(No Model.) 3 Sheets—Sheet 1.

A. D. COLEMAN.

CAN SOLDERING MACHINE.

No. 384,825. Patented June 19, 1888.

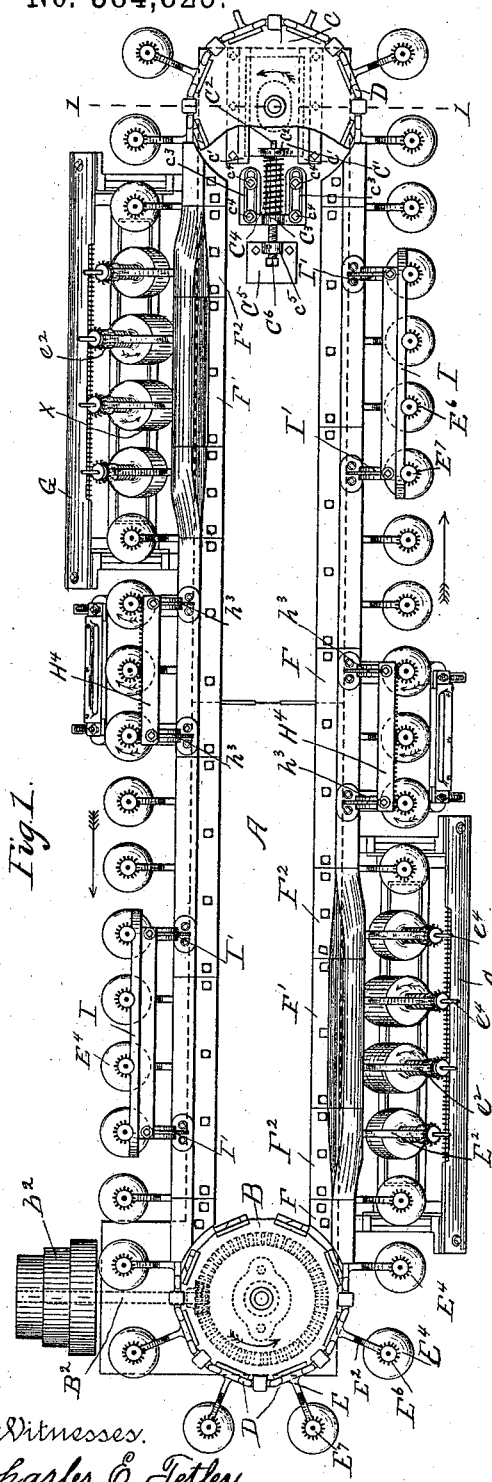

Fig. 1.

