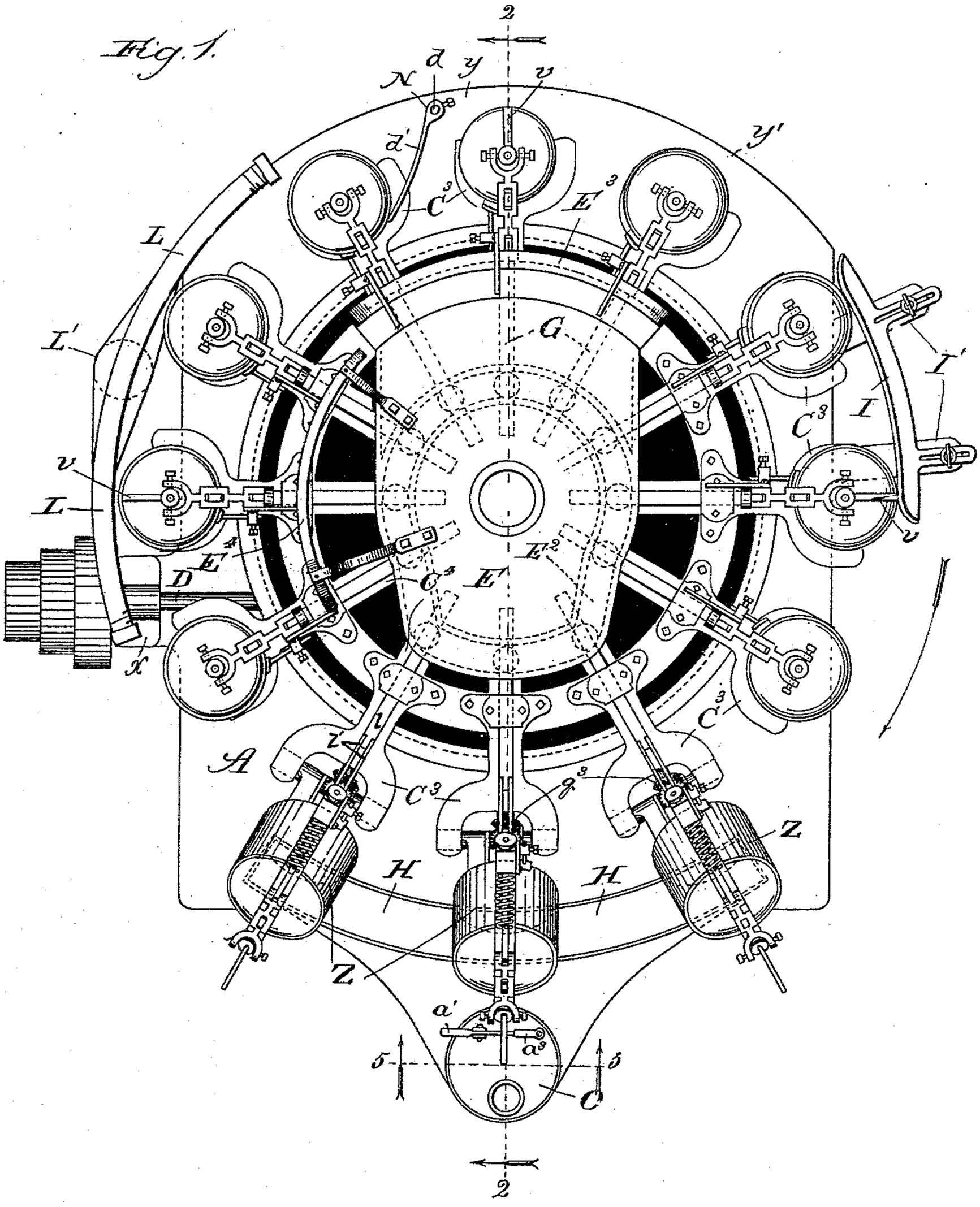
(No Model.) 3 Sheets—Sheet 1.

J. BROWN, Dec'd.

K. BROWN, Administratrix.

CAN SOLDERING MACHINE.

No. 401,125. Patented Apr. 9, 1889.



Witnesses.
Chas. E. Gaylord.
J. H. Dyrenforth.

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By her Attorneys
Dyrenforth & Dyrenforth.

(No Model.) 3 Sheets—Sheet 2.

J. BROWN, Dec'd.

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No. 401,125. Patented Apr. 9, 1889.

