(No Model.) 5 Sheets—Sheet 1.

D. M. MONROE.

CAN SOLDERING MACHINE.

No. 483,234. Patented Sept. 27, 1892.

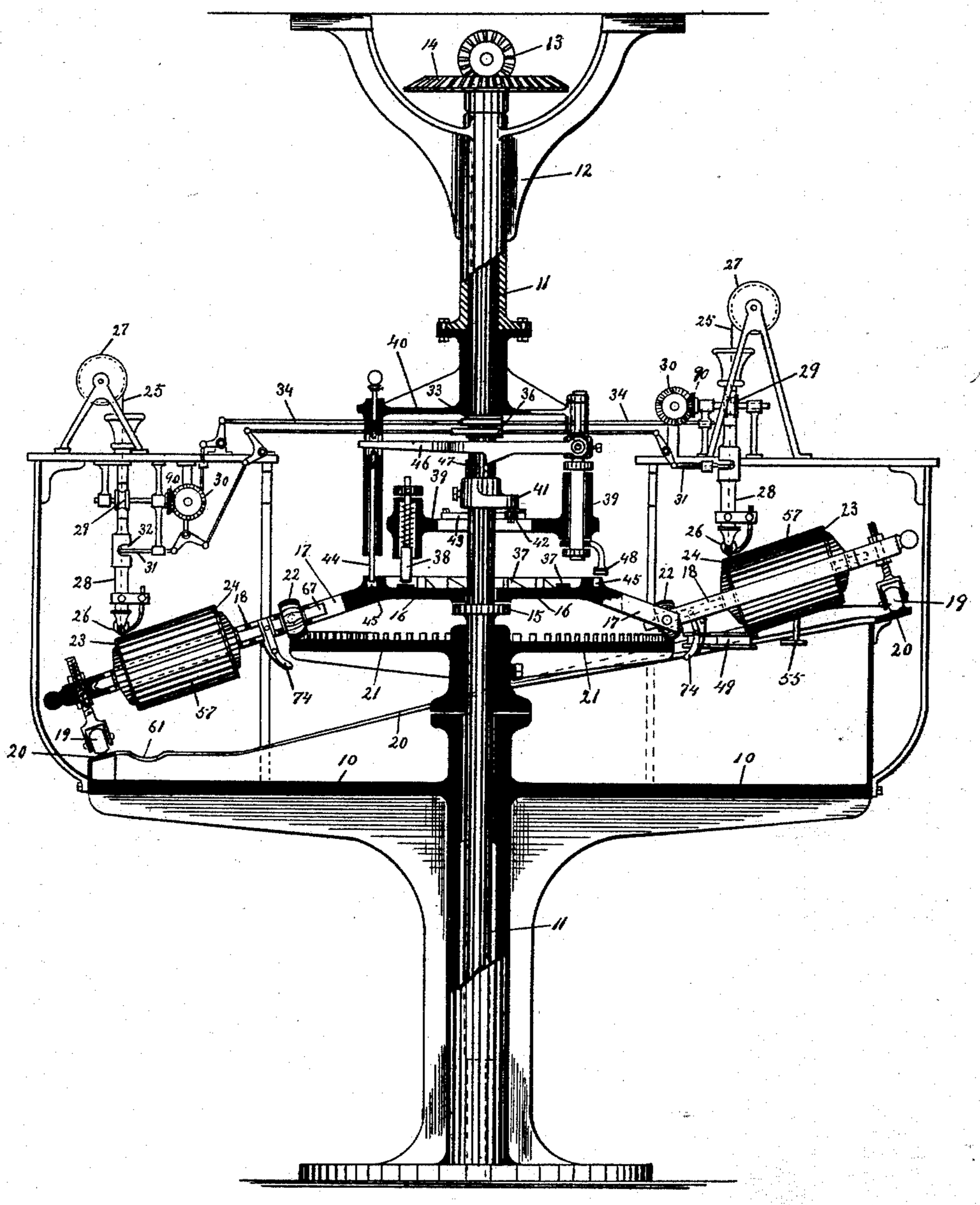

Fig. 1.

Witnesses:
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E. R. Ravly.

Inventor,
David M. Monroe.
By his Attorney.
Wm. L. Bailie.

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(No Model.) 5 Sheets—Sheet 2.

D. M. MONROE.

CAN SOLDERING MACHINE.

No. 483,234. Patented Sept. 27, 1892.

