No. 842,926. PATENTED FEB. 5, 1907.

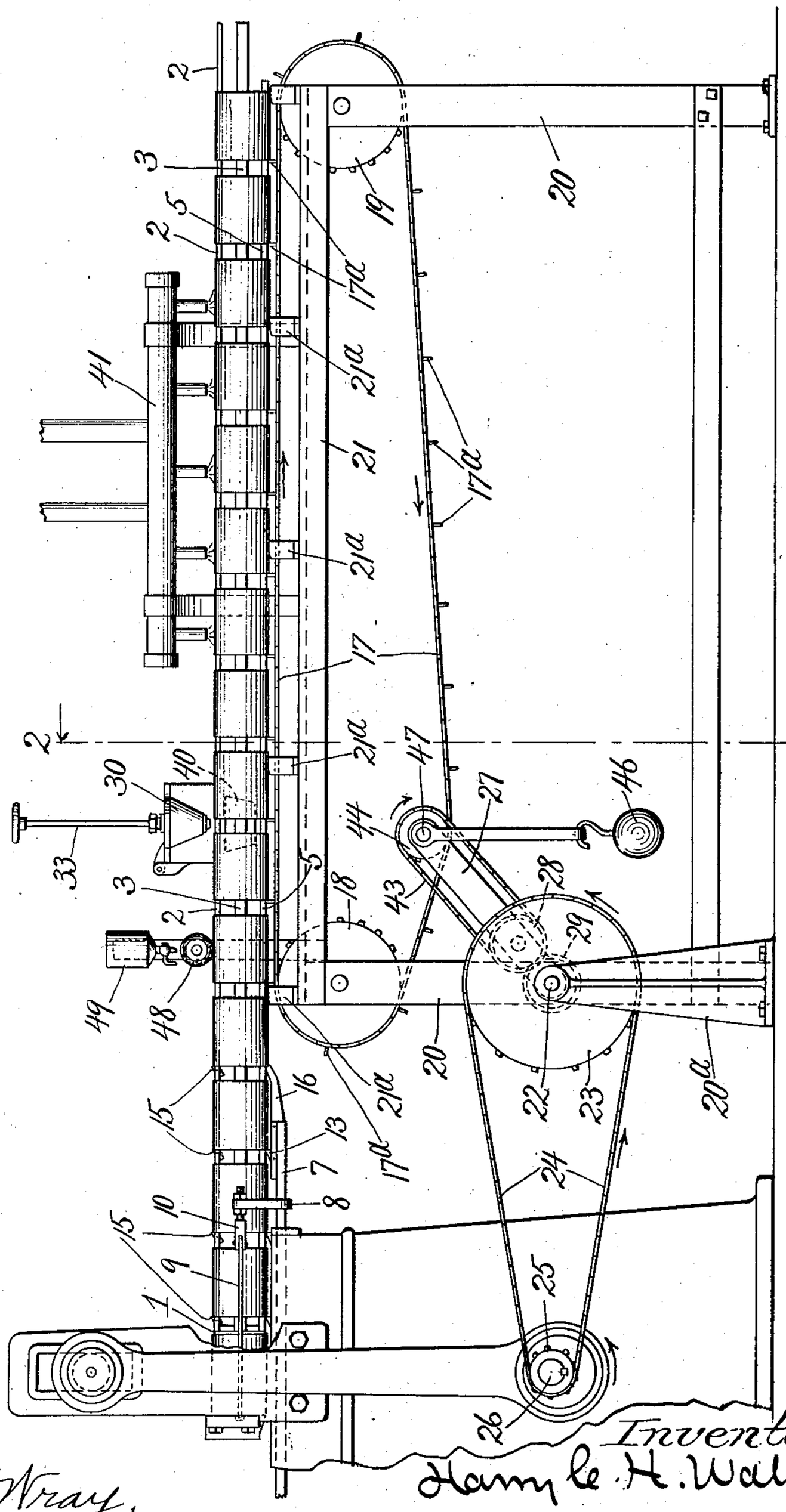
H. C. H. WALSH.

CAN SOLDERING MACHINE.

APPLICATION FILED SEPT. 12, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
Edward T. Wray.
Fred'k G. Fischer

Inventor:
Harry le H. Walsh
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3 SHEETS—SHEET 2.

Fig. 7.

