No. 652,406. Patented June 26, 1900.

F. W. SMITH.

CONTINUOUS CAPPING MACHINE.

(Application filed Aug. 13, 1898.)

(No Model.)

2 Sheets—Sheet 1.

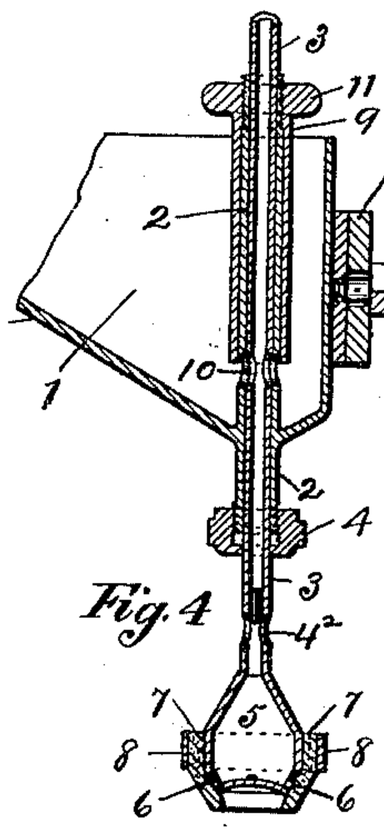

Fig. 4

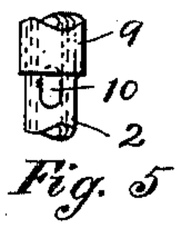

Fig. 5

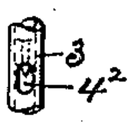

Fig. 6

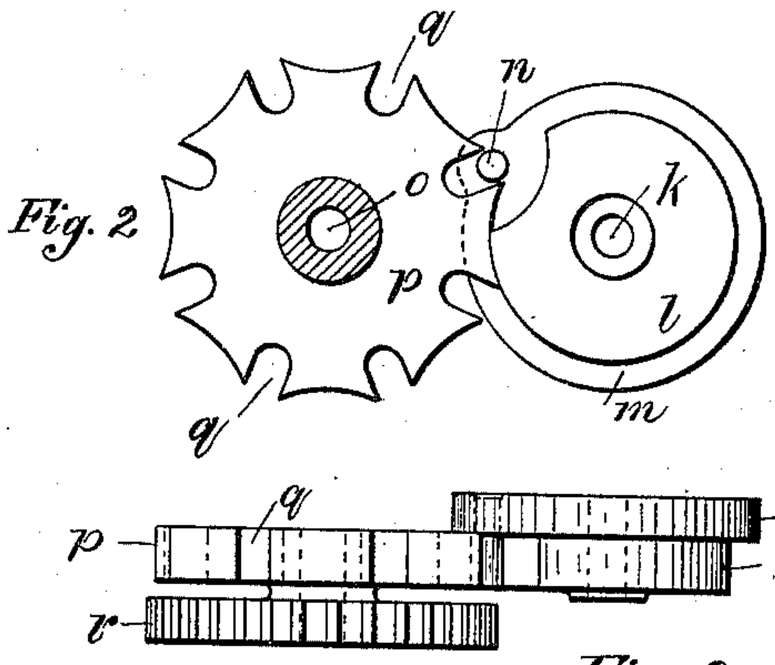

Fig. 2

Fig. 3

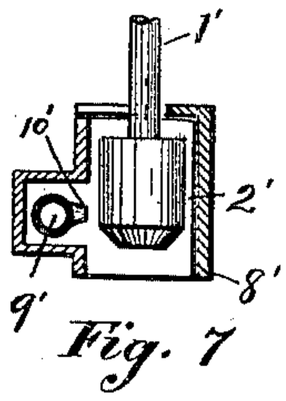

Fig. 7

Fig. 1

Witnesses:
F. E. Bird.
H. L. Cheney.

Inventor:
Frank W. Smith

No. 652,406. Patented June 26, 1900.

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CONTINUOUS CAPPING MACHINE.

(Application filed Aug. 13, 1898.)

(No Model.) 2 Sheets—Sheet 2.

