2 Sheets—Sheet 1

W. J. GORDON.

CAN-SOLDERING MACHINE.

No. 172,921. Patented Feb. 1, 1876.

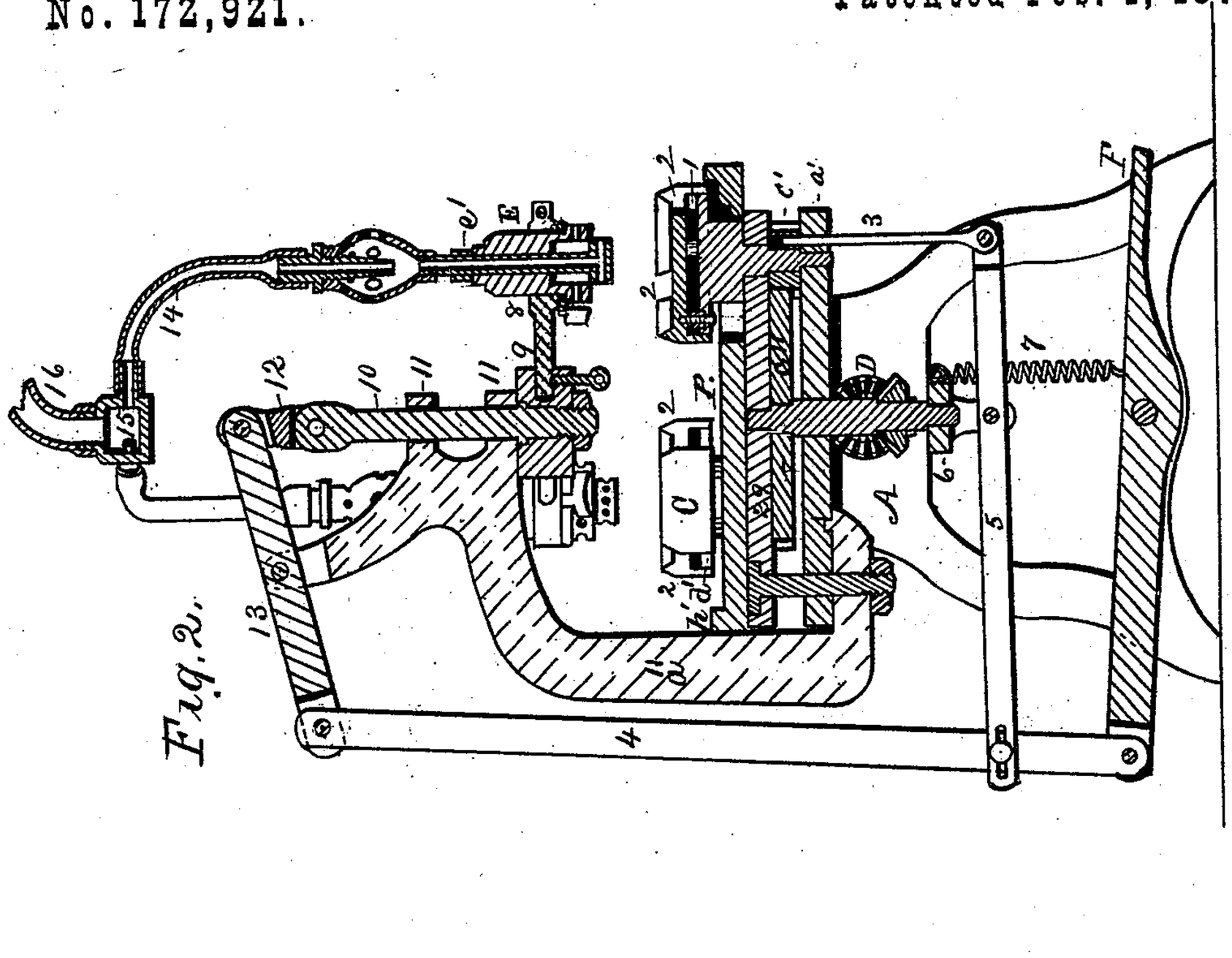

Fig. 2.