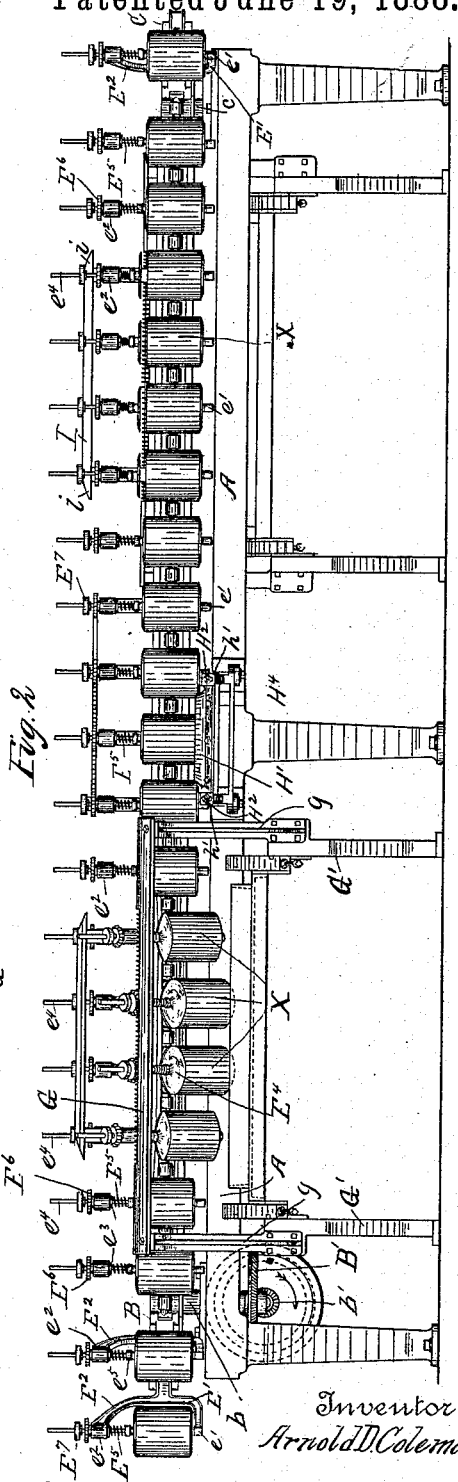

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

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CAN SOLDERING MACHINE.

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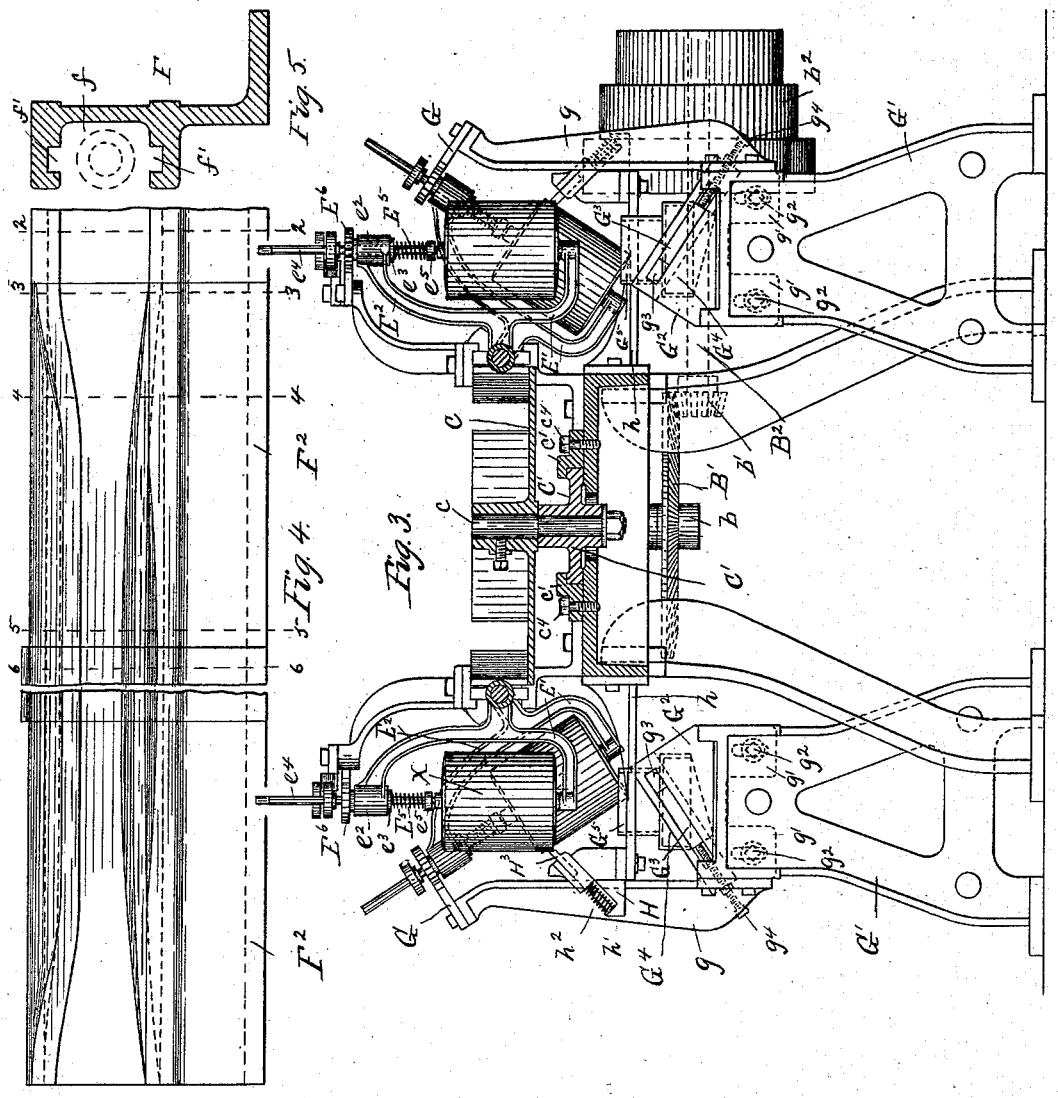

