(No Model.) 4 Sheets—Sheet 1.

C. W. SLEEPER.

CAN FORMING AND SOLDERING MACHINE.

No. 549,693. Patented Nov. 12, 1895.

Fig. 1.

Fig. 2.

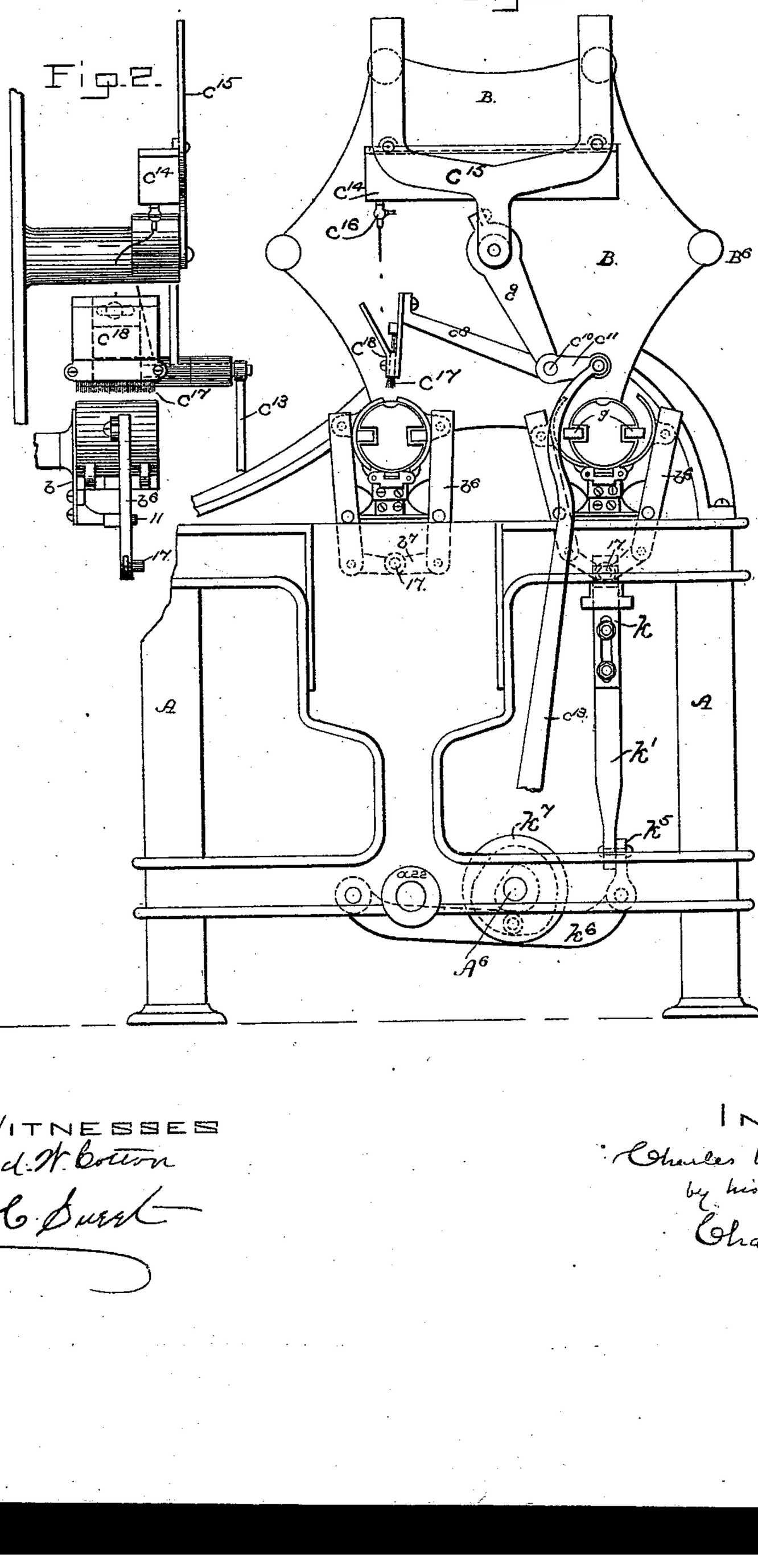

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Fig 4.