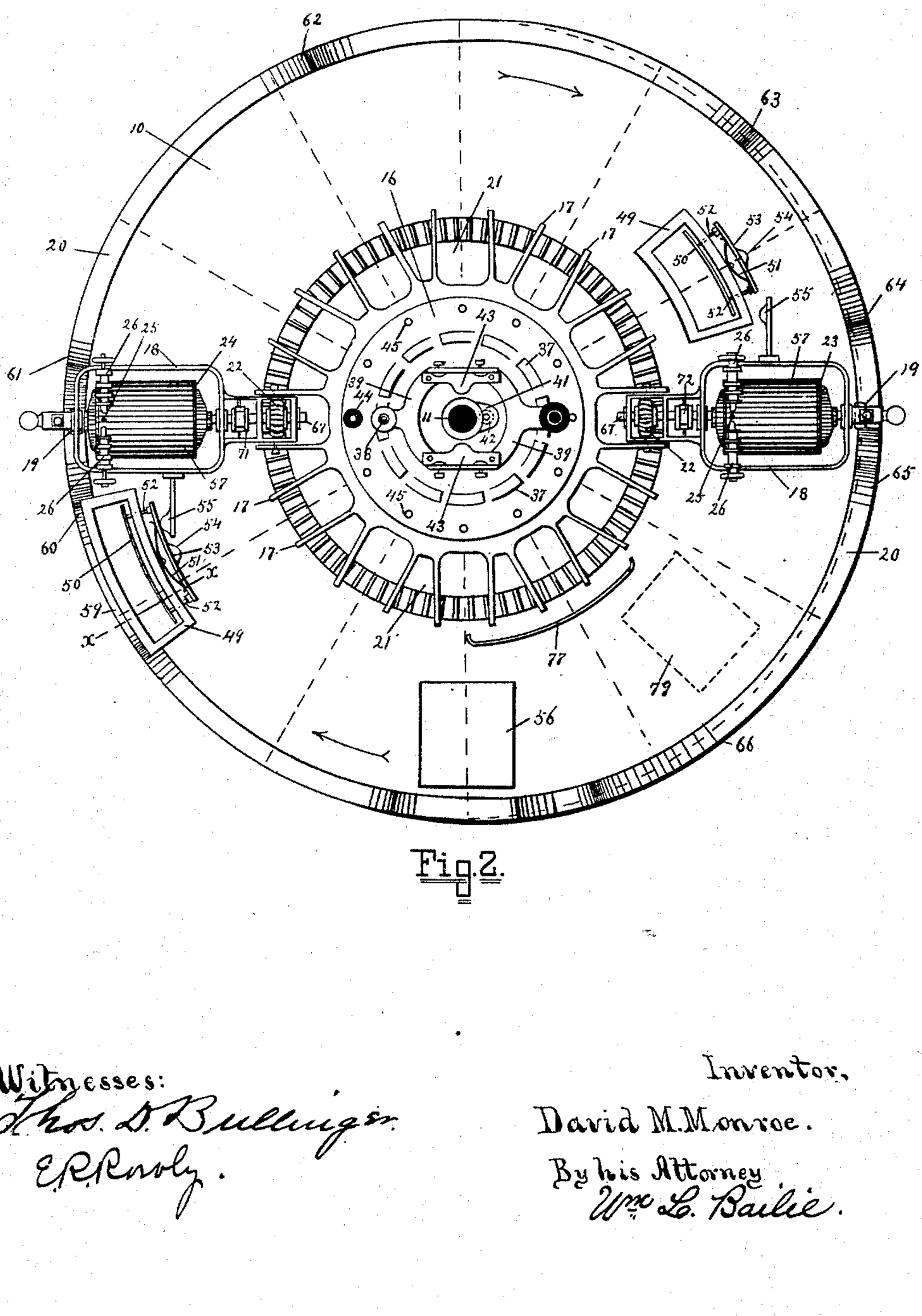

Fig. 2.

Witnesses:
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(No Model.) 5 Sheets—Sheet 3.

D. M. MONROE.

CAN SOLDERING MACHINE.

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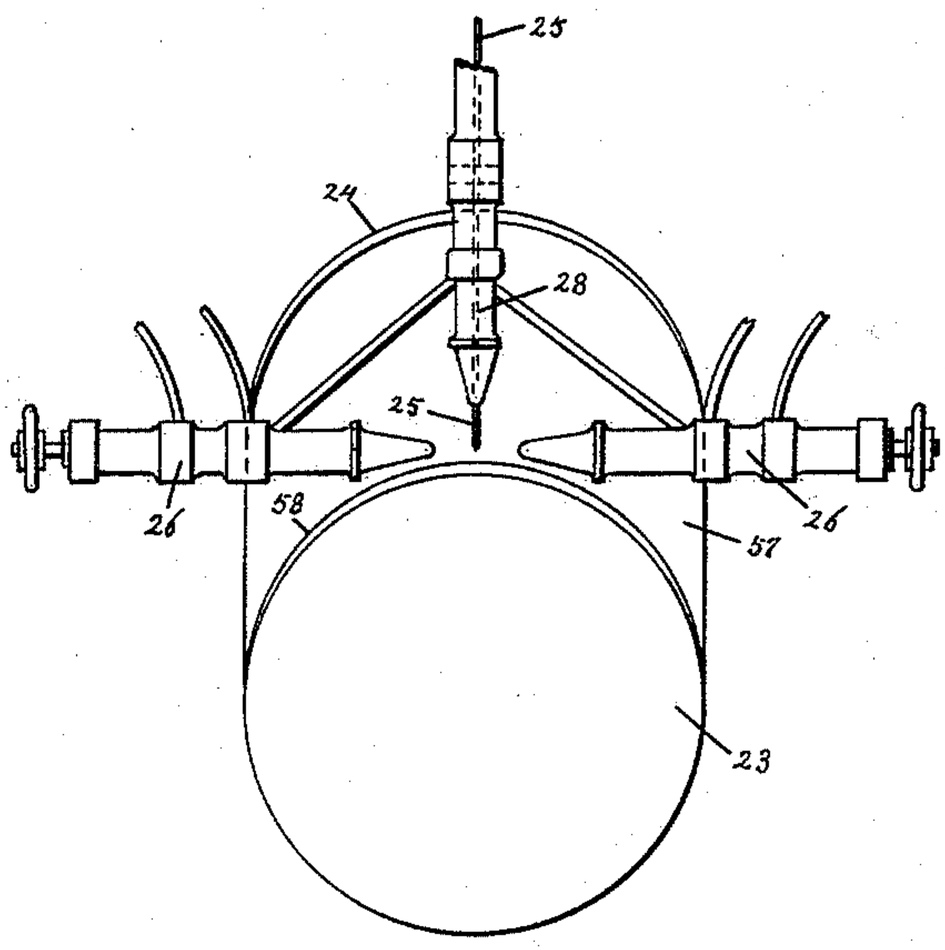

Fig. 3.

