(No Model.) 4 Sheets—Sheet 1.

E. NORTON.

CAN CAP SOLDERING MACHINE.

No. 365,316. Patented June 21, 1887.

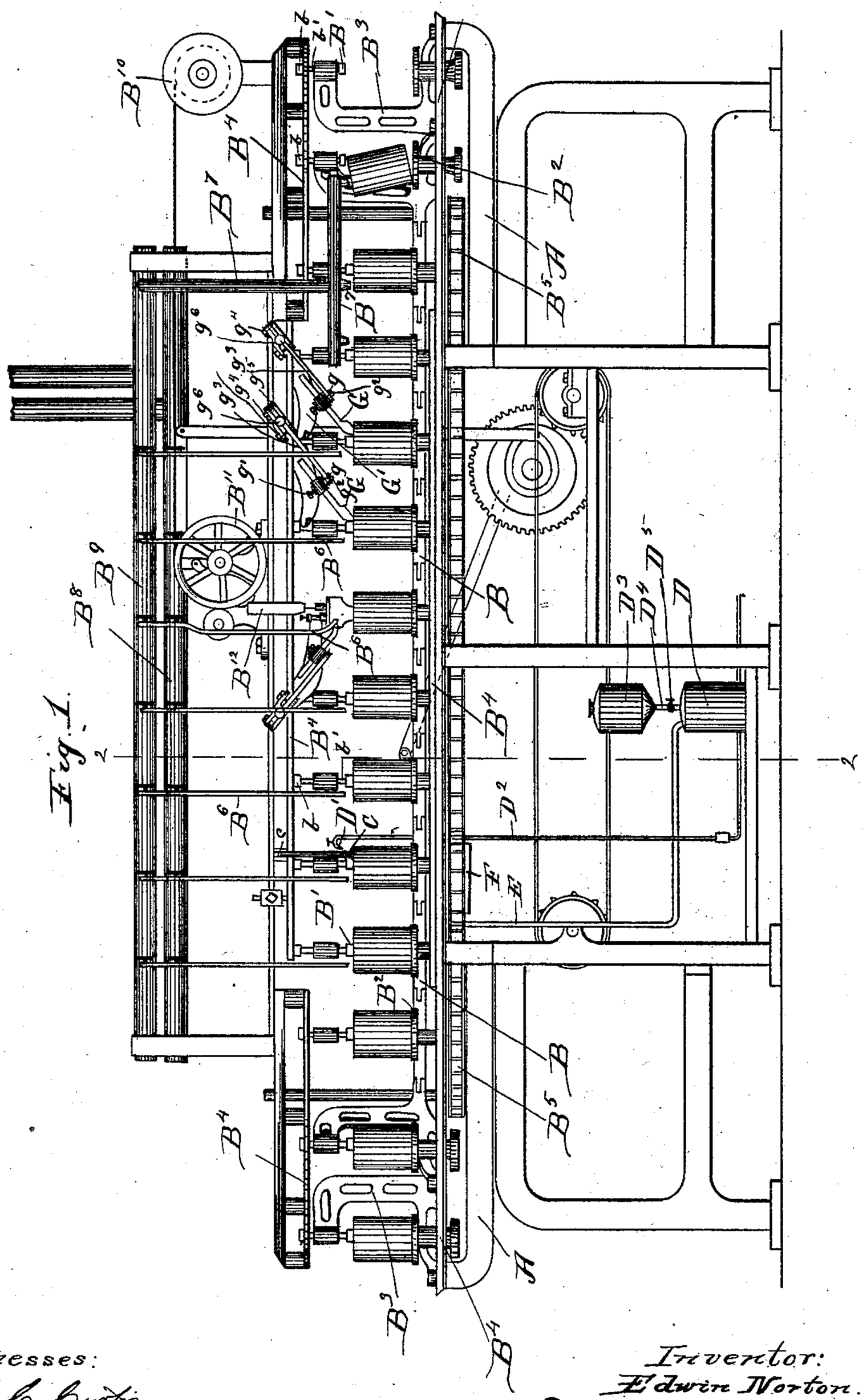

Fig. 1.