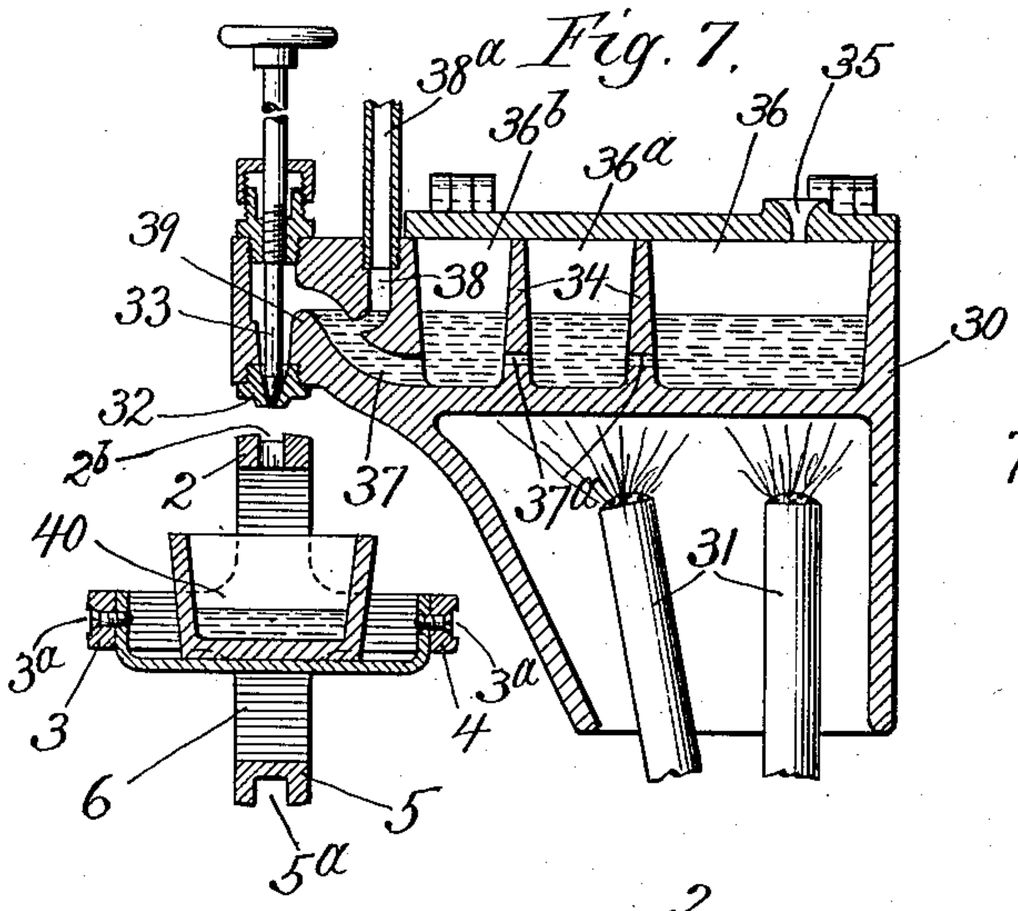


Fig. 6.

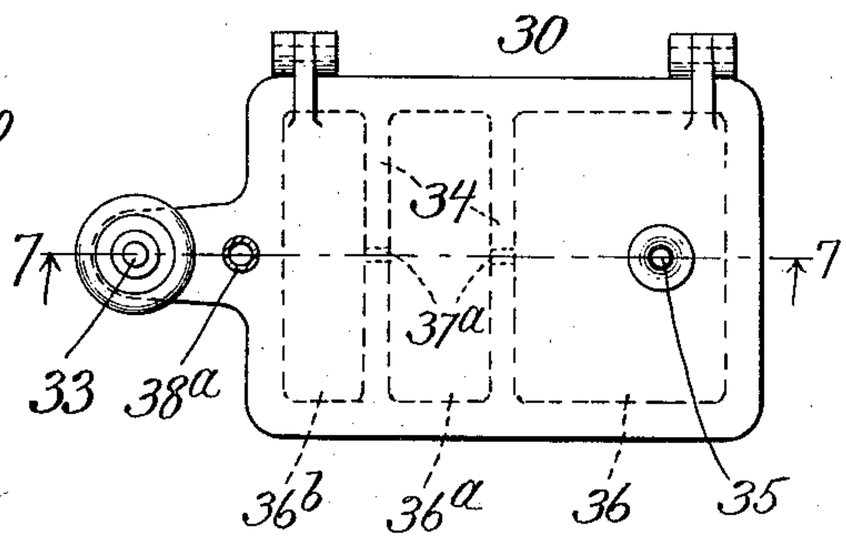


Fig. 5.

