No. 796,099. PATENTED AUG. 1, 1905.

J. T. WILMORE.

CAN CAP SOLDERING APPARATUS.

APPLICATION FILED DEC. 15, 1903.

4 SHEETS—SHEET 1.

Fig. 1.

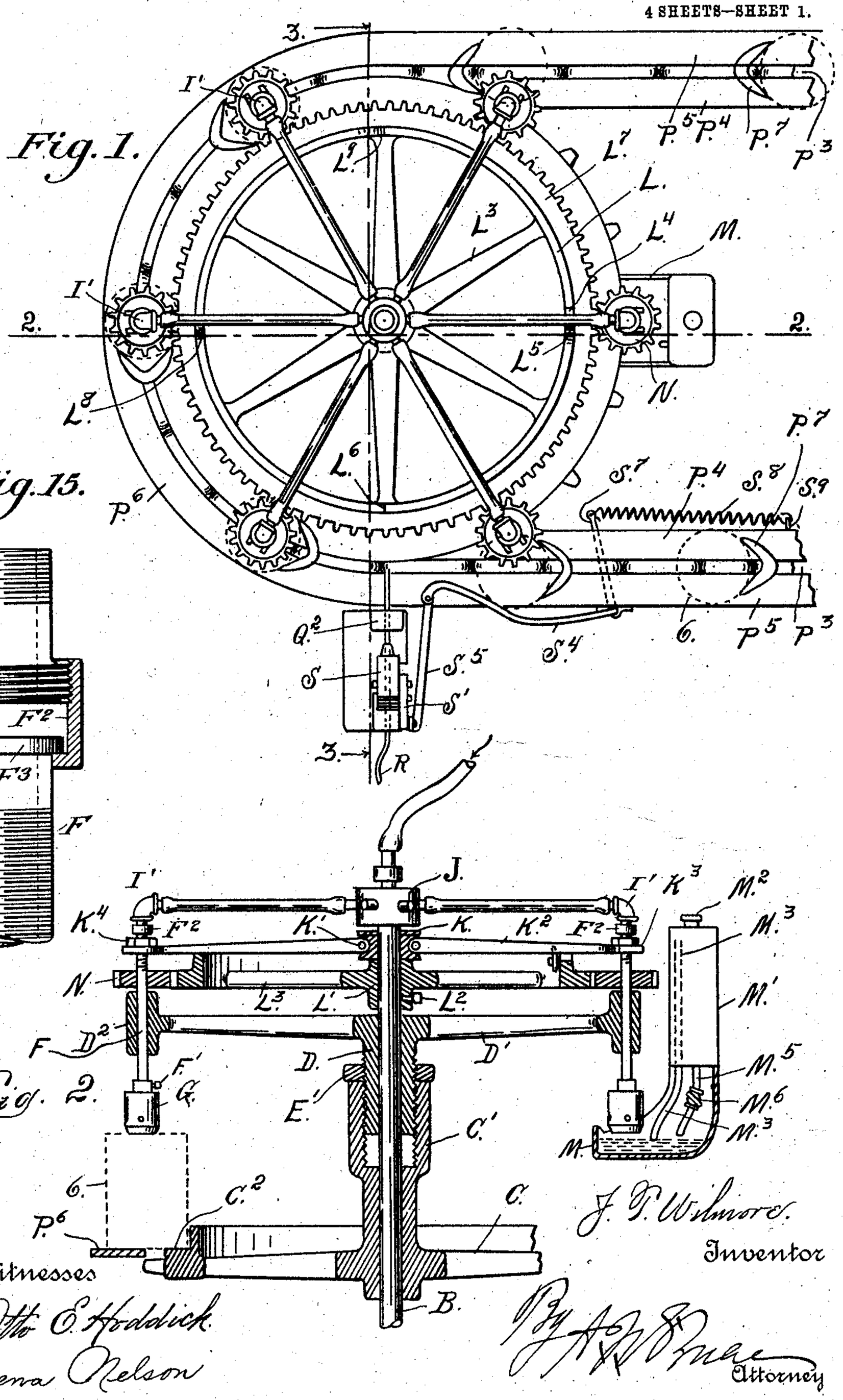

Fig. 15.

Fig. 2.

Witnesses

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4 SHEETS—SHEET 2.