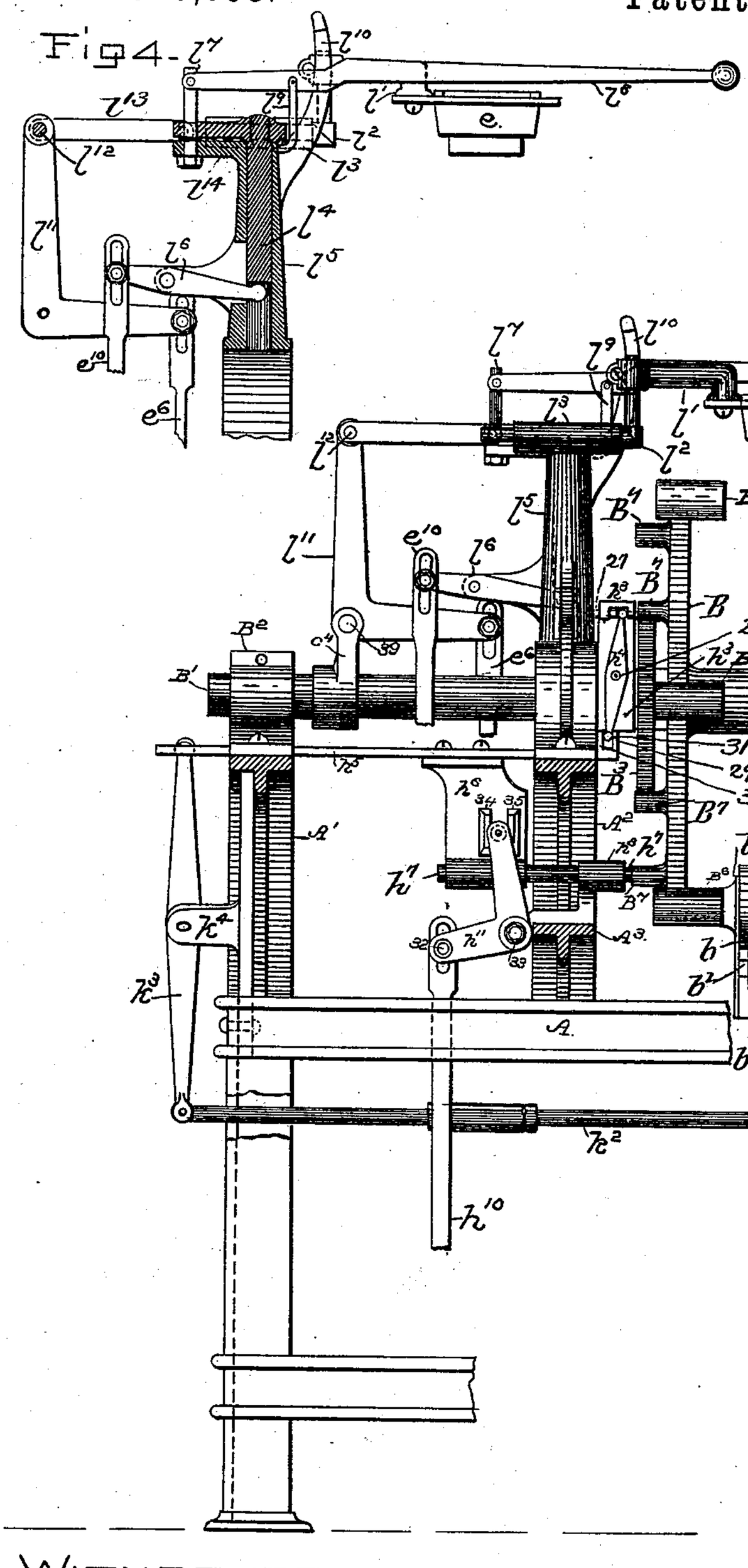

Fig. 3.

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Fig. 7.

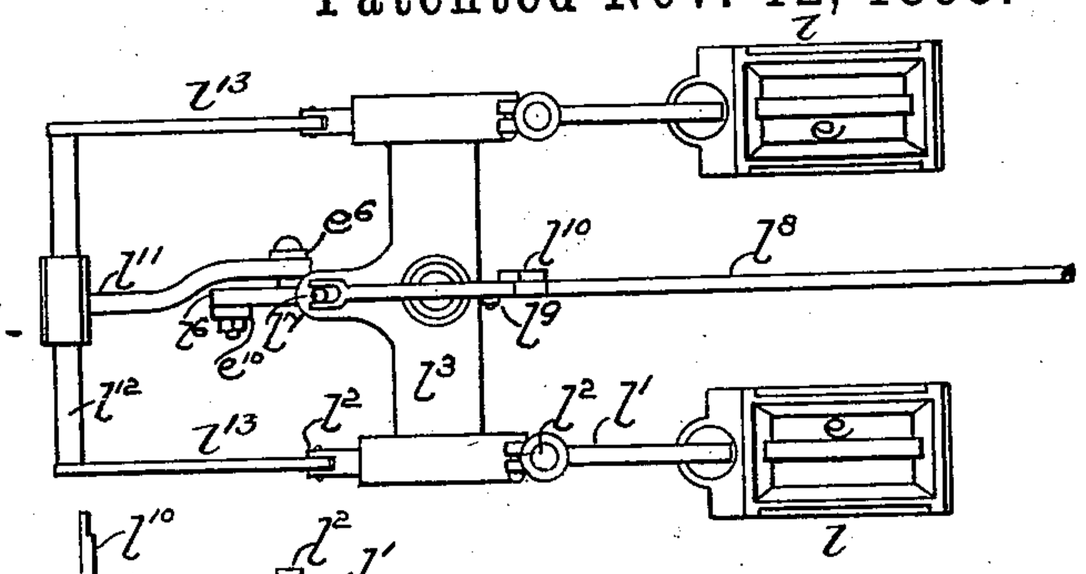

Fig. 5.