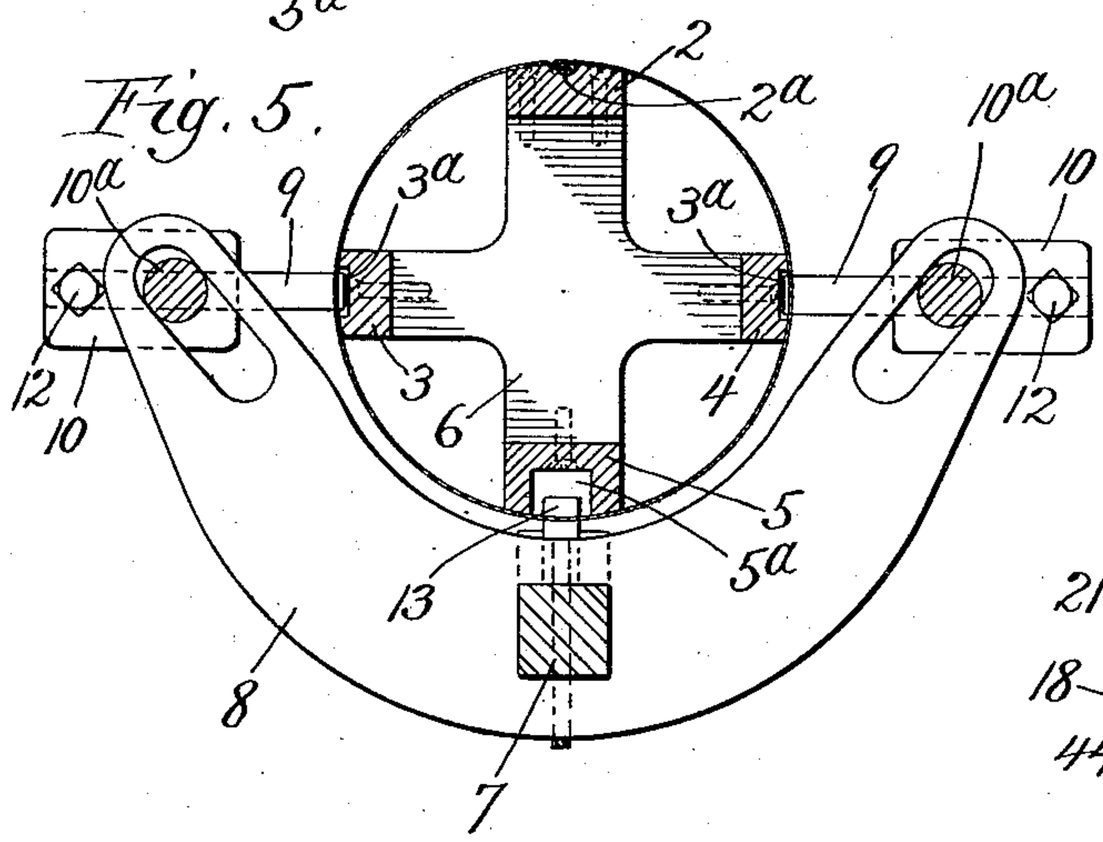
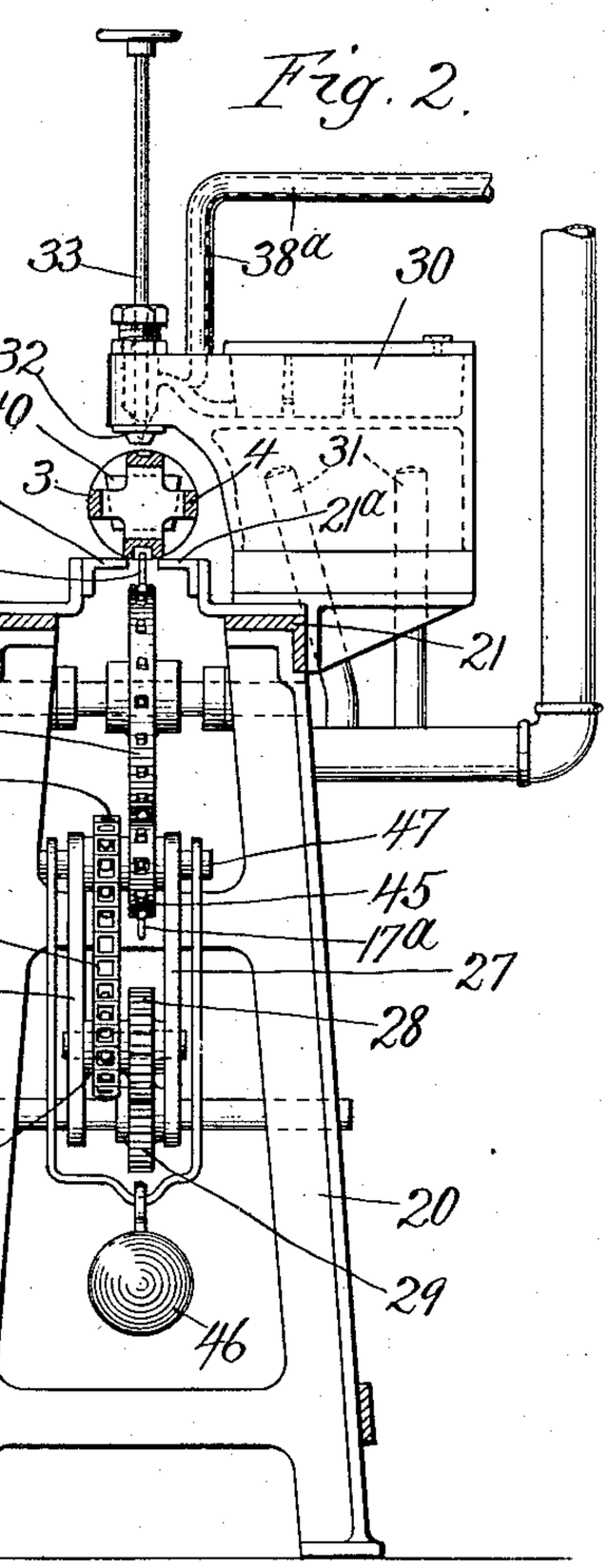