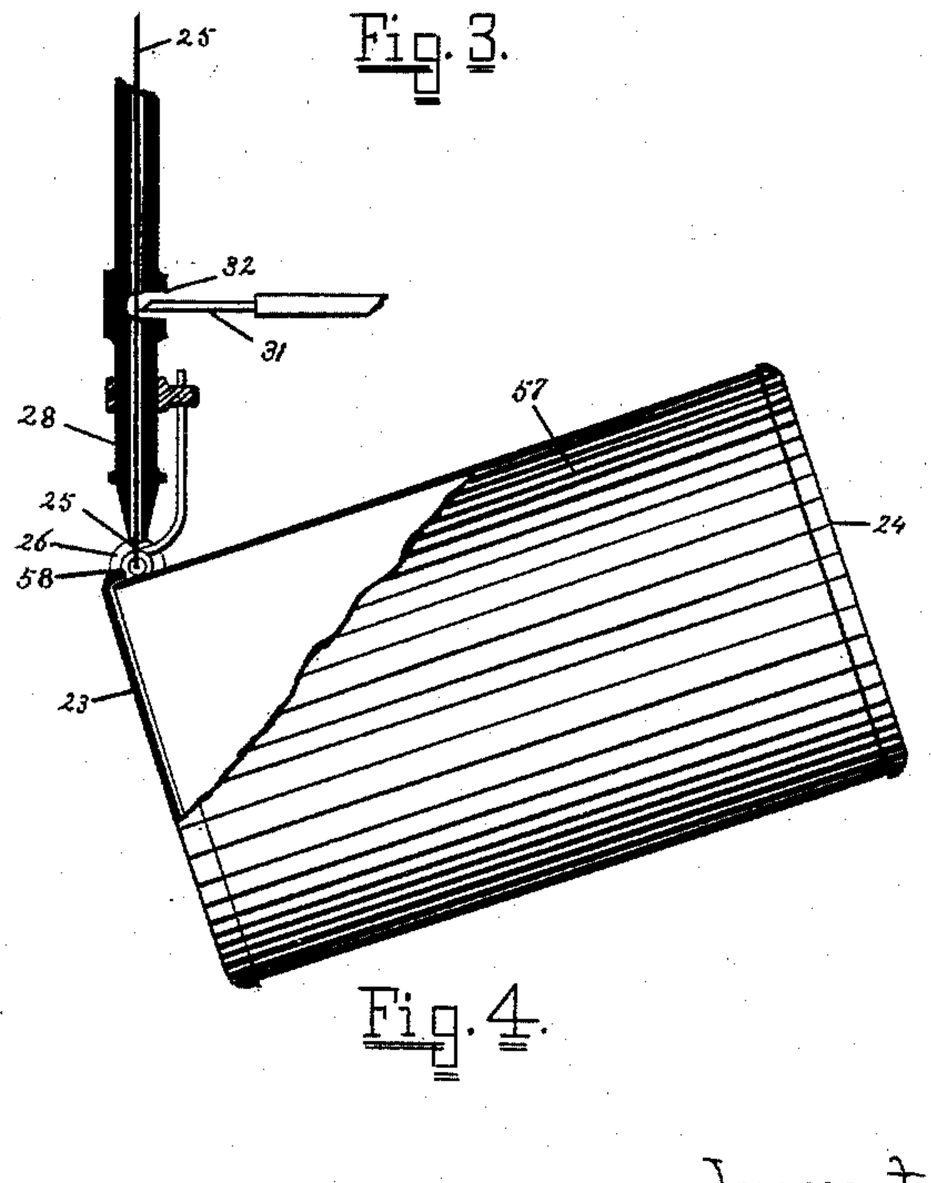

Fig. 4.

Witnesses:
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(No Model.) 5 Sheets—Sheet 4.

D. M. MONROE.

CAN SOLDERING MACHINE.

No. 483,234. Patented Sept. 27, 1892.

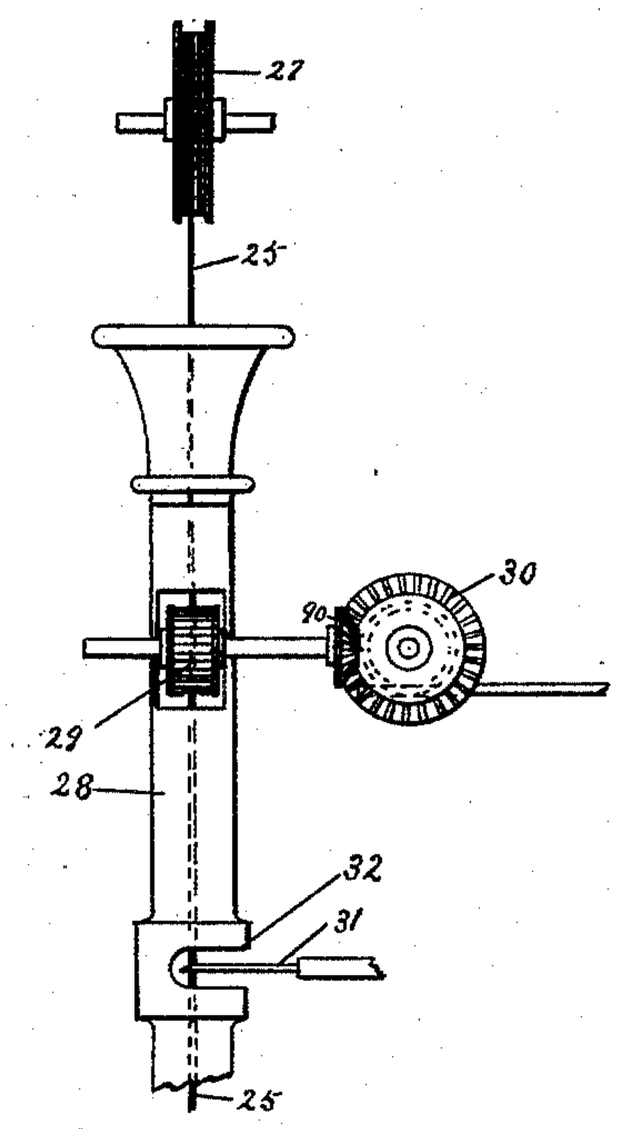

Fig. 5.