Fig. 5.

Fig. 4.

Fig. 3.

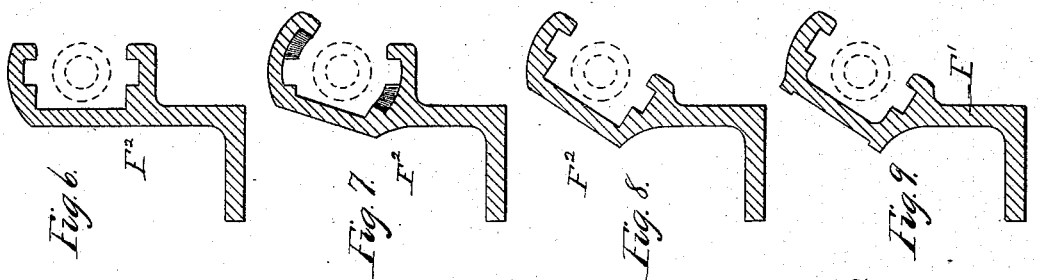

Fig. 6. Fig. 7. Fig. 8. Fig. 9.

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(No Model.) 3 Sheets—Sheet 3.

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CAN SOLDERING MACHINE.

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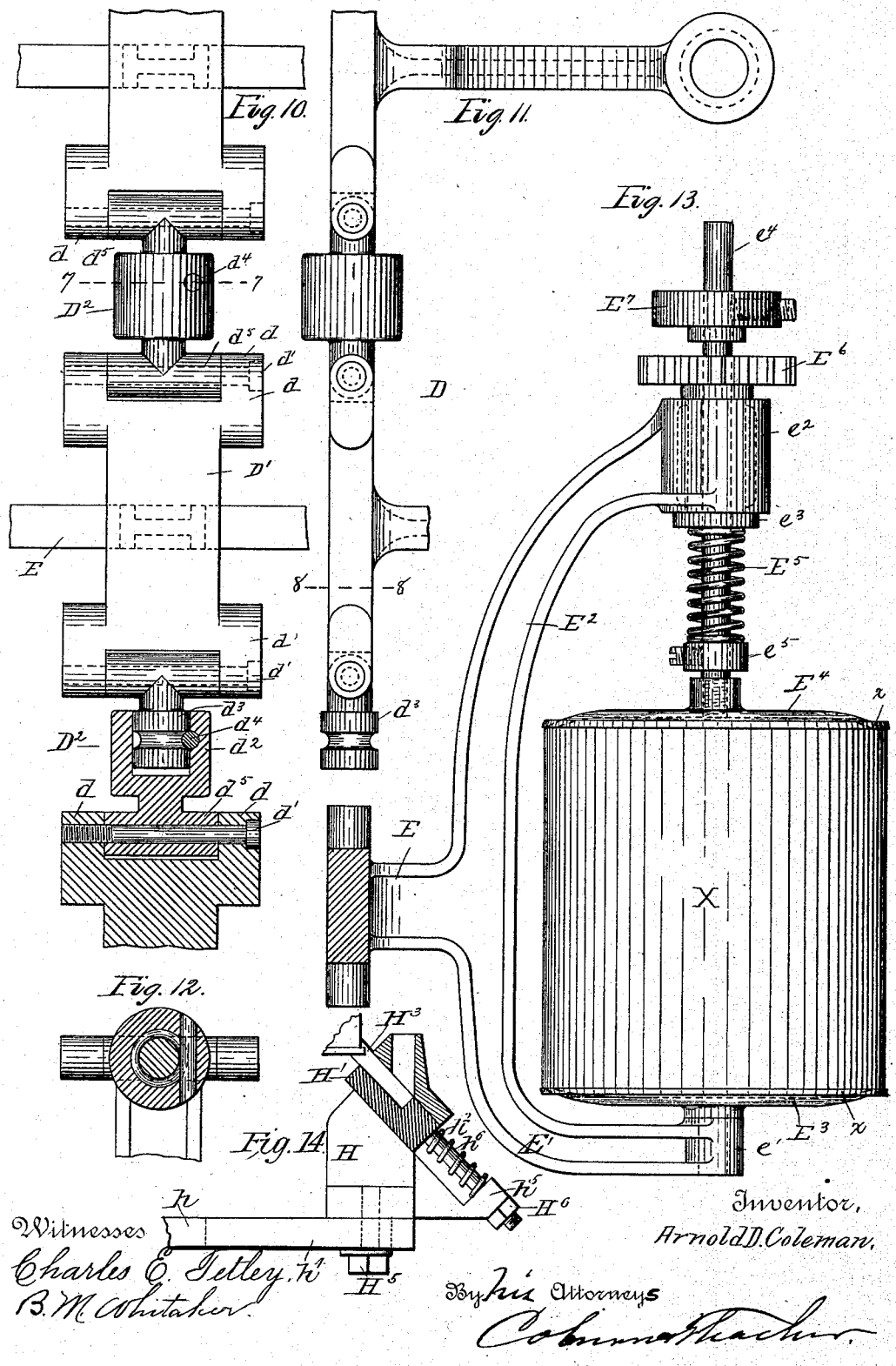

Witnesses
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UNITED STATES PATENT OFFICE.

ARNOLD D. COLEMAN, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO MICHAEL CUDAHY, OF SAME PLACE.

CAN-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 384,825, dated June 19, 1888.

Application filed December 17, 1887. Serial No. 258,250. (No model.)

To all whom it may concern:

Be it known that I, ARNOLD D. COLEMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Can-Soldering Machines, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of a machine embodying my invention; Fig. 2, a side elevation of the same; Fig. 3, a sectional view taken on the line 1 1 of Fig. 1; Fig. 4, a detail view of a portion of the guiding-way; Fig. 5, a sectional view of the same, taken on the line 2 2 of Fig. 4; Fig. 6, a similar section taken on the line 3 3 of Fig. 4; Fig. 7, a similar section taken on the line 4 4 of Fig. 4; Fig. 8, a similar section taken on the line 5 5 of Fig. 4; Fig. 9, a similar section taken on the line 6 6 of Fig. 4; Fig. 10, a face view of the chain, partially in section; Fig. 11, a plan view of the same; Fig. 12, a detail sectional view taken on the line 7 7 of Fig. 10; Fig. 13, a sectional view taken on the line 8 8 of Fig. 11, and Fig. 14 a detail sectional view of the wiper. Figs. 1 and 2 are on the same scale. Fig. 3 is on a somewhat larger scale. Figs. 4 to 9, inclusive, are on a still larger scale. Figs. 10 to 13, inclusive, are on a still larger scale.

Like letters refer to like parts in all the figures of the drawings.

My invention relates to can soldering machines, and has for its object to produce a machine by means of which the ends of cylindrical cans shall be automatically soldered to the body portions thereof.

I will now proceed to describe a machine in which my invention is practically embodied in one form, and will then point out in the claims those features which I deem to be new and desire to protect by Letters Patent.