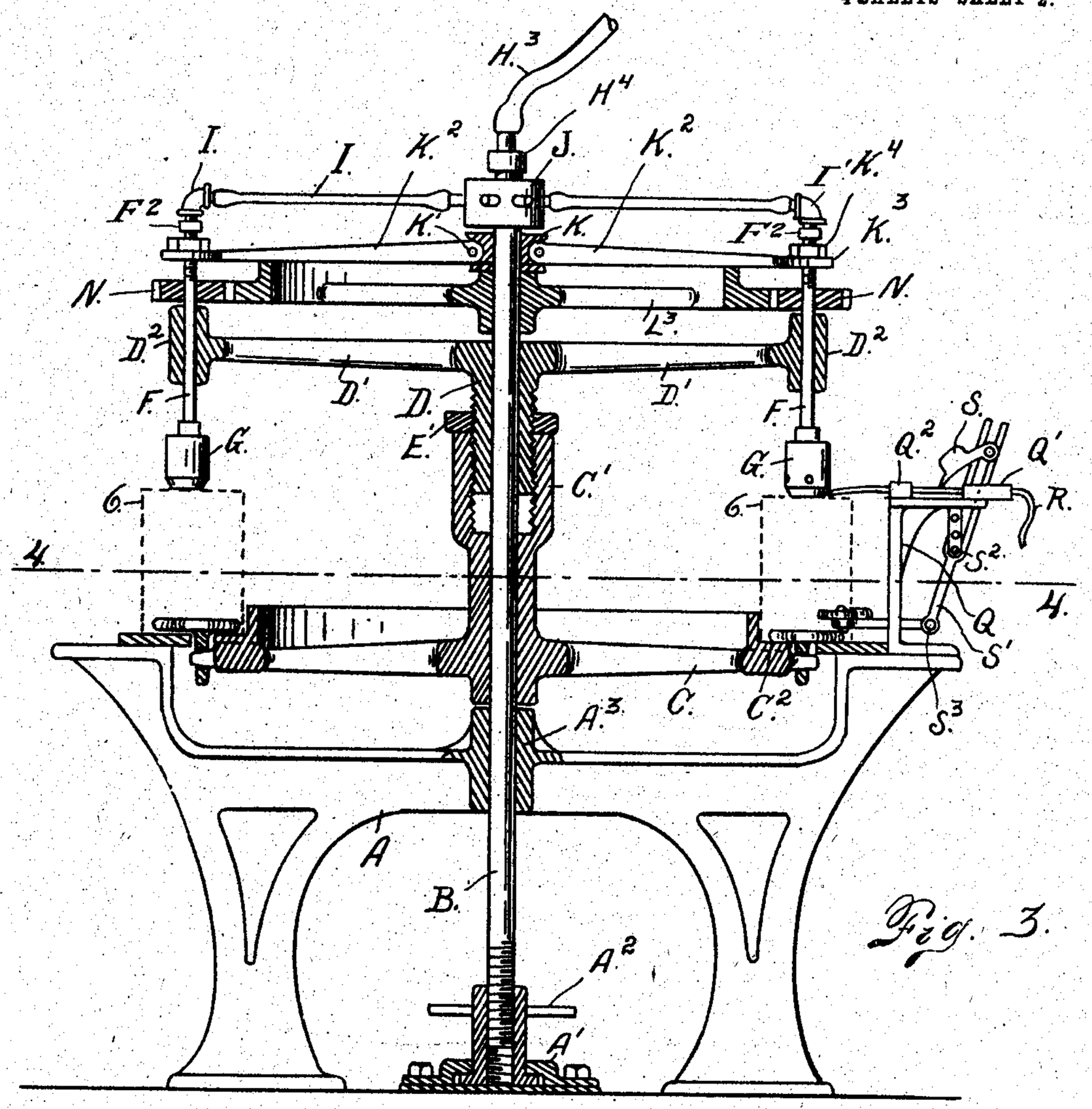

Fig. 3.

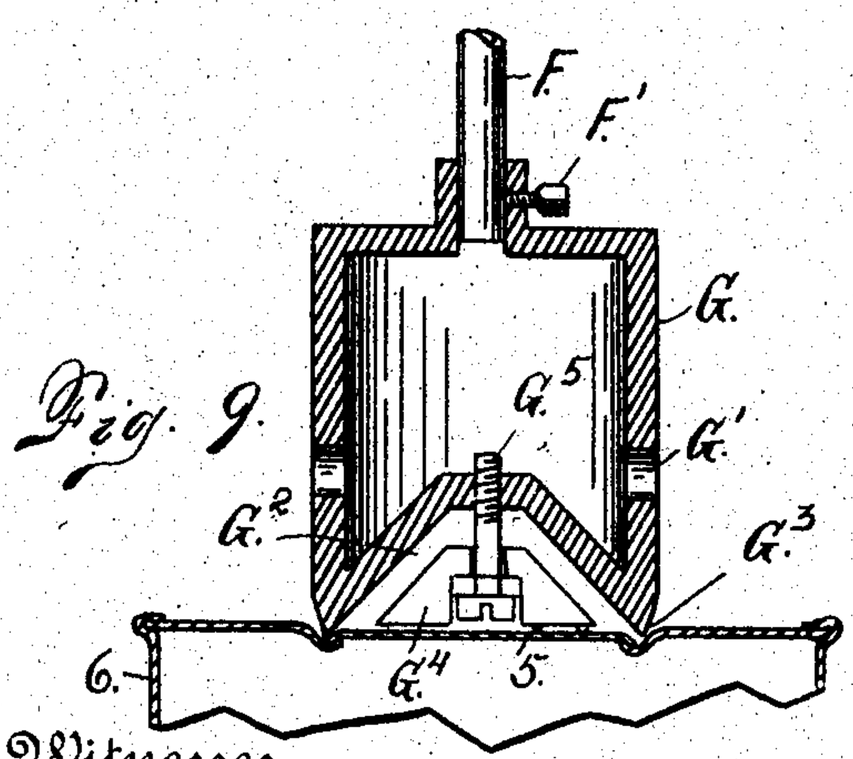

Fig. 9.