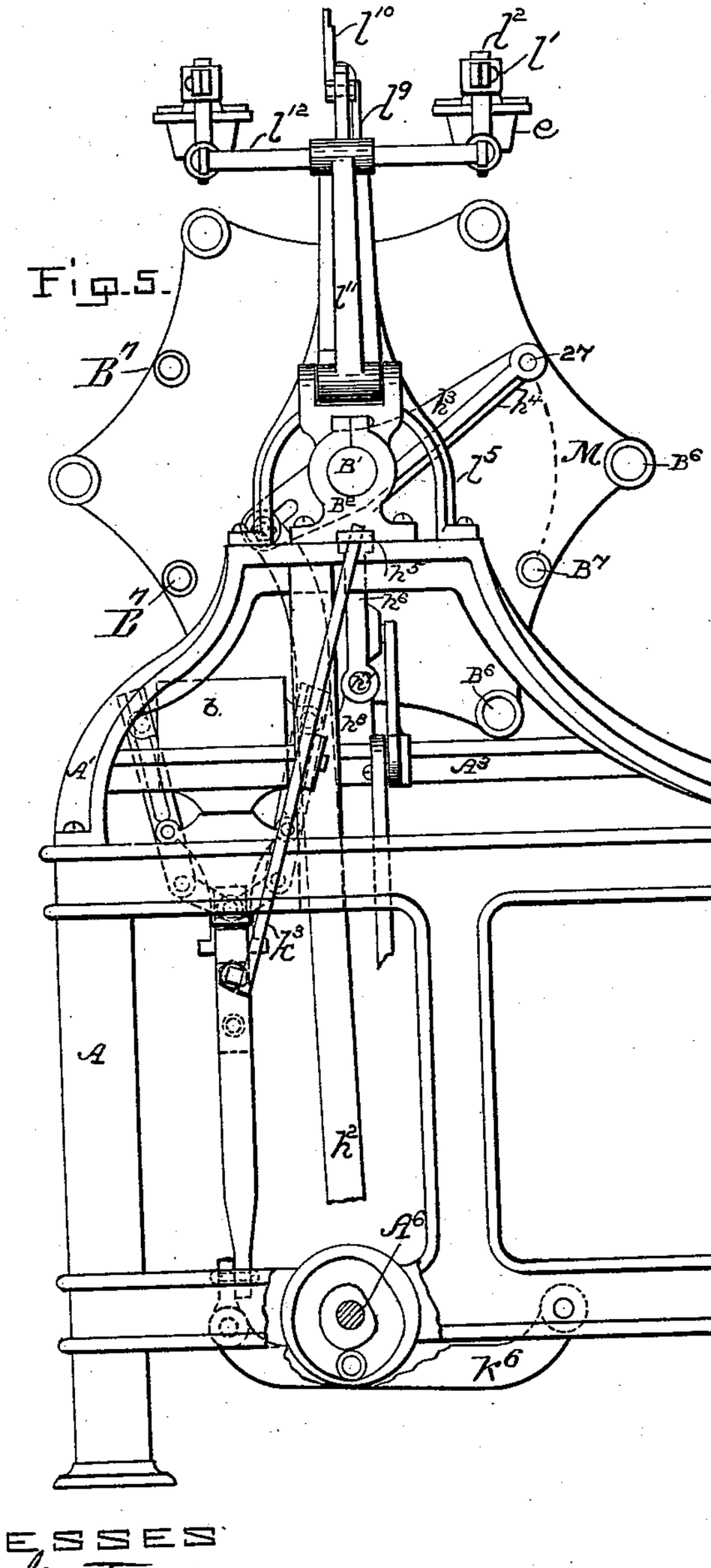

Fig. 6.