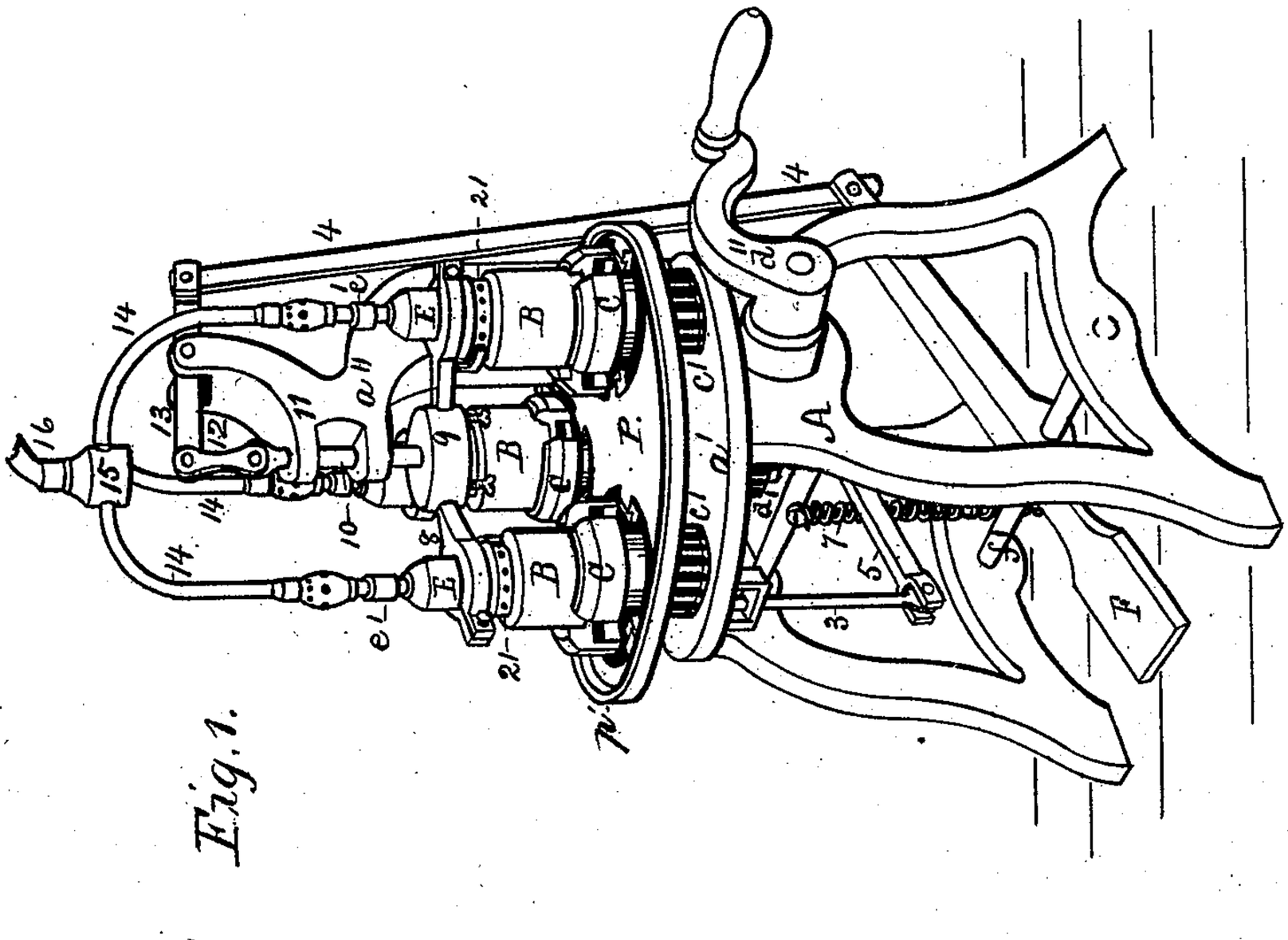

Fig. 1.

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Inventor:

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2 Sheets—Sheet 2.

