(No Model.) 6 Sheets—Sheet 1.

L. PETTERSON

MACHINE FOR SOLDERING END SEAMS OF SHEET METAL CANS.

No. 543,401. Patented July 23, 1895.

Fig. 1.

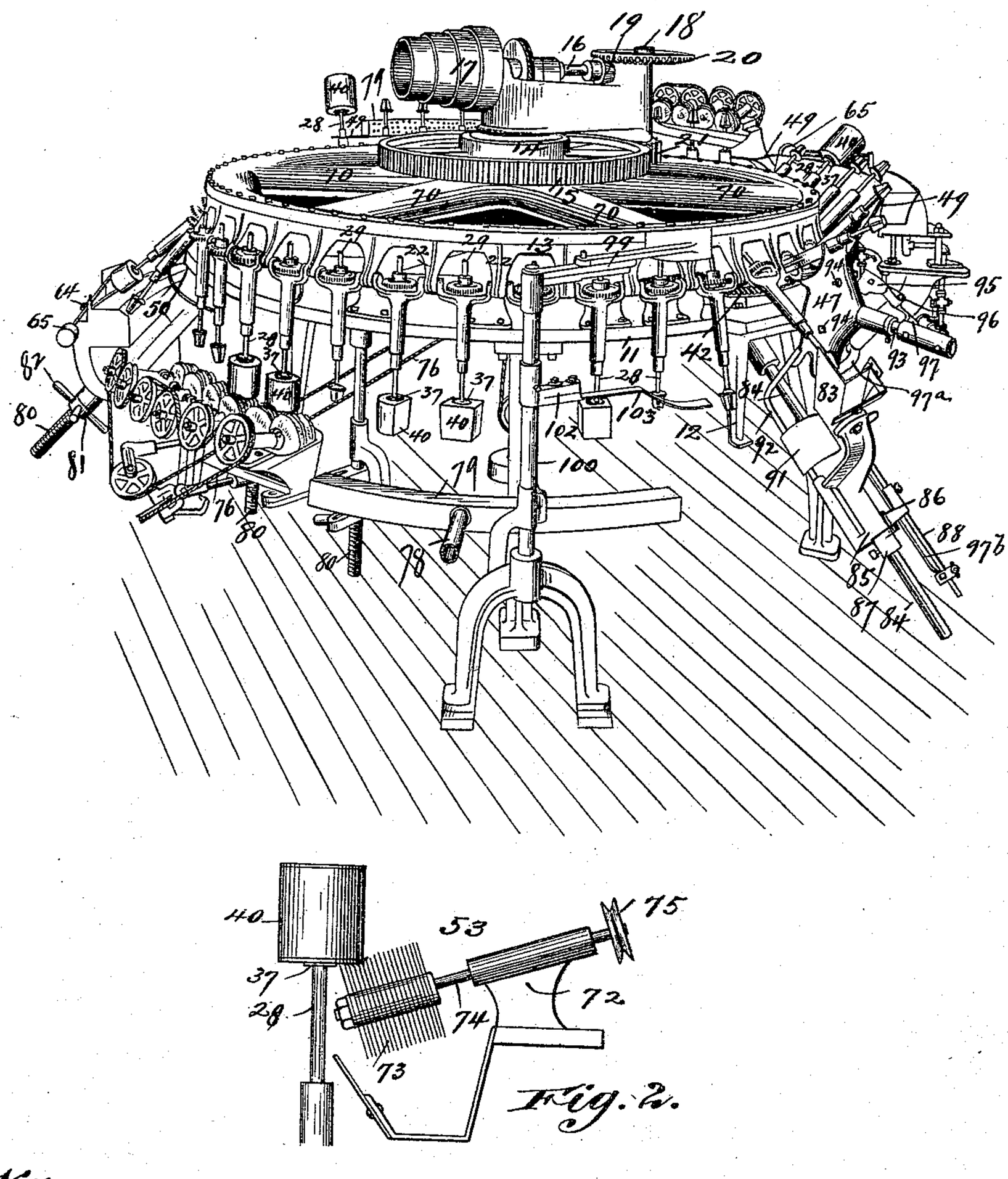


Fig. 2.

Witnesses,
D. D. Mann,
G. Dewey.

Inventor;
Ludwig Petterson
by A. M. Gustle
Atty.