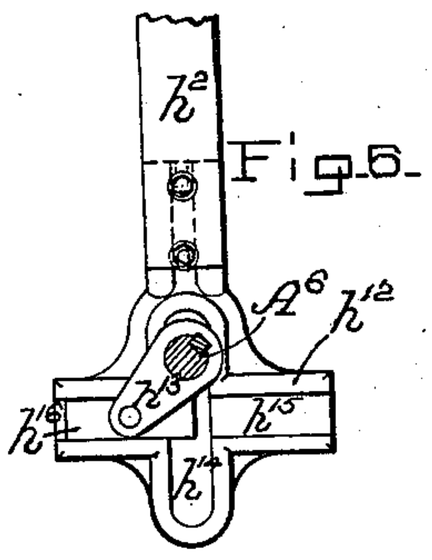

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Fig. 8.

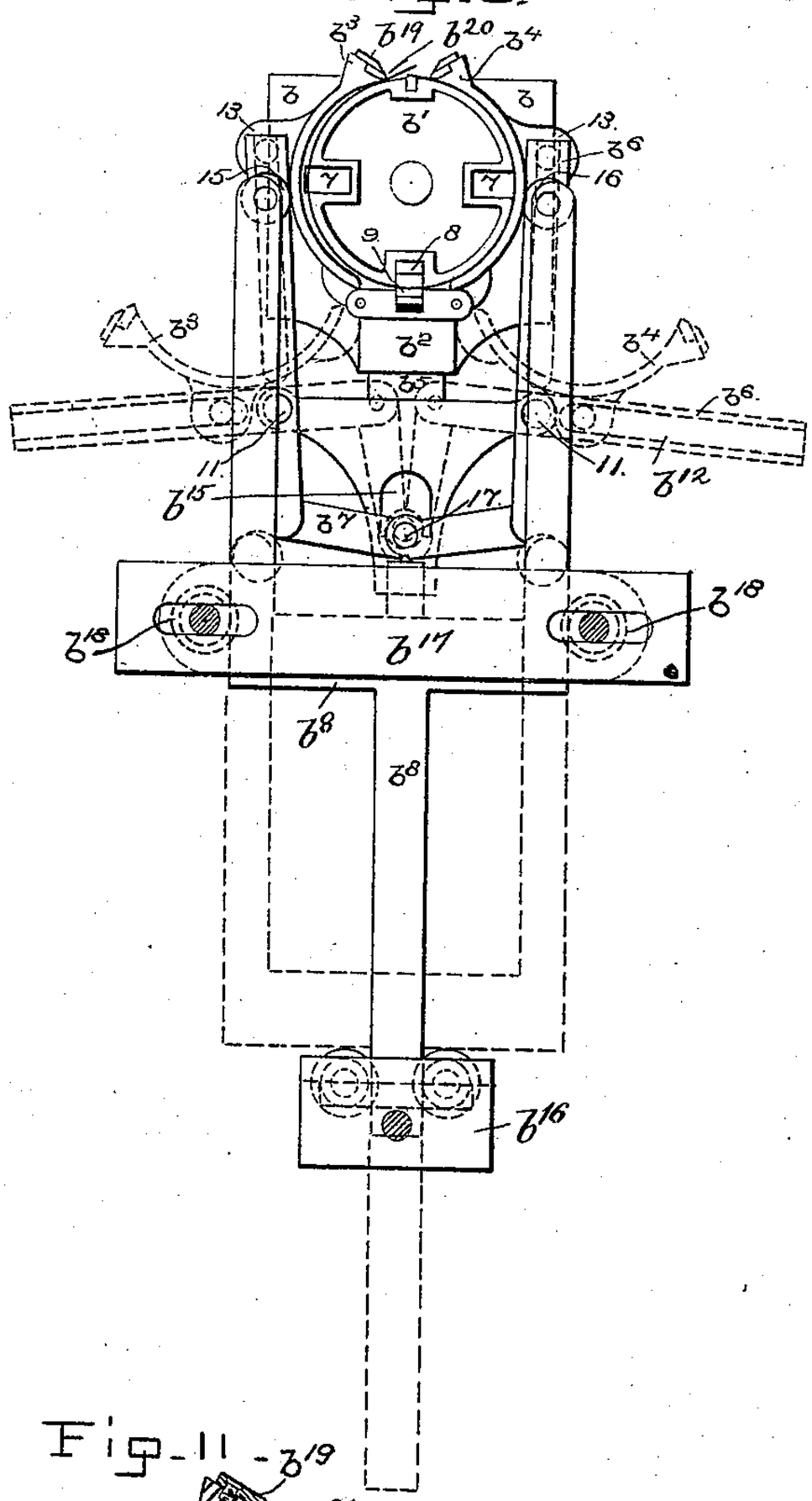


Fig. 9.

