No. 708,798. Patented Sept. 9, 1902.

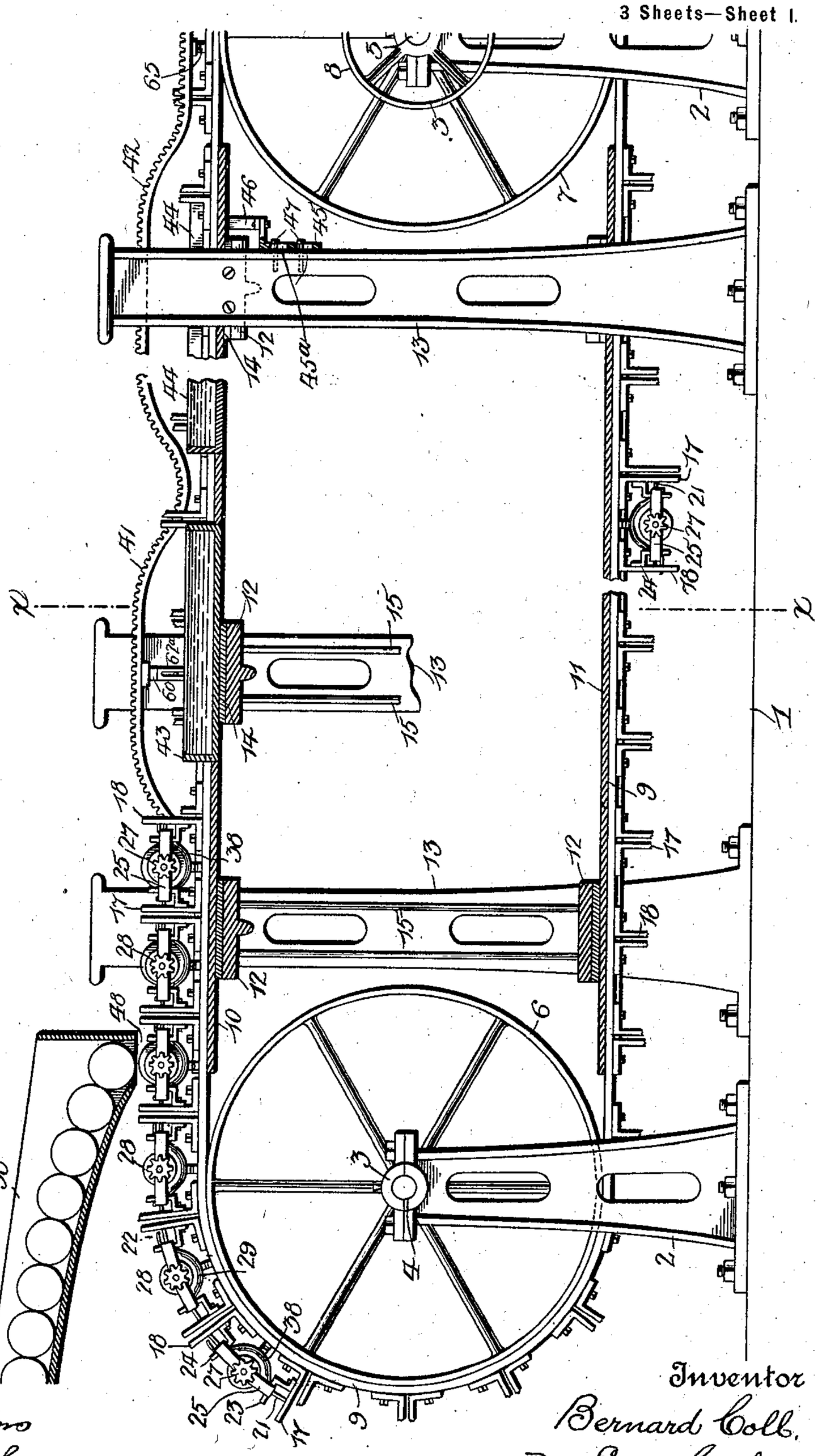
B. COLL.

CAN SOLDERING MACHINE.

(Application filed Nov. 22, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1



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3 Sheets—Sheet 2.

