show the effect of these brushes revolving at a very high rate of speed, while the can also is revolving on its own axis. In Fig. 7 a thin coating of solder X will have accumulated around the entire corner and quite a thick lump of solder Y at the reëntrant angles formed under the edge of the bottom and just above the lower end of the body. Fig. 8 shows that my brushes as placed and revolving in the direction in which they do are most effective in removing the solder first from the place in which it accumulated most thickly and then from the more thinly-coated parts. As the can is pushed up out of the solder, the brush R follows it a short distance to remove all the solder from the ends. The brush S, as shown by Fig. 8, laps the can a sufficient distance to be effective after the can has been pushed a slight distance out of the bath, so as to insure the removal of all the surplus solder from the body. By reason of the fact that I employ a plurality of spindles H H′ I am enabled to mount the support for my end brush R directly on said spindles without making special provision to prevent the rotation of said support with said spindles. The manner of mounting is shown most clearly in Fig. 4. The brush-support consists of a pair of opposite parts r and r', carrying bearings which fit into grooves in the heads h^4 and being fastened together by bolts or otherwise, as shown at r^3. From the member r' a pair of bearings r^4 project upwardly and forward and support a shaft r^5, which carries the brushes near its opposite ends and preferably immediately above the shafts H and H′. The relative position of these brushes, however, may be varied considerably, as well as the direction of their rotation with respect to the corner of the can, it being most advisable, however, to operate them in the positions and in the direction shown.

For the purpose of removing superfluous solder from the can-body as well as the outer edge of the end of the can I provide a second pair of brushes S, which are supported near opposite ends of a shaft s, carried in bearings s', supported from the frame C and angularly adjustable thereon and adapted to be clamped in any desired position by means of a nut s^2, as shown. This adjustment, though not always necessary, is of use in adjusting the brush to different-sized cans or to the removing of a different quantity of solder from the outer edge of the same can. The brushes S, as well as the brushes R, may be placed at any point adjacent to the corner of the can. It may be found, for example, that with some solders it will be advisable to place them very close to the point at which the cans emerge from the solder-bath, while with other solders it may be necessary to give the solder as much

time to harden before coming in contact with the brushes as possible. I do not therefore wish it to be understood that the position shown is the only one in which my brushes are to be used. They may both be varied from this position or they may be in different relative positions with regard to each other from that shown.

For the purpose of rotating the brushes R and S, I connect them in any preferred manner to the driving-shaft—for example, by a pair of pulleys r^6 and s^6 on the ends of the respective brush-shafts. I also provide a large pulley e^6, keyed on the shaft E, and I belt said large pulley to the pulleys r^6 and s^6, the belting in the present case being shown as passing over a pair of idlers e^5, supported on the top plate L.

Having described the various parts of my machine and the functions thereof, I will now proceed to describe the operation of my machine as a whole.

The driving-shaft E being constantly rotated produces also a constant rotation of the shaft F, with an intermittent rotation of the star-wheel e^2 and of the notched forwarding-wheel composed of the disks M and M′. The chute K is kept supplied with cans either from the previous soldering-machine in case only the solder-removing mechanism of my machine is used or directly from the crimping-machine in case both the soldering and the solder-removing mechanisms of my machine are used. The mechanism for handling the cans—that is to say, the chute and the intermittently-rotating forwarding-wheel—therefore advances the cans rapidly and with an accurate movement to their positions between the separated ends of the spindles G G′ and H H′. The latter protrude the cans axially into a position with their lower corners submerged in a bath of melted solder and their upper corners between the two brushes, give the can rapidly the desired number of rotations, and withdraw the spindles G and G′ and force the can back onto the chute, and, finally, the next movement of the notched forwarding-wheel expels the soldered and brushed cans and substitutes new ones for them. Whether used with or without the solder-bath the plate P receives the superfluous solder, which is brushed off from the cans as a powder, and may be provided with means for removing the powdered solder continuously or may be itself removed in order to obtain the solder intermittently. The arrangement of two separated disks of light metal M M′ is most effective in preventing wabbling of the cans and in holding them with great precision in their soldering position, being at the same time very light and economical of manufacture. The intermittent operation of the cans besides making possible a smaller bath produces a joint the quantity of solder in which can be more perfectly adjusted than is the case in machines in which the can is rolled continuously forward at the same time that it is rotated in the bath. By the adjustment of the wheel h the quantity of solder taken up is very nicely regulated.