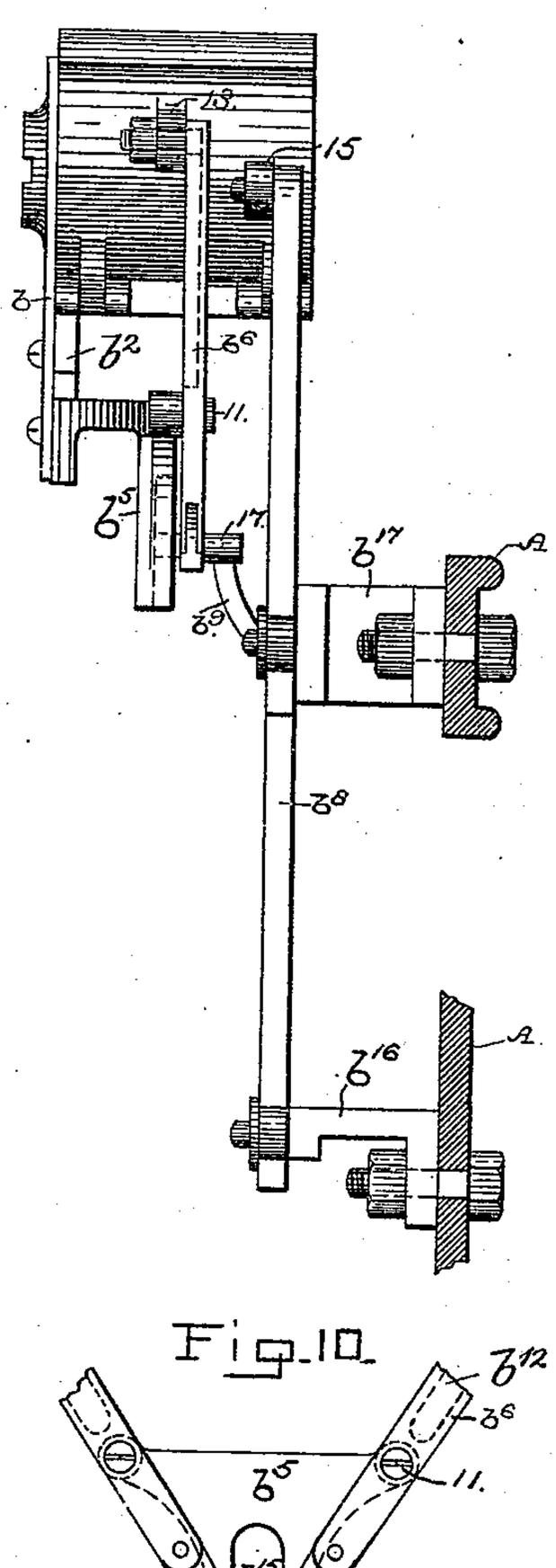
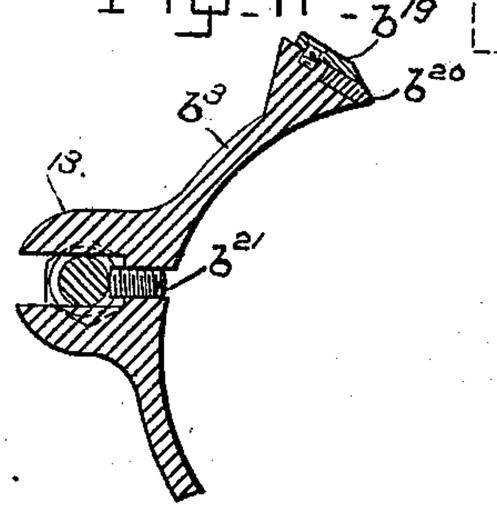


Fig. 10.

Fig. 11.



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UNITED STATES PATENT OFFICE.

CHARLES W. SLEEPER, OF LANCASTER, NEW HAMPSHIRE.

CAN FORMING AND SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,693, dated November 12, 1895.

Application filed July 12, 1894. Serial No. 517,288. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. SLEEPER, of Lancaster, in the county of Coos and State of New Hampshire, have invented a new and useful Improvement in Can Forming and Soldering Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to improvements and additions to a machine for "Can forming and soldering," for which Letters Patent of the United States No. 429,872 were granted to me June 10, 1890; and it consists in special mechanism relating to the operation of different parts, all of which may be best understood by reference to the accompanying drawings and specification, and more particularly to the claims, the object being to improve the working of the machine as a whole and to make it more certain and better adapted to the requirements of the art as now practiced. These objects I attain by the use of the mechanisms shown in the accompanying drawings, in which—

Figure 1 is a front elevation of my machine, from which parts not essential to the understanding of the invention are omitted. Fig. 2 is a side elevation showing parts that relate to flux-distributing mechanism. Fig. 3 is a side view, partly in elevation and partly in vertical section, and is intended to show the clamp-opening device and the mechanism for operating the soldering-irons. Fig. 4 is a side view, partly in elevation and partly in vertical section, showing parts of the mechanism for operating the soldering-irons not shown in Fig. 3. Fig. 5 is a rear elevation of my machine, several parts not essential to the understanding of the present invention being omitted. Fig. 6 is an elevation showing details relating to the movement of the carrying-wheel. Fig. 7 is a plan showing the soldering-irons and their connecting parts. Fig. 8 is a front view enlarged showing the former and connected parts. Fig. 9 is a side view of the former and its connected parts. Fig. 10 is a view in elevation showing details. Fig. 11 shows in vertical section a part of one of the clamps and some of its connected parts.