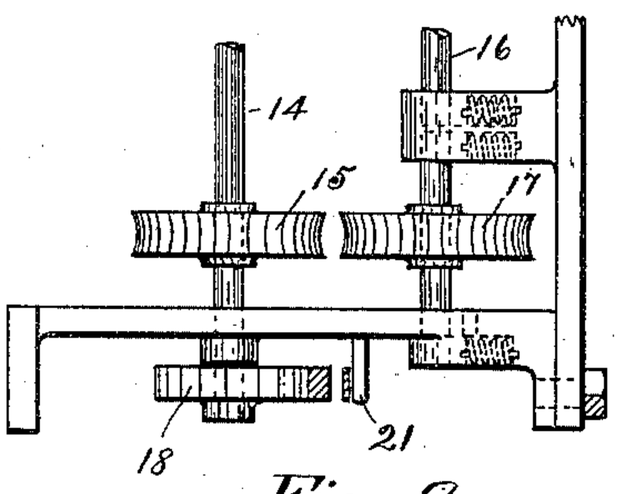

Fig. 9

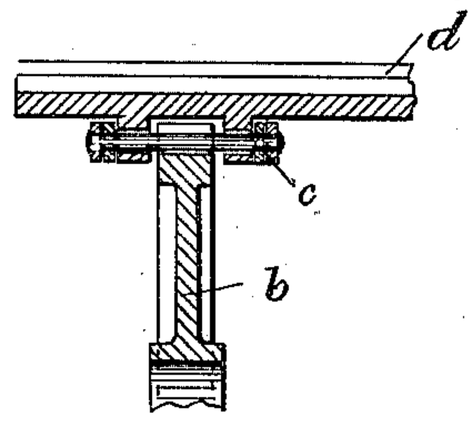

Fig. 10

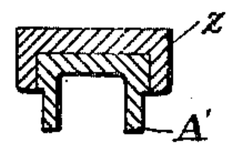

Fig. 11

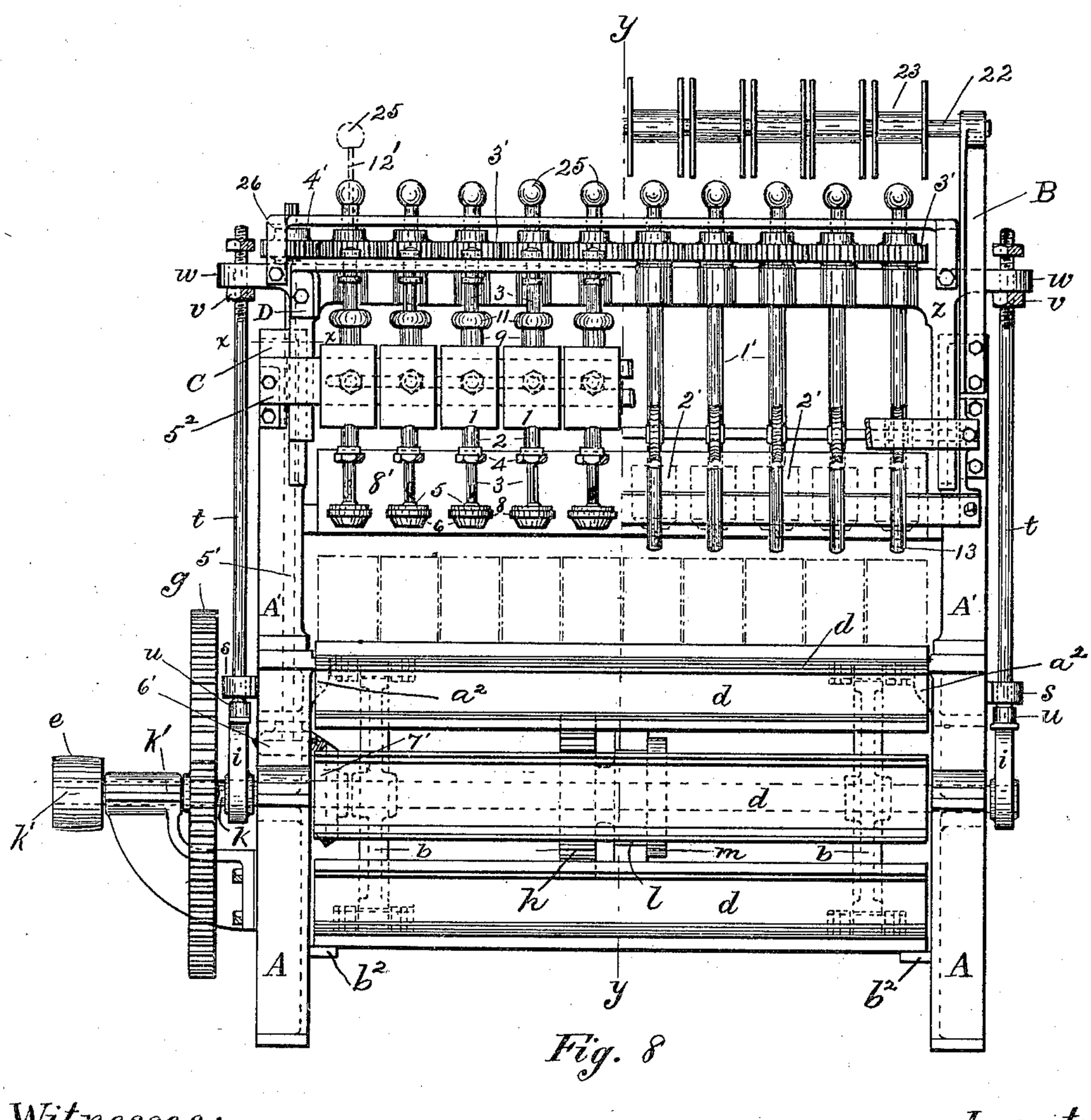

Fig. 8

Witnesses:
E. E. Reid
H. L. Chenery

Inventor:
Frank W. Smith

UNITED STATES PATENT OFFICE.

FRANK W. SMITH, OF PORTLAND, MAINE, ASSIGNOR OF ONE-HALF TO FREDERICK O. CONANT, OF SAME PLACE.

CONTINUOUS CAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 652,406, dated June 26, 1900.

Application filed August 13, 1898. Serial No. 688,497. (No model.)

To all whom it may concern:

Be it known that I, FRANK W. SMITH, a citizen of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented a certain new and useful Continuous Capping-Machine; and I do hereby declare that the following is a full, clear, and exact description of the invention which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to capping-machines or machines for soldering caps upon the cans in which are packed hermetically-sealed goods. It consists of means whereby continuity of the soldering process is insured, a device for applying the acid to the cap of the cans, a device for feeding the solder, and other novel features which will appear in the following description, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a detail in elevation of the locking mechanism; Fig. 3, a top plan of the same; Fig. 4, the aciding device in transverse vertical section; Fig. 5, a detail of a part of the tube of the same. Fig. 6 is a detail of the lower part of such tube. Fig. 7 is a side elevation of the capping-iron and section of the casing. Fig. 8 shows on the left of the line $y\ y$ a front elevation of the machine, while upon the right of said line $y\ y$ it shows a rear view of the machine. Fig. 9 is a detail in top plan of the solder-feeding mechanism. Fig. 10 is a transverse vertical section of a tray and part of the operating mechanism; Fig. 11, a section of the frame and slide on the line $x\ x$ of Fig. 8.