In the drawings, A represents a suitable table or frame provided at its ends with horizontal sprocket-wheels B and C. The sprocket-wheel B is attached to the upper end of a vertical shaft, b, mounted in suitable bearings on the table A and provided at its lower end with a bevel-gear, B′, with which meshes a bevel-pinion, b', mounted on a driving-shaft, B^2, provided with a pulley, b^2, by means of which the machine is actuated from any suitable source of power. The sprocket-wheel C is attached to a shaft, c, which is mounted in suitable bearings in a slide, C′, moving in ways c' on the table A. This slide is provided with an automatic and adjustable tension device constructed as follows: Upon the inner end of the slide C′ is mounted or formed a lug, c^2, through which passes loosely a rod, C^2, which is attached at its other end to a supporting-bridge, C^3. This bridge is provided with slotted feet c^3, by means of which it is attached to the table A, bolts c^4, passing through the said slots, being employed for this purpose. A spring, C^4, is coiled around the rod C^2, one end of said spring bearing against the bridge C^3 and the other end bearing against the lug c^2 on the slide C′.

C^5 represents a plate attached to the table A and provided with a lug, c^5, having a threaded aperture, through which an adjusting-screw, C^6, passes, the end of the said screw bearing against the bridge C^3 and serving to adjust the same in an obvious manner.

Around the sprocket-wheels B and C there passes a chain, D. This chain is composed of main links D′, each consisting of a flat body provided at its ends with lugs d, perforated to receive pintles d'. Between the main links D′, and connecting the same, are swivel-links D^2, each consisting of two parts, one forming a socket, d^2, and the other a cylindrical head, d^3, entering the said socket and held in position by a pin or key, d^4, the head d^3 being grooved circumferentially, as shown, to accommodate the said pin. Each member of the swivel-link D^2 is provided with a lug, d^5, which fits between the lugs d of the main link, to which it is attached, and is apertured to receive the pintle d', which serves to connect the whole. This is the preferred form of swivel-connection for the main links D′ of the chain D, and is one which I have devised for the purpose; but it is obvious that any other suitable form of swivel-connection may be substituted therefor. To each of the main links D′ there is attached a bracket, E, which is bifurcated, as shown, to form two arms, E′ and E^2. The arm E′ is provided at its end with a bearing, e', in which is mounted a short shaft carrying a clamping-disk, E^3. This disk is circular in

form and is free to revolve in its bearing e', the said disk being of such dimensions as to fit snugly the depressed portion of the top or bottom x of the can X. The arm E^2 is provided with a bearing, e^2, within which is mounted a sleeve, e^3, free to rotate in said bearing, but prevented from moving longitudinally therein. A rod, e^4, is splined in the sleeve e^3, so as to rotate along with the said sleeve and at the same time be free to move longitudinally within the same. This rod is provided with a clamping-disk, E^4, corresponding in dimensions to the clamping-disk E^3 and arranged opposite to and facing the same.

E^5 represents a spring coiled around the rod e^4, the upper end of the said spring bearing against the lower end of the sleeve e^3, while the lower end of said spring bears against an adjustable collar, e^5, on the rod e^4. E^6 represents a pinion secured on the upper end of the sleeve e^3, and E^7 represents a collar adjustably mounted on the upper end of the rod e^4 above the said pinion.

It will be seen that the apparatus carried by each link D′ forms an automatic chuck, which serves to clamp and hold the can during the operation of soldering to the body thereof the top and bottom or ends.

The table A is provided along its edges, between the sprocket-wheels B and C, with a guiding-way in which the chain D travels. The main portion of this way is composed of straight sections F, one of which is shown in section in Fig. 5 of the drawings. It will be seen that the way F is provided with a groove, f, open at its outer face and provided with extensions f' at top and bottom, in which the projecting lugs d of the chain D fit. By this means the links D′ of the chain are held in a vertical or upright position while traveling along the edges of the table A between the sprocket-wheels B and C, and since the links are held in this position it is obvious that the brackets and the clamping-chucks mounted thereon are also held in an upright or vertical position, as well as the cans carried thereby. Near each end of the table A, and on opposite sides thereof, this guiding-way is provided with an inclined section, F′, a sectional view of which is shown in detail in Fig. 9 of the drawings, and this inclined section is connected to the straight sections at each end thereof by means of gradually-curving sections F^2.