Though I have described a machine embodying my invention with great particularity of detail I am not to be understood as limiting myself to the specific elements or combinations shown and described. For example, as stated above, my machine is well adapted to be used solely for the purpose of removing superfluous solder from cans which have been previously soldered in another machine by the omission of the solder-bath and heating apparatus, or my solder-removing brushes may be dispensed with and the machine used merely for applying solder to cans, or both the solder-bath and the solder-removing appliances may be omitted without destroying the usefulness of the remainder of my machine as a very efficient combination for handling cans in the way specified for any purpose whatsoever. It is also obvious that many other mechanical equivalents may be substituted for the Geneva stop-movement shown as long as the required step-by-step movement is effected.

What I claim, therefore, and desire to secure by Letters Patent, are the following-defined novel features and combinations, all substantially as shown and described:

1. In a can-soldering machine, the combination of a receptacle for containing solder, means for liquefying said solder, means for forwarding a can to a position with its corner in said solder, means for rotating said can in such position, and means for simultaneously removing superfluous solder from said can.

2. In a can-soldering machine, the combination with a molten-solder receptacle, of a runway for the cans, an intermittently-rotating notched can-body-feed wheel, and a pair of opening and closing rotary chucks or spindles bearing against the ends of the cans for automatically rotating the cans and immersing the corners thereof in the molten solder, substantially as specified.

3. In a can-soldering machine, the combination of a receptacle for containing solder, means for liquefying said solder, means for forwarding a can to a position with its corner in said solder, and rotating said can in said position, and a brush adapted to bear simultaneously on the solder taken up by said can and to remove the superfluous portion thereof.

4. In a can-soldering machine, the combination of a receptacle for containing solder, means for liquefying said solder, means for forwarding a can to a position with its corner in said solder and rotating said can in said position, a brush adapted to bear simultaneously on the solder taken up on the side of said can, and a brush adapted to bear simultaneously on the solder taken up on the end of said can, said brushes being adapted to remove the superfluous portions of solder taken up.

5. In a can-soldering machine, the combination of a receptacle for containing solder, means for liquefying said solder, means for forwarding a can to a position with its corner in said solder and rotating said can in said position, a brush adapted to bear simultaneously on the solder taken up by said can, and means for rotating said brush to remove the superfluous portion of solder.

6. In a can-soldering machine, the combination of a receptacle for containing solder, means for liquefying said solder, a runway, means for forwarding a can to a fixed point of said runway over said solder, means for moving said can axially to a position with its corner in said solder, rotating it in said position and then withdrawing it to its former position above the solder, and means for forwarding the same along said runway from its position above the solder.

7. In a can-soldering machine, the combination of a molten-solder receptacle, of a runway for the cans, an intermittently-rotating notched feed-wheel for the cans and a plurality of pairs of rotatable and reciprocating chucks or spindles for chucking the cans endwise between them and rotating the same and immersing the corners thereof in the solder-bath, substantially as specified.

8. In a can-soldering machine, the combination of a receptacle for containing solder, means for liquefying said solder, a laterally-inclined runway, means for forwarding cans along said runway to a position over said solder, means for holding said cans within said runway while they are being forwarded to said position, and means for projecting said cans beyond the lower side of said runway and into said solder when in said position.

9. In a can-soldering machine, the combination of a receptacle for containing solder, means for liquefying said solder, means for forwarding a can to a position above said solder, and means for moving said can downward into said solder and means controlled by said downward movement for rotating said can.

10. In a can-soldering machine, the combination of a receptacle for containing solder, means for liquefying said solder, means for holding a can in a position with its corner in said solder and rotating it in said position and a cover extending over the can in said position for preventing the escape of heat.

11. In a can-soldering machine, the combination of a molten-solder receptacle, of a runway for the cans, an intermittently-rotating feed-wheel for the cans, rotating chucks or spindles for rotating the cans with the corners thereof in the molten solder, and a solder-removing brush, substantially as specified.

12. In a can-soldering machine, the combination of a molten-solder receptacle, of a runway for the cans, an intermittently-rotating feed-wheel for the cans, rotating chucks or spindles for rotating the cans with the corners thereof in the molten solder, and a pair of solder-removing brushes embracing the corner of the cans, substantially as specified.

13. In a can-machine, the combination of a rotative spindle, a non-rotative brush-support thereon, a solder-removing brush on said support, means for connecting a can to said spindle whereby said can is rotated, said brush bearing against said can when the latter is connected to said spindle, and means for rotating said spindle.

14. In a can-machine, the combination of a rotative and longitudinally-movable spindle, a non-rotative brush-support carried by said spindle, a solder-removing brush on said support projecting beyond the end of said spindle, means for pressing a can into contact with said brush and against the end of said spindle, and means whereby said pressure rotates said spindle.