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A. W. Munday

Inventor:
Edwin Norton.
By Munday, Evarts and Adcock
His Attorneys:

(No Model.) 4 Sheets—Sheet 2.

E. NORTON.

CAN CAP SOLDERING MACHINE.

No. 365,316. Patented June 21, 1887.

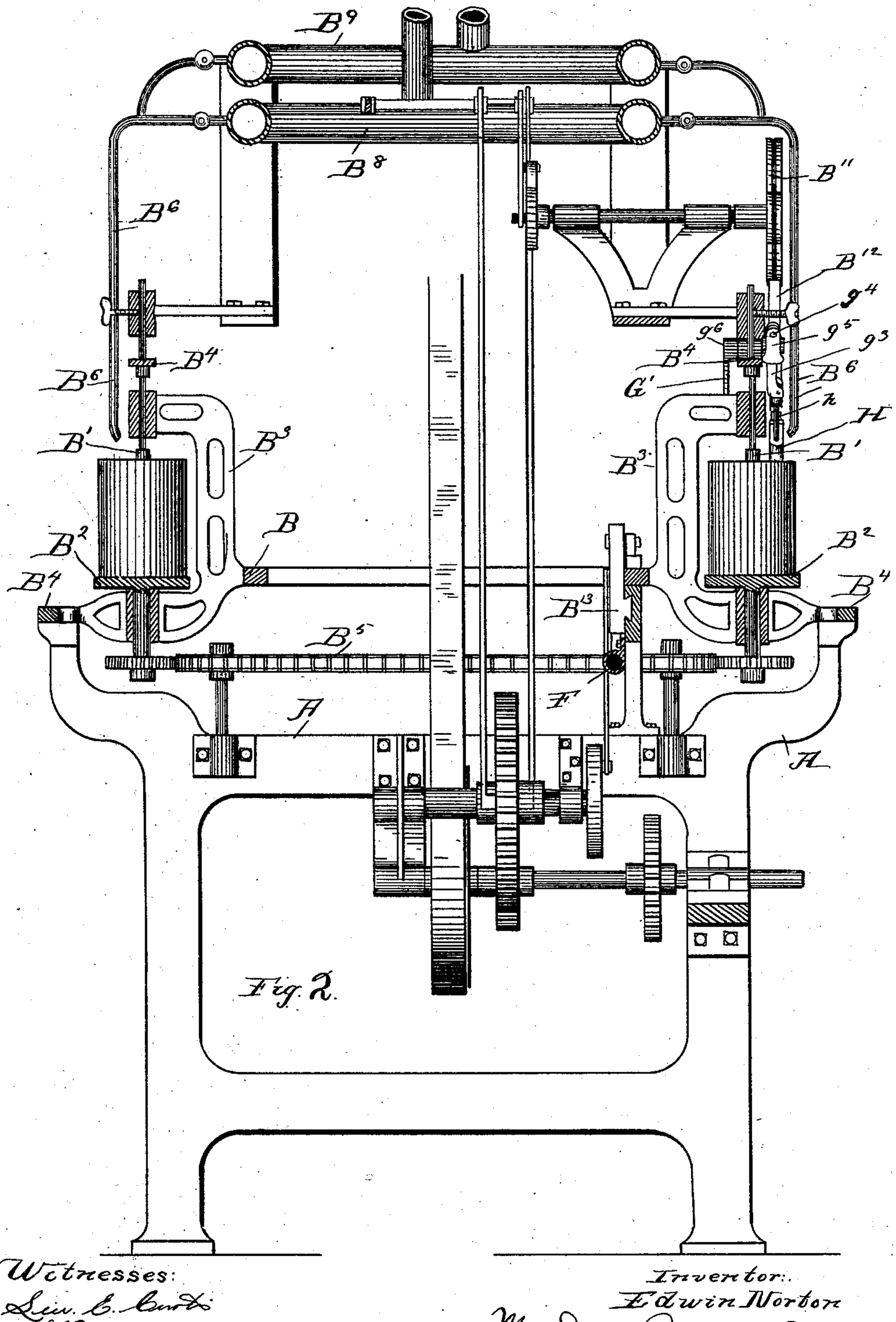

Fig. 2.