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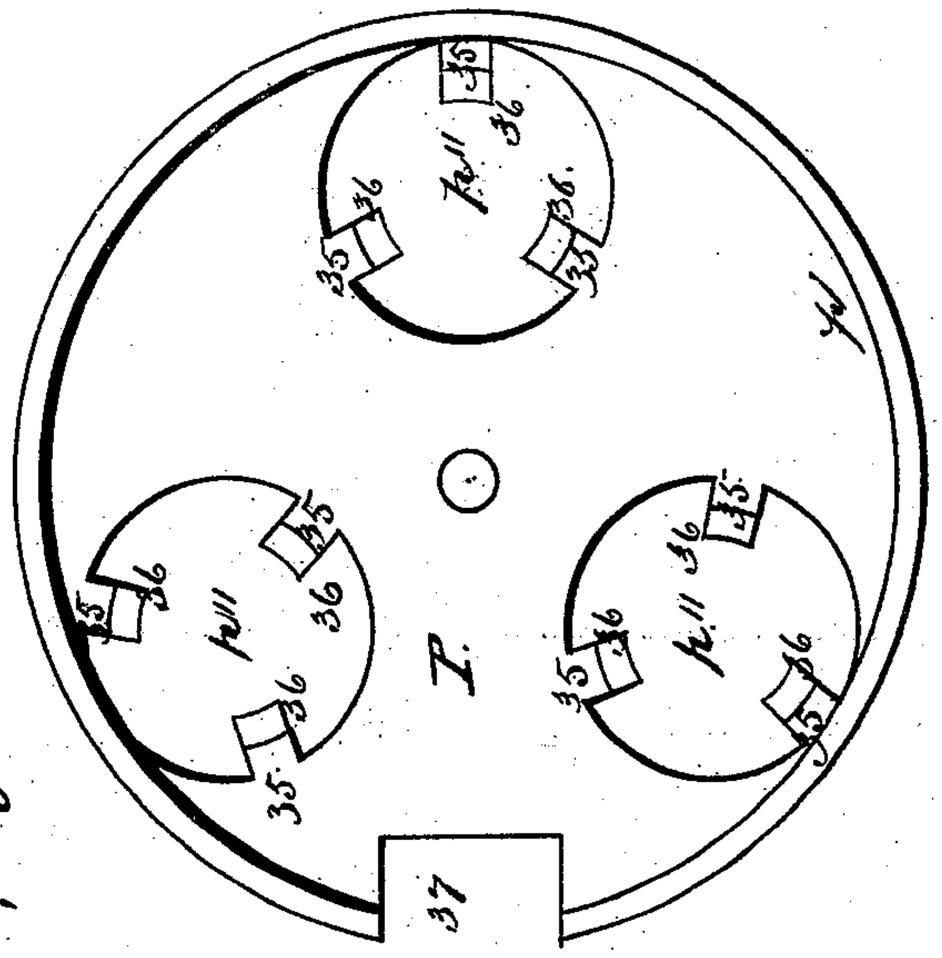

Fig. 5.

