(No Model.) 3 Sheets—Sheet 1.

LE GRAND M. & E. NORTON & J. G. HODGSON.

SOLDERING MACHINE.

No. 354,731. Patented Dec. 21, 1886.

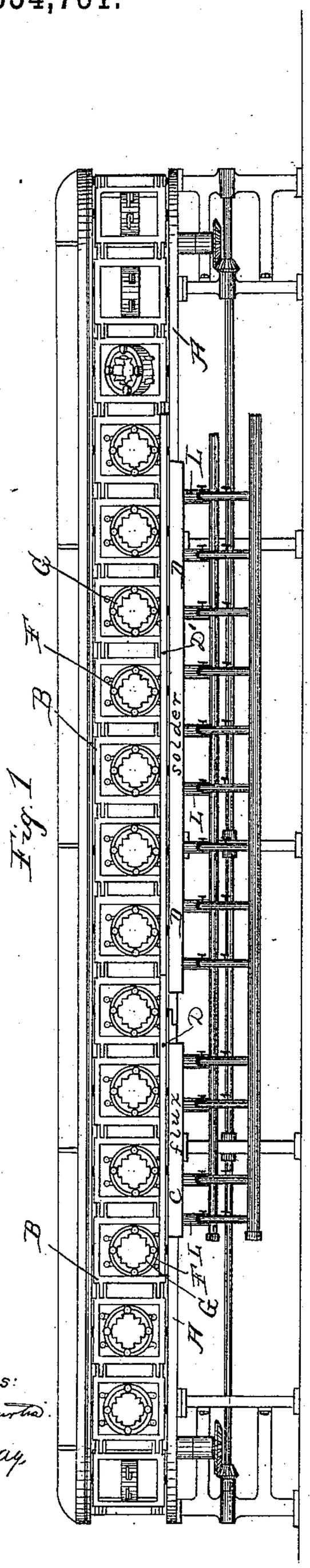

Fig. 1.

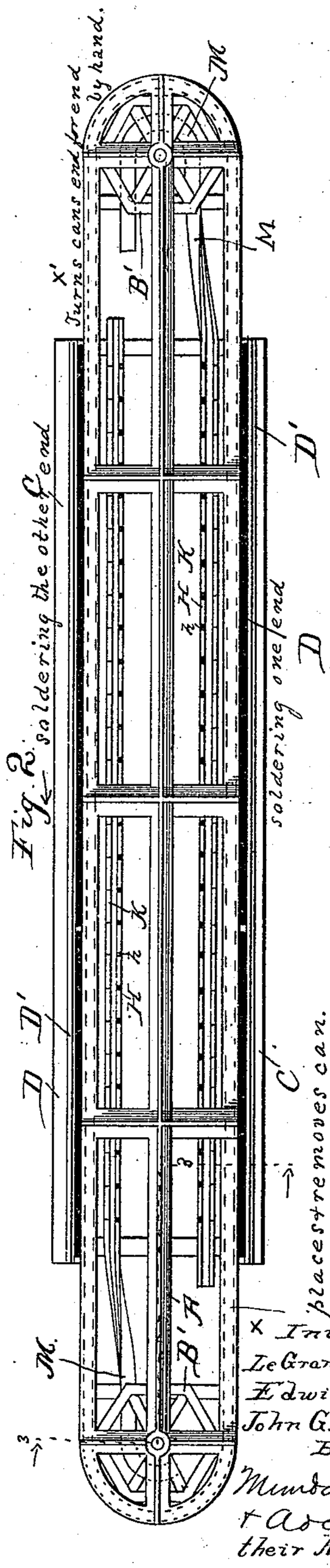

Fig. 2. Soldering the other end

soldering one end places strem moves can.

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(No Model.) 3 Sheets—Sheet 2.

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SOLDERING MACHINE.