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

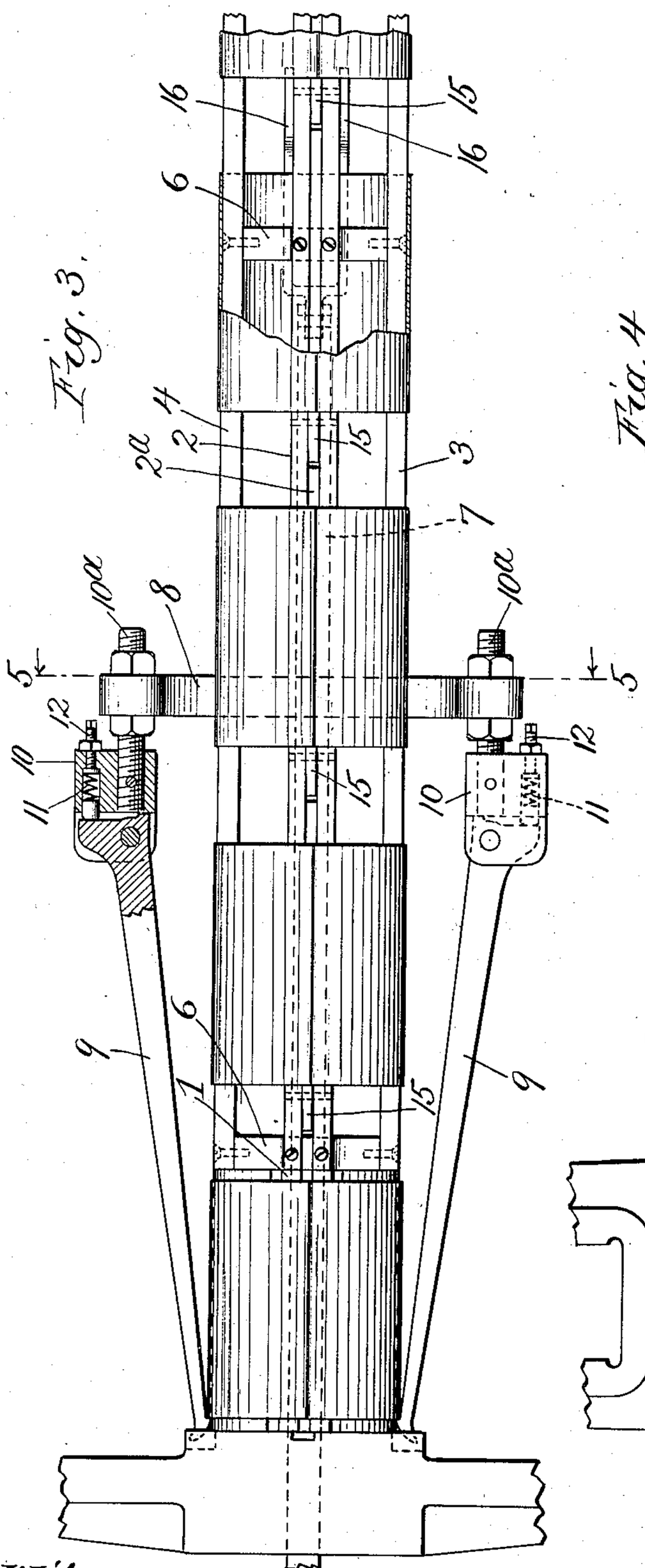
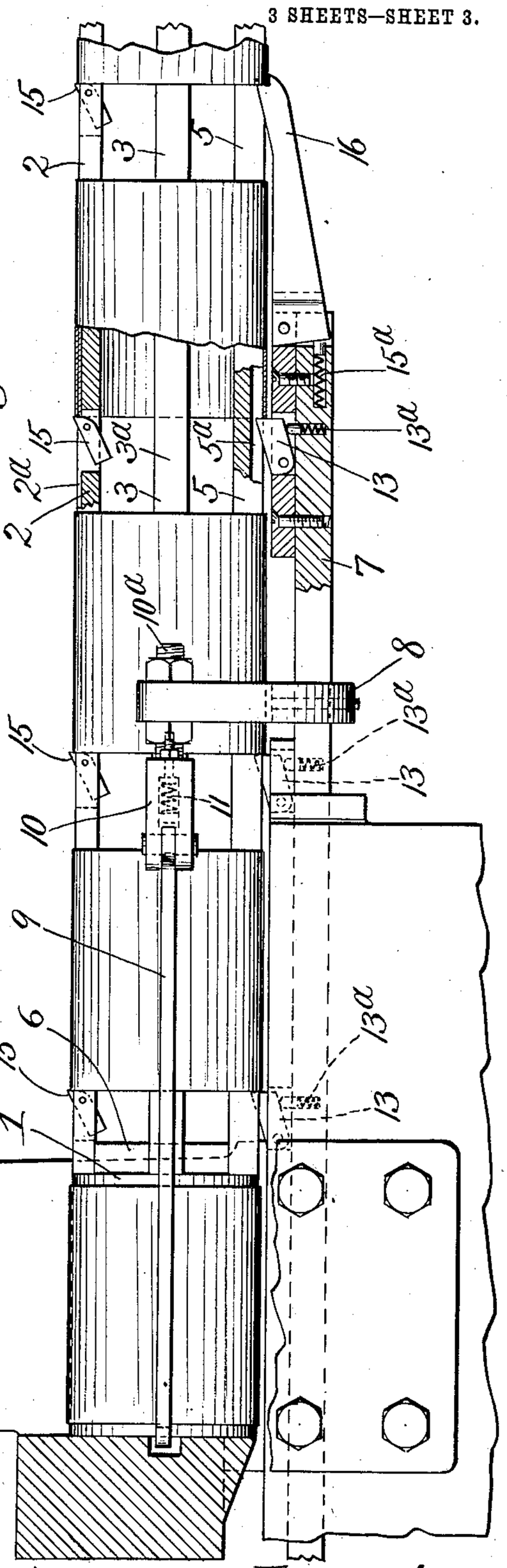