The frame A of the machine is of the ordinary construction, being provided at the top with a frame consisting of the uprights or standards A′ A′. At the front and back of the frame are placed the shafts $a\ a'$, respectively. Within the frame these shafts are provided at either end with the wheels $b\ b$. The peripheries of these wheels are flattened for like distances at regular intervals, and in the center of the flattened portion is placed a slot, as shown in Fig. 1. The wheels $b\ b$ upon either side of the machine are connected by means of an endless chain or belt c. To the connections of the respective links of these chains are attached the trays $d\ d$, being so connected that they assume a horizontal position as the chain c reaches a horizontal position upon the wheels $b\ b$, this being the result of the construction of the wheels $b\ b$, as already described. The links of the chain being at the center of the trays, the joints of the links are received by slots in the peripheries of the wheels $b\ b$, whereby the trays rest and are centered upon the flattened portions of the wheels $b\ b$. The sides of the frame A A are provided with ledges $a\ a^2$. (Shown in dotted lines in Fig. 8.) The upper surface of these ledges should be in the same plane with the upper surface of the wheels $b\ b$. A similar ledge b^2 is placed on the inner side of the legs of the frame A A, (see Fig. 1,) the upper surface of these ledges b^2 being in a horizontal plane distant from the lower surface of the wheels $b\ b$ equal to the combined thickness of the chain and the trays. The shaft a is provided between the wheels $b\ b$ with the gear h. (See Fig. 1.)