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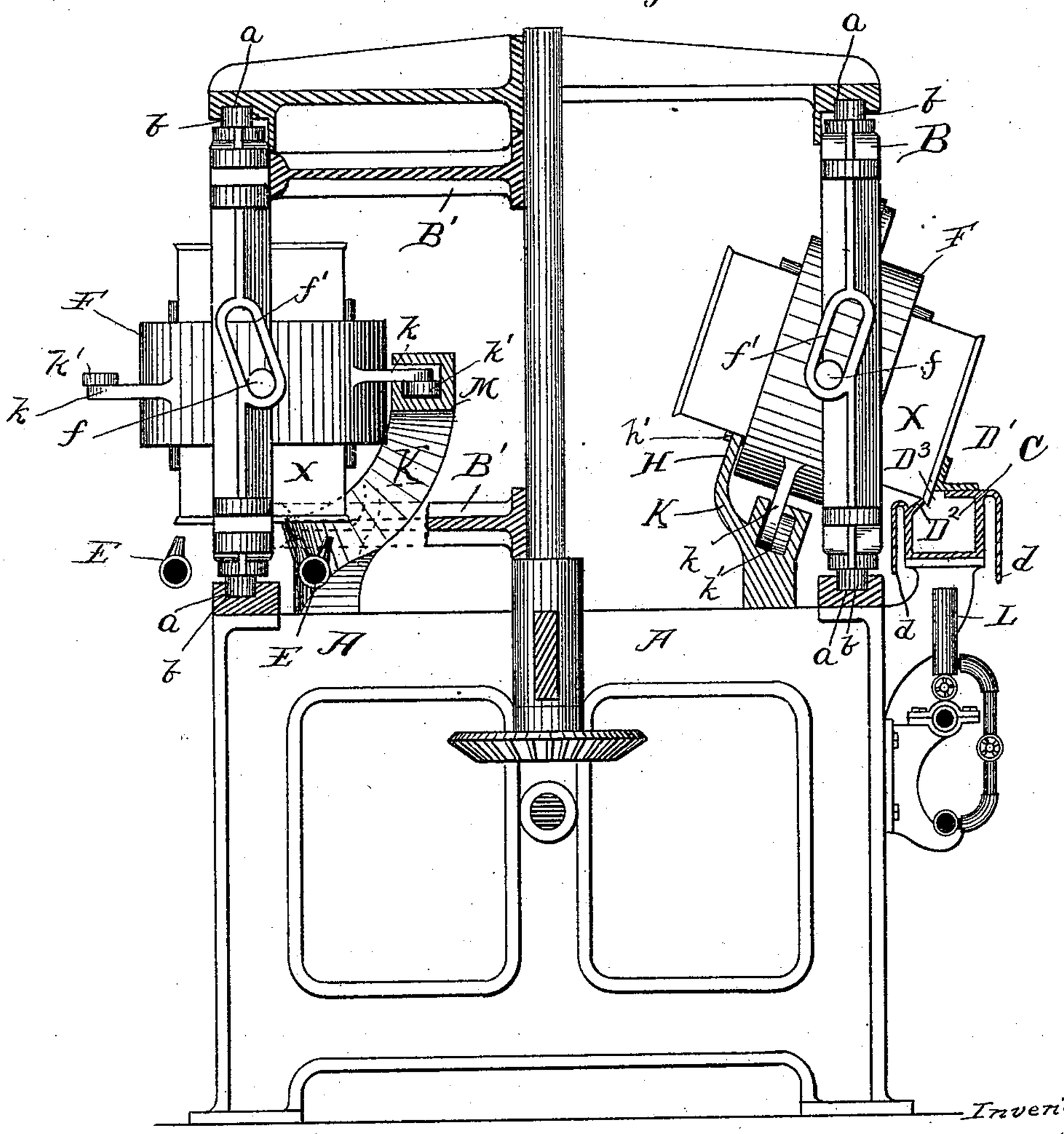
Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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SOLDERING MACHINE.

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Fig. 4.

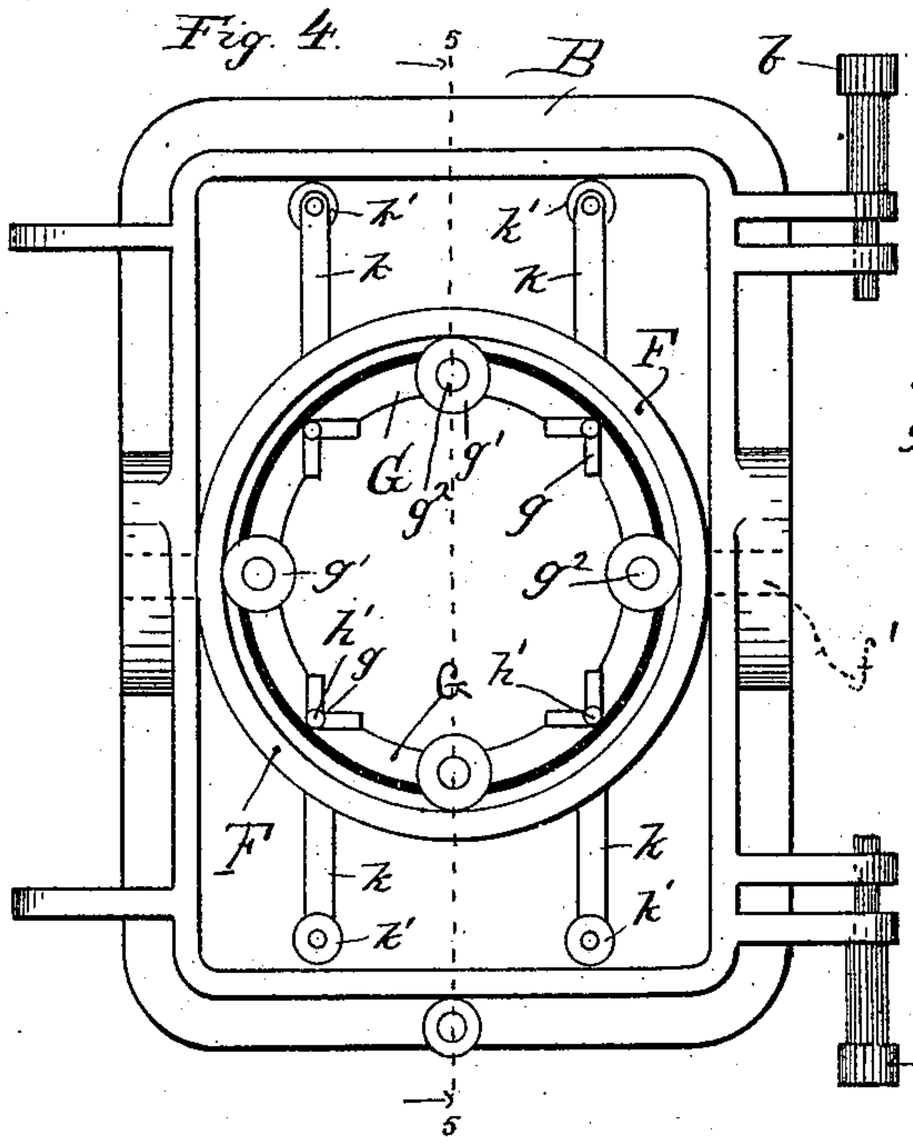


Fig. 5.