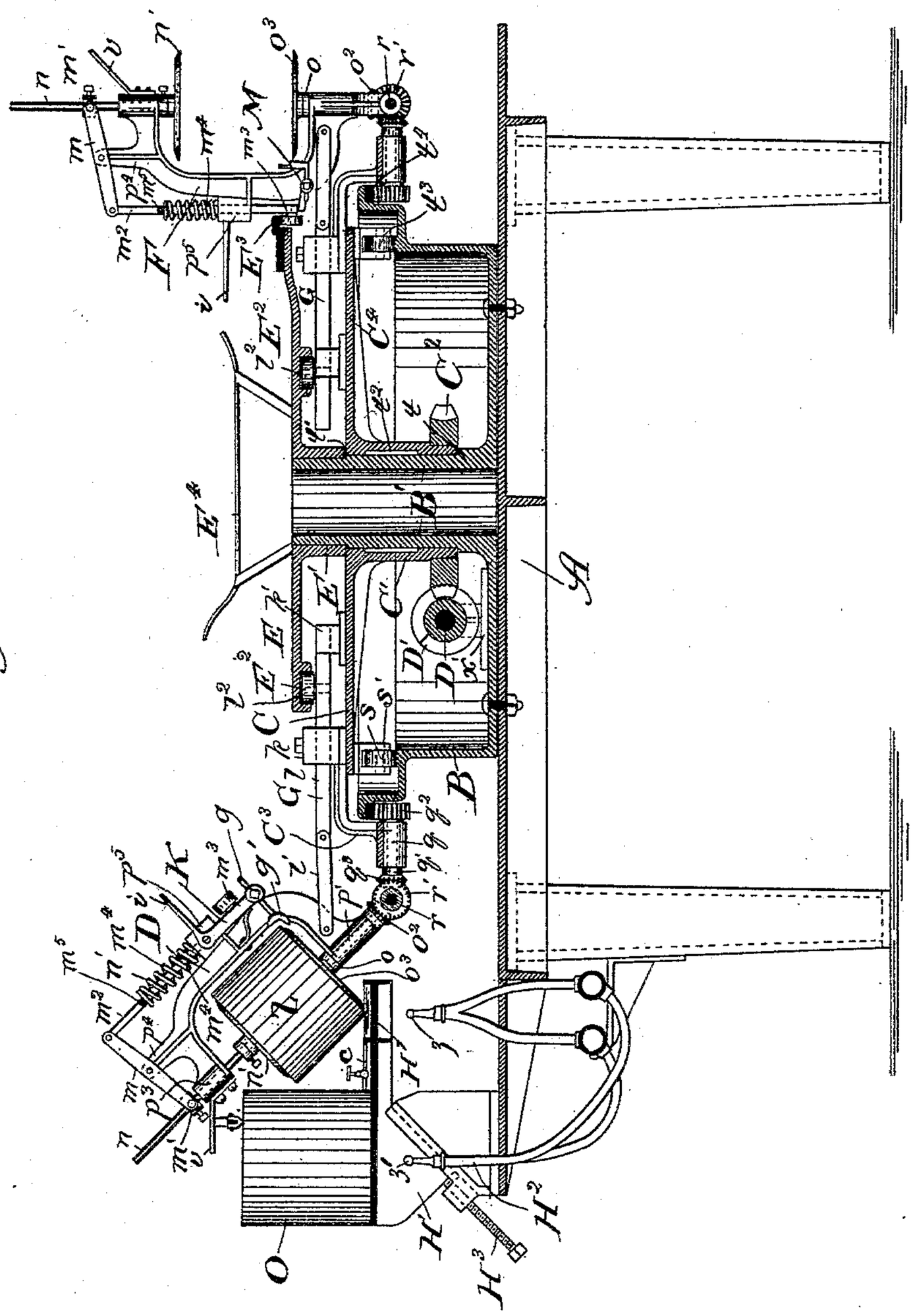

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

J. BROWN, Dec'd.

K. BROWN, Administratrix.

CAN SOLDERING MACHINE.

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Fig. 3.

