

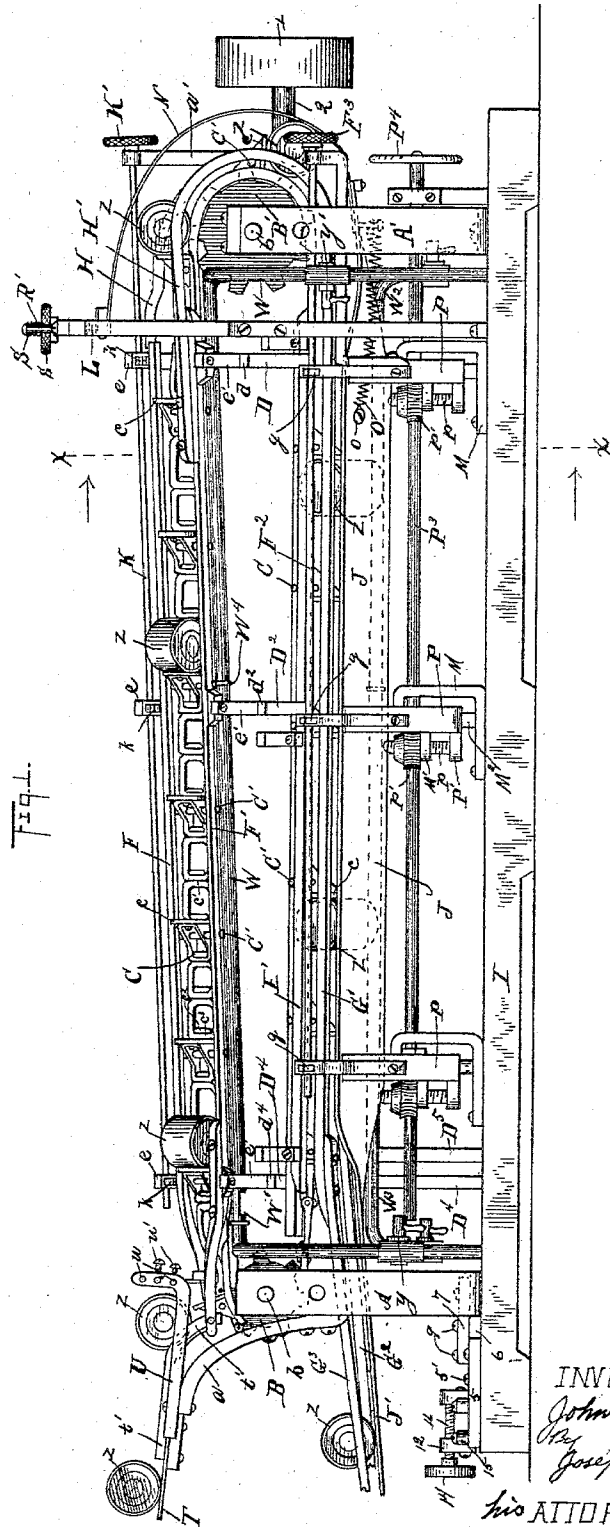
(No Model.)

7 Sheets—Sheet 1.

J. W. ROBERTS.
CAN SOLDERING MACHINE.

No. 490,126.

Patented Jan. 17, 1893.