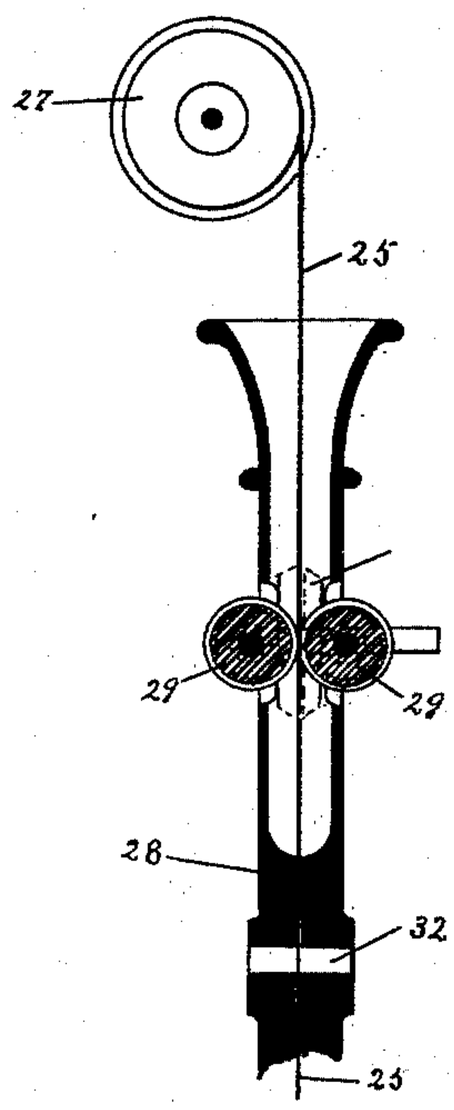

Fig. 6.

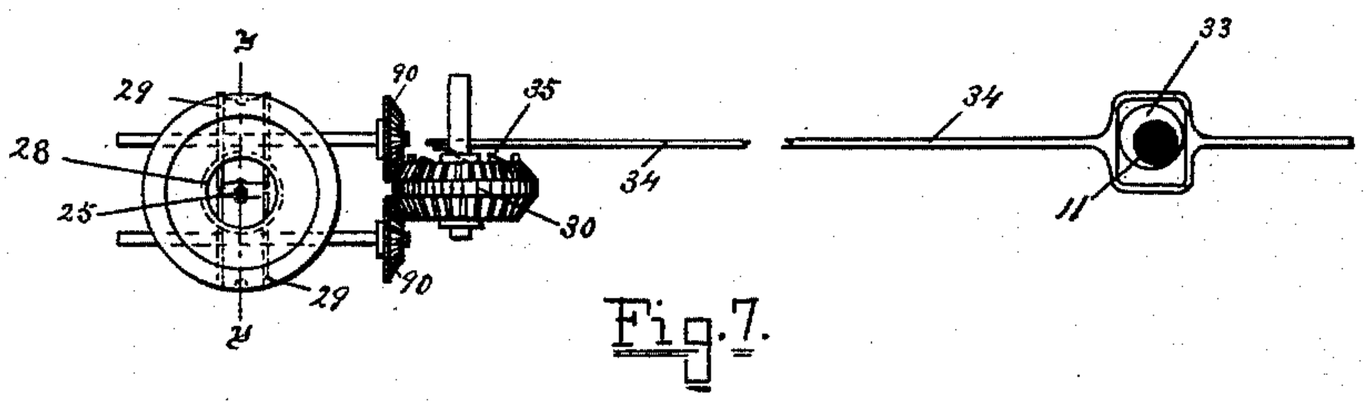

Fig. 7.

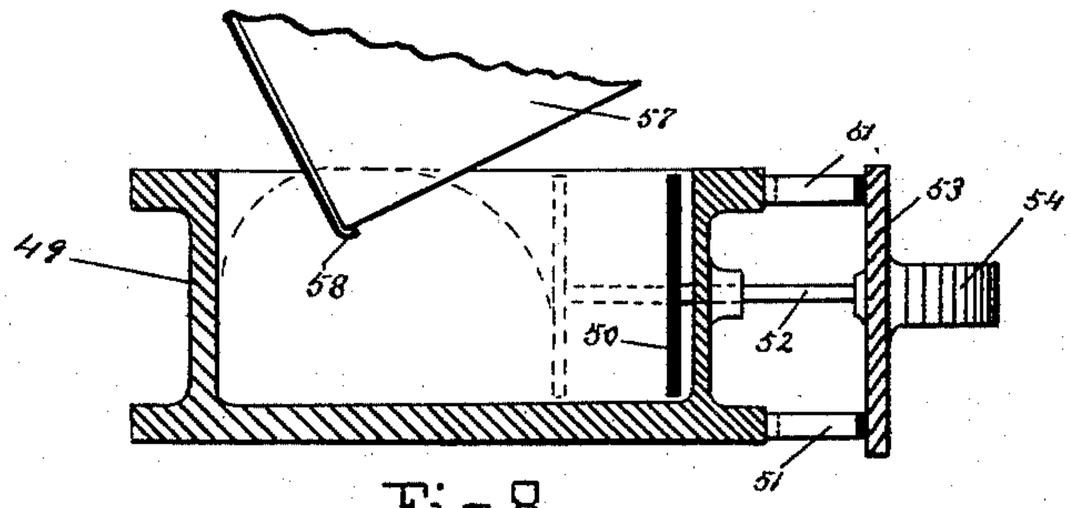

Fig. 8.

Witnesses:
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(No Model.) 5 Sheets—Sheet 5.

D. M. MONROE.

CAN SOLDERING MACHINE.

No. 483,234. Patented Sept. 27, 1892.