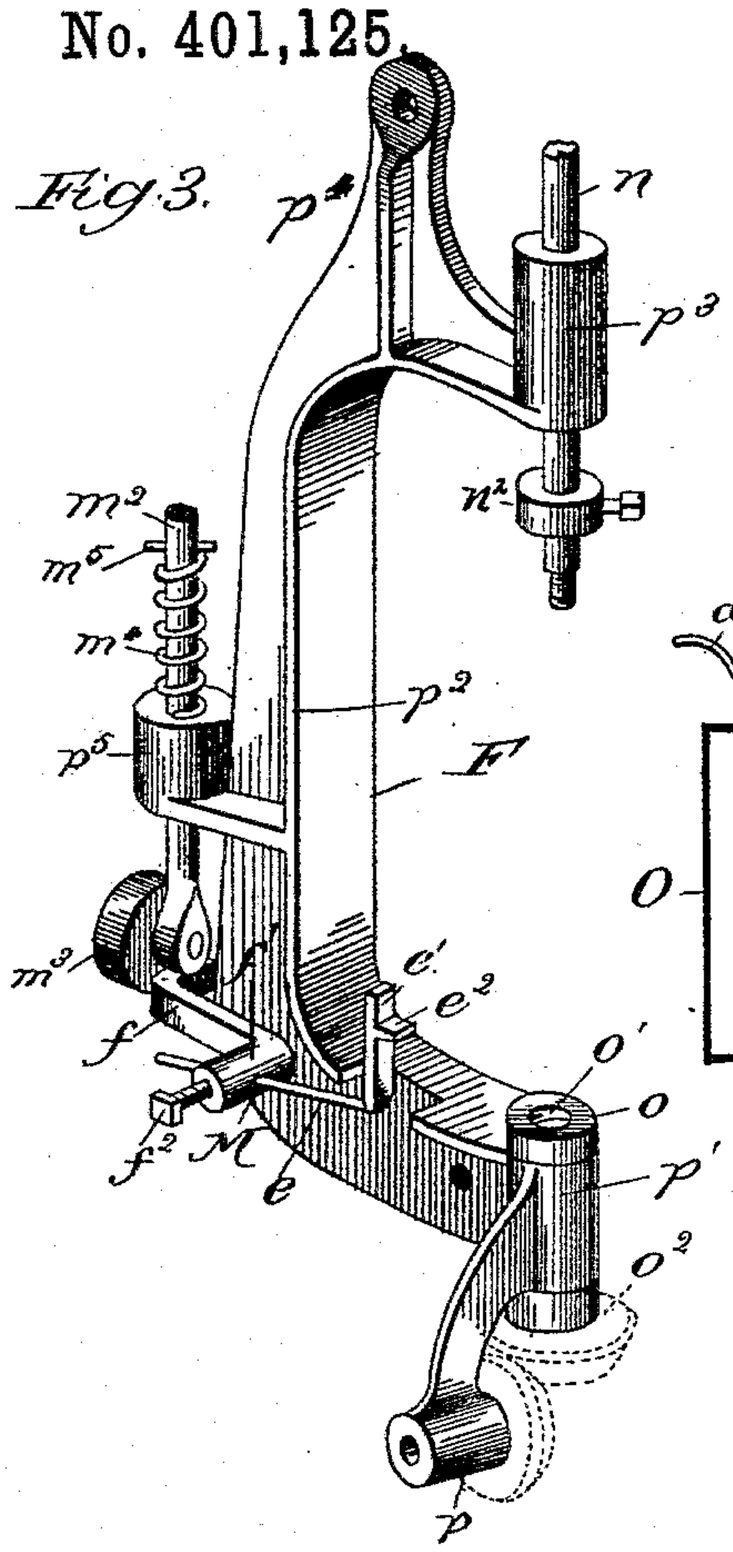


Fig. 5.

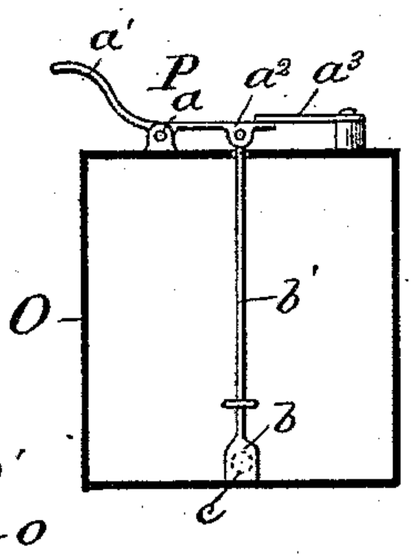


Fig. 4.

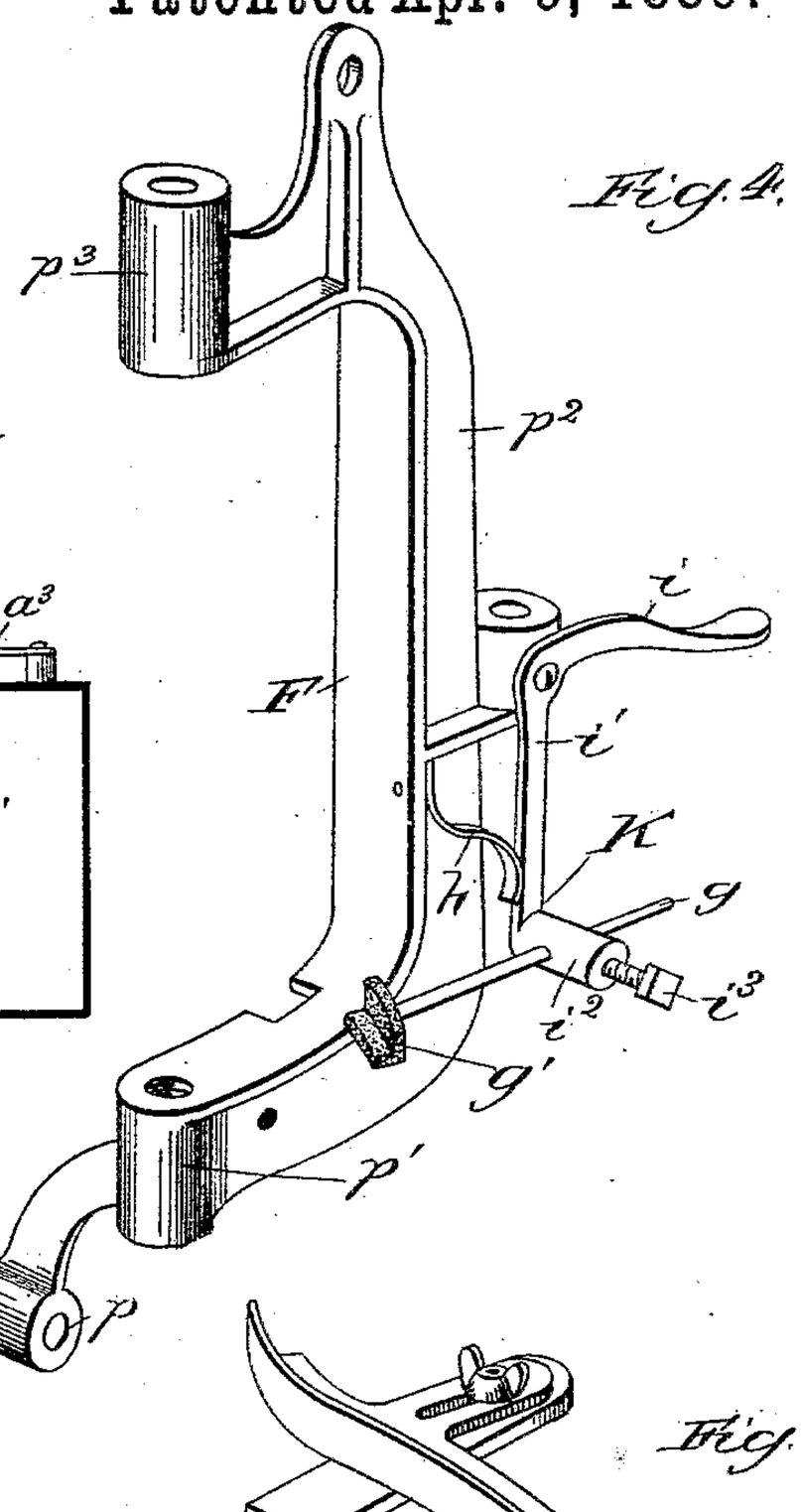


Fig. 8.