FIG. 2

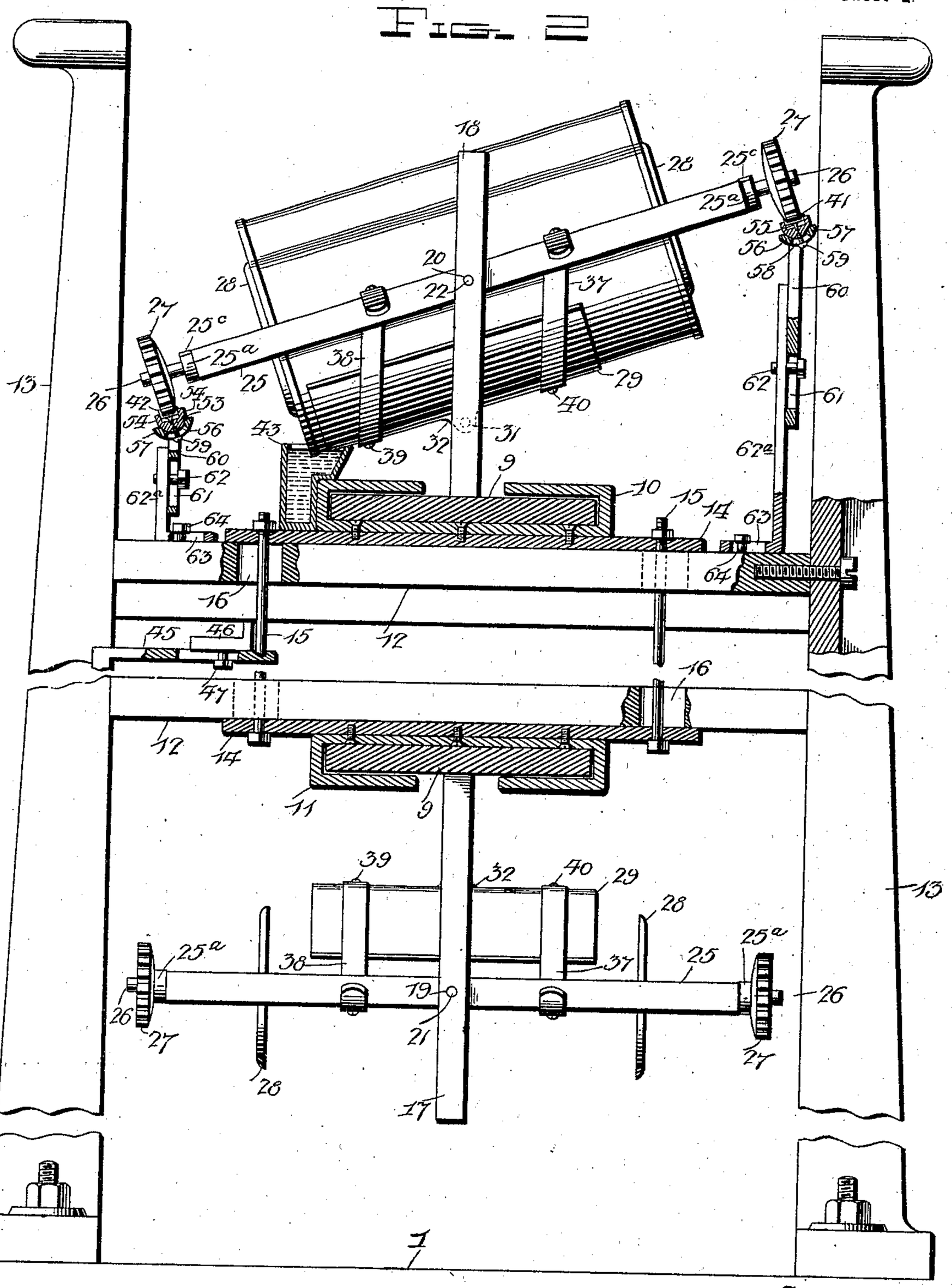

FIG. 1

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FIG. 3

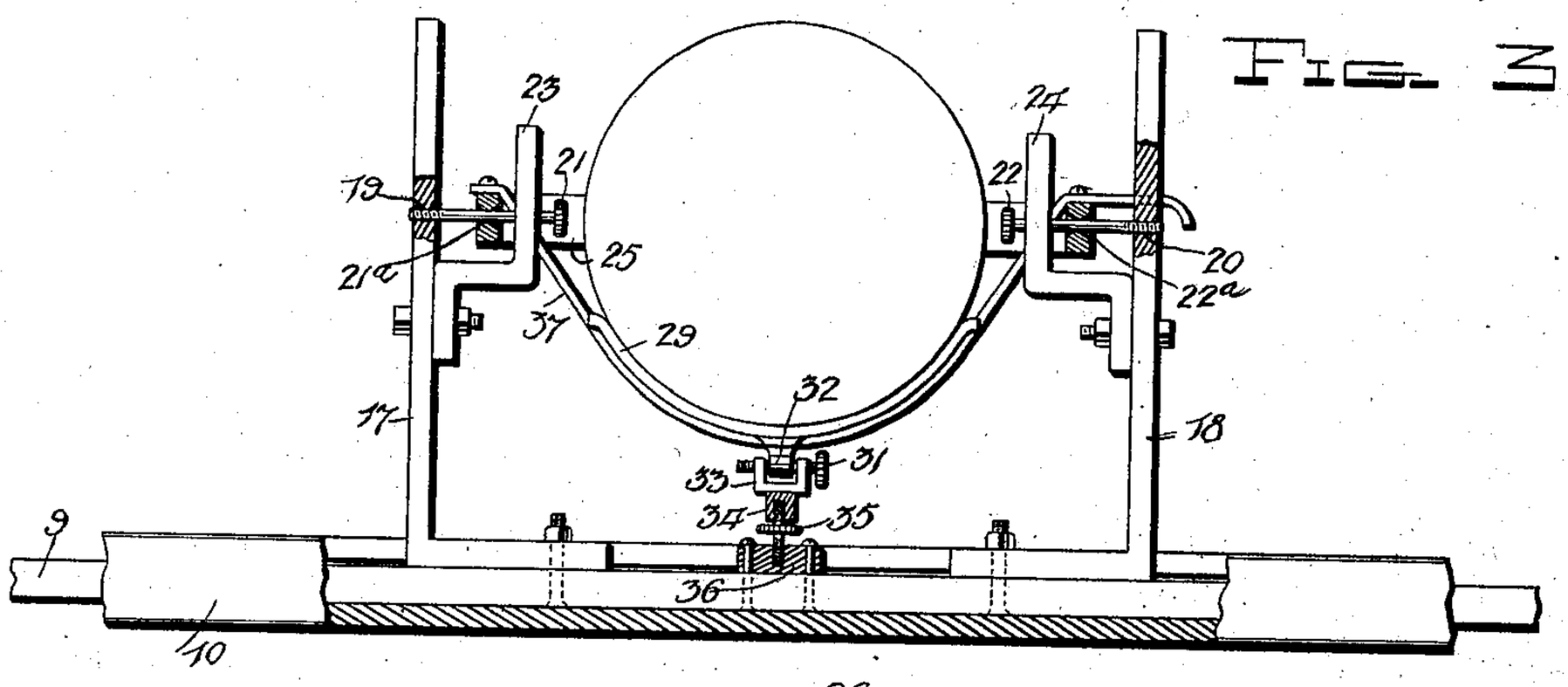


FIG. 4

FIG. 5

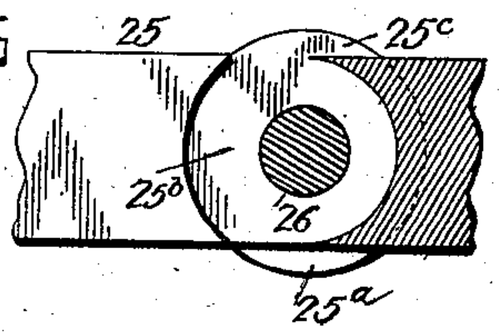
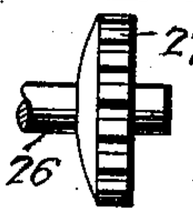


FIG. 6



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UNITED STATES PATENT OFFICE.

BERNARD COLL, OF BALTIMORE, MARYLAND.

CAN-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 708,798, dated September 9, 1902.

Application filed November 22, 1901. Serial No. 83,254. (No model.)