Midway between the shafts $a\ a'$ is placed the shaft k. This shaft carries outside the frame at either end the cams $i\ i$ (see Figs. 1 and 8) and also at the left of the machine the gear g, the gear g matching with the pinion f, placed upon a shaft k', located between the shaft k and a'. The shaft k also carries near the middle of the frame the disk and cam l and m. (See Figs. 2, 3, and 8.) The cam is provided upon its side near the circumference with the pin n, (see Fig. 2,) while the disk l has a semicircular depression in its periphery. The point or center from which said semicircular depression is described is in the same line with the center of the shaft k' and the center of the pin n. The cam and disk m and l are connected so that they rotate together. Upon the shaft o, located upon the frame of the machine between the shaft k and the shaft a', is placed the disk p, which is provided at regular intervals with the slots $q\ q$. Connected with the wheel p and on the same shaft is the gear r, (see Figs. 1, 2, and 3,) which gear r matches with the gear h on the shaft a. At either end of the machine and outside the frame are placed in suitable bearings $s\ s$ the rods $t\ t$, terminating at the bottom in a disk u. The rods are so placed that the disks $u\ u$ rest upon the cams $i\ i$. (See Figs. 1 and 8.)

The upper ends of the rods *t t* may be provided with shoulders or, as I prefer, as adjustability is thus secured, may be threaded and provided with nuts *v v*, upon which rest the ears *w w*, which are fixed to the movable frame *z*, which slides upon the uprights A′ A′. (See Figs. 1 and 11.)

The trays *d d*, as is apparent, extend from side to side of the machine. The surfaces of these trays are provided at the side with one or several pairs of parallel flanges or steps l^2, as seen in Fig. 1. The devices for applying the acid and solder and the tools employed are the same in number as the number of cams upon each of the trays *d d*.

The frame A′ has secured to its front brackets C, which are provided with the bar 5^2, having a horizontal slot, to which are connected, by means of bolts, the reservoirs 1 1. (See Figs. 1, 4, and 8.) The reservoir is preferably of the shape shown in Figs. 1 and 4. At its lowest point it is provided with a tube 2, which extends a slight distance above and a somewhat-greater distance below the walls of the reservoir. Within this tube is placed the tube 3, (see Fig. 4,) which is of sufficient diameter to permit it to slide within the tube 2, the lower end of which is rendered tight by means of the stuffing-box 4. Near the bottom of the reservoir the tubes 2 and 3 are perforated by apertures of substantially the same size passing through each, as seen in Figs. 4 and 5, and so placed that they may register. The lower end of the tube 3 terminates in a bulb 5. (See Fig. 4.) The bottom of this bulb curves upward and is provided at its edges with apertures or openings 6 6. The outside of the bulb may be provided (and I prefer so to construct it) with an annular covering of felt 7 7, which is secured to the bulb by the ring 8. Slightly below the stuffing-box 4 the walls of the inner tube 3 are contracted, so as to permit the passage of liquid to such an amount as will only permit it to drop into the bulb 5, and the tube 3 below this point of contraction is perforated, as shown in Figs. 4 and 6, by an aperture 4^2, passing from side to side of the tube. Around the upper end of the tube 2 is placed the sleeve 9. This sleeve extends to the upper edge of the aperture 10 and has at the upper end the nut 11. The tube 3 is supported by the bracket D, which is secured to the movable frame *z*.

Upon the rear of the frame A′ is placed the bifurcated bracket 12, which, at the lower end of its lower arm or fork, holds the curved tube 13. The distance of the lower end of this tube from the surface of the trays *d d* should be about equal to the height of the can to be operated on. The other fork or arm of the bracket 12 is an arm which extends horizontally above the upper end of the tube 13. These arms are provided with the shaft 14, which carries at regular intervals the pulleys 15, which are located so that the periphery thereof is just above the upper end of the tube 13. The outer ends of the same arms support a shaft 16 in suitable bearings and carry at regular intervals the pulley 17, located, as are the pulleys 15, above the upper end of the tube 13. (See Fig. 9.) The bearings of the shaft 16 are slotted, as shown in Fig. 1, and provided with coil-springs on the rear of the shaft 16. The shaft 14, at one end outside the frame of the machine, is provided with a ratchet-wheel 18. In contact with this ratchet-wheel is the pawl 19, the latter being kept in contact with the pawl by means of the spring 20 and the pin 21. (See Figs. 1 and 9.) The pawl 19 is suspended from the bracket 20′, which is adjustably secured to the rod *t*. Above the brackets 12 are the two brackets B, which are bolted to either side of the frame A′ of the machine. These brackets have at the upper end the shaft 22, which carries at regular intervals the spools 23, the center of the spools being in the same horizontal planes as the centers of the respective tubes 3 and 13.