WITNESSES

Belle S. Lowrie
R. C. Buchhalter

INVENTOR

John W. Roberts
Joseph A. Albome

his ATTORNEY

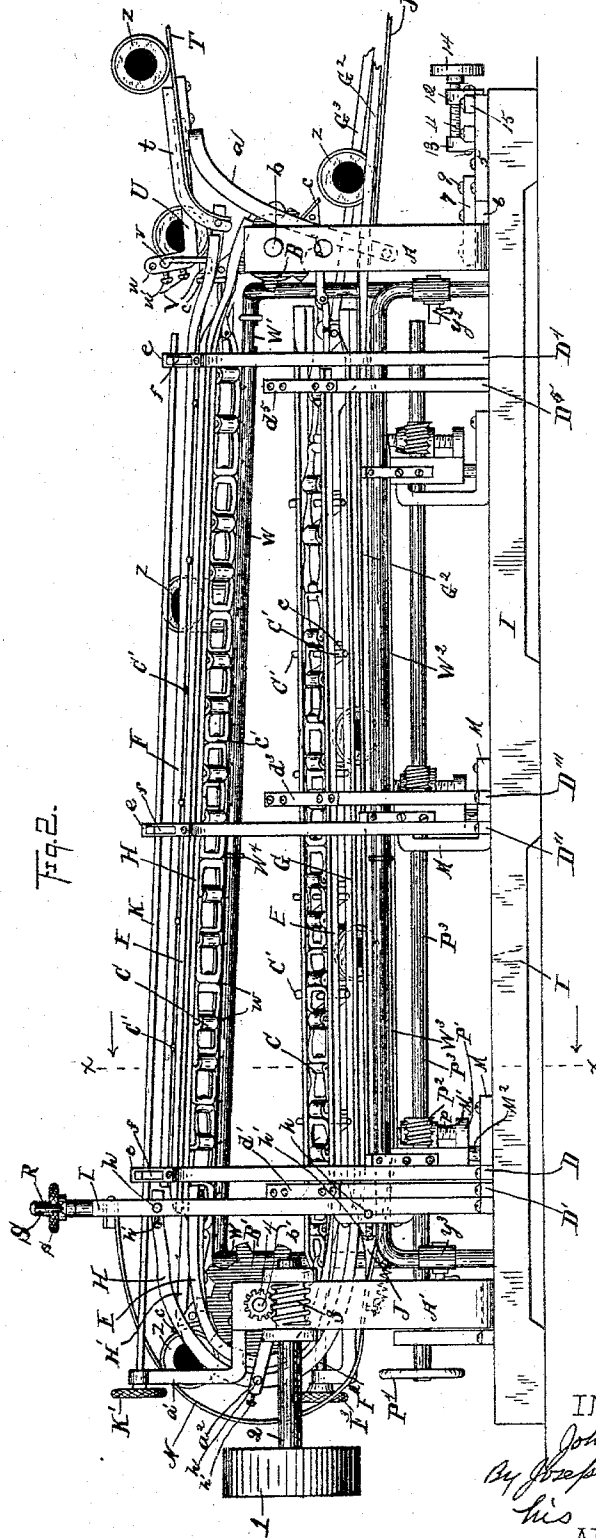
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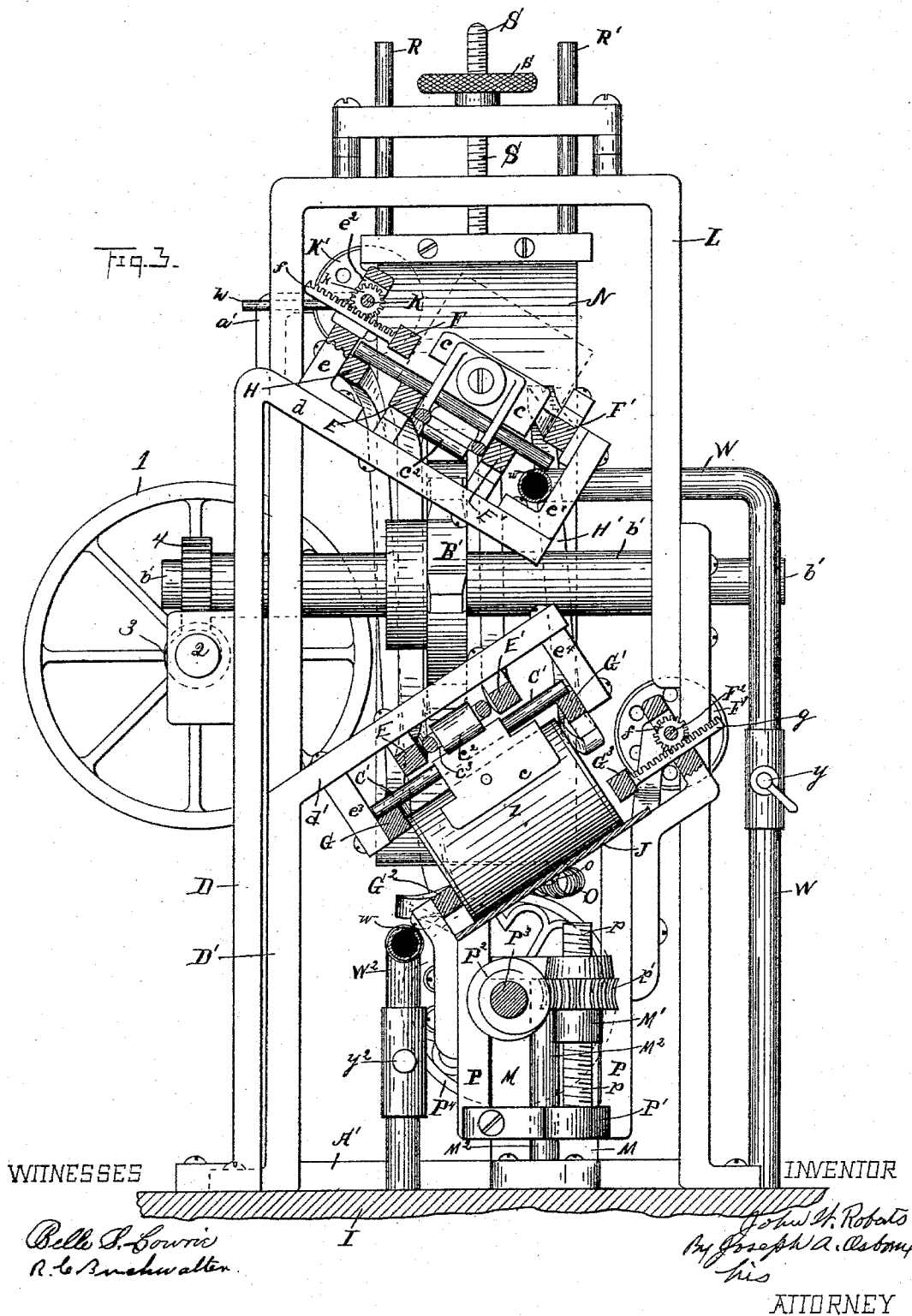
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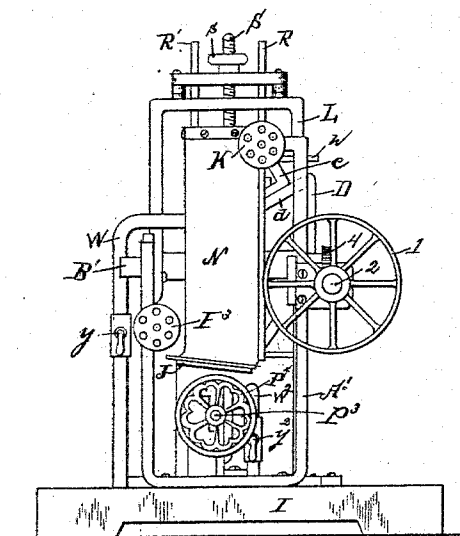


Fig. 4.