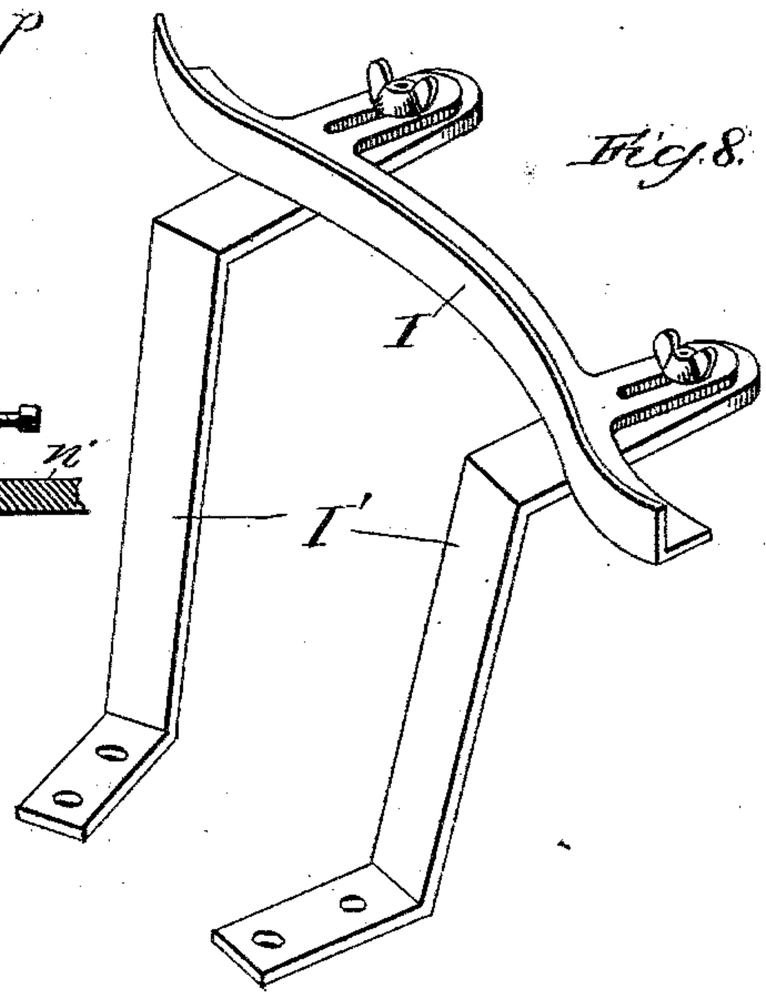


Fig. 7.

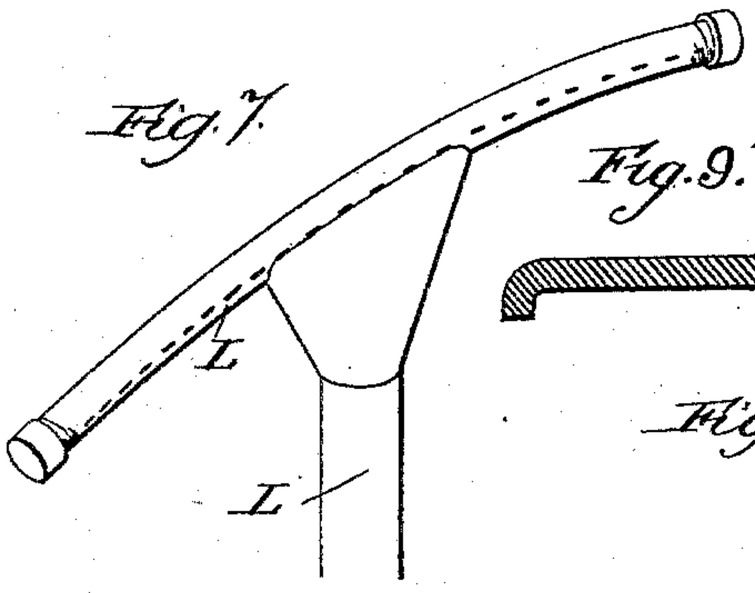


Fig. 9.

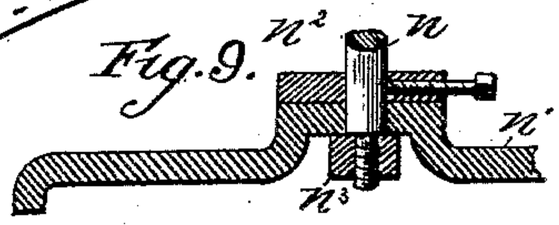
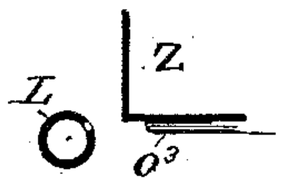


Fig. 6.



Witnesses:
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J. H. Dyrenforth

Inventor:
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Attys

UNITED STATES PATENT OFFICE.

KATIE BROWN, OF CHICAGO, ILLINOIS, ADMINISTRATRIX OF JAMES BROWN, DECEASED, ASSIGNOR TO THE SAID KATIE BROWN, (IN HER PERSONAL CAPACITY.)

CAN-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 401,125, dated April 9, 1889.

Application filed November 27, 1888. Serial No. 291,946. (No model.)

To all whom it may concern:

Be it known that JAMES BROWN, deceased, late a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, invented a new and useful improvement in Can-Soldering Machines, of which the following is a specification.

This invention relates to improvements in machines for soldering the heads on cylindrical cans, in which the soldering is effected by rotating the can with its edge in melted solder.

The object of this invention is to provide a machine of the aforesaid class of improved and comparatively simple construction, which shall be very rapid in its operation and exceptionally effective in its results; and to this end the invention consists in the general construction of the improved machine; and it further consists in details of construction and combinations of parts.