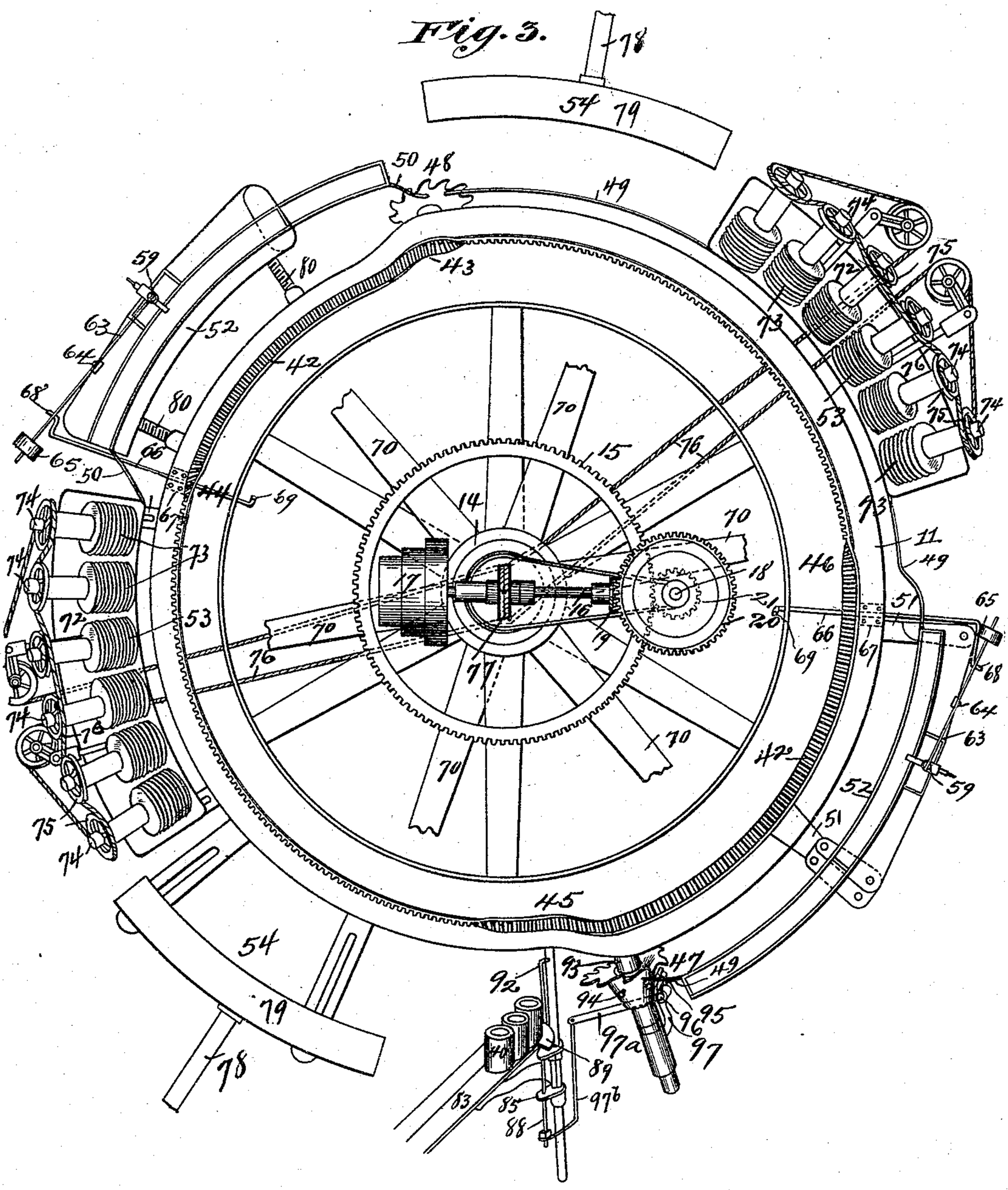
(No Model.) 6 Sheets—Sheet 2

L. PETTERSON.

MACHINE FOR SOLDERING END SEAMS OF SHEET METAL CANS.

No. 543,401. Patented July 23, 1895.

Fig. 3.



Witnesses.
L. Deneut
G. Deneut

Inventor,
Ludwig Petterson
By A. M. Gerstle
Attys.

(No Model.) 6 Sheets—Sheet 3.

L. PETTERSON.

MACHINE FOR SOLDERING END SEAMS OF SHEET METAL CANS.

No. 543,401. Patented July 23, 1895.

Fig. 4.

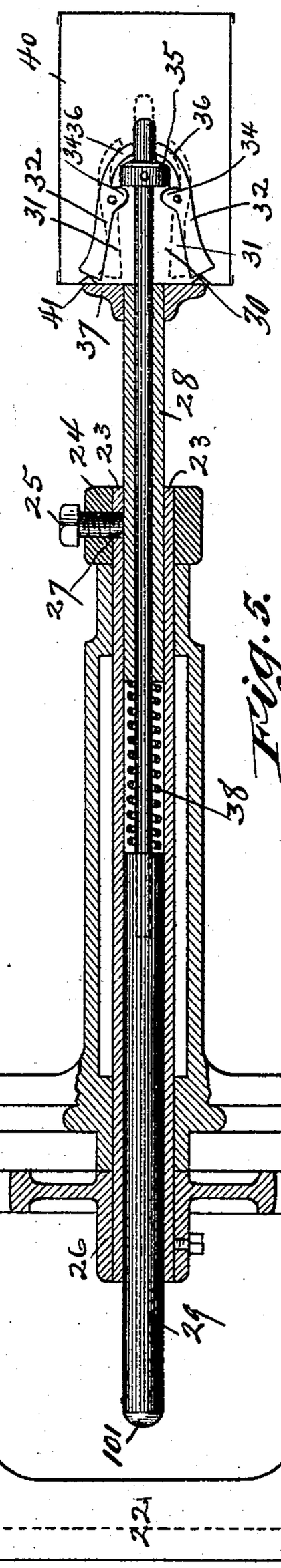
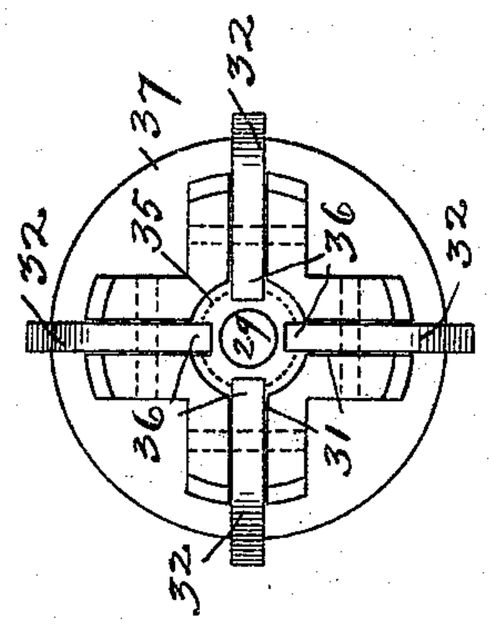


Fig. 5.



Witnesses,
F. D. Mann,
G. Demeut

Inventor,
Ludwig Petterson
By A. M. Gustle
Atty.

(No Model.) 6 Sheets—Sheet 4.

L. PETTERSON.

MACHINE FOR SOLDERING END SEAMS OF SHEET METAL CANS.

No. 543,401. Patented July 23, 1895.

Fig. 4.ª

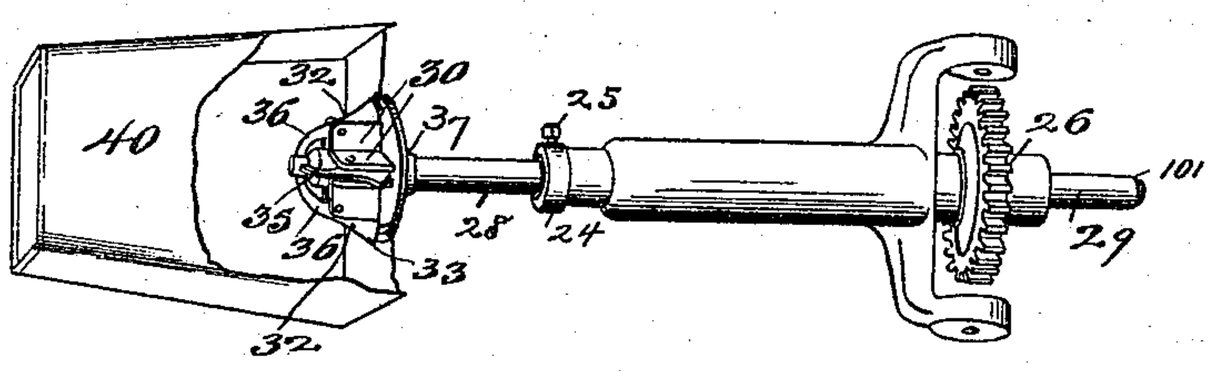
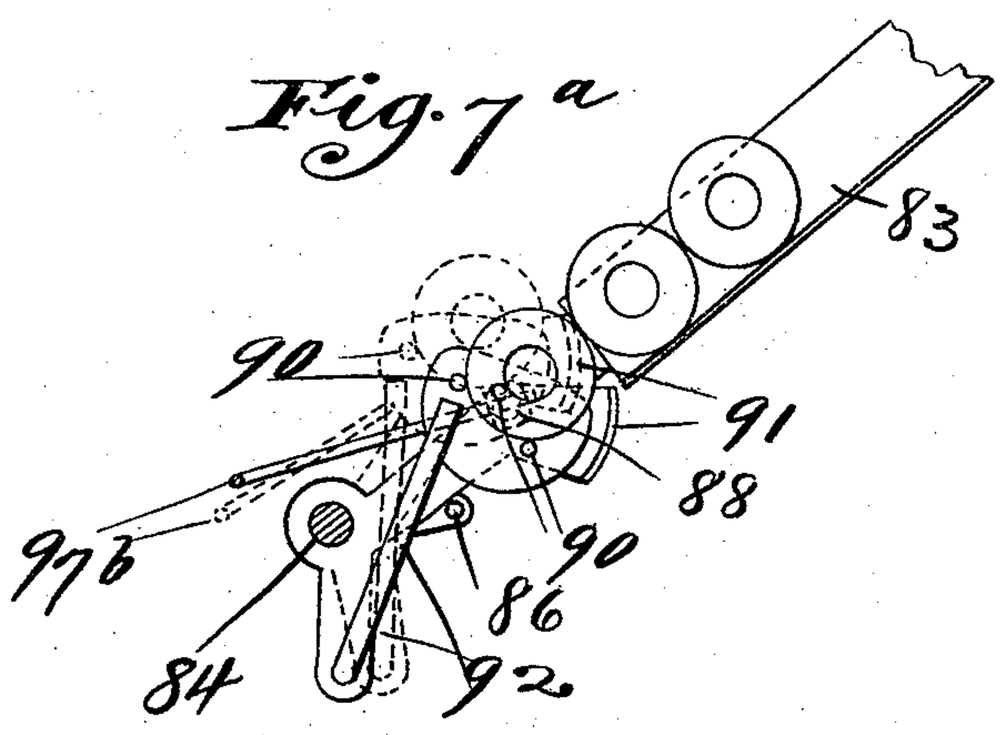