In the top of the frame *z* is placed a slot extending nearly from side to side of the frame or uprights A′ A′, in which are placed at regular intervals the tubes 1′ 1′. At the upper end of these tubes they are provided with the gears 3′, which intermatch with each other, that upon the side of the machine, (upon the left, as shown in Fig. 8,) intermatching with a similar gear 4′ upon the top of the shaft 5′, (shown in dotted lines in Fig. 8,) which has at its lower end the beveled gear 6′, which matches with the beveled gear 7′ upon the shaft *k*. Within each of the tubes 1′ 1′ are placed the rods or wires 12′ 12′, surmounted by a ball or weight 25. The wire is somewhat longer than the combined length of the tube 1′ and iron 2′.

Secured within the frame A′ A′, beneath the tubes 1′ 1′, are the housings or casings 8′. (See Fig. 7.) These casings are placed at a distance above the tops of the trays *d d* slightly greater than the top of the can to be operated on. They are provided at the front with a pipe 9′, through which fuel, either gaseous or liquid, may be introduced, the pipe having within each casing an aperture or burner 10′, through which the flame of the fuel may be directed upon the iron 2′.

When it is desired to operate upon cans of a larger or smaller size than that for which the machine is arranged, the gears 3′, rotating the soldering-tools, may be removed and larger or smaller gears substituted, thus increasing or diminishing, as the case may be, the distances between the centers of the tools, so that the distances between the center of the adjacent tools shall be the same as the distance between the centers of the tops of the adjacent cans which are to be operated on. The change can be more readily made by providing several frames *z*, fitted with gears and tools adapted for use on various sizes of cans. In such case when it is desired to operate upon cans of a different size the frame *z*, with its gears and tools, is removed, and the

frame *z*, carrying tools so separated as to fit the tops of the cans to be operated upon, substituted. Where separate frames *z* are thus provided adapted for the various sizes of cans, apertures at regular intervals may be made in the frame for the reception of the tubes 1′ 1′ instead of providing a longitudinal slot, as above described. When a change in the relative position of the tools is made by either method, a like change should be made in the relative positions of the reservoirs 1 1. This is done by loosening the nuts and sliding the bolts in the support or bar sustaining them, so that the centers of the acid-tubes will be in the same lines as the centers of the respective tools. A like change in the solder-feeding device should be made by moving the pulleys 15 and 17 upon their shafts.