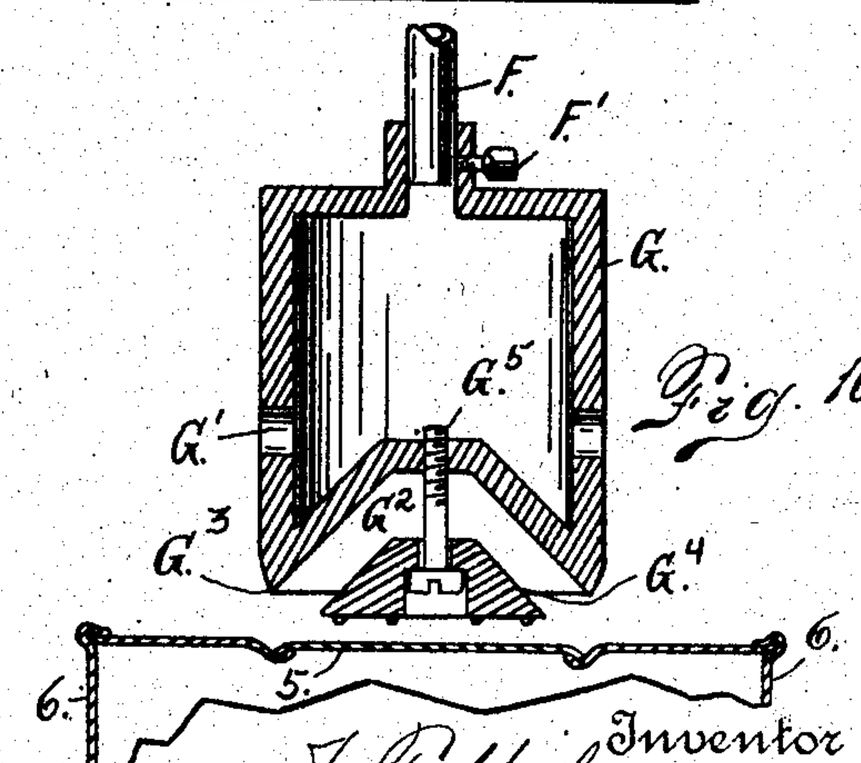

Fig. 10.

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4 SHEETS—SHEET 3.