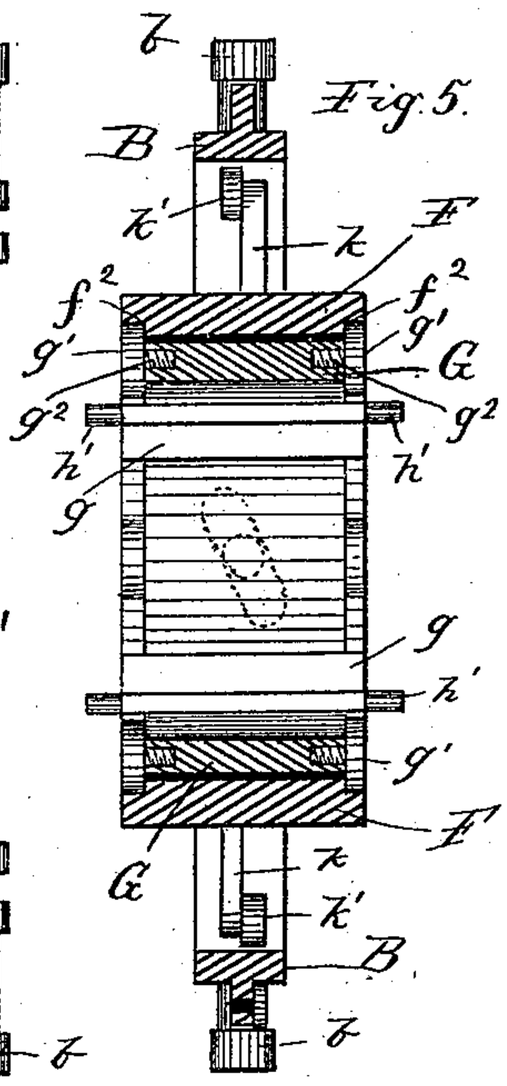


Fig. 6.

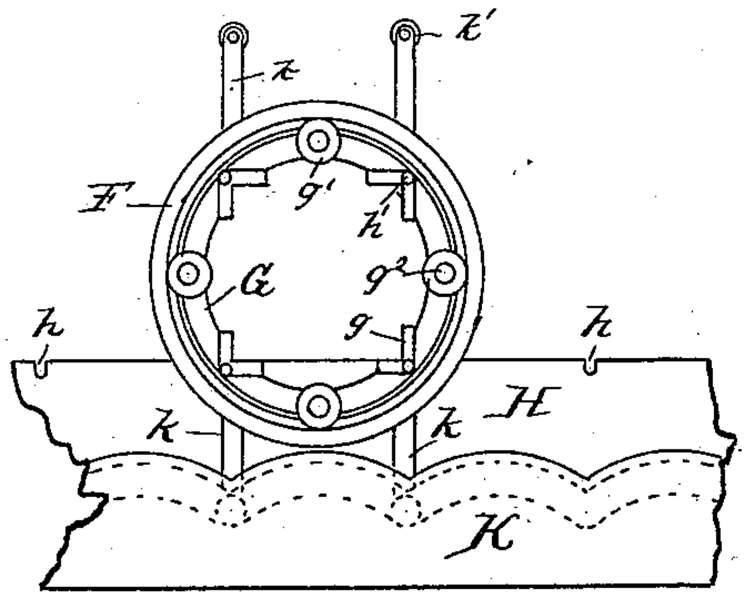


Fig. 7.