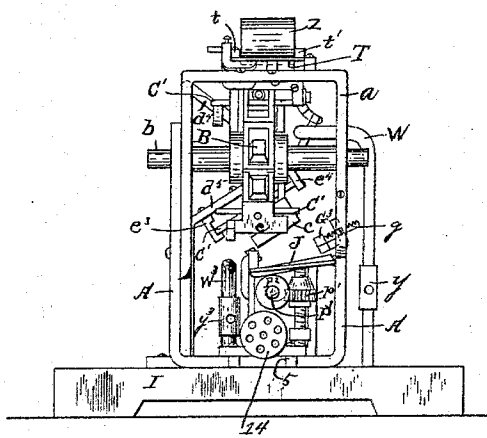


Fig. 5.

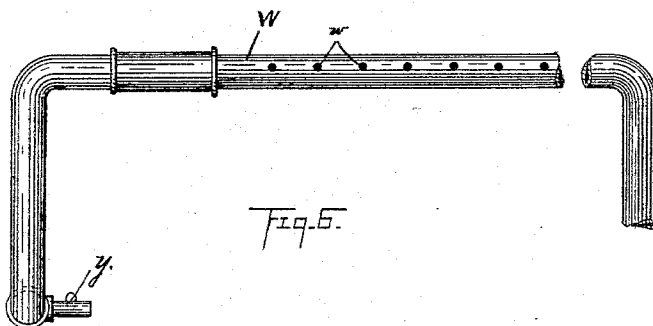


Fig. 6.

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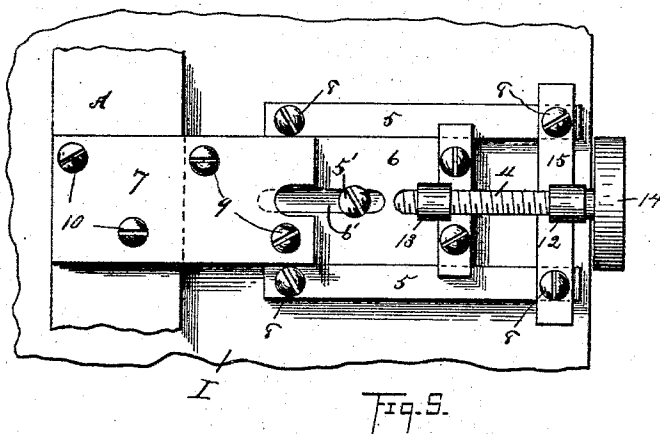
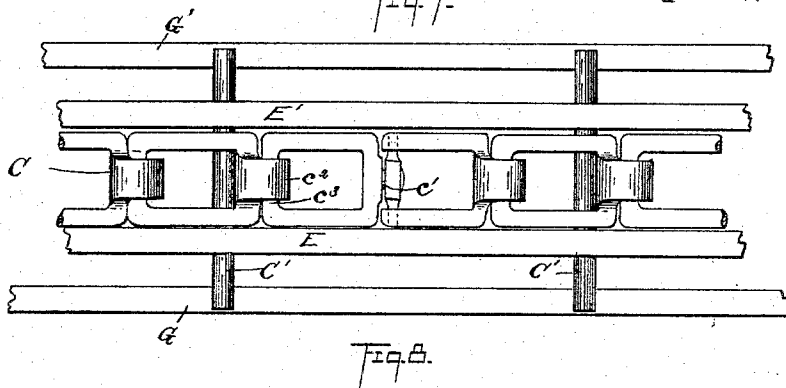
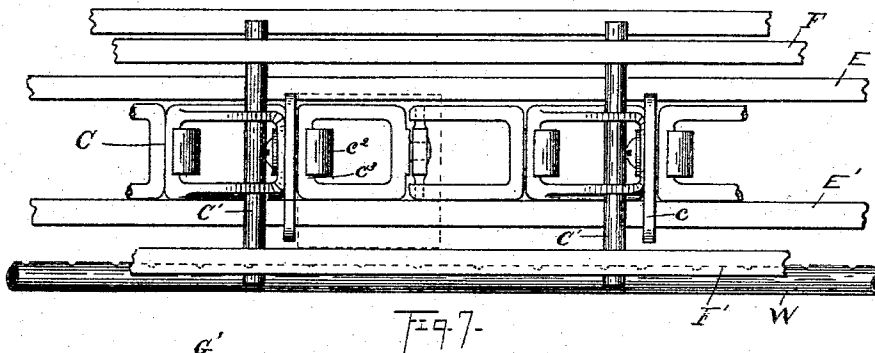
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(No Model.)

7 Sheets—Sheet 6.

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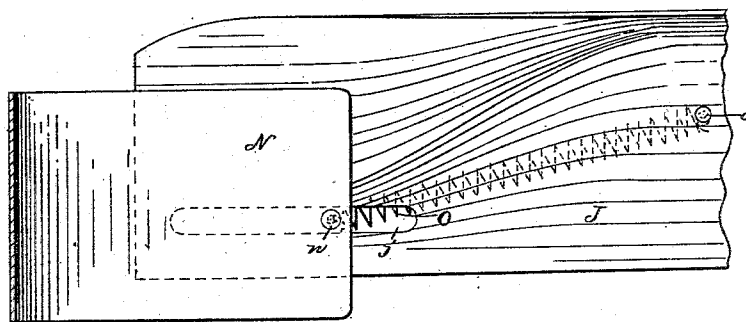


Fig. 10.

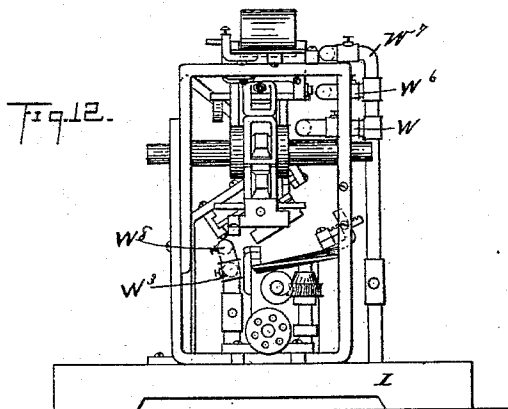


Fig. 12.