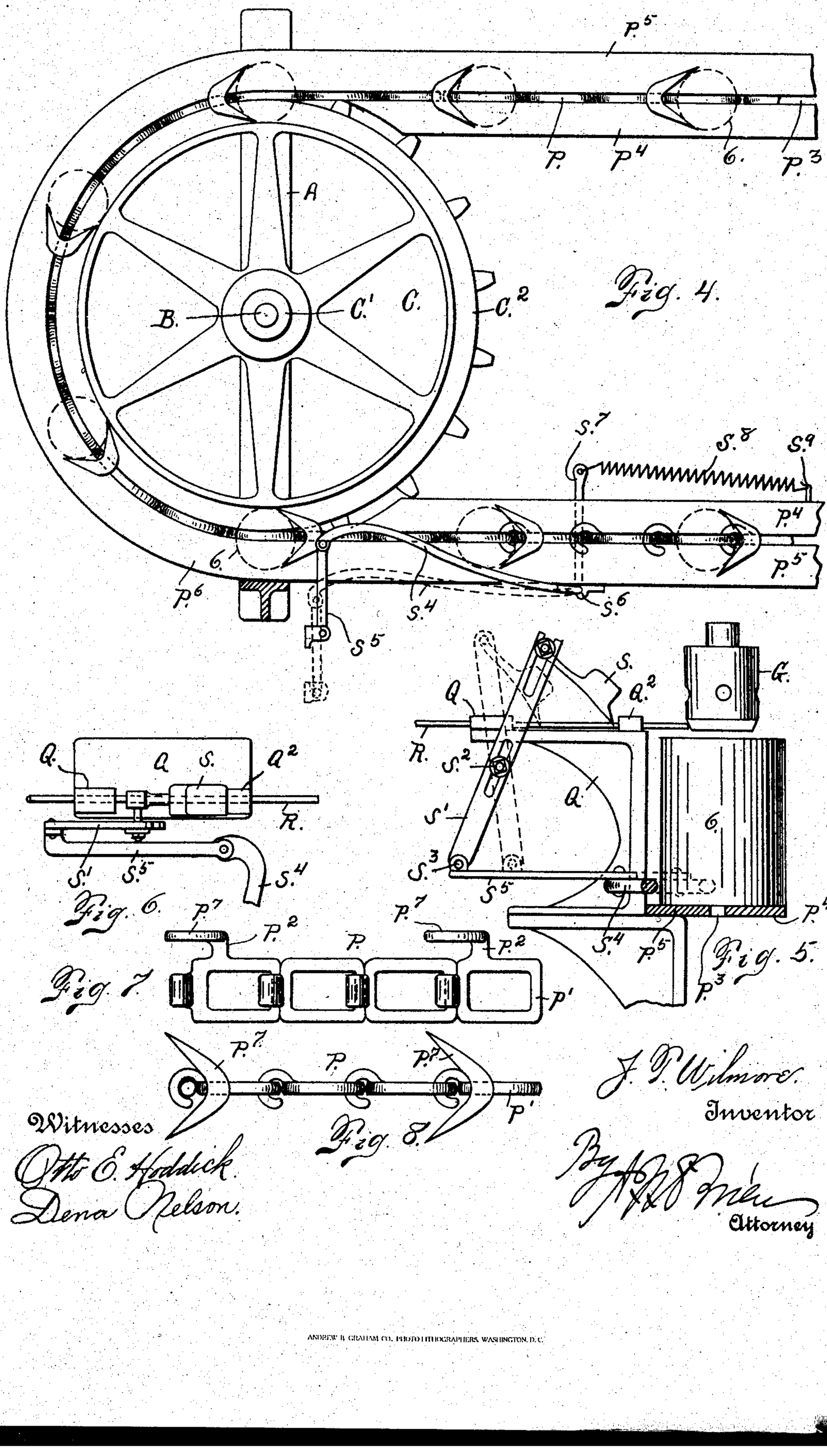

Fig. 4.

Fig. 6.

Fig. 5.

Fig. 7.

Fig. 8.

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4 SHEETS—SHEET 4.

Fig. 16.

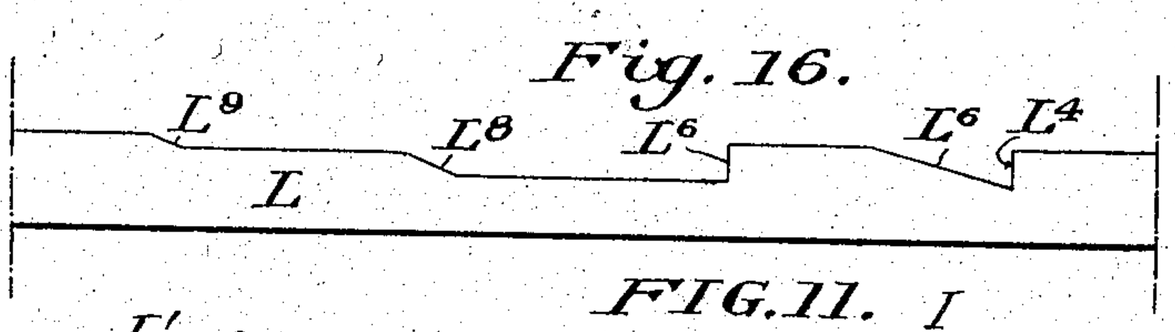


FIG. 11.

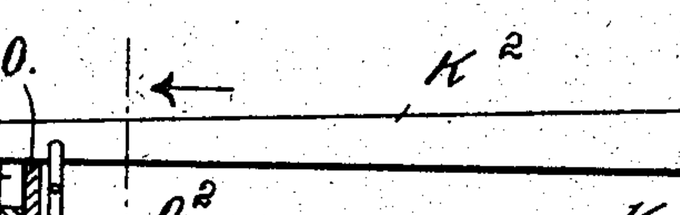


Fig. 12.

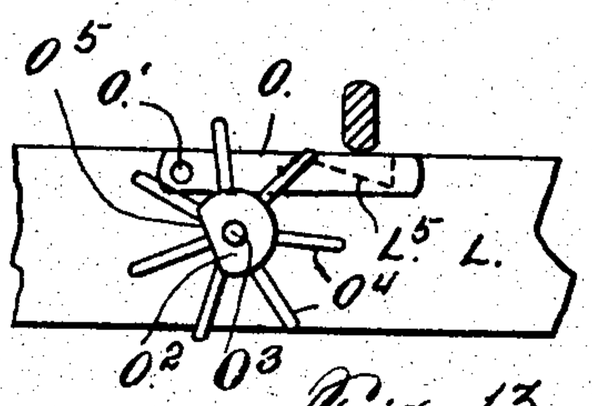
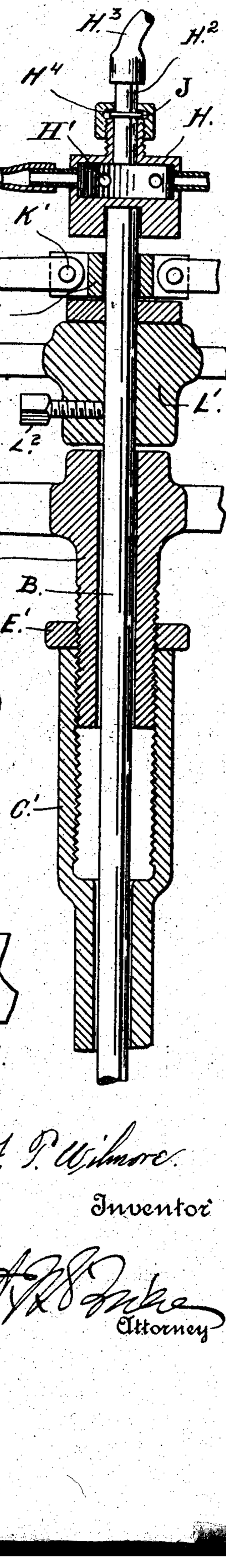


Fig. 13.