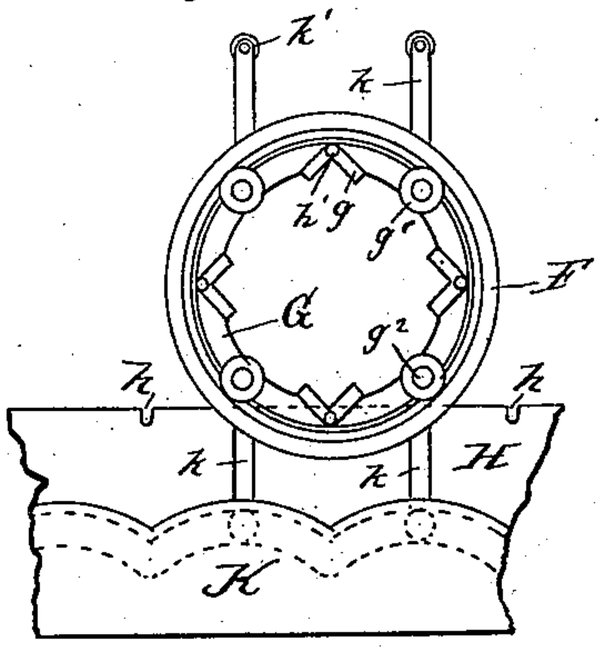
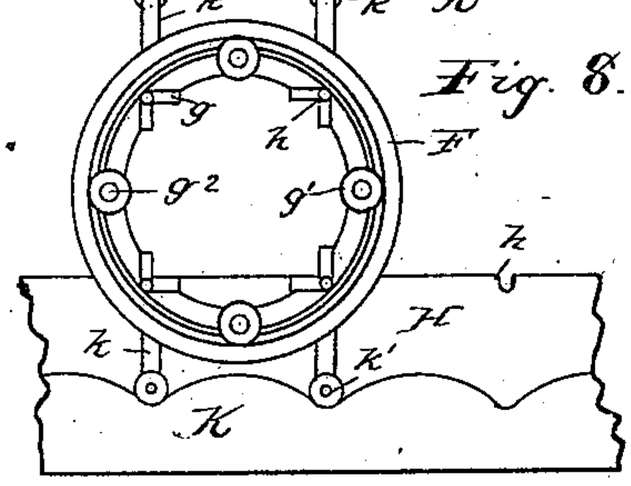


Fig. 8.



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UNITED STATES PATENT OFFICE.

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SOLDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 354,731, dated December 21, 1886.

Application filed August 16, 1886. Serial No. 210,964. (No model.)

To all whom it may concern:

Be it known that we, LE GRAND M. NORTON, EDWIN NORTON, and JOHN G. HODGSON, citizens of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Soldering-Machines, of which the following is a specification.

Our invention relates to improvements in machines for automatically soldering the joints or seams of square, rectangular, or other cans having flat or irregular sides.

The object of our invention is to provide an automatic machine of a simple and durable construction which will operate to roll a square, polygonal, or irregular shaped can in an inclined position through a bath of molten solder, so that each seam or corner of the can may be several times repeatedly immersed in the molten solder, and thus insure the perfect soldering of the can. By continuously rolling the can through the solder bath no part of it is long subjected to the heat and action of the molten solder; and in this way a square can may be soldered on the same principle and with the same degree of perfection as a round can may be by rolling its corner or end seam through a similar bath, as described in the Patent No. 274,362, to Edwin Norton, of March 20, 1883.

To this end our invention consists, in connection with a bath of molten solder and a flux bath, of a can-carrier provided with a series of rotatable can-holders and a track upon which said can-holders roll as the carrier moves forward, said track serving to roll the can so that its end seams roll in the molten solder.

It also consists in mounting the can-holder on pivots, so that after one end has been soldered the can may be turned with its soldered end down while the solder is setting or cooling. We find that in soldering cans by rolling or otherwise immersing them in molten solder, by providing means for immediately turning the soldered seam or end of the can downward after the can leaves the bath, and by keeping it in this position while cooling, so that the solder on the joints will have no tendency to run off, the joints will be soldered much more uniformly and perfectly.

Our invention also consists, in connection with an endless carrier and pivoted or swinging can-holders mounted thereon, of a second or duplicate solder bath, so that by turning the swinging can-holder end for end on its pivot the opposite end of the can may be soldered. As the can rolls forward along the gages of the solder bath, the can not being circular and turning on its corners, it is obvious that the center or axis of the can will not move in a straight line, but in a series of short curves or an undulating or wavy line, depending on the outward contour or shape of the can; and the invention also consists, in connection with the solder bath and the carrier, of a vertically-reciprocating or sliding revolving can-holder and a cam or guide track for moving said can-holder up and down as it revolves and is carried forward on its carrier, so that its center or axis will move in the path which the rolling movement of the can causes said axis to describe.

It also consists in a vertically-reciprocating and revolving can-holder composed of a pivoted or swinging ring having a second revolving can-holder ring mounted to revolve within the former.

It also consists, in connection with said pivotal and revolving rings, of vertical guideways or slots in the carrier, in which said pivotal ring is mounted, so that the can-holder may reciprocate up and down.

The invention also consists in the novel devices and novel combinations of devices herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, we have shown one form and that which we believe to be the best form of machine now known to us for practicing it.

In said drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged cross-section on line 3 3 of Fig. 2. Fig. 4 is an enlarged detail elevation of one of the links of the carrier. Fig. 5 is a section on line 5 5 of Fig. 4. Figs. 6 and 7 are enlarged detail elevations, showing the cam-track upon which the can-

holder rides, and also the track for turning the holder and upon which the can-holder rolls. Fig. 8 shows a slight modification.

In said drawings, A represents the frame of the machine, which may be of any suitable construction; B, the can-carrier or traveling device upon which the can-holders are mounted, and by which the cans, or the corners thereof, are conveyed along the fluxing-bath C, the bath of molten solder D, and the cooling device E.

The carrier B is preferably a link-chain carrier, and is mounted upon suitable wheels, B′ B′, journaled in the frame at each end, and it travels in suitable guideways or tracks, *a a*, on the frame. The links B are provided with friction-rollers or pins *b b*, which travel in the guide-grooves *a a*. The guideways *a a* serve to keep the carrier in position and steady it, so that the cans will be presented in proper relation to the acid and solder baths.