In the drawings, Figure 1 is a plan view of the machine, showing by dotted lines certain concealed parts; Fig. 2, a vertical section of the same, taken on the line 2 2 of Fig. 1, but showing details in elevation; Figs. 3 and 4, perspective views of details; Fig. 5, a section on the line 5 5 of Fig. 1 and viewed in the direction of the arrows; Fig. 6, a view in sectional elevation of a detail; Figs. 7 and 8, details in perspective, and Fig. 9 a broken sectional view of a detail.

A is a table, preferably of metal, mounted upon legs and serving to support the various parts of the machine.

B is a stationary support, preferably in the form of a circular basin, secured to the table A, and provided at its center with a cylindrical post, B′, having circumferential shoulders $t\,t'$, with a bearing-surface, t^2, between them. The edge of the support is formed with two horizontal flanges, as shown, the lower one affording on its upper side an annular track, t^3, and the upper having provided on its under side an annular rack, t^4, the track and rack serving purposes hereinafter described.

C is a support, preferably in the form of a horizontal wheel, having a hub, C′, which fits the bearing portion t^2 of the post B′ and rests against the shoulder t. Surrounding the lower extremity of the hub C′, and rigidly secured thereto, is a gear-wheel, C^2, in mesh with a worm-wheel, D′, upon a drive-shaft, D, which latter extends into the part B and is supported toward opposite extremities in suitable journals, $x\,x'$. Rollers s are journaled in bearings s' on the under side of the wheel C to travel upon the annular track t^3 when the wheel is revolved, as hereinafter described.

E is a plate having a sleeve, E′, which fits over and is rigid on the post B′.

The parts A, B, B′, and E are in fixed position with relation to each other and afford a stationary support for the parts secured thereto, while the wheel C affords a rotatory support for the parts carried by it, as hereinafter described.

On the under surface of the plate E is a cam-groove, E^2, of the form shown by dotted lines in Fig. 1, arranged to produce reciprocating motion in a horizontal plane of parts hereinafter described, and on its upper side it is provided with a cam, E^3, and a cam, E^4, on a higher plane than the cam E^3, both cams being arranged in the positions shown in Fig. 1—viz., near the front and lateral edges of the machine—to effect a downward movement of the traveling parts into the paths of which they extend, all as hereinafter explained.

Secured to the upper side of the wheel C, near its periphery, and coinciding in position with the spokes C^4, are a series of bifurcated radially-projecting brackets, C^3, the shanks of which extend beyond the edge of the part B, where they turn downward a short distance and project thence with their bifurcated portions extending horizontally. Each bracket is provided toward the outer ends of its forked extensions with journal-bearings for a short horizontal shaft, r, which carries toward one side (see Figs. 1 and 2) a miter gear-wheel, r', and upon the under side of the centrally-projecting portion of the bracket beyond the part B is a bearing, q, for a short shaft, q', which latter carries at its inner extremity a cog-wheel, q^2, in mesh with the annular rack t^4, and at its outer extremity a miter gear-wheel, q^3, in mesh with the miter-gear r'.

F is a can-carrier comprising a pivotal

frame having a sleeve portion, p, by which it is mounted between the forks of the bracket C^3 upon the shaft r, a preferably longitudinally perforated support or sleeve, p', and a projecting bowed portion, p^2, provided at its outer extremity with a sleeve, p^3, having a perforation directly in line with the perforation in the sleeve p'. Extending through the perforation in the sleeve p' is a shaft having a head, o, at its upper end, provided with a central screw-threaded socket, o', and carrying at its opposite end a beveled gear-wheel, o^2. The threaded socket o' is arranged to receive a threaded stud (not shown) centrally projecting from the back of a holder in the form of a disk, o^3. The perforation in the sleeve p^3 affords a guide for a reciprocating rod, n. The rod n is provided with an adjustable collar, n^2, and is screw-threaded at its lower extremity, where it carries a nut, n^3. The rod is arranged to support a loose-fitting holder, n', preferably in the form of a flanged disk, between the collar n^2 and nut n^3, as shown in Fig. 9, in a manner to render the holder rotatory on its support. A lever, m, is fulcrumed upon a projection, p^4, on the carrier F and is bifurcated at its outer extremity, as most clearly shown in Fig. 1, where it embraces and is pivotally secured to an adjustable collar, m', which surrounds the rod n. The lever is pivoted at its opposite end to a rod, m^2, which extends through a perforated guide-projection, p^5, on the carrier F, and carries toward its lower extremity a projection which is preferably in the form of a roller, m^3, as shown. A helical spring, m^4, surrounds the rod m^2 and bears at opposite ends, respectively, against the upper surface of the projection p^5 and a pin, m^5, which projects from opposite sides of the rod m^2.

Each can-carrier F is pivotally connected with a sustaining-rod, G, preferably in two sections, l and l'. Each section l is supported to be reciprocated in a guide-block, k, (located near the periphery of the wheel C,) and in a guide-block, k', on a spoke, C^4, between the guide k and hub of the wheel, and carries on its upper side a suitable guide-projection, as the roller l^2, extending into the cam-groove E^2. The section l' of the rod G comprises two parallel bars, which at one extremity embrace the part l, to which they are pivotally secured, and at the opposite end embrace and are similarly secured to the opposite sides of the lower part of the carrier F. These supporting-rods G regulate the direction of extension of the pivotal carriers F, and as the rollers l^2 travel in the cam-groove E^2 the reciprocation of the rods thereby produced oscillates the carriers, the latter being caused, in the outward movement of the rods, to incline outward, while movement of the rods to the inward limits of their reciprocation draws the carriers F into vertical positions.