Fig. 4.



Witnesses.
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UNITED STATES PATENT OFFICE.

HARRY C. H. WALSH, OF CHICAGO, ILLINOIS, ASSIGNOR TO CONSOLIDATED PRESS AND TOOL COMPANY, A CORPORATION OF ILLINOIS.

CAN-SOLDERING MACHINE.

No. 842,926. Specification of Letters Patent. Patented Feb. 5, 1907.

Application filed September 12, 1904. Serial No. 224,174.

To all whom it may concern:

Be it known that I, HARRY C. H. WALSH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Can-Soldering Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to means for soldering the longitudinal seams of can-bodies, and is designed as substantially a part of my improved can-body-seaming machine described in my application for Letters Patent of the same, Serial No. 224,176, filed September 12, 1904.

The present invention consists of the features of construction which are set out in the claims.

In the drawings, Figure 1 is a side elevation showing the discharge-end portion of the seaming-machine in conjunction with the mechanism continuing therefrom constituting the soldering-machine. Fig. 2 is a section at the line 2 2 on Fig. 1. Fig. 3 is a detail plan, on a larger scale than the preceding figures, of the initial portion of the supports and feeding mechanism by which the can-bodies are advanced to the soldering apparatus. Fig. 4 is a side elevation of the same. Fig. 5 is a section at the line 5 5 on Fig. 3. Fig. 6 is a plan view of the solder-applying devices. Fig. 7 is a section at the line 7 7 on Fig. 6.

The body-seaming machine to which this soldering apparatus is appurtenant and of which it constitutes a continuation and synchronously with the seam-forming parts of which it is operated comprises, as more fully shown in my said application Serial No. 224,176, a horn onto which the body is advanced and on which it is held for interlocking and clenching the seam, and said machine has a longitudinally-reciprocating bar for feeding the blanks which are to form the can-bodies and the can-bodies when formed with step-by-step movement through the several mechanisms by which the blanks are manipulated in forming the bodies. This horn comprises a rigid metal part 1, and the soldering-machine herein shown comprises a skeleton support for the can-bodies, consisting of parallel bars suitably framed together extending rigidly onward from said middle or fixed portion 1 of the horn. The framework comprising these bars and their connecting-spiders is hereinafter referred to collectively as the "can-track" or "can-support." As shown, this can-track consists of four parallel longitudinal bars 2 3 4 5, connected together at suitable intervals by spiders 6, the entire track being supported by connection of the bars at one end with the fixed element 1 of the horn and throughout the onwardly-projecting extent by the can-feeding devices which are hereinafter described. For the purpose of the soldering feed mechanism is provided for continuing the advance of the cans step by step from the horn past the several soldering devices, keeping them spaced on the can-track as during the progress through the seaming-machine, the feed movement being derived from the same reciprocating feed-bar by which the step movements through the seaming-machine are performed, said bar being continued beyond the horn into range of the soldering-machine, so that the two machines are organized practically as a unitary structure, their movements being synchronous and certain parts of one continuing into the other.