F is a swiveling or pivotal ring, having pivot-pins *f f*, which fit in slots *f′ f′* in the vertical sides of the link B, so that this ring may have an up-and-down reciprocating movement in these slots.

G is a ring mounted in the ring F, and which carries the can. This ring G is provided with a socket, *g*, for the can, conforming in shape thereto. The socket may consist of angle-plates to fit against the side corners of the can, as indicated in the drawings.

To enable the ring G to revolve easily in the ring F, it is provided with friction-rollers *g′*, which are journaled upon stud-pins g^2, screwed or otherwise fixed into the end faces of the ring G. The ring F is furnished with annular shoulders f^2 for the friction-rollers *g′* to fit in and roll upon. The friction-rollers *g′*, thus secured to the ring G, serve also to keep said ring in place within the ring F, as the sides or ends of the friction-rollers fit against the shoulders f^2. The can X in the socket *g* may thus at the same time have a revolving motion on its own axis by means of the revolution of the ring G in the ring F, a turning or revolving motion endwise by means of the swiveling or turning of the ring F on its pivots in the link B, and also a bodily up-and-down movement by means of the up-and-down reciprocation of the ring F in the slots *f′* of the link B.

H is a track provided with notches or recesses *h h* at intervals, corresponding to the side faces or corners of the can, adapted to receive and engage corresponding pins or projections *h′ h′* on the revolving can-holder ring G, and whereby the can is given a rolling or revolving motion as it is carried forward by the carrier B.

K is a cam-track, in or upon which travels an arm or projection, *k*, secured to the swinging ring F, whereby the can is given a bodily up-and-down movement. The arm *k* is furnished with a friction-roller, *k′*.

The solder bath D is provided with a gage or track, D′, for the ends or head of the can to rest against, and also a gage or track, D^2, for the side or corner of the can to rest against. These two gages form the walls of a slot, D^3, through which the corner or seam of the can projects into the molten solder. The fluxing-bath C is or should be furnished with similar gages or guides for the can. The solder-trough D is also furnished with flanges *d d*, one at each side, to confine the flame from the gas-jet or heating device L, and the flux-containing trough C is similarly furnished with flame-guards.

M is a cam at the end of the solder bath, which engages the projection or arm *k* on the ring F, and serves to turn the can into a vertical position, as indicated in Fig. 3, so that the end of the can which has just been soldered will be down while cooling and the soldered seam stand in a horizontal position. This cam extends around the end of the machine, and serves to hold the can in this position while it travels around the end of the machine and while it receives the jets of air from the cooling pipes or nozzles E. The cam M is but a continuation or elevated portion of the cam K. The can X is placed in the machine in its holder at the space or point marked *x*. As it is carried along by the carrier B it is rolled in an inclined position through the flux bath C and the solder bath D, the corner or seam of the can as it rolls projecting into the molten flux and solder. As the carrier moves forward, the pins or projections *h′* on the can-holder ring G engage the notches or recesses *h* in the track H, thus causing the can-holder ring G to roll on said track. At the same time the arms or projections *k*, fitting in the cam K, serve to give the can-holder a gradual up-and-down movement corresponding to that which the center or axis of the can has, due to the revolution or turning of the can on its corners. The can in this way is given the same movement as though it were rolled by hand on its corners along the straight flat gages D′ D^2 of the solder bath. The cam K is arranged in a plane in relation to the pins *f*, so as to carry the can in an inclined position through the solder and fluxing baths, and thus properly project the corner of the can into said baths. The slots *f′* in the sides of the links B have this same inclination, so that as the can-holder ring G is moved bodily up and down by the cam-track K, the can will be kept parallel with itself and always be presented at the same angle to the soldering and fluxing baths.

The flux and solder in the flux and solder vessels C D are heated by gas-jets or other suitable heaters, L L, and the joint to be soldered is heated by contact with the hot solder and flux. If preferred, however, the can may be heated by suitable flame-jets or other heaters arranged in the path of the can as it is carried along by the carrier B, before it reaches the solder bath. After the can leaves the

solder bath the arm *k* on the ring F engages the curved, inclined, or elevated portion M of the cam-track and swings the ring F into a horizontal position, (as indicated in Fig. 3, on the left-hand side thereof,) and while held in this position by the cam the recently-soldered joint is carried over the cooling jets or pipes E, by or through which cold air or other cooling fluid is projected against the joint, which is thereby rapidly cooled. The cooling-jets should be located around the end of the machine. When the can reaches the position marked *x'* it is turned end for end, an attendant revolving the ring F half around on its pivots *f*. As the can thus turned is carried forward its other end is fluxed, soldered, and cooled in the same manner by the duplicate devices on the opposite side of the machine. When the can again reaches the position marked *x* on the drawings, an attendant removes the soldered can and replaces it by another.

The carrier B may be furnished with any desired number of revolving, end-for-end-swiveling, and vertically-reciprocating can-holders, and the solder and fluxing baths may be made of any desired length. We prefer, however, that the flux bath should be long enough to permit the cans to make about two complete revolutions in rolling through it, and that the solder bath should be long enough to permit three or four complete revolutions of the cans.