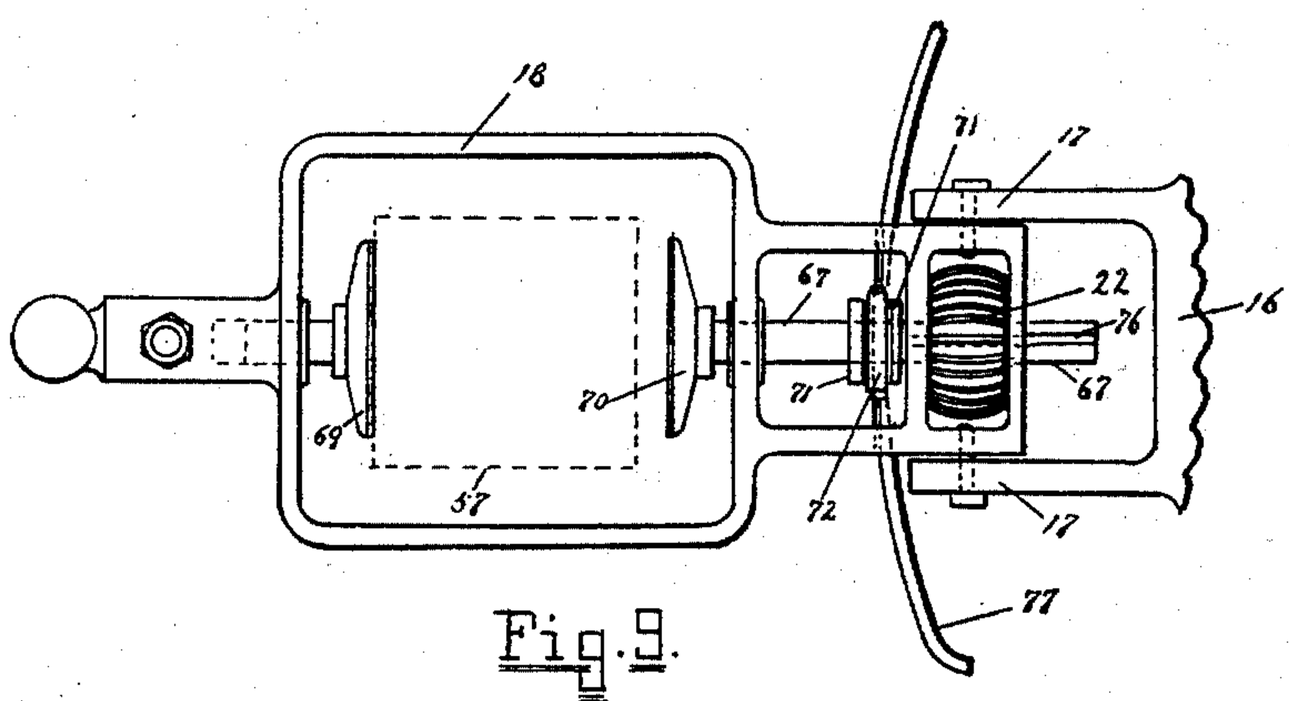

Fig. 9.

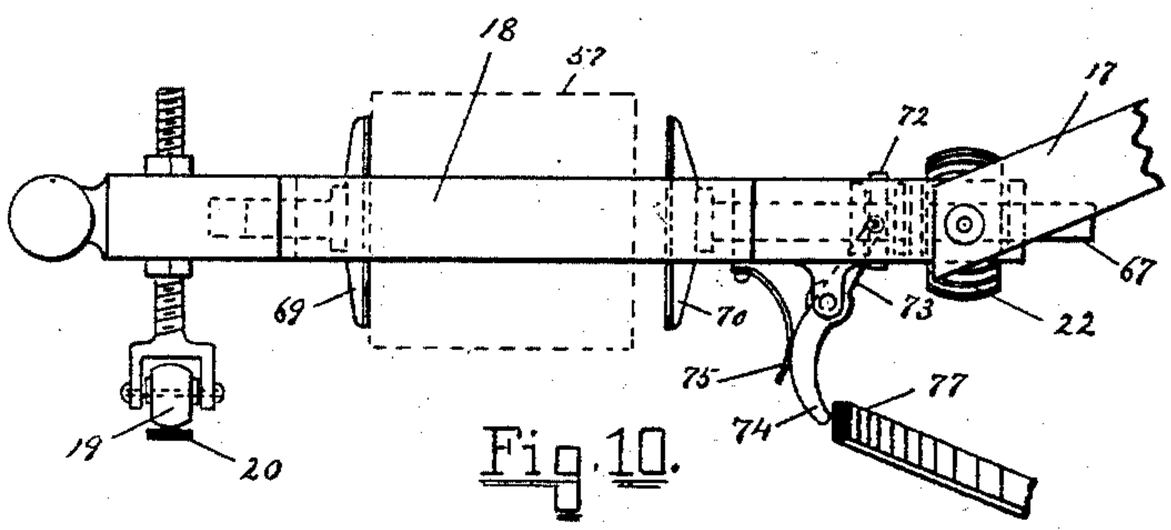

Fig. 10.

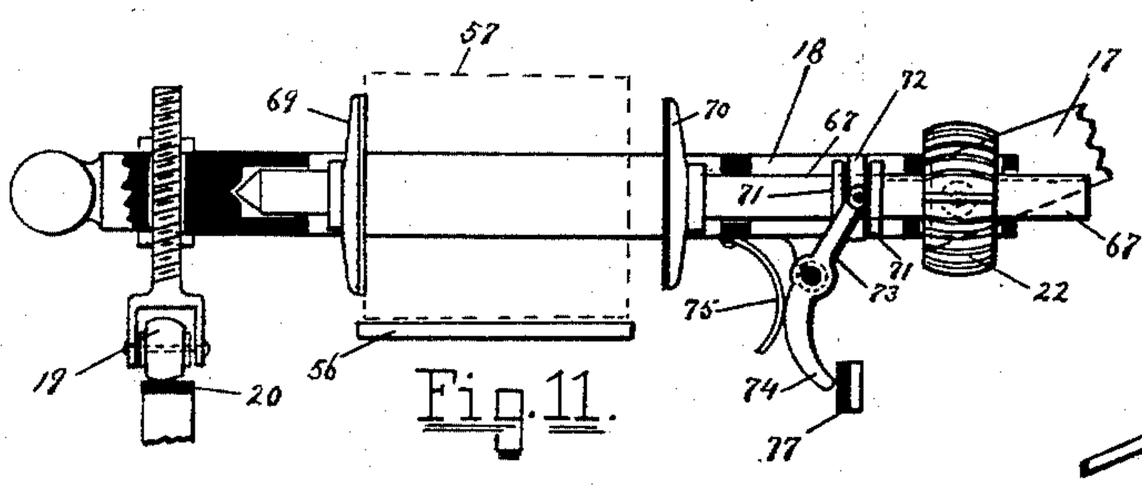

Fig. 11.