Referring to the drawings, A A represent the main part of the frame of the machine to which the operating parts are attached. B′ is a shaft supported by standards A′ A^2, attached to and rising above the main frame A A of the machine. Upon this shaft B′, which is fixed so as not to turn in its bearings, the carrying-wheel B is mounted and is free to turn upon it.

The carrying-wheel B is fully described in the specification of Patent No. 429,872, above referred to, and therefore needs but a brief description in this specification.

The wheel B consists, essentially, of a flat disk loosely mounted upon the fixed shaft B′ and provided with a number of bosses B^6, placed at equal distances from each other and from the shaft B′. In the drawings, six of these bosses are shown; but any required number may be used. The wheel B also has upon its rear side a series of bosses B^7, equal in number to the bosses B^6. To the outer end of a shaft passing through each of the bosses B^6 a forming device is attached, the inner end being furnished with gears (not shown) so connected with the central stationary gears B^3, Fig. 3, that as the carrying-wheel B is made to rotate the said forming device will be revolved about the shaft B′, but will not rotate on its own axis. By this arrangement each of the forming devices will present the seam of the can that it carries accurately to the path of motion of the liquid-flux distributer C^{17}, Fig. 1, and also subsequently to the paths of motion of the soldering-irons *e e*.

To operate the carrying-wheel B, I have provided the following-described mechanism: A^6, Figs. 1, 5, and 6, is a shaft adapted to be rotated by any suitable motor, its motion being timed to correspond with the other moving parts of the machine. Upon this shaft A^6 a crank-arm h^{13}, Fig. 6, is mounted. A pin in the crank-arm works, as the shaft A^6 rotates, a block h^{16}, which slides in a cross-groove h^{15}, made in the cross-head h^{12}. The cross-head h^{12} is provided with a vertical opening h^{14} to admit of its motion during the rotation of the shaft A^6, which it embraces. It is evident that as the shaft A^6 rotates the crank-pin of the crank-arm h^{13} will cause the cross-head h^{12} to move up and down. The motion of the cross-head h^{12} is communicated to the connecting-rod h^2, Fig. 5, and by it to the oscillating arm h^3, which is free to move

on the fixed shaft B′ as a center. A pin 27 is fitted loosely to the end of the arm h^3. One end of the pin 27 is fitted to engage with holes made in the bosses B^7, which are bored to receive it. The motion of the arm h^3 is sufficient to carry the pin 27 back and forth through the arc M, stopping an instant at each extremity. The above movement of the pin 27 equals the distance between two of the bosses B^7, or, in other words, the distance required to cause the carrying-wheel B to rotate sufficiently to take one of the formers and its can the precise distance required by the conditions of the machine. In this case the distance is one-sixth part of a circle, there being six formers on the wheel B. The pin 27 has a groove across it to receive the upper end of the lever h^4, Fig. 3, which is pivoted to the lever h^3 at 28.

The lever h^4 is operated by a slide h^5, resting upon the standards A′ A^2 and guided by rectangular grooves in the boxes B^2 B^2, the said slide being provided with two projections or fingers 29 30, which grasp the ball-shaped end 31 of the lever h^4. A block h^6 is secured to the slide h^5 by suitable screws and is provided with a latch-pin h^7, which is made fast to the said block and passes loosely through the guide h^8. The end of latch-pin h^7 is turned to fit the holes in projections B^7. The slide h^5 and latch-pin h^7 are given an alternating backward and forward motion by the cam-rod h^{10}, which is attached to the arm h^{11} by the stud 32. The arm h^{11} works upon a stud 33 and is provided with a roller that is grasped between the projections 34 35 of the block h^6.

In operation, the arm h^3 being in the position shown in Fig. 3, the slide h^5 and latch-pin h^7 move forward, the latch-pin h^7 entering one of the projections B^7 and thus locking the wheel B in position. At the same time the finger 30 moves the lever h^4, causing it to withdraw the pin 27 from the projection B^7, in which it had previously been inserted. The arm h^3 then moves, carrying the pin 27 through the arc 27 B^7, when the return motion of the slide h^5 forces the pin 27 into another of the projections B^7, and at the same time withdraws the latch-pin h^7. The arm h^3 in its return motion carries the wheel B with it, the operation being repeated with each revolution of the shaft A^6.