The following is the operation of the machine: The acid and solder feeding devices and the soldering-tools being arranged so that they will center upon the respective cans to be operated on, the spools are filled with wire-solder, the free ends being conducted between the pulleys 15 and 17 and through the tube 13, so they will be in contact with the respective irons when the wires descend. The reservoir 1 being filled with acid, the apertures 10 in the tubes 2 and 3 are reduced by means of the thumb-screw 11 to such size that the flow of liquid through the tube 3 will be just sufficient to allow drops of the liquid acid to descend into the bulb 5 at such intervals as to keep the felt ring saturated with the acid, observation being permitted through the opening 4^2. The fuel is now admitted through the tube 9′ and ignited at the burners 10′. The cans are placed or automatically fed upon the front tray *d*, occupying, according to their size, the bottom of the tray or a pair of the flanges, the effect of the flanges being to center the cans upon the tray. The machine is set in motion by power applied to the pulley *e* upon the shaft *k*′, causing the shaft *k* to revolve, which rotates the cam *m* and disk 1, whereby the pin *n* in the slot *q* of the disk *p* causes the latter to revolve for a portion of its circumference equal to the distance between the slots *q q*, the circular depression in the periphery of the disk *l* permitting the disk *p* to pass by. By this motion of the disk *p* the shaft *o* is rotated to an equal degree, which, through the gear *r*, causes an equal rotation of the wheels *b b*, thus advancing the chains *c c* to such an extent that the front row of cans resting upon the front tray is advanced to sufficient distance to place the centers of the cans under the centers of the respective tubes 3 3. At the same time the rotation of the shaft *k* causes the frame *z* to descend, the disk *u* resting upon the periphery of the cams *i i*, the felt ring saturated with the acid supplying the required amount of acid to the edges of the caps. In the meantime the next tray which has mounted to a horizontal position is filled with cans as before, and the rotation of the cams *i i* having raised the frame *z*, together with the acid devices and tools, continuous revolution of the shaft *k* causes the cams *i i* to permit the frame *z* to descend again, and the same intermittent motion of the disk *p* advances the tray, so that that which has just been filled is advanced beneath the acid devices, when continuous depression of the cam again causes the application of the acid devices to the caps of the rows of cans just advanced. The operation is again repeated, when the first row of cans will be advanced beneath the soldering-tool. The solder-wires are now drawn down from the spools and placed between the respective pulleys 15 and 17 and inserted in the tube 13, so that the ends of the wires are just about at the edges of the caps of the cans. Continuous revolution of the cams *i i* now causes the frame *z* to descend as before, carrying with it the acid devices and the rotating heated irons and a sufficient amount of wire to close the seam at the edges of the caps. The frame *z* again rising lifts the iron from the surface of the can, while the rod 12′ remains for a longer period of time until the cams *i i* have elevated the frame to the highest point, when the ball or weight 25 is raised, carrying with it the wire. The pressure of the wire is thus retained upon the top of the cans for a longer period in order to enable the solder to cool before the caps may have been lifted from pressure from within. The lifting movement of the frame also carries upward by and past the ratchet 18 the pawl 19 and spring 20. The operation is thus continued, a new row of cans being placed upon the front tray and a row being discharged from the rear tray with each intermittent motion of the belt *c*. Means of course should be applied to automatically fill the front tray and receive and convey away the soldered cans as they are discharged from the machine. The cans are allowed to remain upon the trays after being soldered, while three other rows of cans are soldered. Opportunity is thus afforded for the cans to cool thoroughly and for the vents to be stopped by an operative standing at the rear of the machine.

The cams *i i* should be of such shape as to allow the iron to remain in contact with the cap just long enough to thoroughly spread the solder and yet not overheat the can to the injury of its contents. The length of time the irons remain in contact with the cans is controlled by adjustment of the rods *t t* by means of the nuts *v v*. The greater the distance between the disk *s* and the ear *w* the shorter the play of the irons on the cans, while if it is desired to lengthen the time of contact the nuts are screwed downward, thus shortening the distance between the ear *w* and the disk *s*.

The trays may of course be provided with more than two flanges, as shown in Fig. 1, so that cans of various sizes may be accommodated thereon.

What I claim is—

1. A tool for applying acid or other fluids having in combination a reservoir, a tube depending therefrom, a perforation through said tube within said reservoir, a perforated bulb at the lower end of said tube, said bulb being of a shape adapted to apply the acid or liquid to the desired point or points, substantially as described.

2. A tool for applying acid or other fluids having in combination a reservoir, a tube dependent therefrom, a perforation through said tube within said reservoir, a perforated bulb at the lower end of said tube and bibulous material surrounding and attached to said bulb and of a shape adapted to apply liquid to the desired point or points, substantially as described.

3. A tool for applying acid or other fluid, having in combination a reservoir, a tube dependent therefrom, a perforation through said tube within said reservoir, means for adjusting the size of said perforation, a contraction in said tube below said reservoir, a perforated bulb at the lower end of said tube and bibulous material surrounding or attached to said bulb and of a shape adapted to apply liquid to the desired point or points, substantially as described.

4. In a machine for capping cans an upright frame having secured thereto a reservoir, a tube adapted to slide within the same, an opening in said tube whereby it communicates with the interior of said reservoir, at the lower end of said tube a perforate bulb provided with a ring of bibulous material and means for elevating and depressing said tube, substantially as described.