Fig. 7ª



Witnesses,
F. G. Mann
Frederick f Goodwin

Inventor,
Ludwig Petterson
By Offield, Towle Linthicum
Attys.

(No Model.) 6 Sheets—Sheet 5.

L. PETTERSON.

MACHINE FOR SOLDERING END SEAMS OF SHEET METAL CANS.

No. 543,401. Patented July 23, 1895.

Fig. 6.

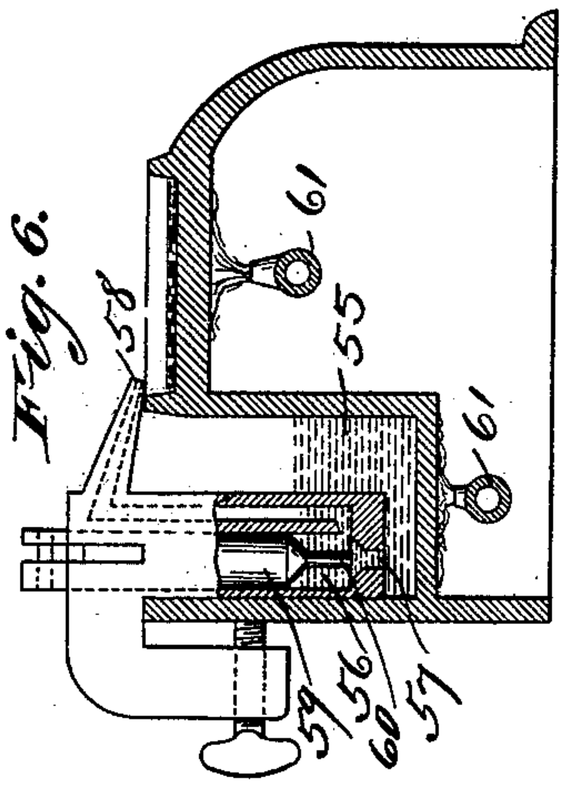


Fig. 8.