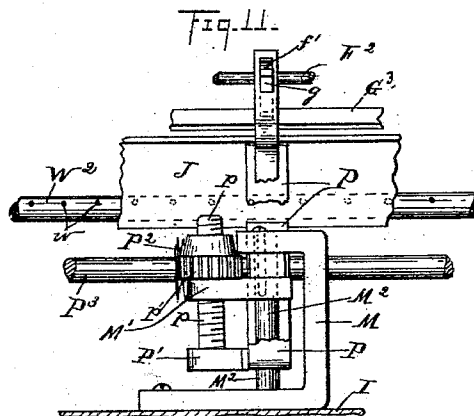


Fig. 11.

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(No Model.)

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J. W. ROBERTS.
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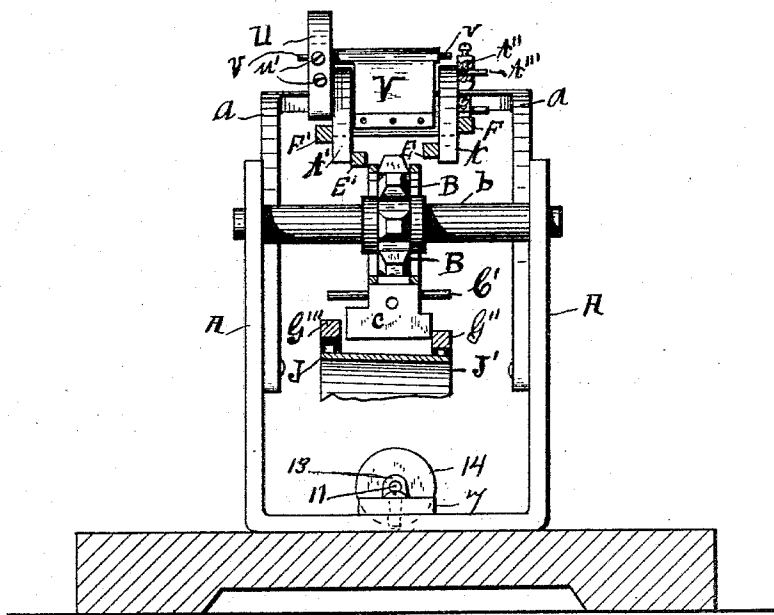


Fig. 13.

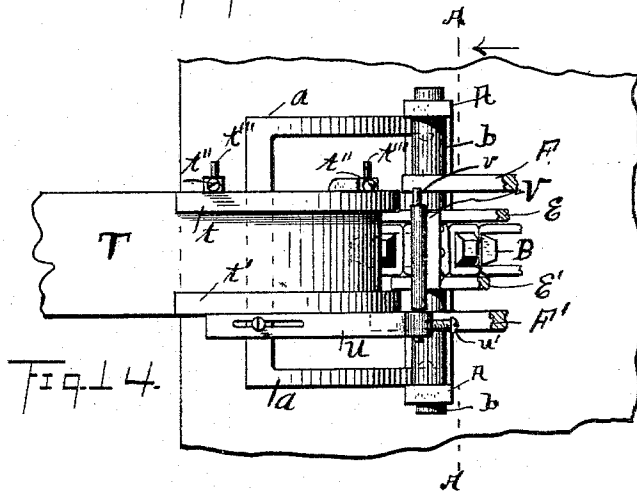


Fig. 14.

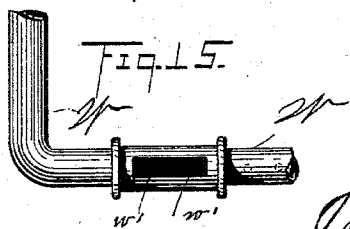


Fig. 15.

WITNESSES.

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UNITED STATES PATENT OFFICE.

JOHN W. ROBERTS, OF CLEVELAND, OHIO, ASSIGNOR TO THE SHERWIN-WILLIAMS COMPANY AND BENJAMIN PATTERSON, OF SAME PLACE.

CAN-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 490,126, dated January 17, 1893.

Application filed January 17, 1891. Serial No. 378,080. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. ROBERTS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Can-Soldering Machines; and I do hereby declare the following to be a full, clear, and an exact description of my said invention, such as will enable others skilled in the art to make and use said improvements in can-soldering machines.

My invention relates to machines for soldering the ends upon cans.

The object of my invention is an improvement upon machines for soldering ends upon cans whereby such work may be done neatly, accurately, rapidly and economically.

With this object in view, my invention consists in the details of construction and combination of parts substantially as shown in the drawings, described herein, and defined in the claims.

In the drawings accompanying this description and forming part of my specification, Figure 1 is a front side elevation of my soldering machine; Fig. 2 is a rear side elevation of the same; Fig. 3 is an enlarged vertical section of Fig. 1 on the line *xx*; Figs. 4 and 5 are end elevations of my said machine; Figs. 6, 7, 8, 9, 10 and 11 are enlarged detailed views of parts of my machine, and Fig. 12 is an end elevation showing a means of increasing the can heating capacity of the machine. Fig. 13 is an enlarged vertical cross-section of the machine on the line of *AA* of Fig. 14; Fig. 14 is a partial top plan view of my machine, enlarged, and Fig. 15 is an enlarged detail view of a portion of the gas and air conducting pipes.

In all the views of the drawings, like letters and figures refer to like parts.

In the different figures of the drawings, I is the machine bed.