5. In a machine for capping cans an upright frame having secured thereto a reservoir, a tube adapted to slide within the same, an opening in said tube whereby it communicates with the interior of said reservoir, a contraction of said tube below said reservoir, at the lower end of said tube a perforated bulb provided with a ring of bibulous material and means for elevating and depressing said tube, substantially as described.

6. In a capping-machine the combination of an upright frame having attached thereto a reservoir provided with a tube communicating with and sliding within the same, means for regulating the size of the opening communicating with the reservoir, a perforated bulb at the lower end of said tube provided with a ring of bibulous material, a movable frame sliding upon the first-named frame, a connection between said movable frame and said tube and means for elevating and depressing said movable frame, substantially as described.

7. In a capping-machine, the combination of a frame supporting an acid-reservoir and a solder-supply, a movable frame sliding on the first-named frame and having a tube communicating with said reservoir whereby acid may be applied to the seam to be soldered, having also a soldering-tool with means for rotating the same, and also a device for feeding the solder and means for alternately elevating and depressing said last-named frame whereby said acid and said solder are applied to the cans, substantially as described.

8. In a machine for capping cans, a series of trays, means for advancing them intermittently, a frame provided with an acid-reservoir, a tube adapted to slide therein and connected with a movable frame sliding upon said first-named frame and means for raising and depressing said movable frame whereby the contents of said tube are deposited upon the cans placed upon said trays, as they respectively advance, substantially as described.

9. The combination of a reservoir, a tube depending from the same, a movable tube within the first-named tube, both said tubes having perforations capable of partially or wholly registering and said movable tube being provided at its lower end with a perforated bulb or point, substantially as described.

10. A tool for applying acid or other fluids having in combination a reservoir and tube depending therefrom, a perforation through said tube within said reservoir, a contraction in said tube below said reservoir and a perforated bulb at the end of said tube, said bulb being of a shape adapted to apply said acid or fluid to the desired points, substantially as described.

11. In a machine for capping cans, the combination of an upright frame, a movable frame thereon, the latter supporting the soldering-tool with means for rotating the same, a weighted rod through the center of said tube, means for raising and depressing said movable frame and means whereby the time of contact of the tool may be adjusted, substantially as described.

12. In a machine for capping cans, the combination of an upright frame, a movable frame thereon, the latter supporting the soldering-tool with means for rotating the same, means for raising and depressing said movable frame and means whereby the time of contact of the tool with the can may be adjusted, substantially as described.

13. In a machine for capping cans, a series of longitudinal trays having on either side like parallel grooves or flanges whereby cans of various sizes may be received and means for intermittently advancing said trays and locking them while at rest, substantially as described.

14. In a machine for capping cans, a series of trays having similar parallel grooves or flanges along their sides whereby cans of different sizes may be automatically fed upon said trays and means for intermittently advancing said trays, substantially as described.

15. In a machine for capping cans, the combination of a frame supporting a solder-supply, a movable frame sliding upon said first-

named frame having a soldering-tool and a device for feeding the solder, together with means for alternately depressing and elevating said movable frame whereby said soldering-tool and said solder are alternately brought in contact with and raised from the cans, substantially as described.

16. The combination of wheels or pulleys having at regular intervals upon their peripheries plane surfaces and slots in the center of said plane surfaces, an endless chain, the connection of the links thereof being adapted to enter said slots and trays fixed to said connections and adapted to rest upon the plane surfaces of said wheels, substantially as described.

17. The combination of wheels or pulleys having at regular intervals upon their peripheries plane surfaces and slots in the center of said plane surfaces, an endless chain, the connection of the links thereof being adapted to enter said slots and trays fixed to said connections and adapted to rest upon the plane surfaces of said wheels, together with platforms or ledges adapted to support said trays or links between said wheels, substantially as described.

18. In a machine for capping cans, the combination of a solder-supply and an acid-reservoir, a frame supporting said supply and said reservoir and, sliding on said last-named frame, a movable frame provided with a device for feeding the solder and a tube connected with said reservoir whereby the acid may be applied to the seam to be soldered, together with means for alternately sliding said movable frame whereby said solder and said acid are successively brought in contact with and removed from the cans, substantially as described.

In testimony that I claim the foregoing as my invention I have hereunto set my hand this 11th day of August, A. D. 1898.

FRANK W. SMITH.

In presence of—
GEO. E. BIRD,
M. C. LIBBY.