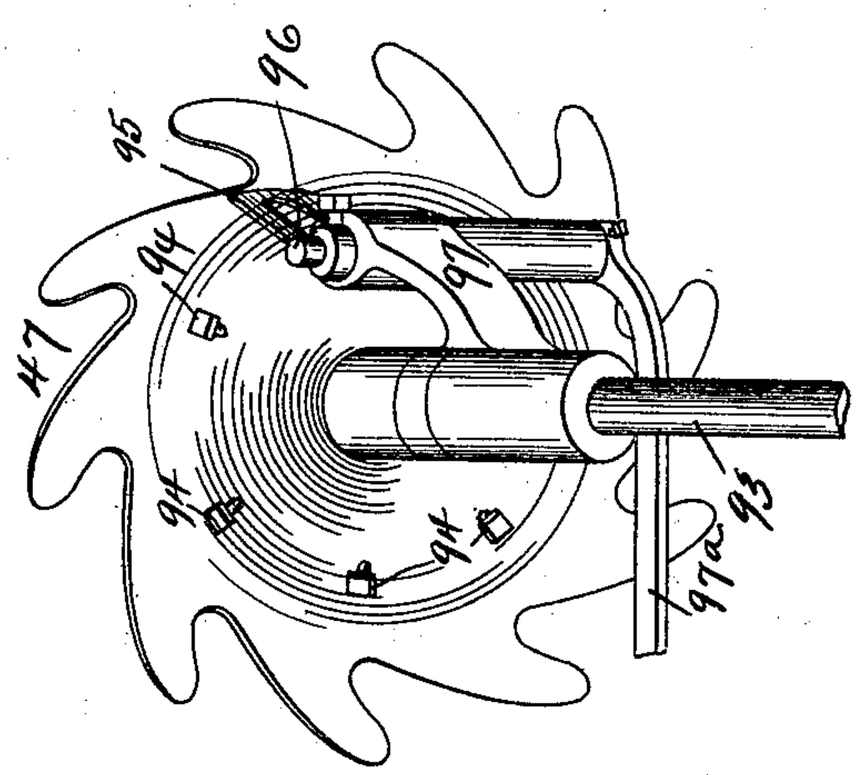
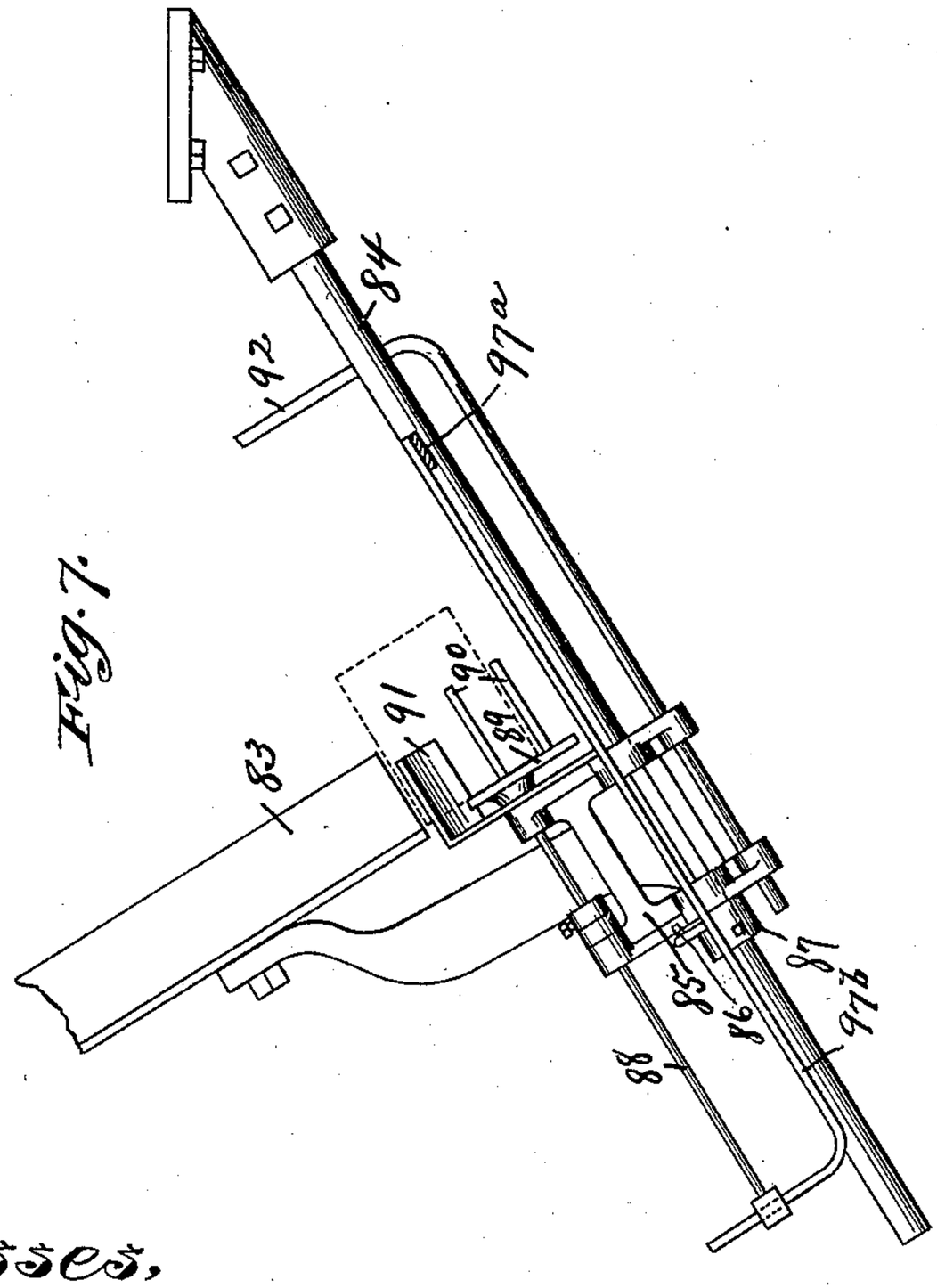


Fig. 7.



Witnesses,
D. S. Mann,
G. Demeut

Inventor,
Ludwig Petterson
By A. M. Gerstle
Atty.

(No Model.) 6 Sheets—Sheet 6.

L. PETTERSON.

MACHINE FOR SOLDERING END SEAMS OF SHEET METAL CANS.

No. 543,401. Patented July 23, 1895.

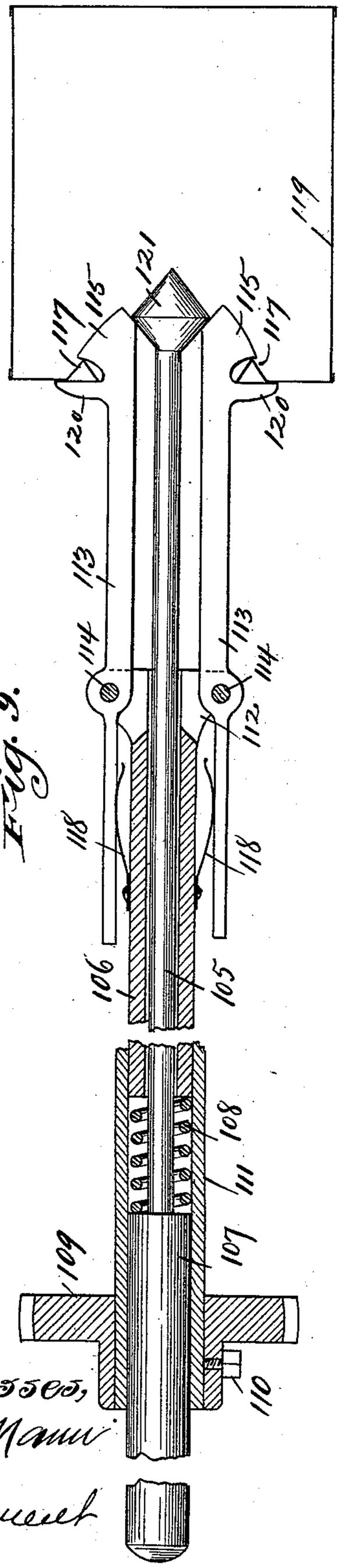


Fig. 9.

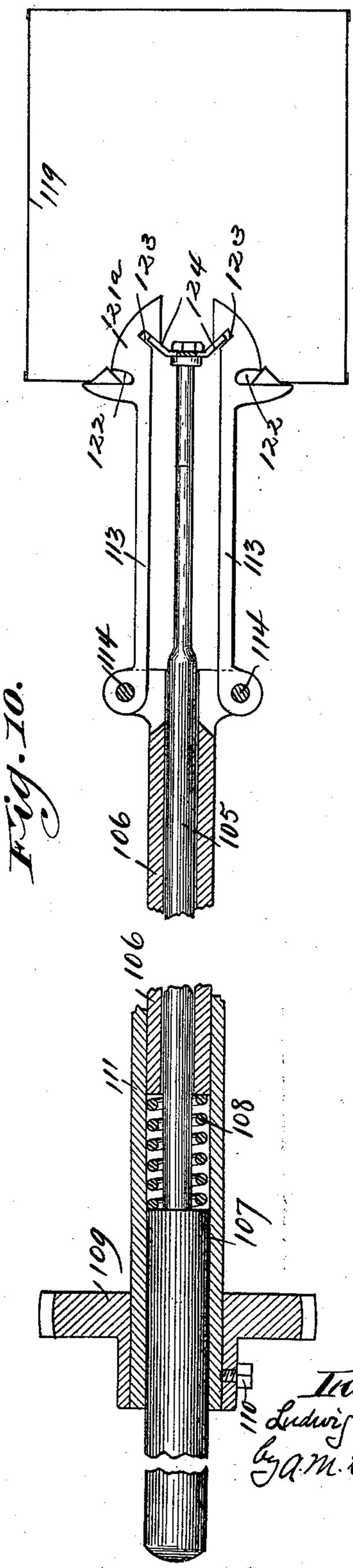


Fig. 10.