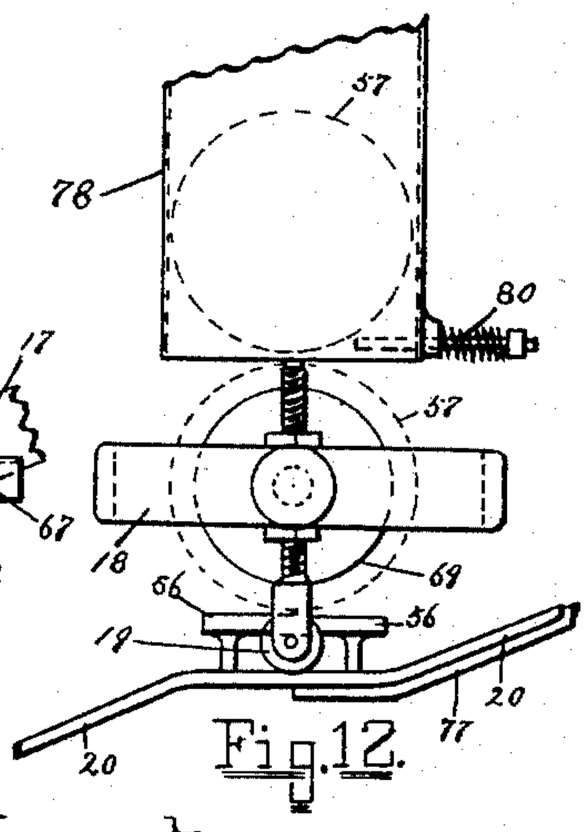

Fig. 12.

Witnesses:
Thos D. Bullinger
E. R. Purdy.

Inventor.
David M. Monroe.
By his Attorney
Wm L. Baillie.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

DAVID M. MONROE, OF BALTIMORE, MARYLAND, ASSIGNOR TO ROBERT TYNES SMITH, OF SAME PLACE.

CAN-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 483,234, dated September 27, 1892.

Application filed January 22, 1892. Serial No. 418,881. (No model.)

To all whom it may concern:

Be it known that I, DAVID M. MONROE, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Can-Soldering Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My present invention relates to an improvement in the can-soldering machine for which United States Letters Patent were granted me on November 30, 1886, No. 353,421, my object being to provide such devices therewith whereby a more economical, reliable, and perfect means may be employed for soldering the heads and bottoms to the body of a can, and which consists of such mechanism whereby, in lieu of the molten-solder baths employed in said patented device, I employ wire-solder that is automatically brought in contact with the can near the seam to be soldered, at which point the said solder is brought within the oxygenated flame of a blow-pipe and thereby melted, a continuous rotating movement being imparted to the can, whereby the solder will be distributed around the seam, an intermittent circumferential movement imparted thereto, whereby the successive cans in the machine will be brought in proper position for the action of the said blow-pipes on the wire-solder and caused to rest there until the operation of soldering is completed, and an undulating track by which the incline of the can is reversed, and thereby permit the operation of soldering both head and bottom, a flux-box of particular construction being provided, whereby the seams are suitably prepared with flux for soldering, all of which I accomplish by the devices hereinafter fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 shows an elevation of the device, partly in section. Fig. 2 shows a view looking down on the device shown in Fig. 1, the upper bearing, fixed plate, stop-lever, and solder-feed device removed. Fig. 3 shows an enlarged detailed view of the can and soldering device, looking on the end of the can. Fig. 4 shows a side elevation of the device shown in Fig 3, the solder-tube and part of can in section. Fig. 5 shows an enlarged detailed view of the solder-feeding device shown in Fig. 1. Fig. 6 shows a sectional view of the device shown in Fig. 5, the section being indicated by the line *y y* in Fig. 7. Fig. 7 shows a view looking down on the device shown in Fig. 5, the reel removed. Fig. 8 shows an enlarged cross-section view of the flux-box, section indicated by line *x x*, Fig. 2. Fig. 9 shows an enlarged detailed view of the can-carrier, looking down thereon, with disks apart for receiving or dropping the can. Fig. 10 shows a side view of device shown in Fig. 9. Fig. 11 shows a similar view of the can-carrier as shown in Fig. 10, a part of frame removed and with the device for placing a can therein. Fig. 12 shows an end view of the devices shown in Fig. 11, a chute from which the cans are supplied shown therewith.

The same numbers refer to the same or similar parts throughout the several views.

The number 10 denotes a table that supports the rotating shaft 11, the hanging bracket 12 providing an upper bearing for the shaft, which is caused to rotate by the pinion 13 and geared wheel 14.

Seated upon the collar 15 and so that the shaft 11 will rotate freely therein is a plate 16, provided with the jaws 17, to which is pivoted the inner end of the can-carrier 18, whereby the can 57 held therein may assume either of the inclined positions shown in Fig. 1, the particular construction of the can-carrier 18 being more fully described hereinafter. In order that the can 57 may be caused to assume the inclined positions shown, there is provided at the free end of the can-carrier the roller 19, that travels upon the undulating and inclined track 20, the incline thereof being such that when the can travels, circumferentially, one-half the way around the track its incline will be reversed, and thus alternately place the head 23 or bottom 24 of the can at the lower point, the object of which will be more fully explained hereinafter in describing the manner of operating.

To impart a continuous rotating movement

to the can, there is fixed to the shaft 11 and rotates therewith the gear-wheel 21, the teeth thereof being on its upper surface, which engage with the toothed pinion 22, attached to the spindle 67 of the can-carrier, whereby the can 57 will be caused to rotate. The devices so far described are nearly identical with those employed and described in my Patent No. 353,421, of November 30, 1886. I now come to that part of the device where other mechanism is required to perform the soldering by another method.