The main frame consists of the upright yoke *A*, which is capable of movement longitudinally of the machine, as hereinafter described, and the uprights *A'*, which are firmly fixed to the bed of the machine. Sprocket wheels, *B* and *B'*, turning upon axles or shafts, *bb'*, are carried by said frame *A* and *A'*. The

sprocket wheel *B'* is of greater diameter than the sprocket wheel *B*. The purpose of making these sprocket wheels of different diameters will be herein explained. Around said sprocket wheels *B* and *B'* travels an endless driver, *C*. This endless driver consists of open flat links, the links at every third connection between them having a swivel joint, *c'*, the links at all other connections being joined by a lip *c''* encircling the end bar *c³* of the adjacent link. Every third link is provided with an upright projection *c*. Of course, the number of swivel connections *c'*, and the number of upright projections *c*, is largely a matter of individual preference, depending, somewhat, upon the size of the machine and the size of the cans to be soldered.

I have given what I consider the best arrangement of links and upright projections for the endless driver. At suitable intervals along the said endless driver I provide cross-bars *C'*, which are preferably made integral with the links of the driver.

DD', D''D''', and *D⁴D⁵*, constitute the track supporting frame. Said track supporting frames *D*, *D''* and *D⁴*, which support the upper lap of track, each have a downwardly slanting arm, *d*, *d''* and *d⁴*, to the upper side of which are attached the brackets *ee'*. The track supporting frames *D'*, *D'''* and *D⁵*, which support the lower lap of track, each have upwardly inclined arms, *d'*, *d³* and *d⁵*, to the under side of which are attached the brackets *e³* and *e⁴*. The track begins at the feed end of the machine and extends along the upper lap of the endless driver *C* to the opposite end of the machine, around the sprocket wheel *B'*, and back with the lower lap of said endless driver *C* to the feed end. The track consists substantially of four rails. The rails *E* and *E'* are supported from the bent arms *d*, *d''* and *d⁴* on the upper lap, and from the bent arms *d³*, *d³* and *d'* on the lower lap in close proximity to the endless driver *C*, and said endless driver travels between said rails, which keeps it from material lateral swinging motion. Said rails *E* and *E'* are below the cross-bars *C'* of the endless driver of the upper lap, and are above said cross-bars *C'* on the lower lap of the endless driver.

To the brackets e' is attached a rail F' above the cross-bars C' of the endless driver on its upper lap. Said rail extends from the feed end of the machine to the track frame D . The rail F is held above the cross-bars C' on the upper lap of the endless driver by means of laterally projecting racks f which pass through openings e'' of the brackets e . Through said brackets e , lengthwise of the machine, there extends a rod K carrying pinions k which mesh with said racks f . The outer end of said rod K is supported by an arm or brace a' projecting from the main frame A' . A hand wheel K' serves to turn said rod K , and thus adjust the rail F through the pinions k and racks f , to the length of cans being soldered. Said rail F extends from the feed end of the machine to the track frame D . The rails F and F' , besides steadying the endless driver from above by keeping the cross-bars C' from jumping up, also act as guides for the cans to keep them straight upon the track. In this last respect they perform the same function that is performed by the rails G^2 and G^3 above the platform J .

To the brackets e^3 and e^4 are attached the rails G and G' below the cross-bars C' on the lower lap of the endless driver C . The rails G and G' extend from the frame D' to the feed end of the machine.

Corresponding with the track rails F G and $F' G'$ are the bent rails H and H' outside the sprocket wheel B' , inside of which rails travel the cross-bars C' as the endless driver C passes over said sprocket wheel B' . The rails F , H and G , and F' , H' and G' , make a continuous guide outside the cross-bars C' , and substantially correspond with the inner rails E and E' of the track. The bent rail H has a lateral adjustment by means of the projecting rods h , which pass through holes in the frame L and the brace a^3 . Set screws h' secure the rail H at any adjustment by holding the rods h firmly. Below the lower track is placed a platform J . Above said platform are two guide rails G^2 and G^3 . The rail G^2 is firmly fixed to the movable part of the frame which supports the platform. The rail G^3 has adjustment horizontally to said platform by means of the rack g and pinion f' upon the rod F^2 , which is operated by the hand wheel F^3 .

Upon the bed I of the machine stand the platform supports M . To the upper horizontal part of the support M is fixed a plate M' . A guide rod M^2 extends from the upper part of the support M to its bottom. A yoke, P , having its open end up, works vertically upon the guide rod M^2 . Horizontally from the lower portion of the yoke is an extension P' , to which is fixed firmly a vertical screw p which passes up through a smooth bore in the plate M' . Upon this screw is a pinion p' having a central bore threaded internally to screw upon the screw p . The outside of the pinion p' is toothed to mesh with the worm gear P^2 keyed upon the shaft P^3 . The platform J is supported upon the yoke P . By

turning the hand wheel P^4 the pinion p' is turned upon the screw p , which raises or lowers the yoke P and the platform J upon it.

L is a frame which straddles the machine tracks, and is designed to afford a means of attachment for the top end of the clamp N . The upper end of said clamp is made adjustable vertically by means of the screw S projecting from the clamp up through the frame L , and the thumb-nut s . The guide rods R , R' , projecting from the clamp N vertically through bearings in said frame L prevent the clamp twisting about.

To the lower side of the lower end of the clamp N is a pin n which passes through the slot j in the platform J , and to which pin n is attached one end of the coil spring O which has its opposite end attached to the bottom of the platform J at o , as shown. This arrangement allows a sufficient yielding of the clamp to adapt itself to cans as they pass under it.