Witnesses,
D. J. Manu
G. Dennett

Inventor,
Ludwig Petterson
by A. M. Gerstle
Atty

UNITED STATES PATENT OFFICE.

LUDWIG PETTERSON, OF CHICAGO, ILLINOIS.

MACHINE FOR SOLDERING END SEAMS OF SHEET-METAL CANS.

SPECIFICATION forming part of Letters Patent No. 543,401, dated July 23, 1895.

Application filed March 13, 1895. Serial No. 541,641. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG PETTERSON, a subject of the King of Sweden and Norway, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Soldering the End Seams of Sheet-Metal Cans, of which the following is a specification.

This invention relates to a machine for soldering the end seams of sheet-metal cans, and more particularly to that type of soldering-machines wherein a number of cans are operated upon simultaneously or successively and which employ a rotary carrier-table having a series of can-carriers mounted thereon, each of the carriers being adapted to rotate on a fixed axis and to be tipped or oscillated in order to present the ends of the can to the solder wiping and cooling devices.

A feature of my invention relates to novel means for holding the cans while being operated upon.

Another feature relates to novel means for oscillating the can-carrier so as to present first one end of the can and then the other to the various operations.

Other features of my invention relate to improvements in other parts of the machine and will be hereinafter more fully described, and particularly pointed out in the claims.

Heretofore can-soldering machines have been constructed so that the means employed to hold the can during the various operations engage the can by clamping the two ends or by engaging the body. My holding means differ from these in that I support or hold the can by engaging the head thereof at or about an opening therein, preferably the filling-opening. This opening being common to many of the various kinds of cans the same shaped holding device will serve for many styles of cans. In this machine one set of devices serves to solder square, round, or other shaped cans without changing any parts of the machine, or cans of various shapes may be operated upon at one and at the same time. In some machines soldering-troughs have been disposed on opposite parts of the machine, but at different elevations, and an inclined track has been employed to oscillate the can-carrier arm. By that means first one end of the can and then the other is presented to the soldering mechanism. I dispense with an inclined track and use a combination of means for oscillating the carrier-arm. These consist in part of ratchet-wheels and guides. The latter devices sometimes serve other purposes as well. At certain points I employ guiding-rods, which lie in a horizontal plane throughout their length, but which diverge at places from the mean circumferential path of the carrier-arm.

My machine will admit a wide range in length of cans without requiring any change in the machine, adjustment, when needed, being accomplished by simply raising or lowering the soldering-troughs.

In the preferred construction my machine comprises a suitable supporting-frame having a circular rack thereon, a horizontally-rotating carrier-table, a series of can-carriers rotatably and pivotally mounted thereon, so that each carrier may rotate upon its axis and also tip or oscillate endwise, adjustable acid and solder receptacles, novel means for wiping the soldered joints, simple cooling mechanism, and automatically-operating devices for feeding and discharging the cans. All these are arranged in proper relation to each other and suitable gearing effects the movements of the several parts in due order and relation.

In the accompanying drawings, which are made part hereof, Figure 1 is a perspective elevation of the machine. Fig. 2 is an enlarged detail of part of the wiping mechanism. Fig. 3 is a plan view, the peripheral portion of the rotary table and the carrier-arms being broken away. Fig. 4 is a plan, partly in section, of a can-carrier arm and its supporting-bracket, showing a can held in position by a chuck of preferred form. Fig. 4ª is perspective view of a can-carrier arm and chuck, with a can engaged by the chuck, a portion of the can being broken away. Fig. 5 is a front end elevation of the preferred construction of a chuck-head forming a part of the can-holder. Fig. 6 is a sectional detail through one of the solder-receptacles, showing means for supplying solder to the trough from a reservoir and also means for maintaining the solder in a molten condition. Figs. 7 and 8 are views of means employed in feeding the cans. Fig. 7ª is an end elevation of the can-feeding mechanism, the view being from the center of the machine and an inclined rod being shown in section. Figs. 9

and 10 are partial plan views, partly in section, of modified forms of can-chucks.

In the drawings, 11 represents a stationary skeleton frame of circular outline mounted upon the supports 12. This frame has at its center an upwardly-projecting hollow hub to provide a bearing for the rotary carrier-table 13. The latter has a hub 14, sleeved over that of the stationary frame, and has secured thereon at its upper end the large pinion 15, through which rotary motion is transmitted to the carrier-table.

The gearing for driving the rotary carrier-table comprises the horizontally-arranged driving-shaft 16 with its pulley 17, the vertically-arranged shaft 18 driven through the bevel-pinion 19 and bevel-gears 20, and the pinion 21, which enmeshes with the large pinion 15 secured with the hub of the carrier-table. The shafts 16 and 18 have their bearings in a casting which is bolted to the projecting hub of the frame 11.

The can-carriers are mounted upon the carrier-table 13 and move around therewith. These can-carriers are pivotally mounted in the depending yokes 22, one of which is shown in the detail in Fig. 4. Each of the can-carriers comprises a chuck-frame bifurcated at its inner end and pivoted to the yoke members. This chuck-frame is bored out longitudinally and provides a bearing for the sleeve 23, which has at one end a collar 24, held by the set-screw 25, and on its opposite end the fixed pinion 26. The screw 25 passes through a slot 27 in the sleeve 23, so as to secure it to the sleeve 28. When the pinion 26 is rotated, it causes the sleeves 23 and 28, the collar 24, and set-screw 25 to turn as one piece. The sleeve 28 forms a bearing for the sliding spindle 29 and carries a chuck-head 30. This chuck-head has recesses 31, within which are pivoted the chuck-jaws 32. Such chuck-jaws have tail-pieces 36 and lugs 34, and their engaging ends 33 are preferably beveled or inclined, as seen clearly in Fig. 4. The spindle 29 has a collar 35 thereon, and this collar works between the inwardly-projecting lugs 34 and the inwardly-curved tailpieces 36 as the spindle is reciprocated. The sleeve 28 carries the block or disk 37, which is adapted to engage the outside of the can-head, while the spindle, chuck-head, and chuck-jaws are adapted to pass through the filling-opening and engage the head of the can at or about the said opening. The spindle for convenience of construction is made of two parts of different diameters, the smaller of which is socketed within the larger. A spring 38 surrounds the smaller member of the spindle, being housed by the sleeve 23, and one of its ends bears upon the sleeve 28 and the opposite end upon the end of the larger section of the spindle 29. Normally this spring tends to withdraw the spindle from the chuck-head, and this movement of the spindle is utilized, through the collar 35 thereof engaging with the lugs 34 of the chuck-jaws, to spread them and cause their engaging or free ends 33 to impinge upon the inner surface of the head of the can around the opening therein.