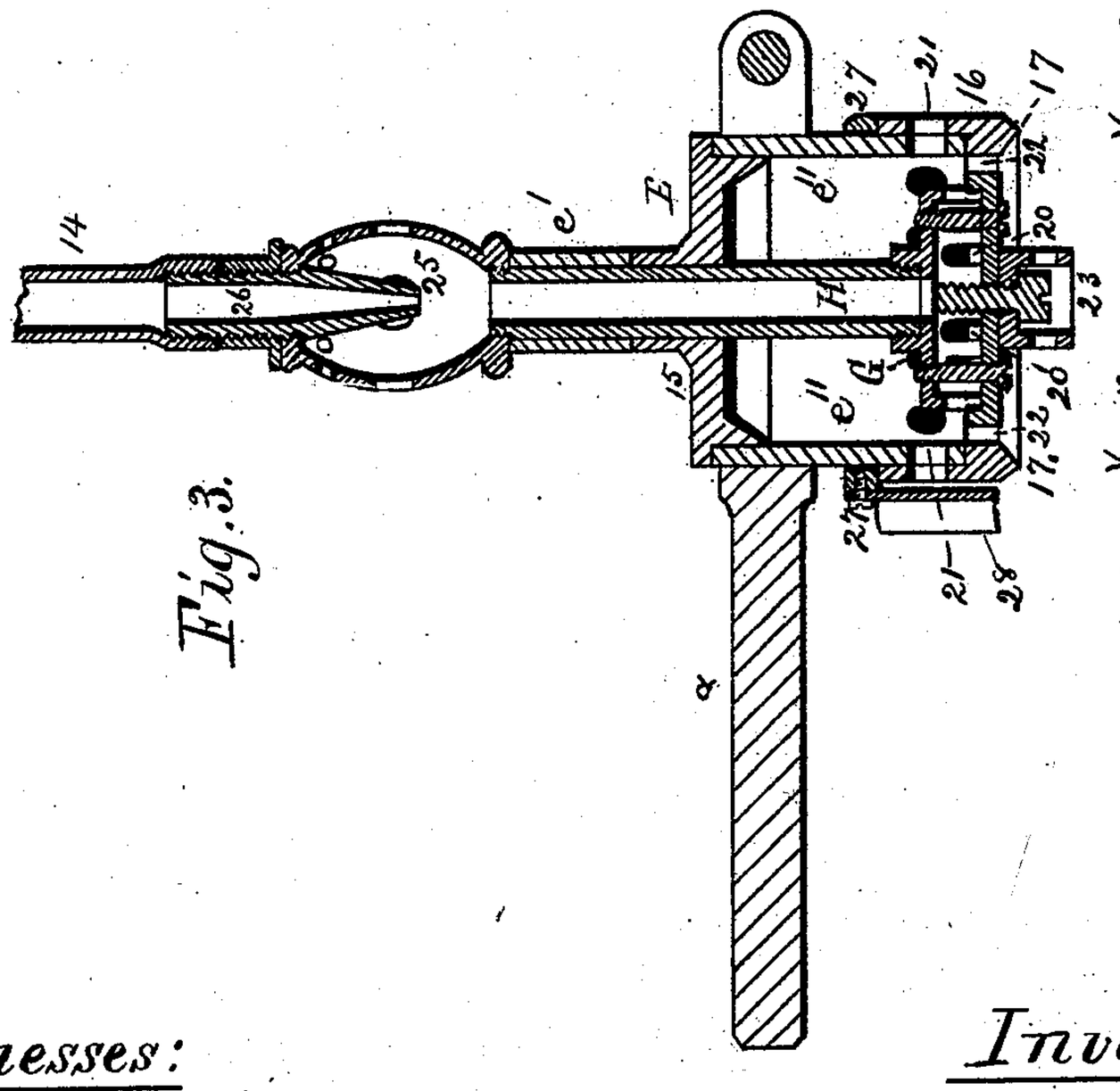

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM J. GORDON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN CAN-SOLDERING MACHINES.

Specification forming part of Letters Patent No. **172,921**, dated February 1, 1876; application filed October 11, 1875.

To all whom it may concern:

Be it known that I, WILLIAM J. GORDON, of the city of Philadelphia, in the State of Pennsylvania, have invented an Improved Machine for Soldering the Caps onto Sheet-Metal Cans, of which the following is a specification:

The object of my invention is to facilitate the operation of soldering the caps onto filled sheet-metal cans by supporting a series of them, above a depositing and lifting tray, upon a corresponding series of distinct rotary carriers, each provided with a pinion on its shaft, and operated by a central spur-wheel supported in a suitable frame, which also supports, in an adjustable manner, above the series of carriers, a corresponding series of peculiar soldering-irons, kept heated by ignited gas or gasoline supplied through respective elastic tubes, which communicate with a main supply-pipe above, so that the said hot soldering-irons can be readily raised and lowered by a treadle or otherwise, as occasion requires, during the use of the machine, as will be more fully described and explained with reference to the accompanying drawings, in which—

Figure 1 is a perspective view of the machine embodying my invention, with the cans inserted; Fig. 2, a vertical central section of Fig. 1, without the cans. Fig. 3 is a vertical central section of one of the peculiar soldering-irons, showing its gas-pipe in connection with its flexible tube—enlarged and detached from the machine. Fig. 4 is a diametrical section of the upper end of a can, with its cap enlarged to correspond with the soldering-iron shown in Fig. 3; and Fig. 5 is an enlarged view of the depositing and lifting tray detached.

The frame A is provided with a circular platform, a', and an upright arm, a'', fixed upon it, which together support all the moving parts of the machine (and especially the cans B) when placed on their rotary carriers C, substantially as represented in Fig. 1. The vertical shafts of the carriers C each has a pinion, c', fixed on its lower end, and each pinion c' gears with a central driving-wheel, c'', which is rotated by a pair of bevel-wheels, D, operated by a shaft, d', and hand-crank d''. (See Fig. 1.) The can-carriers C are each supported, on their respective bases, directly upon another circular platform, 29, which is rigidly supported just above the pinions, with their respective journals passing loosely through platforms 29 and a', and tightly through the pinions c', respectively, so that, when the central wheel c'' is rotated, the said can-carriers C will each be simultaneously rotated, but with much greater velocity. Each of the can-carriers C is made in two horizontally-divided parts, attached together, with an elastic cushion or spiral springs, 1, between, (see Fig. 2,) for the purpose of allowing the respective cans B to have an elastic up-and-down motion, as well as a canting one, to cause the cans to yield sufficiently to the soldering-irons E, as will be described or explained. Each of the said carriers C has its vertical sides and bottom cut away by three equidistant rectangular recesses, 2 2 2, which extend toward the center of the carrier about one-fifth of its diameter, substantially as indicated in Figs. 1 and 2. The object of the said recesses will be explained after describing the tray, which is shown enlarged in the plan view, Fig. 5.