A brace a from the frame A supports the feed-way T , having guide-rails t , t' , one of which, t , has lateral adjustment on the feed-way by means of the lateral rod t'' and the set screws t''' so that it may be adjusted to the various lengths of cans to be soldered. The feed-way T should be inclined to the machine so that cans will roll down it. From the brace a projects an arm U having its inner end turned up to support the swinging trap V . The trap V is capable of vertical adjustment by means of the holes u in said arm U , and the set screws u' , which hold the rod v of the trap firm. Said swinging trap V turns upon the rod v . The trap should be heavy enough to keep cans from passing under it till pushed under by the upright projections c on the endless driver.

By reference to the drawings (Figs. 1, 2, 3, 4 and 5) it will be seen that the upper lap of track and endless driver incline laterally in one direction from a horizontal plane, while the lower lap inclines laterally to the opposite direction; and that the tracks are so arranged as that the endless driver has no lateral inclination as it passes around the sprocket wheels $B B'$. The platform J below the lower lap of track has the same lateral inclination as said lap of track from the frame L to the frame D^4 , while beyond these frames the platform is substantially level. The purpose of so laterally inclining the laps of track and driver in opposite directions is to keep the cans on one angle of inclination from a horizontal plane as they are carried in one direction by the machine, and to keep them inclined to the opposite direction as they are carried back. By making the sprocket wheel B' of greater diameter than the sprocket wheel B , and placing the axial centers of said wheels in the same plane, the track and endless driver will be upwardly inclined from the feed end of the machine on the upper section, and they will be upwardly inclined to the feed end on the lower section of the machine. This is the preferred construction;

though the lower lap is illustrated as substantially level from end to end, because of the necessarily small scale of the drawings. Between the track frames L and D⁴ the platform J should have the same horizontal and longitudinal inclination that is given to the lower lap of track and endless driver. Outside of said frames the platform is substantially level, as herein-before described, and the discharge end J' may be given a slight declination so that the cans will roll away readily. The rail F, which, besides holding down the ends of the cross-bars C' on one side of the upper lap of track, acts as a guide rail; and the guide rails t, H, and G are made adjustable laterally so that the space between the guide rails may be adjusted to different length of cans; and the platform J is made vertically adjustable, and the clamp N is made adjustable so that they may be adapted to cans of different diameters.

I provide for heating the joints of cans to be soldered by means of gas pipes which are connected with a source of gas supply and run along the lower edge of the travel of the cans a part of the length of the machine. W is a pipe which runs along the lower edge of the upper lap of track to the point marked W⁴. The horizontal part of the pipe has perforations w. On the under side of the horizontal part of said pipe W is an opening w'. Gas is admitted through the pipe W. The gas is lighted and the jets from the perforations w burn against the lower edge of the can as it is rolled over the flame. The entrance of air at the opening w' and its mingling with the gas makes a blue flame, which is known to and understood by persons skilled in the art. A valve y controls the admission of gas into the pipe. A similar pipe, W', at the opposite end of the machine, and having like perforations in the upper side of its horizontal part, carries a blast of cold air to the cans upon that part of the track, and cools the cans that have passed over the flame from the pipe W. A valve Y' controls the admission of air thereto.

At the lower edge of the platform J I place a gas pipe W², having perforations w and an air opening w' like that described for the upper lap of track. Said gas conducting pipe also extends but a part of the length of the machine, and a cold air pipe W³, like the one for the upper lap of track, and having like perforations for carrying cold air to the cans, is provided. The admission of gas to the pipe W² is regulated by the valve y², and the blast of cold air through the pipe, W³ is regulated by the valve y³, the same as with the other pipes and valves described.

I have provided for tightening and slackening the endless driver C, so that it may be placed upon or taken off the sprocket wheels B B', and to facilitate the making of needed repairs thereto.

The frame A, which supports the smaller

sprocket wheel B, is not attached to the machine bed I.

To the bed I is fixed a plate 5 forming ways or guides for the plate 6. To the plate 6 is secured a plate 7, which is firmly fixed to the frame A. The ways 5 are held down by means of screws 8. The two plates are secured together by screws 9. Screws 10 secure the plate 7 to the frame A. A slot 6' is made in the plate 6, through which a screw 5' passes into the guide plate 5 to prevent the plate 6 from lifting up. A screw 11 passes through a loop 12 attached to a cross-bar 15 on the guide plate 5 and screws into its counterpart 13 forming part of the plate 6. The screw is operated by the hand wheel 14. It will be seen that by turning the screw 11 as stated the frame A may be drawn back or pushed forward, which will tighten or slacken the endless driver C.

Z, Z represent cans at different places as operated upon by the machine.

Power may be communicated to the machine by any known means. The means shown consists of a drive pulley 1 mounted upon the shaft 2 which has a worm gear 3 meshing with a pinion 4 that is keyed upon the end of the shaft b'.

Having given a full, clear, and an exact description of my machine, I will now describe its operation. The different guide rails t, F, H, and G, and the platform J and the clamp N are first adjusted to the size of cans to be soldered. The cans Z are placed upon the inclined feed-way T, and roll down against the swinging trap V. As the endless driver C travels along, the upright projection c push the cans under the swinging trap upon the upper track. The required amount of solder and flux for one end of the can is then placed in it. This may be done by hand, or by other known means. As the endless driver travels its course, the upright projections c cause the cans to roll along upon the rails E E' of the upper lap of track and upon the platform J below the lower lap of track. As the cans roll upon the upper section of the machine in proximity to the perforated gas pipe W, the joint to be soldered is heated, the solder within the can melts, and as the cans are rolled in an inclined position the melted solder runs into the joint at all points. Having passed over the flame from the gas pipe W, the cans roll on continuously over the cold air pipe W' and are cooled. The cans then continue their travel around the sprocket wheel B', and are kept from falling from the endless driver by means of the clamp N. When the cans come upon the platform J they incline oppositely from what they did upon the upper section of the machine. Solder and flux for the top end of the can are put into the can through the opening in the can top just before the cans leave the upper lap of track to pass under the clamp N. On the first half of its travel over the platform, J, the joint is sub-

jected to heat from the gas pipe W^2 ; and on the second half of its travel over the platform J it is subjected to a cold air blast from the pipe W^3 . It will be seen that the bottom ends of the cans are soldered and cooled upon the upper section of the machine, and that the tops of the cans are soldered and cooled upon the lower section of the machine. The cans, having been soldered, roll out of the way off the projecting end J' of the platform.