The engagement of the worm-wheel D′ with the gear-wheel C^2 causes the former, as its shaft D revolves, to turn the gear-wheel C^2, and with it the support C, while the support B and plate E remain stationary. As the support C revolves, all the brackets C^3, carriers F, rods G, and their attendant parts are caused to travel in a circle about the support B and plate E, during which the engagement of the gear-wheels q^2 with the annular rack t^4 causes a rotary movement to be transmitted through the medium of the miter-wheels q^3 r' o^2 and their shafts to the holders o^3. The holders o^3 thus afford revoluble supports for cans Z, which latter, in the operation of the machine, are placed upon them, as hereinafter described, and while it is preferred that these supports o^3 should be disks, as described, any other form of support which will serve to sustain and rotate the cans in the manner desired would be embraced within the term "revoluble supports."

The shape and position of the cam-groove E^2 causes it, through the medium of the rods G, and in the manner before described, to retain each traveling carrier F in a vertical position during about three-quarters of its revolution—that is to say, while it travels along the front and lateral sides of the machine—and to cause each carrier F to incline outward at an angle of, say, forty-five degrees, during the remainder of its revolution, or, in other words, during its progress across the back of the machine.

In the path of the edges of the disks o^3, and extending from the point where the carriers assume the lowest limit of their inclined position to the point where they assume the vertical position, is a solder-trough, H, upon a frame, H′, which may be adjusted forward and backward to a limited extent upon an inclined support by means of a set-screw, H^3, as shown. Underneath the solder-trough H is a series of burners, z, which communicate with gas and air supply pipes, whereby a continuous flame is directed against the under side of the trough H to heat the solder.

The cam E^3, before referred to, upon the plate E is preferably of a length which corresponds to about one-quarter of the circumference of the wheel C, and is located in the path of the rollers m^3, which latter are depressed by the cam as they travel across the front of the machine, and, through the medium of the rods m^2, levers m, and rods n, cause a corresponding rise of the retaining disks or holders n'.

In the operation of the machine thus far described the cans Z to be soldered are placed by the operator upon the revolving supports o^3 while they are passing between the points y y', Fig. 1, (the direction of travel being from the former toward the latter,) and during which time the disks n', owing to the engagement of the rollers m^3 with the cam E^3, are raised. When they pass the point y' and end of the cam E^3, the resilience of the helical springs m^4 forces the disks n' down upon the tops of the cans Z, which are thereby clamped firmly in position. As the carriers F travel, the engage-

ment of the rack t^4 and gear-wheels q^2 causes the latter to revolve rapidly and, as before described, communicate their motion to the disks o^3, which in turn rotate the cans Z and disks n'. When they reach the solder-trough H, the carriers F, as before described, are tilted outward, causing the lower edges of the cans to rotate in the solder, the trough being adjusted by means of the screw H^3 to the proper level to cause the edges to enter the solder to the necessary depth. As they approach the farthest extremity of the trough H the carriers F and their cans Z assume vertical positions, as before described, and when they reach the cam E^3 the engagement of the rollers m^3 with the latter raises the disks n' from the cans Z, when the latter are discharged from the machine in the manner hereinafter set forth.

To insure the proper adjustment of the cans Z upon the disks o^3, whereby the edges of the latter will dip into the solder equally all around them, a gage, I, is provided upon brackets I', secured to the table A. The gage I has a concave inner edge, which the lower edges of the cans will barely touch when in proper position, so that should a can be improperly placed by the operator it will be forced to its proper position as it rotates across the guide. The guide may be adjusted by means of thumb-screws, as shown, for cans of different diameters. If desired, the gage may be provided along its concave edge with a covering of material pervious to moisture, as felt or cloth saturated with an acid or oil, which would prepare the seam of the can as it rotates against it for the application of the solder. In this manner the part I would serve the double purpose of a gage and an "oiler" or fluxing device.

It is desirable that the seam when soldered shall present a bright and smooth appearance, and to this end wiping mechanism K is provided upon each carrier F. It comprises a bell-crank lever, the arm i of which extends horizontally backward from the carrier F and the arm i' downward against a flat spring, h. Toward the lower end of the arm i' is a laterally-projecting stud, i^2, having a transverse opening for a rod, g, and a screw-threaded opening in its end for a set-screw, i^3, which bears against the rod g. The rod g is provided at one end with a wiper, g', preferably of cloth or felt saturated with oil, and may be adjusted in its support toward and away from the disk o^3 and held in its adjusted position by the set-screw i^3. The cam E^4, before mentioned, extends into the path of the projecting arms i, and operates to depress them during their engagement against the resistance of the springs h and forces the rods g and wipers g' forward. The wipers are normally out of contact with the cans Z and the rods g are adjusted to cause the wipers when forced forward to be rubbed by the lower edges of the cans. The cam E^4 is located as shown, to engage the arms i immediately after the cans have left the solder-trough H and have been brought to vertical positions, so that the wiping operation commences while the solder is still hot, and any superfluous portion of the latter is removed. The continued contact of the wipers until released by the cam E^4 with the soldered edges of the cans polishes the latter while they are being cooled, as hereinafter described, and gives to them a bright clean appearance.

L, Figs. 1 and 7, is a curved horizontal air-pipe located, as shown, opposite and on the same side of the machine as the cam E^4 and just outside of the circle described by the revolving cans Z, and is provided with a line of perforations on its concave side. A vertical pipe, L', leads into the pipe L from any suitable compressed-air supply, (not shown,) whereby a constant current of air is forced through the perforations against the freshly-soldered edges of the cans Z as they revolve past them and produces rapid cooling of the solder.