Fig. 14.



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Inventor
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UNITED STATES PATENT OFFICE.

JOHN T. WILMORE, OF DENVER, COLORADO.

CAN-CAP-SOLDERING APPARATUS.

No. 796,099 Specification of Letters Patent. Patented Aug. 1, 1905.

Application filed December 15, 1903. Serial No. 185,301.

To all whom it may concern:

Be it known that I, JOHN T. WILMORE, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Can-Cap-Soldering Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in apparatus for soldering the caps upon cans, and is especially applicable to cans in which what are known as "canned goods" are placed.

After the goods are placed in the cans the top of the can must be closed by soldering the cap or central portion of the top of the can in place. There is a small opening in the central part of the cap to allow the vapor to escape from the can, since the goods are put in hot. It is necessary that this should be left open until the cap is soldered in place in the top of the can, after which it is necessary to fill this small orifice with solder. My improved apparatus is also adapted to perform this function, as well as the function of soldering the cap in place.

Having briefly outlined the function of my invention, I will proceed to describe the construction in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a top or plan view of my improved construction, a portion of the track and the endless chain being broken away. Fig. 2 is a section taken on the line 2 2, Fig. 1. Fig. 3 is a section taken on the line 3 3, Fig. 1, viewed in the direction of the arrow. Fig. 4 is a section taken on the line 4 4, Fig. 3, looking downwardly. Fig. 5 is a detail view of the device for feeding the solder to the soldering-iron, the latter being shown in place. Fig. 6 is a top view of the device with the soldering-iron removed. Fig. 7 is a side view of the chain or carrier employed in connection with my improved apparatus. Fig. 8 is a top view of the same. Figs. 9 and 10 are detail views of the soldering-iron shown in connection with the can and cap. In these views the iron is shown in two positions. Fig. 11 is an enlarged fragmentary sectional view of the apparatus, showing the acid-trough in place. Figs. 12 and 13 are detail views of the device for controlling the vertical position of the soldering-iron with reference to the acid-trough. Fig. 14 is a detail view of the form of soldering-iron employed for filling the cap-orifices. Fig. 15 is an enlarged detail view, partly in section, illustrating the connection between the rotary stems of the soldering-irons and the radial conduits which conduct the heating-gas to the said irons. Fig. 16 is a diagrammatic view illustrating the offsets and inclines of the circular rim L.

The same reference characters indicate the same parts in all the views.

Let A designate a suitable frame provided with a step-box A′, interiorly threaded to receive a vertical shaft B, which is adjustable in the box for the purpose of regulating the mechanism. After the shaft is properly adjusted a pin A^2 is passed through registering openings formed therein and in the box to hold the shaft against rotation. This shaft passes through a hub A^3, formed in the center of the frame A. Above this hub a sprocket-wheel C is journaled on the shaft, being provided with an upwardly-projecting interiorly-threaded sleeve C′, into which is screwed a sleeve D, provided with a number of radial arms D′. The sleeve D is adjustable in the threaded socket of the sleeve C′ for the purpose of regulating the vertical position of the arms D′. When the apparatus is in use, the sleeves C′ and D are locked together, whereby the gear-wheel and the radial arms are made to rotate in unison. After these two parts are adjusted a lock-nut E′ is screwed down upon the sleeve D to engagement with the top of the sleeve C′, thus locking the parts in the adjusted position. The outer extremity of each arm D′ is T-shaped, forming vertically-elongated apertured bearings D^2 for the hollow spindle or stem F of the soldering-iron G, the latter being connected with the stem F by a set-screw F′.

Made fast to the upper extremity of the shaft B is a hollow head H, provided with openings H′ to allow gas to escape into hollow radial arms I, connected with the head and occupying a horizontal position. These arms are connected, by means of an elbow I′, with the hollow soldering-iron stems F. The head H rotates freely on the shaft and is connected, by means of a coupling-nut J, with the stationary inlet-pipe H^2, the latter being connected with a flexible hose-pipe H^3. The coupling-nut J is screwed down upon a collar H^4, formed upon the lower extremity of the