In Figs. 1 and 2 there are shown only two of the can-carriers, which are placed in opposite positions, and in consequence of the incline of the track the cans 57 therein are at such incline that at the left of the machine the head 23 of the can will be at the lower point and at the right the bottom 24 of the can will be in like position, and whereat the seam to be soldered will be under the end of the wire-solder 25 and in such position therewith that the oxygenated flame from the blow-pipes 26 will impinge upon both the can and the end of the wire-solder, as shown in Figs. 3 and 4, the circumferential movement of the can being stopped at this point to permit the operation of soldering the seam, the rotating movement of the can being continued by the geared wheel 21 and pinion 22, as previously described, whereby the molten solder as it is melted from the end of the wire-solder by the blow-pipes will be thoroughly distributed around the seam. There is now fed down from the reel 27 the requisite amount of wire-solder 25 to perform the operation of soldering the seam, the end thereof being brought in contact with the body of the can a short distance above the seam 58, and sufficient thereof projecting from the end of the guide-tube 28 for the oxygenated flame to impinge thereon. That just the requisite amount of solder-wire may be fed down the guide-tube there is provided thereon the feed-rollers 29, Figs. 5, 6, and 7, which are caused to rotate at proper intervals by the gear-wheels 90 and 30, the wire-solder being gripped between the said feed-rollers and the properly-timed intermittent rotary movement drawing from the reel 27 just the required amount of wire-solder, the required length thereof being cut off in the guide-tube by the knife 31, that moves in and out a suitable opening 32 provided in the guide-tube therefor, the part of wire-solder that has been cut off falling down the tube as the end thereof is melted by the blow-pipe, whereby just the necessary quantity of solder will be supplied to solder the seam. To impart this properly-timed intermittent movement to the feed-rollers 29 there is fixed to the shaft 11 the cam 33, Fig. 7, that imparts a reciprocating movement to the rod 34, at the end of which is a suitable pawl or ratchet engaging with the ratchet-teeth 35, provided on the side of the gear-wheel 30, as in common usage, a like cam 36 serving to impart a reciprocating movement to the knife 31, for the purpose stated.

As shown in Fig. 2, the plate 16 is provided with sufficient number of jaws 17 for the attachment thereto of twelve can-carriers 18, the relative positions thereof being at the regular distances apart. (Indicated by the dotted lines in Fig. 2.)

In order that each of the twelve cans held therein may be successively brought in position under the influence of the blow-pipes on the wire-solder and held thereat sufficient time, there is provided on the upper surface of the plate 16 the ratchet-teeth 37, with which engages the pawl or spring-bolt 38, attached to the free end of the pedulum 39, the other end of this pendulum being pivoted to the fixed plate 40, thus permitting a vibratory movement thereof, and through the spring-bolt 38 and ratchet-teeth 37 impart an intermittent circumferential movement to the said plate 16 and the can-carrier pivoted thereto. To impart this properly-timed vibratory movement to the pendulum, there is fixed to the shaft 11 the crank 41, that is provided with a roller-pin 42, Fig. 1, that in the circumferential movement of the crank will come in contact with the jaws 43, provided on the upper surface of the pendulum, Fig. 2, thereby imparting one complete vibration thereto at each revolution of the shaft 11, there being provided the same number of ratchet-teeth 37 (twelve) as there are can-carriers, the length of the arc described by the pendulum and the position of the ratchet-teeth 37 being such that each can will be brought in proper position and there remain during the operation of soldering. To absolutely fix this point of rest of the plate 16, there is provided a stop-pin 44, that moves in a suitable guide extended from the fixed plate 40, the end of the stop-pin engaging in a recess 45, provided on the upper surface of the plate 16, a lever 46, pivoted at some fixed point, being operated by a suitably-timed cam 47 on the shaft 11, serving to raise or lower the said stop-pin and thereby hold the plate 16 rigidly in position during the operation of soldering, and which will be released in time to permit the circumferential movement imparted by the crank 41 and pedulum 39, a brake 48 being provided, which bears upon the plate 16 and thereby prevents any excess of movement from momentum.

In the intermittent circumferential movement of the can just previous to reaching the soldering-point the end of the can to be soldered is caused to travel through and rotate in the flux-box 49, thus preparing the seam with a suitable flux for soldering, which, for sanitary and other reasons, I prefer simply pulverized rosin. In order that this character of flux may be advantageously used, the flux-box 49 is constructed in the form shown in Figs. 2 and 8, a plate 50 being provided therein that is normally held close to the side of the

box by the springs 51, the rods 52 connecting the plate 50 with the outer contact-plate 53, which is provided with the curved projection 54, whereby the said plate 50 will be moved to the position shown by the dotted line in Fig. 8, and thus cause the powdered flux to be heaped up and insure the immersion therein of the seam to be soldered, the movement of this plate 50 being derived from a suitable projecting piece 55 extended from the can-carrier 18, which in the circumferential movement thereof makes contact with the contact projection 54 and causes the plate 50 to be moved inward, the springs 51 drawing the plate 50 back when released from said contact.

In Figs. 9, 10, 11, and 12 are shown detailed views of the can-carrier 18 and the devices thereof by which the can is adjusted and released therefrom. This can-carrier consists of a frame 18, at the free end thereof being a disk 69 free to rotate therein, a spindle 67 being provided, to which is attached the gear-pinion 22 by means of a feather 76, so that the said spindle may be moved longitudinally in the pinion, a disk 70 being attached to the end of the spindle, which, with the disk 69, holds the can in position to be rotated and soldered. That the disk 70 may be raised or lowered from the can to permit its adjustment on release there is provided on the spindle 67 the collars 71, between which is a sleeve 72, a lever 73 being fulcrumed from the frame and terminating in the horn 74, serving to move the spindle longitudinally with its attached disk 70, the horn 74 being backed by a spring 75, serving normally to hold the said disk 70 against the bottom of the can. That this movement of the spindle 67 may be controlled automatically there is provided a contact-bar 77, placed in such position that when the can is finished and to be released from the machine the horn 74 will come in contact therewith, the disk 70 will be drawn out to the position shown in Fig. 10 and the can released therefrom and dropped into a suitable receptacle. This open position of the disk 70 is maintained by the contact-bar 77 until the can-carrier is over the plate 56, and where a new can will be dropped in the carrier from the chute 78, Fig. 12, the plate 56 being so placed that the can dropping and resting thereon, as shown in Figs. 11 and 12, will be in proper adjustment when clamped by the disks 69 and 70, which now follows by the release of the horn 74 in its movement past this end of the contact-bar 77, a suitable spring-bolt 80 being provided at the end of the chute 78, whereby the cans are held in the chute until released by an automatic movement thereof from some suitable part of the device, thus permitting the can to fall upon the plate 56 and be thereby adjusted in position between the disks 69 and 70, as described.