In Fig. 4 the can, which is marked 40, is shown as having a groove 41 surrounding the opening, the metal of the can-head being creased, and the beveled ends of the jaws impinge on the inclined side of this solder-groove.

The can-carriers in addition to their orbital movement have a rotary movement upon their own axis, and are also capable of tipping or oscillating. The rotary movement is imparted through their pinions 26, which travel in mesh with a rack 42, carried upon the stationary base 11, and which rack may be continuous around the frame or sectional, as desired. I prefer to make it continuous.

The rack as a whole is or may be arranged in a horizontal plane with the teeth thereof disposed in different portions of the rack, so that in approximately one-half of the circle the teeth trend to face inwardly, while in the remaining portions the teeth trend to face outwardly. This may be conveniently done by twisting the body of the rack at such parts thereof and in such direction as it is desired the face of the teeth shall turn, as at 43, 44, 45, and 46.

In order to prevent the pinion 26 from disengaging itself from the rack 42, as well as to guide the tilting or oscillating movements of the carrier-arms at the twisted portions of the rack, I make use of the rotating ratchet-wheels 47 and 48 and of the diverging guide-rods 49 and 50. Each guide-rod lies throughout its entire length within a horizontal plane; but the guide-rod 49 is arranged in a plane above the horizontal plane of the rack 42, while the other 50 is arranged in a plane below it.

The guide-rod 49 extends past one of the wiping devices from one ratchet-wheel to the other and the rod 50 extends from the ratchet-wheel 48 to the other wiping device. The guide-rods may rest upon the edges of the solder-troughs, or the edges of the troughs may constitute the guides so far as they extend. The ratchet-wheels 47 and 48 are located, respectively, on opposite sides of the machine and adjacent to the ends of the solder-troughs. The carriers are supported by the guide-rods after passing the ratchet-wheels until they reach the solder-troughs. In passing the solder-troughs the edge of a can on the carrier may roll on the bottom of the trough, and hence support the carrier. When the can leaves the solder-trough, the carrier will again engage the guide-rod.

When the carrier-arm in the course of its circumferential revolution arrives at the ratchet-wheel 48, it engages with one of the teeth of the ratchet-wheel and becomes supported by it, while it also imparts a rotary movement to the ratchet-wheel, and as the wheel revolves it carries the arm gradually from the upper to the lower guide-rod. The can-carrier being pivotally mounted on the yoke members,

as shown at 22, is capable of an oscillating or tilting movement in a vertical plane. The carrier-arm rests near its outward end upon the guide-rods or ratchet-wheels, as the case may be; and as the guide-rod is secured either below or above the plane of the pivot of the carrier-arm the latter will assume more and more of a vertical position when it is in engagement with those portions of the rod that are nearer the pivotal point of the carrier-arm, and, conversely, the carrier-arm will assume a position more nearly horizontal as it is in engagement with those parts of the guides which are farther from the pivotal point. In this manner the oscillation of the carrier-arm is controlled. Whenever there is to be a change in the inclination of the carrier-arm the teeth of the rack 42 are disposed so as to permit the pinion to continue traveling in mesh therewith, as at 43, 44, 45, and 46. The angle of inclination of the carrier-arm being different during approximately one-half its circuit from that of the remainder, the ends of the can may be operated upon respectively at different points in the circuit without reversing or altering the position of the can with reference to its holder.

The machine is so organized that at each revolution of the carrier-table a can is fed to each carrier. The seam at one end is treated to acid, then soldered, the seam wiped, and the joint cooled during the first half of the circuit, and during the latter half of the circuit the opposite end of the can is similarly treated. Therefore the acid and solder receptacles and the wiping and cooling mechanisms are duplicated on opposite sides of the machine. These appliances are in two groups and are disposed at the periphery of the machine on opposite portions of its center and at different elevations. One group may be stationary and the other is preferably adjustable as to elevation, so as to permit operation upon cans of varying lengths. In the drawings the various members of the stationary group are mounted upon brackets 51 of the frame, and the several parts thereof are marked, respectively, as follows: the acid and solder troughs 52, the wiping mechanism 53, and the cooling mechanism 54.

The acid and solder receptacles may be of any desired capacity and supplied with acid and solder manually; but I prefer to provide means for automatically replenishing the supply of either. In this instance these means comprise for the solder-receptacle a reservoir 55, Fig. 6, having a pump therein, said pump consisting of a pump-chamber 56, communicating with the reservoir through the inlet-aperture 57, and having also a delivery-aperture 58. A plunger 59, carrying a plug 60, is adapted to close the inlet 57 as the plunger descends. The plunger in descending also forces the solder through the delivery-aperture 58 into the solder-trough. The raising of the plunger again opens the inlet-aperture and solder flows up into the chamber 56 from the reservoir until the hydrostatic level is established in it and in the pump-chamber. Suitable means for maintaining the solder in a molten condition are indicated by the pipes 61, having jets for burning a hydrocarbon fuel. The upper end of the plunger is connected with a lever 63, fulcrumed to the solder-receptacle at 64. The other end of the lever carries the weight 65, which counterbalances the plunger. A rock-lever 66, secured to the frame 11 by the supports 67, has its ends upturned. One of said ends 68 projects under the rod 63, while the other end 69 extends into the path of the carrier-table arms 70. The arms 70 of the carrier-table in their revolution engage the trip-arm and cause an oscillating movement of the lever 66, which imparts in turn a similar movement to the lever 63.

The wiping mechanism is shown in Figs. 1, 2, and 3. It consists of a series of shafts 74, bearing at one end a number of flexibly-supported disks 73 of cloth. The shafts are journaled on the bracket-trough 72, and their other ends are provided with the sheaves 75, by means of which a rapidly-revolving movement is imparted to the shaft 74 through the cord 76, which is driven by power transmitted through the master-sheave 77, secured to the main driving-shaft 16.

Centrifugal force due to the rapid revolutions of the disks causes them to maintain their positions at right angles to their shafts even though supported flexibly laterally, and hence they are adapted to wipe thoroughly cans of various sizes, as well as cans of irregular shapes.

The disks are disposed so that their edges at least revolve in the path the can-seam travels after it leaves the solder-trough. The extent of embedment of the can in the wiping-disks is readily controlled by means which will hereinafter be described.

The cooling device consists of an air-blast apparatus comprising an air-pipe 78, through which cool air under pressure is delivered to the head or trunk 79, having a slot or a series of openings, through which the air escapes and is directed upon the joints.

The foregoing describes the upper or stationary group of soldering, wiping, and cooling appliances, and the lower or adjustable group are of the same construction except as to their capacity for adjustment. Instead of mounting the last-named group upon stationary brackets, I mount them upon brackets sliding upon rods 80, extending from the supporting-frame 11. These rods are threaded and have adjustable nuts 81, with operating-handles 82. By manipulating these adjusting-nuts the brackets may be moved up or down, thus changing the elevation of the soldering, wiping, and cooling devices. By making them vertically adjustable obviously cans of various lengths may be soldered.