By our present invention cans of almost any irregular shape may be automatically soldered. The cam-track K, which raises and lowers the can bodily as it moves forward, will be so curved or shaped as to cause the center or axis of the can to describe the line as it moves forward, due to the rolling motion of the can corner or seam on the gages of the solder bath. The ring F is furnished with two guide-arms, *k k*, one on each side of a central vertical line, so that both pivots *f f* of the ring F will be raised and lowered equally by the cam K. The ring F also has a second pair of guide-arms, *k k*, on its opposite side to ride in the cam K on the opposite side of the machine when the can and its holder are turned end for end on the pivots *f f* for the purpose of soldering the other end of the can.

The can-socket *g* in the can-holder ring G should fit the can snugly, and so that the friction of the can in the socket will hold it in position and still permit the can to be readily slipped in and out. The socket may be furnished with springs or yielding cushions of rubber or cloth to bear against the side faces of the can. The socket *g* may also be constructed to fit the can somewhat loosely, in which case, however, some guide or support will be required to sustain the can after it leaves the solder bath, when it is swung into a vertical position. While rolling through the acid and solder baths the gages on such baths would support the can and keep it from slipping out of its socket.

In Fig. 8 we have shown a modification of the cam-track K, in which it is made in two parts, one adapted to bear against the lower pair of guide-arms *k k* and the other against the upper pair, instead of a grooved cam, as shown in Figs. 6 and 7. The operation of the cam, however, is the same in both cases.

We are aware that heretofore machines have been made for soldering square or rectangular cans, wherein first one corner or end seam of the can is carried in a horizontal path or slid through a solder bath, and then the can turned a quarter of a revolution and another corner slid through a second bath, and so on, and that also machines have been made in which first one corner of the can has been dipped in a solder bath and then another, the can being turned a quarter of a revolution while it is raised out of the bath. We make no claim to any such machines.

We are also aware of and make no claim to the device shown and described in the patent to Graves, No. 242,631, of June 7, 1881, wherein a square can is revolved as it is carried through or with its end seam projecting in a bath of solder by means of a revolving can-holder mounted in a pivotal carrier, and having a round or circular periphery, which engages a stationary straight track or wire cable, and wherein the pivotal holder is provided with an arm engaging a stationary sinuous cam, by means of which the carrier is tilted at different inclinations, so as to raise the lower end of the can somewhat when its corner is turning into the bath, or wherein, in lieu of such tilting of the carrier, the can-holder is provided with a yielding spring-socket, which moves up and down in the holder as the corner of the can turns down into the solder, stationary straight guide-rails being provided for the corners of the can to strike against as it turns down, and thus cause the socket to yield against the springs.

In our invention the can rolls through the bath, and thus moves forward at each complete revolution a distance equal to its periphery or to the sum of its four or more sides. In said Graves device the revolving can is carried forward at each complete revolution a distance equal to the circumference of its holder, which itself rolls on a stationary straight track or wire cable, and though the can revolves as it is carried forward through the bath it does not have or describe a rolling motion along its surface.

In our invention, while the can is given a true rolling motion by means of the revolving up-and-down bodily-reciprocating can-holder and its projections or pins and the stationary notched track with which they engage, the can itself receives no weight, pressure, or blows, due to its rolling motion, as it is completely supported by the holder and given its rolling motion by said holder and the two cam-tracks H and K, with which the devices on said holder engage, and the can is presented to the solder at the same inclination and projected therein

at the same depth at its corners and sides. In said Graves device the revolving can-holder has no up-and-down bodily-reciprocating movement, and it either has a pivotal movement which changes its inclination to the solder bath or it is provided with a spring-socket, so that the can itself, by striking against a guide-rail, may raise itself up and down against the spring of said socket, which striking of the can against the guard-rail not only tends to injure it, but also by the jarring to disturb the unset solder on the seams.

In our invention the revolving can-holder is provided with faces, projections, or pins *h'*, correlative to the shape of the can, or one for each of its corners, which engage a corresponding cam or track, on which the revolving part of said holder rolls, and the revolving part of the holder is mounted inside an up-and-down bodily-reciprocating outer part which rides upon a sinuous track or cam.

In our invention the can is rolled continuously through the solder bath, the can being bodily raised as its corner turns down into the bath, so that the seam projects a like or nearly like distance into the bath of solder at all times as it rolls through it; and this feature of our invention (the bodily raising of the revolving square can as the corners turn down into the solder, so that the seam projects no deeper into the solder when the corner is immersed than when the straight edge of the can is immersed) is independent of the forward bodily movement of the can on the carrier B, and might be practiced or embodied in a machine having no carrier, or wherein the can-holder is stationary so far as any longitudinal movement is concerned, as also obviously might that feature of our invention relating to turning the can into a vertical position while the can is cooling and the solder becoming set.

The machine shown in the drawings is intended and adapted for soldering square cans, or cans whose horizontal section is square. As all the four sides of such a can are equal, the recurring curves of the cam-track K are of course all alike and equal to each other. If, however, the can were of a rectangular or other shape, and its sides unequal or of different form from each other, the recurring curves of the can would correspond to the shape of the can and be different from each other. The cam-track K operates in a measure on the principle of a former used in machines for turning irregular bodies, as gun-stocks, lasts, &c.