Witnesses:
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(No Model.) 4 Sheets—Sheet 3.

E. NORTON.

CAN CAP SOLDERING MACHINE.

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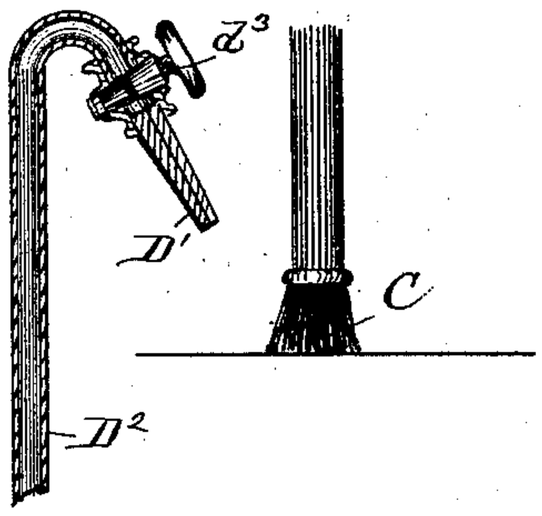
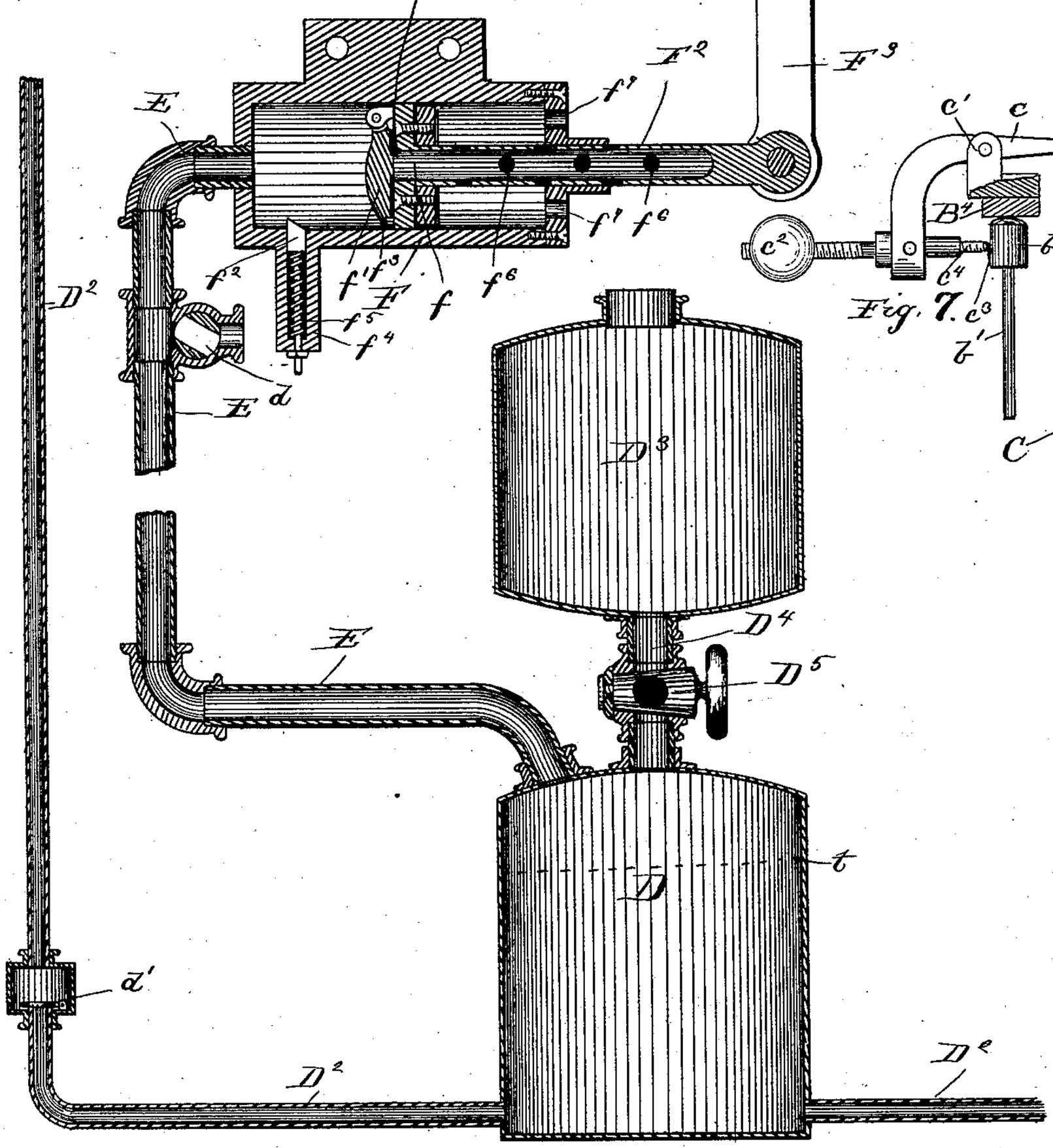