Of course the cans might be forced over the end of the chuck manually; but I prefer to

employ a mechanical device for placing them, which is shown in Figs. 1, 3, 7, and 8. The cans are fed over the chute 83 and are delivered from the lower end of said chute upon a rocking and reciprocating device, by the movements of which they are forced over the chuck-heads of the can-carriers. Upon a stationary inclined rod 84 is mounted the frame 85. The movement of this frame in one direction is limited by the limit-pins 86, carried by the adjustable collar 87. The rocking frame has bearings in its upper end for a reciprocating rod 88, which carries at one end a disk 89 and two pins 90. These pins may be adjustable and are so disposed as to receive and support the can between them.

The rocking frame carries a shield 91, which when the frame is rocked is brought into position to prevent the discharge of the cans from the chute while the can resting upon the pins is being placed upon the chuck-head. The frame 85 is rocked by means of the bent arm 92, the crank of which is engaged by a portion of the can-carrier arm in its circumferential revolution. By this movement the can is rocked into line with the chuck-head, and in order to force it over the chuck-head an endwise reciprocation of the supporting-disk and pins is necessary. This is accomplished by the intervention of the ratchet-wheel 47, which is rotatably mounted upon a stud 93. The body of this ratchet-wheel 47 is slightly conical, as shown in Figs. 1 and 8, and has the tripping projections 94, which are made to engage a trip-arm 95 carried upon a rocking pin 96 mounted in a bearing formed in a bracket-arm 97, which bracket-arm is supported by the stud 93. The pin 96 has a pitman 97^a secured thereto, and this pitman is connected to a rod 97^b, which has its upturned end connected with the rod 88. As the can-carriers pass the bent arm 92 in succession each one will engage said bent end and rock the frame into position to bring the can in line with the chuck. A preceding can-carrier will at the same time engage a tooth of the ratchet-wheel 47, and, through the mechanism previously described, cause an endwise reciprocation of the rod 88 and the forcing or snapping of the can over the head of the chuck, the spring upon the chuck-spindle causing a reciprocation of said spindle and the spreading of its jaws, so as to firmly engage the cans about the mouth of the filling-opening. As the can-carriers pass over the end of the bent arm 92 the latter and the rocking frame, with which said arm is connected, will drop back into place, the shield will be removed from in front of the chute, and another can will fall upon the pins.

The can-discharging mechanism comprises a cam-block 99 mounted upon the independent frame 100 in proper position to engage the rounded projecting end 101 of the spindle 29, causing an endwise reciprocation of the spindle, and, through the collar 35 thereon, engaging the tailpiece 33 of the chuck-jaws. The latter will then be folded into the recesses of the chuck-head, so as to release the can. The frame 100 also carries the arm 102, and at its extremity is secured the spring 103. This spring is adjusted to bear upon the head of the can immediately after the chuck-jaws release their hold upon the can, and the downward pressure of the spring forces the can off the chuck-head should gravity not already have caused the disengagement of the can from the holder.

The complete operation of the machine may now be understood. As the can-carrier table revolves the cans are successively automatically placed upon the can-carriers, as previously described, and each can-carrier with the can held thereon next engages the ratchet-wheel and thereby operates the mechanism to place a can upon a following carrier. The passage of the carrier over the ratchet-wheel changes the inclination of the carrier-frame, so that instead of projecting below a horizontal plane it is raised at an angle above such plane, the two positions being shown in Fig. 1 at opposite sides of the view. The disposition of the teeth on the rack allows the pinion of the carrier-arm to run from the outwardly-projecting to the inwardly-projecting teeth of the rack. As the pinion revolves upon the rack it gives a like rotation to the can upon the chuck, and thus the end seam of that part of the can having the filling-opening is revolved through the acid and solder appliances. The can now leaves the support yielded by the solder-trough and the revolution of the carrier-table causes the carrier-arm to engage with the converging guide-rod, and this changes the inclination of the carrier-arm to an almost if not quite perpendicular position. The teeth of the rack at this point are so disposed as to have their faces turned inwardly, and while in this position the carrier-arm moves the can past the wiping and cooling mechanism, being in part sustained in that position by the guide-rod, which extends only to the end of the cooling mechanism. One end seam of the can has now been operated upon and finished. The pinion traveling in mesh with the rack next reaches the twisted part, where the teeth begin to turn and face outwardly. This causes the carrier-arm to swing in its pivotal bearings from the vertical position and fall upon the ratchet-wheel, which latter as it revolves gradually lowers the carrier-arm to the inclined position shown at the extreme left of Fig. 1. The unoperated-upon end seam of the can is now in the proper position to engage the second group of acid and solder appliances, and after having been treated therein the guide-rod and twisted rack lower the cans to the perpendicular position, in which they pass in turn over the wiping device and into the reach of the cooling-blast. The spindle next engages the releasing cam and spring and discharges the can.

All of the operations of the machine are

automatic and the same appliances are adapted for use with different shapes of cans and upon all sizes of cans which have filling-openings of substantially the same diameter, and therefore the can-holding mechanism requires no change or adjustment for different shapes or lengths of cans. The provision of adjustable soldering appliances permits the soldering of cans of widely-different lengths without any change in the can-holding mechanism.

It will be understood that the specific construction hereinabove described does not constitute the essential features of my invention, except as pointed out in the claims, and that modifications of the structural details may be made. For example, the can-holding devices may be varied by having the chuck expansible, so as to engage the edge of the opening instead of engaging the inside of the head of the can. The mechanism engages only one head of the can and holds it securely while it is being operated upon in the machine. Essentially, the mechanism engages only one part of the can—the head. Many machines are arranged to hold the can by clamping the heads, thus requiring separate adjustment to clamp various sizes; and these clamps also absorb heat from the solder as they drag through the trough, and, again, when heated present additional material to be cooled. Other devices to hold the cans have holding means engaging the body of the can; but I would find objection to this method on account of the danger there is of the mechanism spreading, squeezing, or straining the can as it is suddenly thrust into engagement with the can-body.

The mechanism which I have invented is intended to engage only the head, and I have represented several forms of means to that end. Those shown in the drawings present devices adapted to engage the head about the filling-opening.

I have also shown in Figs. 9 and 10 two forms of means for clamping the can that I deem of special merit as modifications of my preferred form of construction. These drawings do not show complete can-carriers; but the devices can be used in combination with parts illustrated in Fig. 4.