Figs. 6, 7, and 8 illustrate the varying degrees of curvature of the sections F^2 at different points, and show how the transition from the upright position of the links while traveling along the straight sections F to the inclined position which they occupy while traveling along the inclined sections F′ is gradually made through the intervention of the intermediate sections, F^2. It will be understood, of course, that the swivel-connections between the links permit this alteration of their angle.

As shown in the drawings, one of the inclined sections F′ is arranged near one end of the table A on one side thereof and one near the other end of the table A on the opposite side thereof. Opposite each inclined section F′ there is arranged a rack, G, with which the pinions E^6 of the clamping-chucks successively engage and with which they continue in engagement while the several links to which they are attached are traveling along the inclined section F′, this engagement being effected by the tilting of the links in an obvious manner. Each rack G is preferably supported by means of arms g, attached to uprights G′, which serve to support the solder bath. Of course, instead of employing separate uprights for this purpose, the main frame may be so constructed as to adapt it to support these parts. The solder bath is mounted in the manner shown in the drawings, in which there is shown attached to each upright G′, by means of slotted lugs g' and bolts g^2, an end piece, G^2. These end pieces are provided with inclined slots g^3, within which fit correspondingly-inclined tongues G^3 on the table G^4, which supports the solder bath G^5. Each end piece, G^2, is provided with an adjusting-screw, g^4, which passes through a suitable threaded aperture therein and extends into the slot g^3, so as to bear against the tongue G^3. The solder bath is of course provided with any suitable means for keeping the solder therein in a molten condition.

Next to each solder bath there is arranged a wiping apparatus. Arms h, extending outward from the table A, serve to support two inclined ways, H, upon which is mounted an oil-receptacle, H′, connected to the said ways by slotted lugs h' and bolts H^2. Springs h^2, bearing against the said lugs, serve to move the receptacle upward and inward when the clamping-bolts H^2 are loosened.

H^3 represents the wiper proper, consisting of a sheet of felt or other suitable absorbent material arranged partly in the oil-receptacle H′ and extending upward and inward through a slot therein, so that its upper edge is in a position to come in contact with the cans in the manner shown in Fig. 3 of the drawings. Opposite the wiper there is arranged a fixed rack, H^4, supported by means of arms h^3, with which rack the pinions E^6 of the clamping-chuck engage, as shown in Fig. 1 of the drawings.

The arms h are slotted, as shown at h^4 in dotted lines in Fig. 14, and the ways H are connected to said arms by bolts H^5, passing through the said slots, so that the ways may be adjusted in and out upon the arms. The springs h^2 are coiled around bolts h^6, secured to the receptacle H′ and passing loosely through lugs h^5 on the ways H. Each bolt h^6 is provided with a nut, H^6, mounted on the end thereof outside of the lug h^5 and serving to limit the upward and inward motion of the receptacle under the action of the springs h^2.

Adjacent to each wiping device there is arranged a lifting-cam, I, provided with inclined

ends *i* and supported by means of arms I'. The collars E^7 of the clamping-chucks engage successively with this cam, and, riding upward upon the same, serve to lift the rods e^4 and clamping-disks E^4 upward and hold them in a raised position for a considerable length of time.