The pinion c' at the front side of the machine (see Fig. 1) has a vertical through-hole near its perimeter, into which a vertical rod, 3, will slip and stop the motion of the can-carriers C soon after the foot of the operator has been taken off of the treadle F, which is a lever of the first class, a spiral spring, 7, continually tending to lift the fulcrum f' of the treadle, turning in the lower part of the frame A, and its weight end extending back beyond the frame, where it is articulated to a nearly-vertical bar, 4, which extends upward nearly to the upper end of the upright arm a'' of the frame A; a horizontal lever-bar, 5, having its fulcrum-pin in a fixed hanger, 6, and its two ends articulated to the respective bar 3 and bar 4, so that when the operator places his foot upon the treadle F the latter lifts the bar 4, and consequently, also, the rear end of lever 5, thus forcing downward the opposite end of the same, and consequently drawing the sliding rod 3 downward out of connection with the hole in the pinion c' above it, and thus permits the geared wheels c' c'' to be rotated by means of the cranked shaft d'.

The tray P (see Fig. 5) is intended to be used for lifting on and off the series of cans. It consists of a thin circular plate having a flanged rim, p', to strengthen it and a series of equidistant through-holes, p'', each provided with three radially inward-projecting lugs, 35, which correspond in position with the respective recesses 2 of the carriers C, but still small enough to pass freely down through the said recesses 2 and allow the tray to rest down upon the upper platform 29, substantially as shown in Fig. 2. The upper side of each projecting end of the lugs 35 is notched or sunk, so as to form a step, 36, to receive the lower end of the can B and keep it concentric in the upper half of its respective hole p'', when the said can is placed upon the steps 36. In using the tray P each can, with its cap laid over its mouth, is placed so as to rest upon the steps 36, the tray then lifted and placed with its holes p'' concentrically over the respective carriers C, and lowered down until the said tray rests upon the upper platform P, thus leaving the cans resting concentrically upon their respective carriers C, as represented in Fig. 1. The tray is recessed at 37, (see Fig. 5,) to receive the upright arm a'', and thus cause the said tray always to fit the recesses 2 of the series of carriers C, when the sliding rod 3 is engaged with the hole in the pinion c' above it, as shown in Fig. 2.

Each of the series of can-carriers C has supported directly above it one of a corresponding series of the soldering-irons E, which is firmly held by a horizontal radial arm, 8, adjustably fixed in a central hub, 9, through the center of which latter a stem, 10, is fixed to extend vertically upward, so as to slide up and down in supporting-lugs 11, which project horizontally from the upright arm a''. The upper end of the stem 10 is connected by a link, 12, to a horizontal lever-bar, 13, which has its fulcrum in the upper end of the upright arm a'', and its other end articulated to the upper end of the vertical bar 4. (See Figs. 1 and 2.) The stem e' of each of the soldering-irons E is tubular, and within it a gas-pipe, H, slides within certain limits, as will, together with the peculiar construction of the soldering-iron, be hereinafter described and explained, the upper portion of which stem e' connects with a flexible tube, 14, and all of the said flexible tubes of the series connect with the boss 15 of a main supply-pipe, 16, so that the whole series of the soldering-irons E can be raised above or let down upon the upper ends of the whole series of cans which may be upon the carriers C, by the movements of the treadle F, in the manner hereinbefore explained.

Each of the soldering-irons E is a hollow cylinder with copper sides, e'', closed at its upper end by the flange 15 of its stem e', and open at its lower end. About one-third of the length of the copper sides of the cylinder is surrounded at its lower end by a band of steel, 16, the lower edge of which steel band is made thick enough to form a seat for the bottom edge of the copper sides, or so that the inner side of the two will be even, and so, also, that the bottom edge of the steel band 16 shall form, in its transverse section, a double bevel edge, to correspond with the usual V-groove 18 around the mouth and cap 19 of the can. (See Fig. 4.)

The object in making the cylindrical sides e'' of the soldering-iron E out of copper is because copper will retain heat for a longer time than iron or steel, while the steel soldering-edge 17 is used because it will be more durable in view of the friction to which it is subjected while hot.