In Figs. 9 and 10, 105 is the spindle, which reciprocates in the sleeve 106, the enlarged end 107 of the spindle and the rear end of the sleeve 106 presenting seats for the spring 108, which normally tends to thrust the spindle forward. The gear 109 serves to rotate the entire device and is secured by the set-screw 110 to the housing-sleeve 111. The latter is driven over the sleeve 106. The forward end of the sleeve 106, Fig. 9, terminates in the flange 112. This flange is recessed to admit the jaw-piece 113, which is pivoted at 114 to the flange 112. I have only shown two jaws; but I prefer to use four. The forward end of the jaw has an arrow-like head-piece 115, which is provided with a groove or notch 117, in which the rim of the filling-opening is clasped. Whenever the spindle is moved forward by means described in connection with spindle 29, the spring 118, secured to the sleeve 106, tends to press the head-piece inwardly, whereupon the can 119 may be pushed over the arrow-like head and will rest upon the flanged shoulders 120. When the spindle is permitted to withdraw into its normal position the conical head 121 exerts itself upon the inner surface of the jaw-head 115 and presses it firmly outwardly and clamps the can within the notches of the jaws.

In Fig. 10 the tailpiece of the jaws and their coacting spring have been omitted. The jaws have an arrow-like head 121ª, which has notches 122 for engaging the can and is provided with the cam-groove 123 on its inner side. The forward end of the spindle in this case may be provided with the cams 124. When the spindle is moved forward the cams 124 bear against the upper sides of the cam-grooves and draw the ends of the jaws together and the jaw is ready to receive or discharge the can. When the spindle is moved in the other direction the lower surfaces of the cams engage the lower side of the cam-groove in the jaw and expand the jaws. The can is firmly held in the notches of the jaws and can only be released by the forward movement of the spindle.

The remaining mechanism of the carrier-arm not particularly described is similar to the description of the preferred form of carrier-arm previously described.

Many other forms could be suggested, all embracing the underlying principle of my invention—that is, to hold the can by engaging the head thereof only.

I claim—

1. In a machine for soldering the end seams of sheet metal cans, the combination with a rotary carrier table, of a can carrier pivotally and rotatably mounted thereon and having a driving pinion, soldering appliances arranged respectively at different elevations, adjacent to the path of the carrier, and a stationary rack with which the pinion enmeshes, said rack having its teeth disposed at different angles radially in different portions thereof whereby the angle of inclination of the can carrier may be changed to present the ends of the can successively to the soldering appliances without changing the operative engagement of the pinion and rack, substantially as described.

2. In a machine for soldering the end seams of sheet metal cans, the combination with a rotary can carrier table, of soldering appliances arranged circumferentially thereto and at different elevations respectively, a can carrier pivotally and rotatably mounted upon said table and having a driving pinion, and a rack having its teeth disposed at different angles radially in different portions thereof and enmeshed with the pinion on the carrier whereby the latter is both rotated and per-

mitted to change its angle of inclination in making the circuit of the table, substantially as described.

3. In a machine for soldering the end seams of sheet metal cans, the combination with a rotary carrier table, of a series of can carriers pivotally and rotatably mounted thereon, soldering appliances arranged respectively at different elevations and adjacent to the path of the can carriers, each of the carriers being provided with a driving pinion, a stationary rack having its teeth disposed at different angles radially in different portions thereof and adapted to engage the pinion and said rack having also sinuous or twisted portions connecting the portions of opposite inclination, substantially as described.

4. In a machine for soldering the end seams of sheet metal cans, the combination with a rotary carrier table, of can carriers pivotally and rotatably mounted thereon and having driving pinions, a stationary rack with which said pinions engage and whereby they are rotated, said rack having its teeth disposed at different angles radially in different portions thereof and guides to control and limit the inclination of the carrier, substantially as described.

5. In a machine for soldering the end seams of sheet metal cans, the combination with a rotary carrier table, of a series of can carriers pivotally and rotatably mounted thereon and having each a driving pinion, soldering appliances arranged circumferentially to the table and at different elevations and a stationary rack with which said pinions engage said rack having its teeth disposed vertically in different portions thereof adjacent to the soldering appliances, the vertical portions being connected by sinuous or twisted portions and guides for the carriers whereby the carriers after passing the soldering appliances are caused to assume vertical positions, substantially as described.

6. In a machine for soldering the end seams of sheet metal cans, the combination with a rotary carrier table, of a can carrier pivotally and rotatably mounted thereon and having a driving pinion, soldering appliances arranged respectively at different elevations, adjacent to the path of the carrier and a stationary rack with which the pinion enmeshes, said rack having its teeth disposed at different angles radially in different portions thereof so as to permit the can carrier to change its angle of inclination, and diverging guide rods and ratchet wheels whereby the carrier arm is guided and the angle of its inclination is governed so as to present the ends of the can successively to the soldering appliances, substantially as described.

7. In a machine for soldering the end seams of sheet metal cans, the combination with a rotary can carrier table, of soldering appliances arranged circumferentially thereto and at different elevations respectively, a can carrier pivotally and rotatably mounted upon said table and having a driving pinion, and a rack having its teeth disposed at different angles radially in different portions thereof and enmeshed with the pinion on the carrier whereby the latter is permitted to change its angle of inclination and diverging guides to change said inclinations, substantially as described.

8. In a machine for soldering the end seams of sheet metal cans, the combination with a rotary carrier table, of can carriers rotatably mounted thereon, solder appliances and a joint wiper device comprising a plurality of rotatable shafts extending toward the path of the can carrier and having mounted thereon a series of cloth disks, substantially as described.

9. In a can soldering machine, a can holder having holding mechanism adapted to enter the filling opening of the can and to hold the can by engaging only the head thereof, substantially as described.

10. A can holder having a chuck with jaws constructed to enter the filling opening of the can head and to be expanded to engage the can head at the filling opening, substantially as described.

11. A can holding appliance comprising a two-part chuck, one member of which is adapted to enter the filling opening in the head of the can and to engage said head upon its inner surface and the other to engage the outer surface of the head, substantially as described.

12. A can holder for a can soldering machine, consisting of a rotatable chuck having pivoted jaws and adapted to enter the filling opening of the can and means for expanding and releasing the jaws, substantially as described.

13. A can holder comprising in combination a frame, a sleeve secured to the frame, a spindle having a bearing in the frame and sleeve and capable of rotation and reciprocation therein, a block or collar mounted on the sleeve and adapted to form a rest for the can and a chuck head carried by the sleeve and adapted to enter the filling opening of the can and to be expanded to engage the can at the opening, substantially as described.

14. In a can soldering apparatus, the combination with a rotary carrier table having a series of can carriers rotatably and pivotally mounted thereon, each of said carriers having a chuck to engage the can about its opening, a chute over which the cans are fed and a rocking can support adapted to be rocked by the movement of the carrier table to bring the cans into alignment with the chuck, and also adapted to be reciprocated in order to bring the can into position to be engaged, substantially as described.

LUDWIG PETTERSON.

Witnesses:
TORRIS WOLD,
ALFRED N. WOLD.