7 is the feed-bar both of the seaming-machine and of the soldering-machine. This feed-bar projects about four feed-step lengths beyond the horn and has rigidly secured to it a cross-head or yoke 8, which extends up at both sides of the can-path for connection with the spring-pressed feed arms or pawls 9 9. The form of these arms and their connection is shown in Fig. 3. Each of them is pivoted for horizontal oscillation to a fitting 10, having a threaded stem 10^a, adjustably secured in one arm of the cross-head or yoke 8, a spring 11 being provided for reacting between the two pivoted parts to hold the forward end of the pawl or feed-arm 9 inward for gripping the can-bodies, as seen in Fig. 3.

12 represents a screw for adjusting the tension of the spring 11 in a manner which will be understood from the drawings.

The pivoted ends of the feed pawls or arms 9 are spread sufficiently to admit a can-body of the largest dimension for which the machine is designed, and the springs are adapted to hold their forward ends inward, so that they will reach and engage a can-body of any less dimension which may be on the horn.

The feed-bar 7 is also provided with feed-

pawls 13 13 13, mounted at intervals in its length equal to the feed step and held yieldingly protruded by springs 13ª in position to engage the lower edge of the can-bodies on the can-track between the horn and the endless feed mechanism hereinafter described. As illustrated, this interval is equal to four feed steps, so that four can-bodies are engaged and fed by these pawls 13 at each reciprocation of the feed-bar, the first of the four being brought into reach of the first pawl 13 by the feed arms or pawls 9 taking the body off the horn and the last of them delivering the body with which it is engaged in position to be engaged at the next step movement by the notched terminals of a forked pawl 16, which is pivoted to the end of the feed-bar 7 about one step length beyond the cross-heads 8 and is held up, by means of a spring 15ª, into position for engaging the can-bodies at the lower edge. The reason for the substitution of this forked pawl for the dogs 13 to feed the cans finally into reach of the endless conveyer will appear from the further description of the latter. To accommodate the protruding noses of the pawls 13 13, the lower bar 5 of the can-track is channeled at 5ª in its under edge, as seen in Fig. 5, and to accommodate the hooks of the pawls 9 the side bars 3 and 4 are channeled slightly, as shown at 3ª. To accommodate the seam of the can-body, which is forced to the inside of the can in construction, the upper bar 2 of the can-track has a suitable channel at 2ª, (also seen in Fig. 5,) and the engagement of the seam in the channel keeps the can-body in the proper position for exposing the outer side of the same at the right position for deposit of the solder thereon. For retaining the bodies at their successively-advanced positions retaining-pawls 15 15, similar to the pawls 13, are provided on the upper bar 2 of the can-track. These pawls, however, need not be spring-actuated but are overbalanced, so as to have their noses thrown up by gravity. For conveying the can-bodies further onward through the soldering-machine there is provided an endless chain 17, having feed-fingers 17ª at intervals corresponding to the length of the the feed step. This chain travels around idlers 18 and 19, mounted on a frame which comprises standards 20 20 and longitudinal rails 21 21. A shaft 22, journaled on the forward standard 20 and having additional support in a standard 20ª, has a wheel 23, driven by a chain 24, deriving power from a sprocket-pinion 25 on a shaft 26 of the seaming-machine. On the shaft 22 there is pivoted a gear-frame 27, on which there is journaled a gear 28, which meshes with a gear 29 on the shaft 22, and rigid with said gears 28 there is a sprocket-wheel 42, which by means of a chain 43 drives a sprocket-wheel 44, also journaled on the gear-frame 27 at the end thereof remote from the shaft 22. Rigid with the wheel 32 there is a sprocket-wheel 45, which engages the lower ply of the chain 17, being held in engagement therewith and adapted to take up the slack thereof by means of a weight 46, pivotally suspended from the fixed shaft or axle 47, on which the wheels 44 45 are journaled. By this means the chain 17 is given feed movement in proper direction, and its slack is taken up by the driving devices. The feed-fingers 17ª on the chain 17 extend between the longitudinal rails 21 21 and operate in the channel 5ª of the bar 5 for engaging the can-bodies by their lower edge to keep them in continuous movement along the can-track from the time they are advanced by the forked pawl 16, striding the fingers 17ª, into position at the receiving end of the upper ply of the feed-chain at which they may be encountered by the next following finger 17ª as it rises around the idler 18 at the forward end. The can-track is supported by the lodgment of the lower bar 5 on the lips or marginal flanges 21ª of the longitudinal top rails 21 21 of the endless-conveyer frame, and when the can-bodies are on the can-track they readily pass over these lips, becoming thus the immediate support of the can-track by resting on said lips.