In describing the manner of operating which I now come to I will describe the course taken and the operation performed on one can, which is precisely alike for all the others in the series. The machine having been started by causing the shaft 11 to rotate an intermittent circumferential movement will be imparted to the can, and at the plate 56, when the can-carrier is at rest and in a horizontal position, there will be dropped therein from the chute 78 the can 57. The intermittent circumferential movement of the can is in the direction indicated by the arrows in Fig. 2, and at this point the track is made level for a short distance, as shown in Fig. 12, to permit the proper adjustment in the carrier of the can, a descending movement beginning immediately thereafter and continuing until the seam 58 of the can-head 23 enters the flux-box 49 and assumes the position therein shown in Fig. 8. At this point 59 the track becomes horizontal and continues so until just before the can reaches the end of the flux-box, where a slight rise 60 in the track will cause the can to pass over the end of the flux-box, and the seam thereof is brought under the end of the wire-solder 25, where the flame of the blow-pipe impinges, and is thus in position to be soldered. At this point the crank 41 and pendulum 39 will be in the position shown in Figs. 1 and 2, the stop-pin 44 in its recess 45, and the plate 16 and attached can-carrier will be held firmly in position, the continuous movement of the gear-wheel 21 imparting a rotating movement to the can through the pinion 22, as described, thereby distributing the solder as it is melted from the end of the wire-solder by the plow-pipes, the inclined position of the can causing the solder to work its way well in the seam 58 and at the same time make a clean and perfect finish to this part of the can. When the operation of soldering is completed, the stop-pin 44 will be raised by the lever 46 and cam 47 and the movement of the crank 41 will then cause the pendulum 39 to be vibrated, and the pawl 38 thereof will engage with one of the ratchet-teeth 37 on the plate 16, and the said plate and its attached can-carrier will be moved one-twelfth of its circumferential path, thus bringing the next can in the series under the wire-solder and blow-pipe, when this operation of soldering the head seam is repeated. Immediately after leaving the soldering-point a slight drop 61 occurs in the track to permit the can to pass under the blow-pipe, after which the track is level until the point 62 on the track is reached, when the ascending incline begins and continues until the upper flux-box 49 is reached, which is placed nearer the center of the device and in such position as to be in the path of the seam of the bottom 24 of the can which is now to be soldered. At this point 63 on the track a slight drop occurs to permit the can-seam to be immersed in the powdered flux, a slight rise being provided in the track at 64 to carry the can over the end of the flux-box and bring the seam of the can-bottom 24 in position for soldering under the wire-solder and blow-pipes located at this

point and where the operation of soldering this bottom seam is performed as previously described for the head seam. After leaving this point a slight drop 65 in the track permits the can to clear the blow-pipes when a level movement is made until the point 79 is reached, whereat the finished can is dropped from the machine by the contact of the horn 74 with the bar 77 in the manner described, after which a descending movement begins at 66 on the track and continues until the can reaches the plate 56, when a new can will be placed in the can-carrier from the chute 78, as stated.

From the description just given of the device and its manner of operating it will be seen that twelve cans are in the machine at one time, each at a different stage of the operation and each moving intermittently one-twelfth of its circumferential path at each revolution of the shaft 11, whereby the complete operation of soldering both the head and bottom seams of a can is performed in one adjustment.

Having described my invention and the manner of operating, what I claim, and desire to secure by United States Letters Patent, is—

1. In a can-soldering machine, the combination, with mechanism for giving the can an intermittingly-circumferential movement and continuously rotating it upon its axis during said movement, changing its position vertically during said circumferential movement and also reversing the inclination of its axis when at its lowest and highest points, of two sets of soldering devices above the can, each set consisting of a solder-feeding mechanism and a blow-pipe, the blow-pipe being arranged tangentially to the can-seam, whereby the flame from the blow-pipe will strike the can and the solder at the same time, said sets of soldering devices being arranged at different heights and each can being caused to cease its circumferential movement when under said devices until it has made a complete revolution upon its axis, substantially as set forth.

2. In a can-soldering machine, the combination of a continuously-rotating shaft, an intermittingly-movable plate upon the shaft provided with a series of can-carriers, an undulating track for supporting the outer end of each of said carriers, two sets of soldering devices arranged at different heights, whereby one of the devices will solder one end when the can is at its lowest point and the other device will solder the other end when the can is at its highest point of elevation, each set of said soldering devices consisting of a guide-tube provided with feed-rollers, a knife for cutting the solder, two cams upon the shaft of the machine, and a double set of levers for connecting the cams with the said feed-rollers and the knives, respectively, substantially as set forth.

3. In a can-soldering machine, the combination, with a can-carrier having a rotating and circumferential movement, of a flux-box, a movable plate within the box, and means for connecting the carrier with the plate and moving it within the box, substantially as described.

4. In a can-soldering machine, the combination, with a can-carrier having a rotating and circumferential movement, and provided with a piece 55, projecting laterally therefrom, of a flux-box, a plate therein provided with a projection adapted to be engaged and operated by the piece 55, and springs for retracting said plate, substantially as set forth.

5. In a can-soldering machine, the combination, with an inclined track provided with a level portion, of a can-carrier provided with a support for moving upon said track, a chute from which the can is dropped into the carrier, an adjusting-plate located at said level portion of the track, whereby the can is centrally placed in the carrier, soldering devices, and means for imparting a circumferential movement to the carrier, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID M. MONROE.

Witnesses:
WM. LEBAILIE,
JNO. T. MADDOX.