To all whom it may concern:

Be it known that I, BERNARD COLL, 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 invention relates to can-soldering machines; and its object is to improve the mechanism and cheapen the cost of such machines, wherein the cans are caught and held between sets of clamps on carriers adapted to transport the cans, and means are provided for tilting the cans in alternate directions, first soldering one end and then the other, and finally depositing each soldered can, after it has cooled suitably, in a trough or runway, from which they are removed to be tested and shipped.

Each constituent element of my invention is described in detail, and its individual office, together with the mode of operation of the whole, fully explained hereinbelow.

Of the accompanying drawings, throughout which like numerals designate like parts, Figure 1 is a side view of the two end portions of my invention, a portion of the middle being omitted, as it is identical with parts shown. Fig. 2 shows a cross-section of the machine on the line *x x* of the first figure. Fig. 3 shows a side view of the belt-guide and one of the carriers. Fig. 4 shows a plan view of the machine near one end and exhibits the means employed for spreading the pinions apart to discharge or receive a can from or between the clamps. Fig. 5 shows one method of jointing the carrier-frame; and Fig. 6 shows a side view of one of the pinions, a pair of which are borne by each carrier mechanism. For the purpose of full illustration all the views after the first figure are drawn upon an enlarged scale.

Considering Fig. 1, I erect upon any floor or suitable base 1 the standards 2 2, which support bearings 3 3 for transverse shafts 4 and 5. These shafts bear the relatively large belt-pulleys 6 and 7, and the forward shaft 5 is provided with a driving belt-wheel 8. Any convenient means of driving the large belt-wheels may be substituted within the purview of my invention.

Numeral 9 marks the belt which bears the carriers. It may be made of leather or fabric and is preferably a comparatively stiff and strong band. The carrier-belt runs in two guides, (referred to by the numbers 10 and 11.) These belt-guides are elongated troughs, of iron, having the depth of the thickness of the belt and their sides turned upwardly over the edges of the belt. The office of the guides is to compel the belt to run truly in a direct line between the main pulleys or belt-wheels 6 and 7. There are two belt-guides, one above and one below, extending between the belt-wheels. The guides are supported upon or by cross-pieces 12, that are in turn upheld by standards 13, of which there may obviously be any number placed as may be desired. I do not restrict myself to these standards or the like to support the belt-guides and may use any chosen frame construction for that purpose. Fig. 2 shows the cross-section of the guides and the form in which they bend at the sides over the edges of the carrier-belt. In order that the carriers may be adjusted exactly over one another, means for their independent adjustment is provided. (See Fig. 2.) Upon each cross-piece 12 is a bar or plate 14, and the guides are riveted or screwed to the bars. Bolt-rods 15 pass through holes in the ends of the bars and through slots 16 in the cross-pieces. It will thus be understood that both top and bottom guides may be moved simultaneously sidewise to bring them to the middle of the cross-pieces 12, and there is always sufficient play of the bolt-rods 15 in the bolt-holes to permit the alinement of the belt-guides 10 and 11 one over the other near enough for all practical purposes. The bolt-rods 15 clamp the belt-guides in position after adjustment.

Fig. 3 illustrates that portion of the machine called in this specification the "carrier." It is this device which receives and holds the can during the operations of dipping it into the acid and solder baths common to machines of this nature. In Fig. 3 a part of belt-guide 10 is broken away to clear the