In the machine illustrated there are supposed to be six formers—that is, one on each of the bosses B^6 B^6, Fig. 1—although but two are shown in this figure. One of the formers is shown more in detail in Figs. 3, 8, and 9. (See also Figs. 10 and 11.) These formers are mounted upon plates b, called "work-plates," in the specification of the patent above referred to, in which these are fully described. The plates b have connected to them directly or indirectly the formers and their connected parts. The cylinder b' of the former is bolted to the work-plate b and is provided with two slots 7 7, and is slightly flattened on its lower side. A bracket b^2, supporting two clamps b^3 b^4, is secured to the work-plate b. The clamps b^3 b^4 act to form the can-body (a sheet of tin cut to size to form the body of the can) about the cylinder. A bracket b^5 is secured under each former and supports two lever-locking arms b^6 b^6, pivoted upon the screws 11 11, and also pivotally connected by the toggle-joint b^7. The arms b^6 b^6 are provided with grooves or slots 12, Figs. 8 and 10, and the ears 13 of the clamps b^3 b^4 are provided with studs carrying rollers 14, which work in the slots 12 of the locking-arms. The clamps b^3 b^4 are closed about the cylinder b' by the forked piece b^8, which in rising to the position shown by corresponding dotted lines strikes the clamps b^3 b^4 and carries them up and forces them about the cylinder, the rollers 15 and 16 working against the clamps. The clamp b^4 is closed first, as the roller 16 passes closer to the cylinder than the roller 15. The clamp b^3 is finally closed by the projection b^9 striking the pin 17 of the toggle-joint b^7 and forcing it up past its center. The fork b^8 immediately descends after closing the clamps to allow the wheel to make its motion.

I will now describe certain improvements in the formers.

The bracket b^5 (see Figs. 8, 9, and 10) is extended downward, and provided with a guide-groove b^{15} to guide the toggle-pin 17 and insure the opening of both clamps b^3 b^4 at the same instant.

b^{16} is a guide bolted to the frame A and carrying two flanged rollers to loosely grasp the shank of closing-fork b^8.

b^{17} is a guide bolted to frame A by bolts passing through slots, and carrying two flanged rollers b^{18} b^{18}, to loosely grasp the sides of fork b^8. The bolts and the slots are adapted to permit of adjusting the guides b^{17} to close the clamps, so as to lap the can-body either to right or left, as desired. (Fig. 8 shows can-body being lapped to right.)

b^{19}, Figs. 8 and 11, is a cap secured by screws to the clamp and arranged to hold a piece of non-tinning material b^{20} upon the clamp.

It has been found difficult to adjust the position of stud 13 so as to give clamps correct pressure upon cylinder b' when acted upon by arms b^6. To facilitate this adjustment I have provided a screw b^{21}, Fig. 11, which passes through the clamp and rests against the stud 13.

For opening the clamp I have the following-described device: k, Figs. 1 and 3, is a hand or socket adjustably attached to a bar k', which is connected by a rod k^2 to a lever k^3, which lever is pivoted to a part k^4 of frame A and has its upper end passed through an opening in the end of latch-slide h^5. The bar k' is also connected by a universal joint k^5 to a cam-lever k^6, which has one end pivoted to the frame A and carries a pin and roller to work in the grooved cam k^7. When latch-slide h^5 moves to latch the carrier-wheel B, the motion it transmitted by lever k^3 and rod k^2 to the

hand k, causing the hand to grasp the pin 17 of toggle-joint b^7. The hand k is then pulled down by the cam k^7 until the toggle-joint b^7 and arms b^6 are in the position shown in Fig. 10, when the hand is immediately raised, the clamps b^3 b^4 falling open, as shown by dotted lines in Fig. 8.

As it is sometimes desirable or even necessary to use a liquid flux instead of resin, I have designed a mechanism for this purpose, which I will now describe: A tank c^{14}, Figs. 1 and 2, is supported by a forked bracket c^{15}, which is secured to end of shaft B′. The ends of bracket c^{15} pass upward in front of soldering-irons to intercept any drops of solder that may be thrown out by the irons. The top of tank c^{14} is made in form of a tray to catch such solder as may drop from the irons. A cock c^{16} regulates the flow of flux, which drops upon a brush c^{17}, held by a clasp c^{18}, which is attached to arm c^8, by which and the parts c^{10} c^{11} c^{13} it is operated. The arm c^8 descends at the time required and causes the brush c^{17} to distribute the liquid flux along the seam, ready for the soldering action.