At any convenient point beyond the horn there is located a device for applying any suitable flux to the longitudinal seam of the can-body which lies exposed upwardly. As illustrated, this comprises a rotary wiper 48 in contact at its lower edge with the seam and supplied with suitable liquid flux dropping onto it from the receptacle 49. At a position conveniently onward from the receiving end of the endless carrier-chain 17 there is located the solder-applying devices. These devices comprise a solder tank or reservoir 30, having gas-jets 31 31 mounted underneath it for heating it, and the solder-discharge nozzle 32, which is mounted at one end of the tank 30 and controlled by a needle or taper-pointed valve 33. The tank 30 is preferably subdivided by partitions 34 into any desired number of chambers, of which the first chamber 36 has an opening 35 at the top for insertion of the solder in solid form. As illustrated, the opening 35 is designed to admit a stick or wire of solder which may thus continuously supply the consumption. The several chambers communicate with each other successively by apertures 37ª through the partitions 34 at the lower part thereof. The purpose and result of this construction is that the dross accumulating upon the top of the molten solder in the first chamber 36 is largely prevented from passing on into the second chamber 36ª, and any limited amount of dross that may thus pass into the second chamber tending to rise to the surface of the molten solder in that chamber is thereby prevented from passing into the third chamber

36[b], and so on to whatever number of chambers it may be necessary to provide to cause the solder finally to be delivered from the last chamber free of dross. From said final chamber (represented by 36[b]) there is a discharge-passage 37, leading from the bottom and trending upward to a height intended to be the low liquid-level of the solder-chambers—that is, a height up to which the solder will be maintained in said chambers. At the highest point of the discharge-duct 37 it opens into the chamber of the valve 33, around which the solder may pass for discharge past the end of the valve through the nozzle 32, which discharges overhanging the longitudinal seam of the can-bodies as they are advanced continuously along the can-track by the continuously-traveling feed-chain 17. It will be understood that the valve 33 passes through threaded bearing and stuffing-box at the upper end of its chamber, so that it may be set to control the discharge of molten solder from the nozzle to make the continuous filament of such solder so delivered of suitable diameter to be adequate for securing the seam when sweated thereinto, as provided by the means hereinafter described. For insuring continuous delivery of a sufficiently-slender solder filament without liability of breaking into drops or glubules adequate pressure must be maintained upon the solder to cause the discharge from the nozzle to be more rapid than its descent by gravity after discharge. This result might be accomplished by having the solder-supply elevated above the discharge sufficiently to afford a head for adequate pressure, and to some extent this mode of maintaining the discharge-pressure will be realized in the structure shown, because the solder may stand in the chambers 36, 36[a], and 36[b] to a height sufficiently above the nozzle to afford the necessary pressure. A more efficient means, however, of obtaining the pressure and one which in any event may supplement the pressure afforded by the height of the solder in the chambers is shown in the drawings, in which at a point in the discharge-duct 37 between the chamber 36[b] and the entrance to the valve-chamber there opens into said duct 37 a passage 38, which preferably joins the duct 37 at an acute angle—that is, so that the discharge from the duct 38 is not directly transverse to, but extends onward toward the valve-chamber with respect to the duct 37. The passage 38 back of its junction with the duct 37 extends upwardly and is connected, as by a pipe 38[a], with a source of compressed air. It will be seen that when the valve 33 is closed the liquid solder will rise in the passage 38 to the height at which it stands in the chambers 36, 36[a], and 36[b] unless there is pressure in the passage 38. Also it will be seen that at first the space in the valve-chamber and terminal portion of the passage 37 above the bridge 39, which separates said passage at the further side from the valve-chamber, would be occupied by air; but in practice this air would soon all be forced out up to the level to which the solder would tend to rise to equal the level in the chambers. The valve 32 being opened and pressure being applied through the pipe 38[a], such pressure will operate to force the liquid solder out past the valve, the inertia of the mass of solder in the chambers and the resistance to its mobility which will be caused by the restricted communication between the successive chambers tending to resist the movement back of the solder toward the chambers, so that practically the action will be substantially as if there were a check-valve in the passage 37, closing toward the chamber 36[b]. The air-pressure will be maintained at such degree as may be found necessary to maintain continuity of a sufficiently slender stream of metal to lay an adequate filament of solder along the seam as the can-bodies move continuously past the nozzle, and the nozzle-pressure will therefore remain substantially constant throughout any changes in the height of the molten solder in the chambers, being governed by the air-pressure which will be greater than the maximum gravity-pressure of the solder.