view of the feet of the posts 17 and 18, which are riveted or bolted to belt 9, as shown. At equal distances above the belt are the threaded orifices 19 and 20, one in each post. These orifices receive the threaded ends of the pins 21 and 22, the outer ends of the pins passing through brackets 23 and 24, secured to the posts. Pivotally supported by the pins 21 and 22 is the carrier-frame 25. The pins pass through the middle points of the sides of the carrier-frame, (see also Fig. 4,) and it will be observed that there is a certain space allowed between these sides and each bracket and post. In Fig. 3 the sides of the carrier-frame are shown supported midway between the brackets and the posts, and this is the normal attitude when the belt is passing level through the top guide. The carrier-frame 25 is usually a rectangular parallelogram, as shown. Each end of the carrier-frame consists of two portions. As shown in Fig. 5, a joint or knuckle is formed by giving the meeting extremities of the end portions cylindrical heads and recessing one head 25^a, whereby it may receive the relatively thinner and flattened head 25^b of the other portion, securing them together by passing through both heads the pinion-shaft 26. Head 25^b has a projecting lug 25^c, which meets the neck of head 25^a and prevents the end of the carrier-frame from bending downwardly in the middle, while permitting it to bend upwardly in the middle. In Fig. 4 the bifurcated head 25^a is best shown, and between its sides is introduced the single flat head 25^b. Viewed from the side the form of the head 25^a is circular. In Fig. 5 the side of the bifurcated head 25^a nearest the observer has been cut away to show the entering head 25^b, which, as stated, is inserted between the sides of the head 25^a and held in place by the pinion-shaft 26 passing centrally through both heads 25^a and 25^b. At the top of the head 25^b (see Fig. 5) is formed a projecting lug or finger 25^c. When the ends of the carrier-frame are horizontal, the lug 25^c meets the neck of the head 25^a between the sides of that head as drawn. It will be now understood that the ends of the carrier-frame may break upwardly in the middle, but cannot break downwardly, by reason of the meeting of lug 25^c and the neck of head 25^a. I provide the joint or knuckle in each end of the frame 25 to enable the carrier mechanisms to adapt themselves to certain changes of the relative positions of the parts when passing around the pulleys. At such times the carrier-posts project radially and are no longer parallel with each other, and the axes of the pivot-pins 21 and 22 no longer fall in the same straight line, but intersect at a higher point. This point of intersection will be seen to lie in the axis of the pinion-shafts, and it will be noted that the jointed ends of the carrier-frame are bent upwardly, conforming practically to the peripheral curve of the pulley. Coincidently as the tops of posts 17 and 18 separate the pins 21 and 22 are drawn through the holes in the sides of frame 25 somewhat as shown, and this fact explains the length of the pivot-pins and the interval left between the posts and brackets 23 24. The jointing of the ends of frame 25 could be avoided by making the openings to the pivot-pin holes divergently, as shown in Fig. 3 and marked 21^a and 22^a, thus permitting the pins to slant with respect to the sides of the carrier-frame. This construction may be used when the belt-pulleys are of relatively large size. All the carriers and their appurtenances are alike in every respect. I do not limit myself to the particular means shown for jointing the carrier-frame, the devices illustrated being only the preferred form for the purpose.

Number 26 refers to each of the pinion-shafts, and number 27 marks the pinions. Fig. 6 shows the preferred form for the pinions, which are fashioned thicker toward the center and thinner toward the periphery or teeth in order that the pinions may take the spreader more easily, as hereinafter described. The inner ends of shafts 26 are threaded, (see Fig. 4,) and circular clamping-plates 28 are screwed thereon. These clamping-plates may be of any size to suit the can, and, as they are removable, several sizes may be provided and used at will.

Number 29 refers to the trough, located between the carrier-posts 17 and 18, which catches the cans as they fall from the serving-chute 30 (see Fig. 1) and centers them for the action of the clamping-plates. Trough 29 is centrally and pivotally supported on the pin 31, that passes through the block 32, which block is secured to the under side of the trough at its middle point. The pivot-pin 31 is in turn supported by the yoke 33, and this yoke has a threaded stem or base 34, that engages the adjusting-screw 35. This adjusting-screw effects the vertical adjustment of the trough or of another trough of different size desired to be substituted for it. It is my practice to make the carriers to take a can of relatively large size—for example, a three-pound can—and to so construct the machine that other clamping-plates and other troughs to fit either a two-pound or one-pound can may be substituted, and the machine thus equipped for soldering either of those sizes. The acid and solder baths under these circumstances would be suitably raised to the proper positions to receive the rotating can, whatever its size. The lower end of the adjusting-screw 35 is let into a block 36, which is riveted to belt 9, as shown, midway between the posts. Let it be assumed that the parts of the machine are to be changed and one-pound cans are to be soldered instead of the larger three-pound cans. A one-pound can is less in diameter than the three-pound. Consequently its special trough must be supported at a higher point than the three-pound-can trough in order to bring the axis of the smaller can to coincide with that

of the pinion-shaft and carrier-frame. To accomplish this adjustment, the screw 35 is oppositely threaded near its ends, and by turning it in one direction the trough will be raised farther from the belt and lowered by turning the screw reversely.