inlet-pipe H^2. When the apparatus is in use, the head H, together with the coupling-nut and the parts connected with the head, rotates freely on the shaft, while the gas-inlet conduit remains stationary. The arms I are flexible to allow the soldering-irons to be vertically adjusted at will. Below the head H is a hub K, which is journaled on the shaft B and to which are pivotally connected or hinged, as shown at K′, a number of arms K^2, whose outer extremities are provided with eyes K^3, through which the soldering-iron stems F pass. Above the outer extremity of each arm K^2 is located a nut K^4, which forms a stop to permit the raising and lowering of the soldering-irons by the movement of the pivoted arms K^2. These arms K^2 rest upon a rim L, connected with the hub L′ by spokes L^3. The hub L′ is made fast to the shaft B by a set-screw L^2. At a suitable point in the circular path of the soldering-irons as they rotate around the shaft B as an axis an acid-trough M is located. Suitably connected with this trough is a receptacle M′, provided with an opening in the top normally closed by a stopper M^2. Extending from a point near the upper extremity of the receptacle M′ is an open-ended air-pipe M^3, which projects downwardly below the receptacle M′, its lower extremity terminating below the top but above the bottom of the acid-trough M. The receptacle M′ is provided with an opening in the bottom, with which is connected an outlet-tube M^5, leading to the acid-trough M. This outlet-pipe M^5 is provided with a valve M^6 to stop the flow of acid when desired. This acid-supplying apparatus is automatic in its action, and from its description it will be understood that as long as the lower extremity of the pipe M^3 is above the liquid in the trough M the air will pass into the receptacle M′ above the liquid and allow the acid to flow freely through the outlet-pipe M^5 into the trough M. It will also be understood that as soon as the liquid in the trough M is deep enough to immerse the lower extremity of the pipe M^3, thus preventing the air from entering the receptacle M′, the flow of acid from the said receptacle will be stopped. By this arrangement it is evident that a proper supply of acid may always be maintained in the trough M without any danger of overflowing the latter.

It is necessary that each soldering-iron shall at intervals be dipped into the acid in the trough M during the operation of the machine; but it is not necessary that this shall be done at every revolution of the soldering-irons. The rim L is provided with an offset L^4, located opposite the trough M and of sufficient depth to allow each arm K^2 to drop downwardly sufficiently to permit the soldering-iron to dip into the acid of the trough. One edge of this offset is inclined, as shown at L^5, to cause the arms K^2 to travel rapidly upwardly after the soldering-iron has entered the trough to prevent the iron from being materially cooled from contact with the acid, after which the arms travel practically in a horizontal plane on the rim L until another offset L^6 is reached, when the soldering-iron again passes downwardly to allow it to come in contact with the cap 5 of a can 6.

The rim L is provided with an outwardly-projecting part L^7, which is cogged to engage small gears N, made fast to the stems F of the soldering-irons. By virtue of the engagement of these small gears with the cogged rim the soldering-irons are continually rotated during the operation of the machine.

The soldering-iron G is provided with orifices G′ for the admission of air and the escape of the products of combustion. The lower extremity of each soldering-iron is provided with a cavity G^2, whose walls are downwardly inclined to the edge G^3 of the iron, the circumference of this edge having the same diameter as the cap 5 of the can. Located within the cavity G^2 of the soldering-iron is a weight G^4, which is swiveled on a screw G^5, threaded into the bottom of the iron. The opening of the weight G^4, through which the screw G^5 passes, is of sufficient size to allow the weight to move freely vertically upon the screw, the weight having a limited vertical play for a purpose hereinafter explained.

To prevent the arms K^2 from moving downwardly into the offset L^4 at every revolution, resort is had to the construction shown in detail in Figs. 12 and 13 and also clearly indicated in Fig. 11 of the drawings. This construction consists of an arm O, pivoted upon the rim L, as shown at O′, and resting upon a hub O^2 of a pin-wheel, journaled on the rim, as shown at O^3 and provided with radial pins O^4. When the arm O engages the curved part of the hub O^2, the said arm is raised to a position flush with the top of the rim L and prevents the pivoted arms K^2 from dropping into the offset or notch L^4 of the rim L, and if this hub O^2 was of uniform radius or diameter the arms K^2 would not allow the soldering-irons to drop into the acid-trough at all; but the hub O^2 is flattened on one side, as shown at O^5, and when this flattened portion of the hub reaches the pivoted arm O the latter drops downwardly, allowing the arm K^2 to drop into the notch or recess L^4, thus allowing the lower extremity of the soldering-iron to dip into the acid. The pins O^4 project upwardly above the upper extremity of the rim L, whereby the hub O^2 is rotated by the arms K^2 during the rotation of the latter. Each arm K^2 moves the hub O^2 one-seventh of a revolution, there being seven pins O^4 shown, and once during each revolution of the hub O^2 an arm K^2 is allowed to drop into the notch or recess L^4. As there are six arms K^2, one of the soldering-irons is allowed to dip into the acid-trough during one and one-sixth of a

complete rotation of the said arms. By this arrangement each of the soldering-irons dips into the acid-trough once during every seven complete revolutions or once during the soldering of the caps of seven cans.

The cans 6 are carried into position to be acted on by the soldering-irons by a chain conveyer P, composed of vertically-disposed links P′. At intervals the links of this chain are provided with upwardly-projecting lugs P^2, which pass through a slot or opening P^3, located between track members P^4 and P^5, upon which the cans travel until the gear C is reached, when a shoulder C^2, formed integral with the said gear, takes the place of the member P^4 and coöperates with the part P^5, which merges into a semicircular part P^6, and after the cans have traveled around this semicircular track they again pass out upon the track members P^4 and P^5, being carried along by the chain to any desired destination. The upper extremity of each lug P^2 is provided with a V-shaped part P^7, which directly engages a can and moves the latter along upon the track. The links P′ of the conveyer-chain engage the teeth of the sprocket-wheel C and cause the latter, together with the arms D′, to rotate or travel with the chain during the operation of the machine, and these arms D′ being in engagement with the stems of the soldering-irons cause the said irons and their connections to travel in harmony with the movement in the conveyer-chain.