The machine just described is intended to operate upon cans the bodies of which have already been formed and soldered, and its purpose is to solder to the completed bodies the tops and bottoms—or, in other words, the ends—of the cans. Its operation is as follows: Two attendants are employed, one standing opposite each of the cams I. The machine being set in motion, one of the attendants places within the open chucks, which are held open by means of the cam I, the can-body and its ends, and as each collar E^7 passes off the cam I the clamping-disk E^4 of the corresponding chuck is carried down by means of the spring E^5 and clamps the various portions of the can together in proper position for soldering. The machine moves in the direction shown by the arrows in Fig. 1, and the cans being carried around the sprocket-wheel reach the inclined portion F^4 of the guiding-way and are tilted in the manner hereinbefore described. This tilting operation brings the lower edge of the can into the solder, and while in this position the can is rotated by reason of the engagement of the pinion E^6 with the rack G, so that all portions of the lower edge of the can are dipped into the solder to an equal extent. The can then assumes an upright position and passes to the wiper, which serves to remove any superfluous solder and equalizes the distribution of the same upon the seam. While passing along the wiper the can is rotated by reason of the engagement of the pinion E^6 with the rack H^4. The can then passes onward to the second attendant, who is stationed opposite the cam I, and as this cam opens the chuck the attendant takes out the can, turns it end for end, and replaces it within the chuck in a reversed position. The can then passes around the other sprocket-wheel and is soldered and wiped as to its other end by means of the second solder bath and wiper, so that when it reaches the first attendant it is a finished can. It is then removed and another substituted therefor. It will be seen that the operation of soldering goes on continuously and is performed upon a number of cans at a time, the number operated upon being limited only by the size of the machine. Moreover, the entire operation is automatic in its nature, requiring only the service of attendants to remove and replace the cans and to reverse their position in the chucks.

The automatic tension applied to the sprocket-wheel C serves to keep the chain D always taut, and this tension may be adjusted in an obvious manner by means of the devices shown and described.

It will be observed that the carrying-chain is provided with lateral projecting chucks, which tend to twist the chain from the vertical position which it should assume, and thereby render it liable to bind in the ways, while at the same time this deflection would seriously hinder or prevent the proper entrance of each link into the ways after leaving the sprocket-wheels. These difficulties are obviated by the use of the tension device, which serves to hold the links upright.

The means of adjustment of the solder bath, hereinbefore set forth, permits the same to be adjusted bodily in a vertical direction, or to be adjusted inward and outward, as desired, the combination of the two adjustments being such as to enable me to give the solder bath any desired position with relation to the line of travel of the cans.

The adjustable collar e^5 serves, in an obvious manner, to adjust the tension of the spring E^5, which operates the movable jaw of the chuck, and the adjustment of the collar E^7 upon the rod e^4 is for the purpose of adapting it for use with cans of varying length. Different-sized clamping-disks E^3 and E^4 may be employed to adapt the machine to operate upon cans of varying diameter.

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

1. In a can-soldering machine, the combination, with a solder bath, of a carrying-chain composed of links connected by swivel-joints and provided with revoluble clamping-chucks to clamp the cans endwise, and a guiding-way for the said chain, provided with an inclined section adjacent to the solder bath to tilt the cans and cause the same to dip into the bath, substantially as and for the purposes specified.

2. In a can-soldering machine, the combination, with a solder bath, of a carrying-chain composed of links connected by swivel-joints and provided with revoluble chucks for clamping the cans endwise, a guiding-way for said chain, provided with an inclined portion to tilt the cans into the bath, and means for revolving the said chucks during their passage along the inclined portion, substantially as and for the purposes specified.

3. In a can-soldering machine, the combination, with a solder bath, of a carrying-chain the links of which are connected by swivel-joints and are provided with revoluble chucks for clamping the cans endwise, a guiding-way for said chain, provided with an inclined portion to dip the cans into the bath, a wiper adjacent to the bath, and means for revolving the chucks and the cans therein while passing the bath and the wiper, substantially as and for the purposes specified.

4. In a can-soldering machine, the combination, with a carrying-chain composed of swiveling links provided with revoluble chucks having separable clamping-disks, of a solder bath, a guiding-way for the chain, having an inclined portion to dip the cans in the bath, means for revolving the cans while dipped, and a stationary cam for separating the clamp-

ing-disks, substantially as and for the purposes specified.