The mechanism for operating the soldering-irons (shown in Figs. 3, 4, 5, and 7) may be described as follows: Each of the irons e e is held in a loop l, which is adjustably secured to an arm l', which in turn is clasped to the elbow-piece l^2, which slides in the cross-head l^3. The cross-head l^3 has a rod l^4, Fig. 4, extending downward from it into the standard l^5. The lower end of the rod l^4 engages with one end of the lever l^6. The other end of the lever l^6 is adjustably secured to the cam rod e^{10}, so that by causing the cam-rod e^{10} to move they are raised or lowered. The cam for operating the cam-rod e^{10} is not shown in the drawings, as it is of ordinary construction and does not require description. A guide-pin l^7, secured to a projecting arm l^{14} of standard l^5 and passing through a hole in the cross-head l^3, serves to prevent the cross-head from turning out of position. A hand-lever l^8 is pivoted to the upper end of the guide-pin l^7 and connected by a hook l^9 to the under side of the cross-head l^3. The hand lever l^8 is used for lifting up the cross-head l^3 and the soldering-irons e e. To hold the lever and the irons up out of the way I have a notch in the standard, as shown at l^{10}, Figs. 4 and 5. The soldering-irons e e are given a rubbing motion by a back-and-forth movement imparted to the elbow-pieces l^2 l^2 by the links l^{13} l^{13}, cross-bar l^{12}, bent lever l^{11}, and cam-rod e^6.

By the mechanism above described the soldering-irons are kept constantly in a horizontal position, thereby insuring a more even distribution of solder on the seam.

Two soldering-irons are shown in the drawings, adapted to operate on two cans at the same time; but one may be used alone if preferred.

I claim—

1. In a can forming and soldering machine the combination of the oscillating lever h^3 having a loose pin 27 at its upper end, with the connecting rod h^2, cross-head h^{12}, said cross-head having a vertical slot h^{14} adapted to admit of its working on the shaft A^6 and horizontal groove h^{15} adapted to receive the crank-block h^{16} and the crank-arm a^{13} all operating together substantially as and for the purpose set forth.

2. In a can-forming and soldering machine, the bracket b^5 situated below the former and provided with the vertical groove b^{15}, in combination with the toggle joint b^7 b^7 having its pin 17 engaging with the groove b^{15}, the lever arms b^6 b^6 pivoted to the arms of the toggle joint b^7 b^7, the forming clamps b^3 b^4 loosely connected with the arms b^6 and means for operating said arms and clamps, substantially as and for the purposes set forth.

3. In a can-forming and soldering machine, the bracket b^5 situated below the former and provided with the vertical groove b^{15}, in combination with the toggle joint b^7 b^7 having its pin 17 engaging with the groove b^{15}, the lever arms b^6 b^6 pivoted to the arms of the toggle joint b^7 b^7, the forming clamps b^3 b^4 loosely connected with the arms b^6 and means for operating said arms and clamps, the hand k for engaging with the pin 17 of the toggle joint, and means for connecting and disconnecting the hand k from said pin and for raising and lowering said hand, substantially as and for the purposes set forth.

4. In a can-forming and soldering machine, the vertically movable fork b^8 for operating the clamps b^3 b^4, in combination with the guide b^{17} secured to the frame and provided with two adjustable flanged rollers b^{18} for loosely grasping the prongs of the fork b^8 and guiding the same vertically substantially as and for the purposes set forth.

5. In a can forming and soldering machine the combination of the guide b^{17} having two adjustable flanged rollers adapted to loosely grasp the side arms of the fork b^8 and guide the same, with the clamps b^3 b^4, substantially as and for the purpose set forth.

6. In a can forming and soldering machine, the cross-head l^3 and rod l^4 with mechanism for raising and lowering the same in combination with the elbow piece l^2 sliding in said cross-head and carrying the soldering iron e, and with mechanism for imparting a reciprocating motion to the said elbow piece, substantially as and for the purpose set forth.

7. In a can-forming and soldering machine the cross head l^3 and rod l^4 with mechanism for raising and lowering the same in combination with the guide pin l^7 passing loosely through an opening in the cross head l^3, substantially as and for the purposes set forth.

8. In a can forming and soldering machine the lever l^8 pivoted to the guide pin l^7, the hook l^9 suspended therefrom and engaging with the cross head l^3, and the notched standard l^{10}, in combination with the cross head l^3

carrying the soldering irons *e e* with their supporting mechanism, substantially as and for the purpose set forth.

9. In a can-forming and soldering machine the combination of the standard l^5, the cross head l^3 supported on said standard and pivoted with a vertical movable rod l^4 extending down into the same, the elbow piece l^2 for sliding in said cross head, the arm l' secured to said elbow piece and supporting the loop for holding the iron, the lever l^6 engaging with the lower end of the rod l^4 and adapted to raise and lower the same, and the guide pin l^7 secured to the standard l^5 and passing loosely through an opening in the cross head l^3, all substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 18th day of May, A. D. 1894.

CHAS. W. SLEEPER.

Witnesses:
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