Mounted on a table-bracket Q, supported by the main frame A, are two guides Q′ and Q^2, provided with openings to permit the passage of a narrow strip of solder R, and this solder being freely movable in the guides is fed therethrough to engagement with the heated soldering-irons by means of a dog S, pivotally mounted on a lever S′, fulcrumed at S^2 and having its lower extremity connected, as shown at S^3, with a curved arm S^4 by means of a link S^5, whereby the said lever is actuated. The normal position of the curved arm S^4 is in the path of the cans as they are carried along by the conveyer-chain, the said arm S^4 being engaged by the cans just before they pass from the track member P^4 to the shoulder C^2 of the sprocket-gear. This engagement of the cans with the curved arm actuates the lever S′ and operates the dog S, causing it to feed the solder strip R to engagement with the heated iron every time a can reaches the soldering position. In this way the revoluble soldering-iron is supplied with sufficient solder for securing the cap of a single can every time the soldering-iron makes a complete circuit. The curved arm S^4 is provided with a downwardly-projecting part passing through a bearing S^6, made fast to the track member P^5, and the lower extremity of this downwardly-bent part of the arm projects outwardly beneath the track, forming an arm S^7, with which a coil-spring S^8 is connected at one extremity, the opposite extremity of the coil-spring being made fast to the track member P^4, as shown at S^9. The two parts S^4 and S^7 virtually form the two arms of a bell-crank lever fulcrumed in the bearing S^6. From this explanation it will be understood that as soon as a can passes the arm S^4 and actuates it, moving it and its connections to the position shown by dotted lines in Fig. 4, the recoil of the spring S^8 will return the bell-crank lever to its normal position, bringing the arm S^4 into position to be acted on by the next can and causing the strip of solder to be brought successively into contact with each soldering-iron as the series of irons travel around with the sprocket-gear.

From the foregoing description the use and operation of my improved apparatus will be readily understood. Attention is called to the fact that whether the apparatus is used for closing the small central orifice in the cap or in soldering the cap upon the top of the can the operation is exactly the same. It is evident, however, that the two operations are performed successively and not simultaneously. Hence in the operation of canning two apparatuses will be employed and suitably arranged with reference to each other, the said apparatuses being substantially identical, except that in one case the soldering-iron would be of the construction shown in Figs. 9, 10, and 11 and designated G, while in the other case the soldering-iron would be of the construction shown in Fig. 14 and designated G^6. In this view the lower extremity of the iron is conical, as shown at G^7, and its point G^8 is caused to engage the center of the cap and apply sufficient solder thereto for closing the orifice.

In the use of the apparatus the cans having the caps in position are carried along upon the track composed of the members P^4 and P^5 by the conveyer-chain, and as any can approaches the sprocket C it acts on the arm S^4 of the bell-crank lever device and actuates the lever S′, cuasing the dog S to feed the solder strip R to the heated soldering-iron, the latter having been made sufficiently hot by the introduction of ignited gas to the hollow iron in a manner which will be readily understood, the gas passing to the soldering-iron from a suitable source and by means of the apparatus heretofore described. As the strip of solder R comes in contact with the heated iron sufficient solder is melted for securing a single cap upon the can, the soldering-iron having previously to its contact with the solder strip been dipped into the acid in the trough M, as heretofore explained. The acid causes the solder to flow freely upon the iron, whereby it may be evenly applied to the circumference of the cap. At the same time that this solder is applied the soldering-iron, by reason of the offset L^6 in the rim L, whereby one of the arms K^2 is made to drop downwardly, is brought into contact

with the cap, the parts being then in the position shown in Fig. 9 of the drawings, the weight G^4 resting on the central part of the cap, and the circular edge G^3 of the soldering-iron coming in contact with the outer edge of the cap. It will be understood that as the soldering-iron is continually rotated by virtue of the fact that the gears N are made fast to the stems F and in engagement with the large gear L^7 the cap-soldering operation will be quickly completed. This operation is accomplished while the can is traveling from a point opposite the offset L^6 to an upwardly-inclined part L^8 of the rim L, when the arm K^2 is raised sufficiently to lift the body of the soldering-iron above the cap, but allowing the weight G^4 to remain in contact with the cap, whereby the latter is held securely in place until the solder is set or cooled, after which the arm K^2 engages an upwardly-inclined part L^9 of the rim, when the iron, including the weight, is raised completely from the cap to the position shown in Fig. 10. The cap then passes out upon the straight portion of the track opposite that upon which it approached the soldering apparatus, as heretofore explained.

Attention is called to the fact that the upper extremity of the stem F of each soldering-iron G is connected with the elbow I′ of the hollow radial arm I by a sleeve F^2, the upper extremity F^3 of the stem being swiveled or journaled in the sleeve. (See Fig. 15.)

Having thus described my invention, what I claim is—

1. A soldering apparatus comprising a rotary device, soldering-irons mounted at suitable intervals thereon and traveling in a circular path, an acid-receptacle suitably located in the path of the soldering-irons, and automatic means for causing the soldering-irons to dip into the said receptacle at predetermined intervals.