While the edges and corners of the can are guided and in a measure rest upon the gages D' D² of the solder bath, it should, however, be understood that little if any weight of the can is supported by these gages or guides, and that no part of the weight of the can-holder ring G or ring F comes upon the can, or rests upon these gages or guides. The cam-track K, the track H, and the track *a a*, which guides the links B, in fact support the whole weight, so that the can is subjected to no strain, jars, or injury as it rolls along. The mechanism gives the can its rolling motion, while at the same time fully supporting it. It should also be observed that in soldering pyramidal-shaped cans, or cans larger at one end than the other, in such case the tracks on opposite sides of the machine will not be alike, or of the same size in respect to the length and height of the curves on the cam-track, or the distance between the notches on the notched track; and in soldering pyramidal cans having rounded corners and unequal sides—such as cans now commonly used for putting up canned beef or pressed corn-beef and other meats—the shape of the curves in the cam-track will be varied by the rounded corners of the can, and also by its unequal sides. Whatever the shape of the can to be rolled on its corner along the gages of the solder bath, the cam-track will be so shaped or curved in correspondence therewith as to raise and lower the center or axis of the can as it rolls, and is carried forward by the carrier in just the manner that said axis is raised or lowered when the can is being actually rolled upon a level plane.

We claim —

1. In a machine for soldering angular or irregular-shaped cans, the combination, with a solder bath, of a can-carrier and an inclined revolving up-and-down bodily-reciprocating can-holder mounted on said carrier for rolling the can through said bath, and a stationary cam or track engaging said can-holder for giving it its up-and-down bodily-reciprocating movement, substantially as specified.

2. In a machine for soldering angular or irregular-shaped cans, the combination of a solder bath with a can-carrier and a series of inclined revolving pivotal up-and-down reciprocating can-holders mounted on said carrier for rolling the cans through said bath, and a stationary cam or track engaging said can-holders for giving them their up-and-down bodily-reciprocating movement, substantially as specified.

3. In a machine for soldering angular or irregular-shaped cans, the combination, with a solder bath, of a can-carrier, revolving up-and-down bodily-reciprocating can-holders mounted on said carrier, a cam or track for revolving said can-holder on its axis, and a second cam or track engaging said can-holder, for giving said can-holder its up-and-down reciprocating movement as it rolls through said bath, substantially as specified.

4. The combination, in a machine for soldering irregular-shaped cans, of a solder bath with a can-carrier, revolving pivotal up-and-down reciprocating can-holders mounted on said carrier, a cam or track for revolving said can-holder on its axis, and a second cam or track for giving said can-holder its up-and-down reciprocating movement, said latter cam or track having an inclined or elevated portion at the end of the solder bath for turning the can-holder on its pivots into a horizontal po-

sition, so that the soldered seam will stand horizontally while the solder is setting, substantially as specified.

5. In a machine for soldering angular or irregular-shaped cans, the combination, with a solder bath, of a can-carrier and a series of inclined revolving pivotal up-and-down reciprocating can-holders mounted on said carrier for rolling the cans through said bath, and a device for turning said pivotal can-holder into a horizontal position, so that the soldered seam will be down after the can leaves the solder bath, substantially as specified.

6. The combination, with a solder bath, of an inclined revolving up-and-down reciprocating can-holder for equally immersing the seam of an angular or irregular-shaped can in said bath as the can revolves, and a cam or device engaging said can-holder for reciprocating the same up and down as it revolves, substantially as specified.

7. The combination, with the solder bath D, of revolving can-holder ring G, pivotal ring F, carrier B, having inclined guides or slots *f' f'* for the pivots of said ring F, track H, and cam-track K, substantially as specified.

8. The combination, with solder bath D, of carrier B, having guides or slots *f' f'*, ring F, having pivots *f f*, mounted in said slots *f' f'*, and provided with guide-arms *k*, can-holder ring G, having pins or projections *h' h'*, track H, having notches *h*, and cam-track K, substantially as specified.

9. The combination, with solder bath D, of carrier B, having guides or slots *f' f'*, ring F, having pivots *f f*, mounted in said slots *f' f'*, and provided with guide-arms *k*, can-holder ring G, having pins or projections *h' h'*, track H, having notches *h*, cam-track K, and inclined or elevated track M, substantially as specified.

10. The combination, with solder bath D, of carrier B, having guides or slots *f' f'*, ring F, having pivots *f f*, mounted in said slots *f' f'*, and provided with guide-arms *k*, can-holder ring G, having pins or projections *h' h'*, track H, having notches *h*, cam-track K, inclined or elevated track M, and a cooling device, E, substantially as specified.

11. The combination, with a frame, A, having guide-tracks *a a*, of a link-chain carrier, B, wheels B' B', flux bath C, solder bath D, gages D' D², notched track H, cam-track K, pivotal ring F, having arms *k k*, and pivots *f f*, mounted to reciprocate in slots *f' f'* in the links of said chain, and can-holding ring G, having pins or projections *h' h'*, substantially as specified.

12. The combination, with a frame, A, having guide-tracks *a a*, of a link-chain carrier, B, wheels B' B', and flux bath C, solder bath D, gages D' D², notched track H, cam-track K, pivotal ring F, having arms *k k*, and pivots *f f*, mounted to reciprocate in slots *f' f'* in the links of said chain, can-holder-ring G, having pins or projections *h' h'*, cam M, and cooling air pipes or nozzles E, substantially as specified.