The lower end of the gas or gasoline pipe H is provided with a short hollow cylinder, G, (see Fig. 3,) closed at both ends, except where it communicates with the gas-pipe H at its upper end, and perforated at its sides by a series of holes, 20, through which the gas or gasoline passes into the annular space around and above it, into the hollow cylinder E, and out through a series of holes, 21, made through the sides of said cylinder E, and also out through the annular space 22, between the sides of cylinders E and G. Secured so as to be rotated by friction upon the cap 19 of the can C, as the latter is rotated in the operation of soldering, is a small hollow perforated-cylinder, 23, which, by its gravitation, keeps down the freshly-soldered cap of the can, while the soldering-iron E is being lifted out of contact with the soldered groove of the can, and also allows any steam or aqueous vapor which may rise through the usual temporary minute vent-hole 24 in the cap to escape.

The gas-pipe H has an oval chamber, 25, with perforations through its sides, and fixed in the upper end of said chamber is a tapering jet-tube, 26, which directs the gas or gasoline coming from the flexible tube above into the gas pipe H below, while atmospheric air enters through the perforations in 25, and supports the combustion of the ignited gas or gasoline in and around the soldering-iron when the machine is in operation. A loose heavy ring, 27, to which is fixed a thin vertical plate, 28, rests upon the outside upper edge of the steel band 16, so that the lower edge of the said plate will rest upon the top of the V-groove of the can, and carry any loose lumps of solder dropped within its reach into the said groove during the operation of soldering.

The operation of the above-described machine is as follows, viz: The cans, with their respective caps laid concentrically over their mouths, are to be placed, with their bottoms resting on the steps 36 36 36, in the respective holes p''; the tray then lifted and placed directly over the carriers C, with its recess 37 in juxtaposition with the upright arm a'', and then slipped down until the said tray rests upon the upper platform 29, as shown in Fig. 2, thus leaving the cans resting concentrically upon their respective carriers C, as shown in

Fig. 1. The gas or gasoline having been let into the pipe H and ignited, the whole of the soldering-iron E, with its sliding center cylinder G, soon becomes heated. The operator now places his foot upon the treadle F, and thereby withdraws the sliding rod from the hole in the pinion *c'* above it, and also, by the same downward motion of the treadle, brings each of the heated soldering-irons E down simultaneously into the V-groove of the respective cans B, and immediately drops a sufficient-sized lump of solder into contact with the outer edge of the groove in the can and the side of the hot implement E, or near enough to the said parts to be pushed inward into contact with them by plate 28 of the loose ring 27. The operator now takes hold of the crank *d''*, and gives rotary motion thereby to the carriers C, and, consequently, to the cans E, which are held by friction. The solder almost immediately melts and flows around between the cans and their respective caps, two of the rotations being sufficient to complete the soldering. He then removes his foot off of the treadle, and the sliding rod 3 slips up into the hole in the pinion *c'* above as soon as the said hole comes directly over the said rod, and instantly stops the motion of the said can-carriers, and raises the series of hollow soldering-irons E out of contact with the respective soldered grooves of the series of cans, leaving the steam-vent cylinder 23 under the pressure of the weight of G and H, remain a moment or two, to keep the cap of the respective can secure until relieved from contact with the hot soldering-iron. The operator now lifts the tray, and the steps 36 thereof catch under the cans, and the whole are removed together off of the machine, to be supplied with another series of cans to be submitted to a like treatment on the machine, the ignited gas or gasoline continuing to play through and around the numerous perforations or openings in E and G, and keeping the implement properly heated for the subsequent soldering operations.

The rapidity and facility afforded by this machine for soldering the caps onto filled sheet-metal cans will be evident, and its operation being fully explained, as well as its construction, any further remarks would be superfluous.

I claim as my invention—

1. The series of rotary can-carriers C, each constructed in two horizontally-divided parts, with an elastic cushion or spiral springs, 1, between, and arranged to be revolved around a common center, substantially as and for the purposes hereinbefore set forth.

2. The can-carrier C, having the recesses 2 2 2 in each, as described, for the purpose of allowing the stepped projections 35 of the tray P to pass downward through the same, as described.

3. The hollow cylindrical soldering-iron E, consisting of the copper sides *e''* and the steel band 16, extending a little below the lower end of the copper sides, and forming the beveled soldering-edge 17, and having the flame-jet holes 21, the sliding gas-pipe H, the perforated hollow cylinder G, and the perforated steam-ventilating hollow cylinder 23, all substantially as and for the purposes hereinbefore described and shown.

4. The loose heavy ring 27, provided with the thin plate 28, in combination with the soldering-iron E, substantially as and for the purpose hereinbefore described and shown.

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Witnesses:

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