There is a great advantage in rolling the cans continuously, after being soldered, over a cold air blast till the cans are cooled, as the cans are not disturbed in any manner till the solder is firmly set. This prevents the solder from setting unevenly, and saves leaks in the soldered joint. It will be seen that the swiveled links of the endless driver allow it to run at different angles of inclination upon the upper and lower sections of the machine, and to pass easily over the sprocket wheels B B'. At the feed end of the machine the ends of the rails E E' and F F' are slightly bent in such manner as to insure the passage of the cross-bars C' between the two pairs of rails. The inclination of the cans, as each end is soldered, causes the melted solder to run to the joint, as that is the lowest point. The longitudinal inclination of the upper and lower sections of the machine cause the cans to be rolled up inclines, which keeps the cans against the upright projections c, so that they will not roll too rapidly at some places and then stop till driven again by the uprights c.

Fig. 12 of the drawings illustrates a means of extending and increasing the heating capacity of the machine when used in soldering large cans. On large cans any point in the joint to be soldered may be so long in making a revolution that it will not remain hot while the process as soldering is going on if heat is applied to the can only on their lower edge. By increasing the number of gas pipes corresponding to W and W^2 , the entire end of the largest cans may be kept hot. Fig. 12 of the drawings shows three horizontal gas pipes, W, W^6 , W^7 , upon the upper section, and two gas pipes, W^3 and W^8 , upon the lower section. The pipes may be increased and united in any known manner.

My machine may take on various changes and modifications and I do not, therefore, limit myself to the particular form and arrangement of parts shown and described.

What I claim as my invention and desire to secure by Letters Patent is—

1. The combination, in a machine of the character described, of an endless driver consisting of a link chain, a part of the links having swivel connection and a part of the links having upright projections, cross-bars at intervals upon said endless driver, and a track consisting of two pairs of rails, one pair of the rails being above and the other pair of rails being below the projecting ends of the cross-bars, whereby the endless driver is kept in line and at fixed angles of inclination, the

track along the upper lap of the endless driver being adapted to have cans rolled thereon substantially as shown and described.

2. The combination, in a machine of the character described, of sprocket wheels, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a main frame to support the sprocket wheels, said main frame having adjustment longitudinally of the machine to slacken and tighten the endless driver, and a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars upon the endless driver, the track along the upper lap of the endless driver being adapted to have cans rolled thereon substantially as shown and described.

3. The combination, in a machine of the character described, of sprocket wheels, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a main frame having adjustment longitudinally of the machine to tighten and slacken the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars on the endless driver, the track along the upper lap of the endless driver being adapted to have cans rolled thereon, a perforated pipe along one edge of the upper lap of track, and a perforated pipe along the lower edge of the lower track, substantially as shown and described.

4. The combination, in a machine of the character described, of sprocket wheels, an endless driver which travels over the sprocket wheels, said endless driver consisting of a link chain having swivel connections and upright projections and cross-bars at intervals along the driver, and guides for both the upper and lower laps of the driver, said guides consisting of four rails, two of which are above and two below the cross-bars, the upper guide being adapted to have cans rolled thereon, said guides being also adapted to hold the endless driver at opposite angles of inclination on its upper and lower laps, substantially as shown and described.

5. The combination, in a machine for soldering cans, of two sprocket wheels one of which is larger than the other, an endless driver having cross-bars thereon to travel over the sprocket wheels, a track extending the length of both the upper and the lower laps of said endless driver and around the outside of one of the sprocket wheels, the track consisting of four rails, two of which rails are to the outside and two to the inside of the cross-bars upon the endless driver, the track and endless driver having opposite lateral inclination on their upper and lower laps, substantially as shown and described.

6. The combination, in a machine for soldering cans, of two sprocket wheels one of which is larger than the other, an endless driver to travel over the sprocket wheels, a track extending the length of both the upper

and the lower laps of the endless driver, the track and the endless driver having a fixed lateral inclination on their upper lap and an opposite lateral inclination on their lower lap, with a vertically adjustable platform below the lower lap of the endless driver, the platform having the same lateral inclination as the lower lap of the endless driver and track, and means for sustaining cans against the carrier in their travel over one of said sprocket wheels, substantially as shown and described.

7. The combination, in a machine of the character described, of an endless driver, a clamp to sustain cans at one end of the machine, with a frame to support the upper end of the clamp, a screw projecting from the clamp up through the frame, a nut upon the screw, guide rods projecting from the clamp vertically through bearings in the frame to prevent the clamp from twisting, and a spring fixed to the lower end of the clamp to allow a yielding of the clamp, substantially as shown and described.

8. The combination, in a machine of the character described, of an endless driver, a platform, guide-rails upon the platform, one of said rails having horizontal adjustment, yokes to support the platform, guides for the yokes, vertical screws fixed to the yokes, and pinions upon the screws to give the platform vertical adjustment, substantially as shown and described.

9. The combination, in a machine of the character described, of an endless driver, a clamp to sustain cans at one end of the machine, a frame to support the upper end of the clamp, a screw projecting from the clamp vertically through said frame, a nut upon the screw, a platform having vertical adjustment, and a spring having one end attached to said clamp and the opposite end attached to said platform, substantially as shown and described.