13. In a machine for soldering angular or irregular-shaped cans, the combination of a solder bath with a can-carrier, a series of inclined revolving pivotal up-and-down reciprocating can-holders mounted on said carrier for rolling the cans through said solder bath, a cooling device at the end of said solder bath, and a cam or track engaging said can-holders for giving them their reciprocating movements in the path of said carrier, substantially as specified.

14. In a machine for soldering angular or irregular-shaped cans, the combination, with a can-carrier, of two solder baths in the path of said carrier, a series of inclined revolving pivotal up-and-down reciprocating can-holders mounted on said carrier for rolling the cans through said solder baths, whereby, after the seams at one end of the can are soldered, the said holder may be turned end for end on its pivots and the other end of the can soldered as it rolls through said bath, and a cam or track engaging said can-holders for giving them their reciprocating movements, substantially as specified.

15. In a machine for soldering angular or irregular-shaped cans, the combination, with a can-carrier, of two solder baths in the path of said carrier, and a series of inclined revolving pivotal up-and-down reciprocating can-holders mounted on said carrier for rolling the cans through said solder baths, a cam or track engaging said can-holders for giving them their reciprocating movements, whereby, after the seams at one end of the can are soldered, the said holder may be turned end for end on its pivots and the other end of the can soldered as it rolls through said bath, and a cooling device arranged in the path of said carrier between said solder baths, substantially as specified.

16. In a machine for soldering angular or irregular-shaped cans, the combination of two fluxing-baths, C C, with two solder baths, D D, two cooling devices, E E, a can-carrier, B, and a series of inclined revolving pivotal up-and-down reciprocating can-holders mounted on said carrier for rolling the cans through said baths and turning the same into a vertical position for cooling, and cams or tracks H and K, said cam K having an elevated portion, M, and said cam engaging said can-holders and operating to give them their revolving pivotal and reciprocating motions, substantially as specified.

17. The combination, with a solder bath, of a can-carrier, a revolving and up-and-down reciprocating can-holder, and a stationary cam having a shape corresponding to the series of arcs or curves described by the center or axis of said can as it rolls forward and turns on its corners, said cam engaging said holders and operating to give them their reciprocating movements, substantially as specified.

18. The combination, with a solder bath, of a can-carrier, a series of revolving and up-and-down reciprocating can-holders mounted on said carrier, a notched track for revolving or rolling said can-holders, and a cam of a shape correlative to that of the path of the axis of the revolving can-holder socket, whereby the can-holder is given the up-and-down movement as it rolls forward, due to the turning of the same on its corners, substantially as specified.

19. The combination, with solder bath D, having gages D′ D², of link-chain carrier B and inclined revolving pivotal up-and-down reciprocating can-holders for rolling the cans in said bath along said gages, the links of said chain having slots and said can-holders having pins mounted in said slots, substantially as specified.

20. The combination, with solder bath D, having gages D′ D², of link-chain carrier B and inclined revolving pivotal up-and-down reciprocating can-holders for rolling the cans in said bath along said gages, track H, and cam-track K, engaging said can-holders and operating to give them their revolving and reciprocating movements, substantially as specified.

21. The combination, with flux bath C, of solder bath D, gages D′ D², link-chain carrier B, friction-rollers *b*, frame A, tracks *a a*, and inclined revolving pivotal up-and-down reciprocating can-holders mounted in said link-chain carrier, substantially as specified.

22. In a soldering-machine, the combination, with a solder bath, of a can-carrier and a vertically-swiveling can-holder mounted thereon, and a cam or device engaging said swiveling holder for turning the can into and holding it in a vertical position after leaving said bath for cooling the seam, substantially as specified.

23. The combination of a solder bath with inclined guides or slots *f′ f′* in a suitable frame, up-and-down reciprocating ring F, having pins *f f*, fitting in said slots, and ring G, revolving in said ring F, substantially as specified.

24. The combination, with solder bath D, of a can-carrier, B, having revolving up-and-down reciprocating can-holders, consisting of ring F, having annular shoulders *f² f²*, and ring G, furnished with friction-rollers *g g*, fitting in said shoulders, substantially as specified.

25. The combination, with a solder bath, of an inclined revolving up-and-down reciprocating can-holder having an angular or irregular-shaped can-socket and provided with pins or projections correlative to the shape of said can-socket, and a cam or track having a series of notches or projections along said solder bath engaging said pins or projections on said can-holder, whereby the can-holder is rolled as the can is carried along the solder bath, substantially as specified.

26. The combination, with a solder bath, of an inclined revolving can-holder having an angular or irregular-shaped can-socket and provided with a former or pins correlative to the shape of said can-socket, and a cam or track engaging said former or pins, whereby the can-holder is rolled as the can is carried along the solder bath, substantially as specified.

27. The combination, with a solder bath, of an inclined revolving can-holder having an angular or irregular-shaped can-socket and provided with former pins or projections *h′*, correlative to the shape of said can-socket, and a cam or track having notches *h*, adapted to engage said former-pins *h′* on said holder, whereby the can-holder is rolled as the can is carried along the solder bath, substantially as specified.

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