In soldering the edges of the cans, as above described, the adjacent peripheral edges of the disks o^3 are liable to become bespattered with solder in a manner to cause the cans and disks to adhere together, whereby the former will be held against ready discharge from the machine by the mechanism provided for that purpose. To obviate this difficulty, loosening mechanism M (shown most clearly in Fig. 3) is provided on the side of each carrier F, opposite to the wiping mechanism K, and comprises a bent arm, f, pivotally connected toward one end with the carrier F, where it is provided with a laterally-projecting stud, f', and extending at its opposite end underneath the rod m^2. The stud f' has a transverse opening for a rod, e, and a screw-threaded opening in its end, meeting the aforesaid transverse opening, for a set-screw, f^2, which bears against the rod e. Toward its outer end the rod e is bent upward to about a right angle, and its end is shaped, as shown, to produce an upright extension, e', and a horizontal projection or shoulder, e^2. Normally the free ends of the arms f lie a short distance below the lower extremities of the rods m^2, and the shoulders e^2 of the rods e just below the edges of the cans Z, so that when the rollers m^3 meet the cam E^3 and the rods m^2 are forced down they strike the pivotal arms f and cause the shoulders e^2 to strike upward against the cans Z and separate the latter from the disks o^3. As will be readily seen, the last-named operation is performed directly after the disks n' are raised from the tops of the cans Z, as before described; and situated just beyond the point where the loosening is effected is discharge mechanism N, (see Fig. 1,) which comprises a post, d, rising from the table A to a point above the level of the disks o^3, and carrying toward its upper extremity a rigid finger, d', preferably of springy quality, which extends in an inward and forward direction

across the path of the centers of the cans Z and guides the rotating cans toward the post *d*, whence they drop from the machine.

O is a solder-reservoir upon the adjustable frame H′, in rear of the trough H and communicating with the latter through a passage, *c*. Burners *z*′, communicating with gas and compressed-air supplies, are located beneath the reservoir O and heat the solder contained therein. The supply of solder from the reservoir to the trough may be rendered automatic by the mechanism shown most clearly in Figs. 2 and 5. The opening into the passage *c* is closed by a valve, *b*, on the inside of the reservoir, which is raised and lowered by means of a rod, *b*′, extending upward through the top of the reservoir. A lever, P, is fulcrumed at *a* on the top and forward part of the reservoir, and is provided with an upwardly-extending arm, *a*′, to which the upper projecting end of the rod *b*′ is pivotally secured. A spring, a^3, bears upon the arm a^2 of lever P and retains the lever in its normal position and the valve *b* closed. Pressure exerted upon the arm *a*′ raises the rod *b*′ and opens the valve *b*, permitting solder to flow through the passage *c* to the trough H, and, to render the supply automatic, fingers *v*, Figs. 1 and 2, are removably secured to carriers F in the position shown to project therefrom at an angle which will cause them to press the arms *a* down as they pass the latter. Inasmuch as the amount of solder consumed depends upon the size of can being soldered, the flow from the reservoir is gaged to keep the solder in the trough at the proper level by attaching a finger, *v*, to every second or third or fourth frame, F, as required, and, knowing the amount of solder needed for cans of different diameters and the amount discharged from the reservoir at each engagement of a finger, *v*, with the arm *a*′, the supply may be gaged with sufficient accuracy in the manner above stated. The part (as the arm *a*′) to be engaged by a projection, *v*, to open the valve *b* may be located at any other desired part of the reservoir O, and the projection *v* secured to the carrier or support C, if necessary, to engage it.

The machine being designed for use especially where cans in large quantities are manufactured, when adjusted for cans of a certain size it will be usually employed to solder a large number of the cans before being changed to adapt it to a different size. It is preferable that the disks o^3 and *n*′ shall be of but slightly smaller diameter than the cans they sustain, and it becomes desirable, therefore, to change the said disks for larger or smaller ones, as the case may be, whenever cans of a different diameter from those last operated on are to be soldered. For shorter or longer cans the height of the disks *n*′ may be regulated by raising or lowering the rods *n* in their collars *m*′, and the trough H, wiper K, and loosening mechanism M, &c., may be adjusted according to the diameters of the cans.

What is claimed as new, and desired to be secured by Letters Patent, is—

1. In a can-soldering machine, the combination, with a stationary support, of an annular rack, t^4, cam E^2, and rotatory support C upon the stationary support, pivotal can-carriers F upon the rotatory support, having revoluble supports o^3 for the cans and pinions q^2, connected with the supports o^3 and in mesh with the rack t^4, sustaining-rods G, pivotally secured toward one end to the carriers and toward the opposite end permanently engaging the cam E^2, means, substantially as described, for revolving the support C, whereby the cam E^2 shall cause the rods G to reciprocate and thereby oscillate the can-carriers, and the rack t^4 shall cause the pinions q^2 to rotate and thereby revolve the supports o^3, clamps upon the frames F, operating to hold the cans upon the supports o^3, and a solder-trough, H, in the path of the carriers F, near the limit of their outward oscillation, substantially as and for the purpose set forth.