10. The combination, in a machine of the character described, of an endless driver, a clamp to sustain cans at one end of the machine, a frame to support the upper end of the clamp, a screw projecting from the clamp through said frame and a nut upon the screw to give the clamp adjustment, a platform having vertical adjustment, guide rails upon the platform, one of which rails has horizontal adjustment, and a spring having one end attached to the clamp and the opposite end attached to the platform, substantially as shown and described.

11. The combination, in a machine of the character described, of sprocket wheels, an endless driver having cross-bars traveling over the sprocket wheels, a track consisting of four rails two of which are to the inside and two to the outside of the cross-bars of the endless driver, and an adjustable yielding clamp to sustain cans against the track as

they travel around the sprocket wheel at one end of the machine, substantially as shown and described.

12. The combination, in a machine of the character described, of sprocket wheels, an endless driver to travel over the sprocket wheels, cross-bars at intervals on the endless driver, a track consisting of four rails, two of said rails being to the outside and two to the inside of the cross-bars upon the endless driver, and a clamp, a frame to support the upper end of the clamp, a screw projecting from the clamp through said frame and a nut upon the screw to give the clamp adjustment, and a spring attached to the lower end of the clamp to allow the clamp to yield to adapt the clamp to cans passing under it, substantially as shown and described.

13. The combination, in a machine of the character described, of sprocket wheels, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars, a platform below the lower lap of the track, the platform being supported by yokes, guides for the yokes, vertical screws fixed to the yokes, threaded pinions upon the vertical screws to give the platform vertical adjustment, and a yielding adjustable clamp, having its upper end connected with a frame and its lower end connected with the adjustable platform, substantially as shown and described.

14. The combination, in a machine of the character described, of sprocket wheels, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars, a platform below the lower lap of track, said platform having vertical adjustment, a clamp, a frame to support the upper end of the clamp, a screw projecting from the upper end of the clamp through said frame to give it adjustment, and a spring having one end attached to the clamp and the other end attached to the platform, to allow a yielding of the clamp, substantially as shown and described.

15. The combination, in a machine of the character described, of sprocket wheels, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars, a platform, yokes to support the platform, guides for the yokes, vertical screws fixed to the yokes, threaded pinions upon the vertical screws to give the platform vertical adjustment, a clamp, a frame to support one end of the clamp, a screw projecting from the clamp through said frame to give the clamp adjustment, and a spring having one end attached to the clamp and the op-

posite end attached to the platform to allow a yielding of the clamp, substantially as shown and described.

16. The combination, in a machine of the character described, of a main-frame having longitudinal adjustment, sprocket wheels supported by the main-frame, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars of the endless driver, and an adjustable yielding clamp to sustain cans as they travel under the clamp, having its upper end attached to a frame above the machine and its lower end attached to a platform below the machine, substantially as shown and described.

17. The combination, in a machine of the character described, of a main-frame having longitudinal adjustment, sprocket wheels supported by the main-frame, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars on the endless driver, and a clamp, a frame to support the upper end of the clamp, a screw projecting from the clamp through said frame and a nut upon the screw to give the clamp adjustment, and a spring attached to the lower end of the clamp to yield to adapt the clamp to cans as they pass under it, substantially as shown and described.

18. The combination, in a machine of the character described, of a main-frame having longitudinal adjustment, sprocket wheels supported by the main-frame, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars upon the endless driver, a platform below the lower lap of the track, the platform being supported by yokes, guides for the yokes, vertical screws fixed to the yokes, threaded pinions upon the vertical screws to give the platform vertical adjustment, and an adjustable yielding clamp, having its lower end connected with the platform and its upper end connected with a frame above the machine, substantially as shown and described.

19. The combination, in a machine of the character described, of a main-frame having longitudinal adjustment, sprocket wheels supported by the main-frame, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the

cross-bars upon the endless driver, a platform below the lower lap of track, said platform having vertical adjustment, a clamp, a frame to support the upper end of the clamp, a screw projecting from the upper end of the clamp through said frame and a nut upon the screw to give the clamp adjustment, and a spring having one end attached to the clamp and the other end attached to the platform to allow a yielding of the clamp, substantially as shown and described.

20. The combination, in a machine of the character described, of a main-frame having longitudinal adjustment, sprocket wheels supported by the main-frame, an endless driver to travel over the sprocket wheels, cross-bars upon the endless driver, a track consisting of four rails, two of the rails being to the outside and two to the inside of the cross-bars of the endless driver, a platform, yokes to support the platform, guides for the yokes, vertical screws fixed to the yokes, threaded pinions upon the vertical screws to turn to give the platform vertical adjustment, a clamp, a frame to support the upper end of the clamp, a screw projecting from the clamp through said frame and a nut upon the screw to give the clamp adjustment, and a spring having one end fixed to the clamp and the opposite end fixed to the platform to allow a yielding of the clamp, substantially as shown and described.

21. The combination, in a machine of the character described, of a main-frame having longitudinal adjustment, sprocket wheels supported by the main-frame, an endless driver consisting of a link chain having swivel connections and upright projections to travel over the sprocket wheels, cross-bars upon the endless driver, a track adapted to sustain the endless driver at one angle of inclination on its upper lap and at an opposite angle on its lower lap, a vertical adjustable platform below the lower lap of the endless driver and having substantially the same inclination, guide rails along the upper lap of track and guide rails along the platform, an adjustable yielding clamp, a perforated pipe along the lower edge of the upper lap of track, a perforated pipe along the lower edge of the platform, and a feedway, substantially as shown and described.

In testimony whereof I affix my signature, in the presence of two witnesses, this 15th day of January, 1891.

JOHN W. ROBERTS.

Witnesses:

J. C. BEARDSLEE,
JOS. A. OSBORNE.