Numbers 37 and 38 are bands each having one end secured to one side of the carrier-frame and the other end adjustably attached to the opposite side of the carrier-frame, whereby that part of the band depending within the carrier-frame may be lengthened or shortened. The office of the bands is to support the outer ends of the trough 29, maintaining the bottom of the trough always parallel with the carrier-frame. As the trough is attached to the belt by means of a pivot located below the pivots or axial line of the carrier-frame 25, when the clamps grasp a can lying in the trough and the frame tilts to dip the end of the can in acid and solder there will be a movement of can and trough with relation to each other. (See Fig. 2.) As the bands 37 and 38 are attached beneath the ends of the trough by rivets or staples 39 and 40, or otherwise, there is a twisting or bending of the bands with each rocking movement of the frame. When the trough is also connected with the belt, therefore, the bands are necessarily flexible. The carriers are placed closely following each other on the belt 9, and the pinions engage the racks 41 and 42, extending along the sides of the top of the machine. (See Figs. 1 and 4.)

At certain points on both sides of the top of the machine are located the vessels containing acid or molten solder. The acid vessels are numbered 43 and the solder-baths numbered 44. As each pair or series of vessels 43 44 is approached the rack on the opposite side of the machine rises, (see Fig. 1,) the construction being the same in each instance, and the rack on the same side as the vessels drops below the normal level, thus tilting the carrier-frame, trough 29, and clamped can into first the acid and then the molten solder. It will be noted that the can is continually rotating, and the parts are usually proportioned to permit the can to turn twice or more in each bath. I do not limit myself to the form of the vessels holding acid or solder, nor to the method illustrated, consisting of brackets 45, angle-irons 46, and bolts 47, by which the vessels can be adjusted in higher or lower positions. After being dipped into the acid vessel the can must of necessity be caused to rise and pass over the end of the first vessel, descending again into the solder-bath. This intermediary oscillation is accomplished by suitably raising and lowering portions of the racks at the proper points. As the racks pass each couple of vessels they descend and rise, respectively, into their normal plane, (shown at the right of Fig. 1,) and the carriers and cans are again level; but before the carrier-frames 25 are changed from a tilted into a level position sufficient time elapses to permit the solder caught in the usual circular spaces between the tops and sides of the cans to harden. Cans are received by way of a chute 30, having a mouth 48, through which one can falls at a time into a trough 29. While the carriers pass beneath mouth 48 the clamping-plates 28 are held apart by the sliding and rolling contact between the inclined faces of the pinions 27 and the spreaders 49. These spreaders are pieces bent into the form of an arc of a circle and having one long inclined side. (See Fig. 4.) A pair of spreaders is placed above each of the large belt-pulleys. Those above pulley 6 spread the clamping-plates apart to receive a can from mouth 48 and immediately allow the plates to close in and clamp the can, while the pair of spreaders above pulley 7 open the clamps and permit the can to drop out into any receptacle or runway arranged to receive it. The clamping-plates are forced inwardly by coil-springs 50, and when the carriers are returning empty (see lower part of Fig. 2) they are limited in their inward spring-forced movement by contact of pinions 27 and the ends of the carrier-frame. Circular grooves 51 are formed in the outer surfaces of the hubs or center pieces of clamping-plates 28, and like circular grooves 52 are cut in the inner surfaces of heads 25^a of the jointed ends of the carrier-frames, and in these grooves the end coils of springs 50 rest. The plates, shafts 26, and pinions may thus revolve independently of the springs, yet under their influence, as stated. The grooves and spring elements are best shown in Fig. 4. It is essential that the pinions squarely engage the teeth of the racks both upon the level approaches to the rising and falling sections thereof and upon those sections. The racks as they rise or fall curve inwardly, and the teeth are inclined in correspondence with the tilt of the axis of the pinion-shaft. (See Fig. 2.) I find it convenient to have some means for adjusting the racks, which though cast in pieces of certain length and having as nearly as practicable the curve and twist required often need slight modifications of form to bring them into exactly the necessary shape. To accomplish the adjustment of the racks, one series of devices applicable consists of the joint-chair 53, having the raised sides 54 54, between which the meeting ends of two sections of the rack are placed and secured by screws 55. As ordinarily arranged the joints of the racks rest upon the supports. Each chair 53 is given a rounded bottom 56 and rests in a grooved seat 57, that has a transverse slot 58, through which passes the set-screw 59. It will now be understood that the rack may be twisted either way to a slight extent and held so by fixing the chair in its seat. To raise or lower the rack and adjust it toward or from the median longitudinal line of the machine, I employ the slotted plates 60, having the chair-seats at their upper ends, and lengthwise slots 61, through which bolts 62 pass into angle or knee irons 62^a. The foot of