15. In a can-machine, the combination of a pair of solder-removing brushes, means for holding a can in a fixed position in which one of said brushes bears on the lower end of the can-body and the other on the outer edge of the can-head, means for rotating said can in such position, and a molten-solder bath or receptacle in which the corner of the can is immersed as it is rotated, substantially as specified.

16. In a can-machine, the combination of a pair of solder-removing brushes, means for holding a can in a fixed position in which one of said brushes bears on the lower end of the can-body and the other on the outer edge of the can-head, means for rotating each of said brushes in a direction to bring the solder toward the corner of the can, and a molten-solder bath or receptacle in which the corner of the can is immersed as it is rotated, substantially as specified.

17. In a can-machine, the combination of solder-removing brushes, means for holding a can in a fixed position in which one of said brushes bears on the lower end of the can-body and the other on the outer edge of the can-head, means for rotating each of said brushes in a direction to brush the solder toward the corner of the can, means for rotating said cans in such position, and a molten-solder bath or receptacle in which the corner of the can is immersed as it is rotated, substantially as specified.

18. In a can-machine, the combination of a series of rotative spindles and a single brush-support on said spindles whereby said brush-support is held stationary when said spindles are rotated, a solder-removing brush on said support, and means for rotating said spindles.

19. In a can-machine, the combination of a solder-removing brush, means for forwarding cans to a position in contact with said brush, means for rotating said cans when in said position, and a cover extending over the cans in their rotating position.

20. In a can-machine, the combination of a solder-removing brush, means for forwarding

cans to a position in contact with said brush, means for rotating the cans in said position, a runway for directing the cans to said position, and a cover extending over said runway and over the rotating position of the cans.

21. In a can-machine, a solder-removing brush, means for moving a can toward and from said brush, and rotating said can, and means for pressing said brush toward said can so as to remain in contact therewith while said can is being moved in a direction away from said brush.

22. The combination of a runway for the cans, of an intermittently-rotating feed-wheel for the cans, a pair of rotating and reciprocating chucks or spindles for grasping and rotating the cans mounted on the stationary frame of the machine, and a solder-removing brush also mounted on the frame of the machine, substantially as specified.

23. The combination of a runway for the cans, of an intermittently-rotating feed-wheel for the cans, a pair of rotating and reciprocating chucks or spindles for grasping and rotating the cans mounted on the stationary frame of the machine, and a pair of solder-removing brushes embracing the corners of the rotating can, substantially as specified.

24. The combination of a runway for the cans, of an intermittently-movable can-body feeder, a plurality of pairs of rotating chucks or spindles for grasping and rotating a plurality of cans and mounted on the stationary frame of the machine, and a solder-removing brush, substantially as specified.

25. The combination of a runway for the cans, of an intermittently-movable notched wheel for feeding the cans, and a pair of rotating, opening and closing chucks or spindles bearing against the ends of the cans, a molten-solder vessel, and means for alternately moving the feed-wheel and rotating the can chucks or spindles, substantially as specified.

26. The combination of a runway for the cans, an intermittently-rotating notched feed-wheel for the cans, a pair of rotating chucks or spindles to grasp and rotate the cans, a molten-solder bath or receptacle, and means for alternately actuating said feed-wheel and said rotating chucks or spindles, substantially as specified.

27. In a can-machine, in combination a pair of laterally-immovable spindles opposite each other, means for introducing a can between and into contact with the adjacent ends of said spindles, and means for rotating said spindles.

28. In a can-machine, in combination a runway, a forwarding device consisting of a wheel having notches in its circumference adapted to receive and hold said cans, a can-rotating device consisting of a pair of spindles adapted to embrace said cans between their ends, and means controlled by the pressure of one of said spindles toward the other for rotating said spindles, and means for alternately turning said notched wheel to introduce a can between said spindles and pressing one of said spindles toward the other to embrace said can and rotate the same.

29. The combination with a runway for the cans, of an intermittently-movable can-body-feed wheel, a pair of opening and closing rotating chucks or spindles for grasping and rotating a can between them mounted on the stationary frame of the machine, a molten-solder bath or receptacle, means for reciprocating one of said chucks or spindles, and means for communicating rotary motion to one of said spindles, substantially as specified.

30. The combination with a molten-solder bath or receptacle, of a laterally-inclined runway for the cans, an intermittently-movable feeder for the cans, and a pair of rotating and reciprocating chucks or spindles for grasping and rotating the can and projecting its corner beyond the lower side of the runway into the molten solder, substantially as specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HARRY B. WILLIAMS.

Witnesses:
D. A. USINA,
THOMAS F. WALLACE.