The stream of metal being continuous and the cans being spaced at short intervals along the track, some metal will be discharged through the gaps between the can-bodies, and to receive it there is provided within the four bars constituting the can-track at a point underneath the nozzle a drip-cup 40, into which the solder will be discharged at said intervals between the cans, the bar 2 having a suitable aperture 2[b], through which the solder may pass.

At a convenient distance beyond the solder-applying devices above described there is located a sweating device for heating the seam and causing the solder filament deposited on it to flow into it. This is substantially a gas-burner comprising a longitudinally-extended mixer 41 for supplying a suitable heating mixture of air and gas. Beyond the sweater the can-bodies are carried by the feed-chain 17 and delivered to any proper receptacle or conveyer. (Not shown.)

I claim—

1. In a soldering-machine, in combination with means for carrying the body to be soldered with continuous movement to expose the line at which the solder is to be applied; means for applying a flux at the line to be soldered; a nozzle directed for discharge against the body at such line; a source of molten solder communicating with the nozzle and means for maintaining pressure above the supply of solder adequate for discharge of the latter through the nozzle in a jet for depositing a filament of solder along said line, and means located beyond the nozzle for

heating the body to re-fuse said solder filament.

2. In a soldering-machine, in combination with means for advancing the object to be soldered, a wiper in position for contact with said body as it is thus advanced and means for supplying flux to said wiper; a nozzle directed for discharge against the body at the line of contact of the wiper therewith beyond the latter; a source of molten solder communicating with the nozzle and means for maintaining elastic-fluid pressure in excess of atmospheric pressure above the solder-supply therein adequate for discharge of the solder in a jet to deposit a filament of solder along the line of contact with the wiper, and means located beyond the nozzle for heating the body to re-fuse such solder element.

3. In combination with a can-track and means for advancing the can-bodies continuously along such track with the seam to be soldered exposed; means for applying solder to the seam comprising a nozzle for delivering a jet of molten solder located in position to discharge such jet onto the seam for forming a filament or wire of such solder thereon; a source of molten solder for supplying the nozzle and means for maintaining elastic-fluid pressure in excess of atmospheric pressure above the solder-supply for forcing solder through the nozzle.

4. In combination with a can-track and means for advancing the can-bodies continuously along such track, a solder-applying device comprising a valve-nozzle directed for discharge onto the seam; a source of molten solder in position for maintaining the solder therein at a level above the nozzle for affording gravity-pressure toward the latter; a passage by which such source communicates with the nozzle and a duct leading from a source of elastic-fluid pressure for communicating such pressure above the surface of the solder-supply for adding such elastic-fluid pressure to the gravity-pressure of the solder toward the nozzle.

5. In a can-soldering machine, in combination with means for delivering a jet of molten solder, means for moving the can to expose its seam to such jet; a solder-reservoir comprising a plurality of chambers communicating with each other successively at the lower part, and means for heating the chambers.

6. In a soldering-machine, in combination with means carrying the body to be soldered to expose past one point the line at which solder is to be applied; means for depositing the solder in a filament along such line, comprising a solder-reservoir, a discharge-nozzle, a passage leading from the bottom of the reservoir upward and onward to such discharge-nozzle, means for maintaining elastic-fluid pressure in excess of atmospheric pressure, and a passage leading from the source of such fluid-pressure into the upper side of the above-mentioned passage for communicating such pressure to the solder in the latter.

7. In a soldering-machine, in combination with a nozzle for delivering a jet of solder; a solder-reservoir comprising a plurality of chambers communicating with each other successively at the lower part, the last of said chambers having communication with the nozzle and the first having an opening through which the solder-supply may be maintained and means for heating the chambers.

8. In a can-soldering machine, in combination with means for delivering a jet of molten solder, means for moving the can to expose it to such jet; a solder-reservoir comprising a plurality of chambers communicating with each other successively at the lower part and means for heating the chambers.

9. In a soldering-machine, in combination with a nozzle for delivering a jet of solder, a solder-reservoir and means for heating it; a duct leading from the reservoir to the nozzle; a valve for controlling the nozzle's discharge having its chamber forming part of the duct of communication from the solder-reservoir to the nozzle, said duct leading from the lower part of the reservoir upward for connection with the valve-chamber, and a passage leading into said solder-duct trending forward at its communication therewith, and downward to said forwardly-trending portion, and connections from a source of elastic-fluid pressure to said passage.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 31st day of August, 1904.

HARRY C. H. WALSH.

In presence of—
CHAS. S. BURTON,
FREDK. G. FISCHER.