each angle-iron has a slot 63, and through the slot a bolt 64 passes into the cross-piece 12, as shown. Plates 60 and the vertical portions of the angle-irons vary in length in accordance with the predetermined rise or fall of the rack. On a level any suitable support 65 replaces the adjustable supports just detailed.

Having thus described the construction and explained the operation of my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a can-soldering machine, the combination of a belt, belt-pulleys, a belt-guide, the said belt passing along the guide and around the pulleys, the said guide being arranged tangentially to the pulleys and constructed to maintain and guide the belt flatwise horizontally between the pulleys, can-carrier mechanism adapted to be rotated and tilted, and devices fashioned and disposed to rotate and tilt the said can-carrier mechanism, the said can-carrier mechanism being borne by the belt, the said guide being adjustable laterally whereby the said belt and can-carrier mechanism are correspondingly moved, and means for supporting the guide and for clamping it in position.

2. In a can-soldering machine, the combination of a belt, belt-pulleys, and can-carrier mechanism comprising twin posts secured to the belt, a carrier-frame having jointed ends, pivot-pins projecting from the posts, the said frame being pivotally supported and movable laterally on the said pins, a trough arranged to receive a can, the said trough being adjustably connected to the carrier-frame, spring-clamps adapted to hold a can within the said frame, revoluble and longitudinally-movable shafts attached to the said clamps, and means for rotating the shafts and tilting the can-carrier mechanism, substantially as described.

3. In a can-soldering machine, the combination of the belt, upper and lower belt-guides consisting of plates having their sides bent upwardly and inwardly to cover the edges of the belt leaving a space lengthwise in the middle of the belt uncovered, belt-pulleys, the said guides being arranged flatwise and tangentially between the tops and bottoms of the pulleys, devices adapted for adjusting the guides laterally, can-carrier mechanism secured to the middle of the belt, and means for rotating and tilting the can-carriers, substantially as described.

4. In a can-soldering machine, geared racks arranged at the sides of the machine, devices for supporting the said racks and constructed to effect the adjustment of the racks vertically and horizontally, and means carried by the vertical support whereby the said racks may be adjusted rotatively, substantially as described.

5. In a can-soldering machine, the combination of a belt, belt-pulleys, and can-carrier mechanism comprising twin posts secured to the belt, a carrier-frame, pivot-pins projecting from the posts, the said frame being pivotally supported and movable laterally on the said pins, a trough arranged to receive a can, the said trough being adjustably connected to the carrier-frame, vertically-adjustable devices secured to the belt beneath the said trough and attached pivotally to the trough, spring-operated clamping-plates, revoluble and longitudinally-movable shafts secured to the clamping-plates, and means for rotating the shafts and tilting the carrier mechanism, substantially as described.

6. In a can-soldering machine, the combination of a belt, belt-pulleys, and can-carrier mechanism comprising twin posts secured to the belt, a carrier-frame having jointed ends, pivot-pins projecting from the posts, the said frame being pivotally supported and movable laterally on the said pins, an adjustable trough arranged to receive a can, the said trough being adjustably connected to the carrier-frame, spring-operated clamping-plates, revoluble and longitudinally-movable shafts secured to the clamping-plates, pinions fixed upon the shafts, geared racks arranged at the sides of the machine, the racks being oppositely elevated and depressed whereby the engagement of the pinions rotates the clamping-plates and tilts the carriers, and spreaders adapted to separate the pinions for the purpose of receiving and discharging cans, substantially as described.

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

BERNARD COLL.

Witnesses:
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