2. The combination of a rotating apparatus, soldering-irons mounted thereon to travel in a circular path, means for rotating the soldering-irons on their individual axes, during their orbital travel, an acid-receptacle located in the path of the soldering-irons, means for causing the latter to dip into the said receptacle at predetermined intervals and means for bringing the cans in suitable position with reference to the irons, to allow the latter to act on the cans for the purpose set forth.

3. The combination in a soldering apparatus, of a rotary device, a number of soldering-irons mounted thereon at regular intervals and made to travel in a circular path or orbit, an acid-receptacle located in the path of the soldering-irons, means for causing the latter to dip into the said receptacle at predetermined intervals, means for rotating the soldering-irons on their individual axes, simultaneously with their orbital travel, means for heating the soldering-irons simultaneously with their travel, and means for automatically feeding cold solder to the heated irons.

4. The combination of a revoluble device, a conveyer for actuating said device and carrying the cans to be acted on by the apparatus into their proper relative position, soldering-irons mounted on the said device and arranged to travel in a circular path, said irons having vertical stems provided with screw-threads, nuts screwed on the threaded portions of the stems, arms hinged to the revoluble device and engaging the soldering-iron stems below the nuts which form stops, means for delivering gas simultaneously to the soldering-irons, means for rotating the soldering-irons on their individual axes during their travel in the said circular path, means actuated by the traveling cans for feeding cold solder successively to the soldering-irons during the movement of the latter, and means for regulating the vertical position of the soldering-irons with reference to the cans.

5. The combination of a revoluble device, a number of soldering-irons mounted thereon and arranged to travel in a circular path, an acid-receptacle suitably located in the path of the soldering-irons, means for causing the soldering-irons to dip into the said receptacle at suitable intervals, means for heating the soldering-irons, means for automatically feeding cold solder to the heated irons in succession, and suitable means for bringing the cans into position to be acted on by the soldering-irons, simultaneously with the feeding of the cold solder thereto.

6. In a soldering apparatus, the combination with a stationary shaft, of a sprocket-wheel mounted to rotate thereon, a wheel provided with radial arms, said wheel being connected to rotate with the sprocket-wheel and vertically adjustable with reference to the latter, the outer extremities of the adjustable wheel having openings, soldering-irons having hollow stems passing through said openings, means for delivering fuel-gas simultaneously to all of the soldering-irons, a hub revoluble on the shaft, arms pivotally connected with said hub and having eyes in their outer extremities through which the stems of the soldering-irons pass, a stop on each soldering-iron stem, the same being located above the pivoted arms, a stationary rim upon which the pivoted arms rest, the said rim being shaped to cause the arms to change their vertical position whereby the position of the soldering-irons is regulated and controlled, a conveyer-chain acting on the sprocket-wheel to impart the rotary movement to the soldering-iron-carrying devices, and a track upon which the cans rest, the conveyer being arranged in operative relation with the track to cause the cans to travel thereon during the soldering operation.

7. The combination with a suitable frame, a shaft mounted thereon, soldering-iron-car-

rying apparatus revoluble on the shaft, soldering-irons connected with said apparatus and arranged to travel in a circular orbit or path, means for simultaneously rotating the soldering-irons on their individual axes during their orbital travel, an acid-receptacle located in the path of the soldering-irons, means for causing the soldering-irons to dip into the said receptacle at predetermined intervals and a can-conveyer acting on the can-carrying apparatus to rotate the same, and a track with which the conveyer coöperates to bring the cans into operative relation with the soldering-irons, substantially as described.

8. In a soldering apparatus, the combination with a suitable frame and a shaft mounted thereon, of a hollow head mounted to rotate on the shaft, means for delivering gas to said head, flexible radial arms connected with the head, soldering-irons provided with hollow stems connected with the flexible arms to deliver gas to the soldering-irons the latter being hollow, a hub mounted to rotate on the shaft and provided with rigid arms having openings through which the stems of the soldering-irons pass, means for rotating said hub whereby the soldering-irons are arranged to travel around the shaft in a circular path, a small gear made fast to the stem of each soldering-iron, and a large stationary gear with which the gears of all the soldering-irons mesh during their orbital travel, whereby the soldering-irons are given a rotary movement on their individual axes while traveling in their circular path or orbit.

9. A soldering apparatus comprising a rotary device, soldering-irons mounted at suitable intervals thereon and traveling in a circular path, arms hinged to the rotary device and connected with the soldering-irons whereby the latter are carried around in a circular path, the said arms controlling the vertical movement of the irons, an acid-receptacle located in the path of the soldering-irons, a stationary rim engaged by the said arms and provided with an offset adjacent to the said receptacle, a wheel mounted to rotate on the rim in proximity to the offset and provided with pins adapted to project above the rim whereby the hub is actuated by the said arms, an arm pivoted to the rim and resting on the hub of the wheel, the hub being flattened on one side to allow the pivoted arm to drop when the flattened side is uppermost, the pivoted arm at other times occupying a position flush with the upper edge of the rim.

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

JOHN T. WILMORE.

Witnesses:

DENA NELSON,

A. J. O'BRIEN.