2. In a can-soldering machine, the combination, with a stationary support, of an annular rack, t^4, cam E^2, and rotatory support C upon the stationary support, brackets c^3 upon the support C, carrying rotatory shafts *q*′, each having toward one end a pinion, q^2, in mesh with the rack t^4, and toward its opposite end a miter gear-wheel, q^3, and rotatory shafts *r*, having miter gear-wheels *r*′, in mesh with the wheels q^3, can-carriers F, pivotally supported on the shafts *r* and provided with sleeves *p*′, containing rotatory shafts, each carrying toward one end a miter gear-wheel, o^2, in mesh with the wheel *r*′, and at its opposite end a can-support, o^3, sustaining-rods G, pivotally secured toward one end to the carrier-frame and toward the opposite end permanently engaging the cam E^2, means, substantially as described, for revolving the support C, whereby the cam E^2 shall cause the rods G to reciprocate and thereby oscillate the can-carriers, and the rack t^4 shall cause the support o^3 to rotate, clamps upon the carriers F, operating to hold the cans upon the supports o^3, and a solder-trough, H, in the path of the carriers F, near the limit of their outward oscillation, substantially as and for the purpose set forth.

3. In a can-soldering machine, the combination, with a stationary support, rotatory support, can-carriers, and solder-trough, of a solder-reservoir having a normally-closed discharge-valve automatically opened at intervals by the revolving parts of the machine, substantially as described.

4. In a can-soldering machine, the combination, with a stationary support, rotatory support, can-carriers, and solder-trough, of a gage, I, substantially as and for the purpose set forth.

5. In a can-soldering machine, the combination, with a stationary support, of a rotatory support, C, pivotal can-carriers F upon the support C, provided with revoluble supports o^3 for the cans, means, substantially as de-

scribed, for rotating the support C, a rack, t^4, and cam E^2 on the stationary support, reciprocal sustaining-rods G upon the rotatory support, pivotally secured toward one end to the can-carriers and toward the other end engaging with the cam E^2, pinions q^2 upon the support C, connected with the supports o^3 and in mesh with the rack t^4, whereby when the support C is rotated the carriers F are caused to oscillate and the supports o^3 to revolve, a solder-trough in the path of the carriers F near the limit of their outward oscillation, and a horizontal curved perforated pipe, L, communicating with an air-supply and adjacent to the path of the carriers F, near the limit of their inward oscillation, substantially as and for the purpose set forth.

6. In a can-soldering machine, the combination, with a stationary support, solder-trough, and rotatory support, of can-carriers F, each provided with a wiper, g', substantially as and for the purpose set forth.

7. In a can-soldering machine in which the cans to be soldered are carried by a revolving support, o^3, on an oscillatory frame, F, whereby they are revolved and oscillated into and out of a solder bath, the combination, with the frame F, of reciprocating wiping mechanism K upon said frame, substantially as and for the purpose set forth.

8. In a can-soldering machine, the combination, with a stationary support, rotatory support C upon the stationary support, oscillatory can-carriers F upon the support C, provided with revoluble supports o^3 for the cans, and clamps operating to hold the cans on the supports o^3 to revolve with the latter, and the mechanism for actuating the support C, carriers F, and supports o^3, of wiping mechanism K, secured upon each can-carrier, having a projecting part, i, and a part, i', supporting a wiper, g', and a cam, E^4, upon the stationary support, in the path of the projecting part i, whereby, when the support C is rotated, the engagement of the projecting part i with the cam E^4 advances the wiper g', substantially as and for the purpose set forth.

9. In a can-soldering machine, the combination, with a stationary support, solder-trough, and rotatory support, C, of can-carriers F upon the support C, each comprising a frame provided with a sleeve, p^3, and a support, p', a revoluble holder, o^3, on the support p', a holder, n', upon a rod, n, extending through the sleeve p^3, a lever, m, fulcrumed upon the frame and pivotally secured toward one end to the rod n and toward its opposite end to a rod, m^2, carrying a projection, m^3, a cam, E^3, upon the stationary support in the path of the projection m^3, spring mechanism tending to force the holder n' downward, and loosening mechanism M, fulcrumed upon the can-carrier frame and extending toward one end underneath the rod m^2 and at its opposite end toward the holder o^3, whereby, when the support C is rotated, the engagement of the projections m^3 with the cam E^3 forces each projection m^3, rod m^2, and adjacent end of the loosening mechanism M down and raises the opposite end of the loosening mechanism and raises the holder n' against the resistance of the spring, the resilience of which latter forces the holder n' down when the projection m^3 is freed from engagement with the cam E^3, substantially as and for the purpose set forth.

10. In a can-soldering machine, the combination, with a stationary support, solder-trough, and rotatory support C, of can-carriers F and one or more projections, v, upon the support C, and a solder-reservoir, O, having a discharge-valve, b, normally closed and connected with an arm, a^2, of a pivotal lever, an arm, a', of which latter extends into the path of the projection v, whereby, as the support C rotates, the engagement of the projections v with the arm a' temporarily opens the valve b, substantially as and for the purpose set forth.

11. In a can-soldering machine, the combination, with a stationary support, solder-trough, and rotatory support C of can-carriers F upon the support C, having one or more projections, v, and a solder-reservoir, O, having a discharge-valve, b, rod b', connected with the valve b and projecting above the solder-reservoir, a pivotal lever, P, having an arm, a^2, pivotally connected with the rod b', and an arm, a', extending into the path of the projection v, and spring mechanism retaining the valve b normally closed, whereby, as the support C rotates, the engagement of the projections v with the arm a' temporarily opens the valve b, substantially as and for the purpose set forth.

12. In a can-soldering machine, the combination, with a stationary support, solder-trough, rotatory support, and pivotal can-carriers F, of a cam, E^2, on the stationary support and reciprocal sustaining-rods G upon the rotatory support, pivotally secured toward one end to the can-carriers and provided with projections l^2, engaging with the cam E^2, whereby, when the support C rotates, the cam E^2 causes the rods G to reciprocate and thereby to oscillate the can-carriers, substantially as and for the purpose set forth.

KATIE BROWN,
Administratrix.

In presence of—
J. W. DYRENFORTH,
M. J. BOWERS.