5. In a can-soldering machine, the combination, with a suitable table or frame having a sprocket-wheel at each end, of a carrying-chain composed of swiveling links, each provided with a revoluble can-holding chuck, guiding-ways on each side of said table, provided with inclined portions for tilting the cans, a solder bath adjacent to each inclined portion, a wiper adjacent to each solder bath, and means for revolving the cans while passing the baths and wipers, substantially as and for the purposes specified.

6. In a can-soldering machine, the combination, with the solder baths, the endless carrying-chain provided with laterally-projecting can-holding chucks, and suitable guiding-ways in which said chain travels, of the sprocket-wheels around which said chain passes, one of said sprocket-wheels being provided with an automatic tension device to keep the chain stretched and upright, substantially as and for the purposes specified.

7. In a can-soldering machine, the combination, with the endless carrying-chain D, provided with can-holders, of the sprocket-wheels B and C, the latter mounted in a slide, C′, the spring C^4, bearing against said slide at one end, and an adjustable abutment for the other end of said spring, substantially as and for the purposes specified.

8. In a can-soldering machine, the combination, with the carrying-chain composed of flat body-links provided with can-holders and having projecting lugs *d*, of the guiding-way F, having open groove *f*, with extensions *f′*, to receive the said lugs, substantially as and for the purposes specified.

9. In a can-soldering machine, the combination, with the carrying-chain provided with can-holders and having swiveling joints, of the guiding-way consisting of a straight portion, F, and inclined portion F′, with intermediate connecting portions, F^2, of gradual curvature, substantially as and for the purposes specified.

10. In a can-soldering machine, the combination, with the guiding-way provided with an inclined portion, of the carrying-chain composed of main links D′, provided with can-holders, and intermediate swiveling links, D^2, connecting the main links, substantially as and for the purposes specified.

11. In a can-soldering machine, the combination, with the guiding-way, of the carrying-chain composed of main links D′, provided with can-holders, and the intermediate swiveling-links pivoted thereto and each consisting of a cylindrical socket-piece, d^2, a grooved head, d^3, and a pin or key, d^4, connecting the two, substantially as and for the purposes specified.

12. The combination, with the guiding-way, of the link D′, the bracket E, having arms E′ and E^2, the disk E^3, mounted in the former, the revolving sleeve e^3, mounted in the latter and provided with pinion E^6, the rod e^4, splined in the sleeve e^3 and carrying the clamping-disk E^4, the spring E^5, the collar E^7, and a suitable rack and camway with which said pinion and collar respectively engage, substantially as and for the purposes specified.

13. The combination, with the carrying-chain and its revolving chucks, each provided with a pinion, of the guiding-way for said chain, provided with an inclined portion, the solder bath arranged adjacent thereto, and a fixed rack, G, with which the said pinions engage when the chucks are inclined, substantially as and for the purposes specified.

14. The combination, with the fixed wiper, of the rack H^4, adjacent thereto, the carrying-chain provided with revoluble chucks, and pinions on said chucks to engage the said rack, substantially as and for the purposes specified.

15. In a can-soldering machine, the combination, with the endless carrying-chain and its can-holding chucks, of a solder bath and inclined ways upon which said bath is mounted, said bath being adjustable on said ways to vary its relation to the ways both vertically and laterally, substantially as and for the purposes specified.

16. The combination, with the uprights G′, of the vertically-adjustable end supports, G^2, having inclined slots g^3, the table G^4, carrying the solder bath G^5, and provided with tongues G^3, entering the said inclined slots, and the adjusting-screws g^4, substantially as and for the purposes specified.

17. In a can-soldering machine, the combination, with the inclined ways H, of the oil-reservoir H′, mounted and adjustable thereon, and the wiper H^3, consisting of a strip of felt or other absorbent material, extending upward and inward through a suitable slot in said oil-reservoir, substantially as and for the purposes specified.

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