Fig. 3.



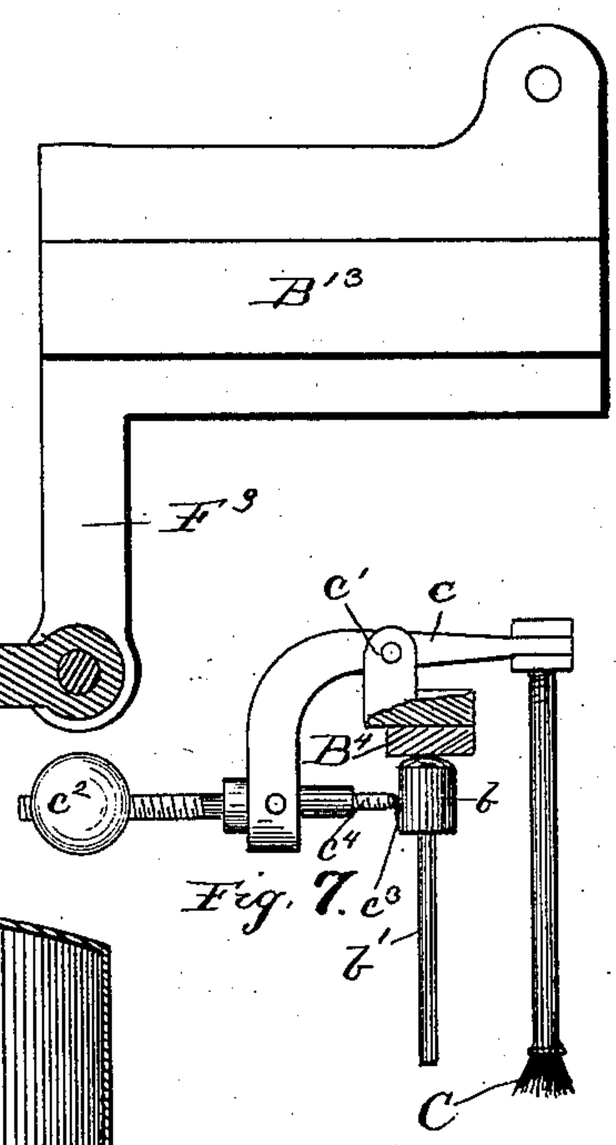


Fig. 7.

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Inventor:
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(No Model.) 4 Sheets—Sheet 4.

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CAN CAP SOLDERING MACHINE.

No. 365,316. Patented June 21, 1887.

Fig. 4.

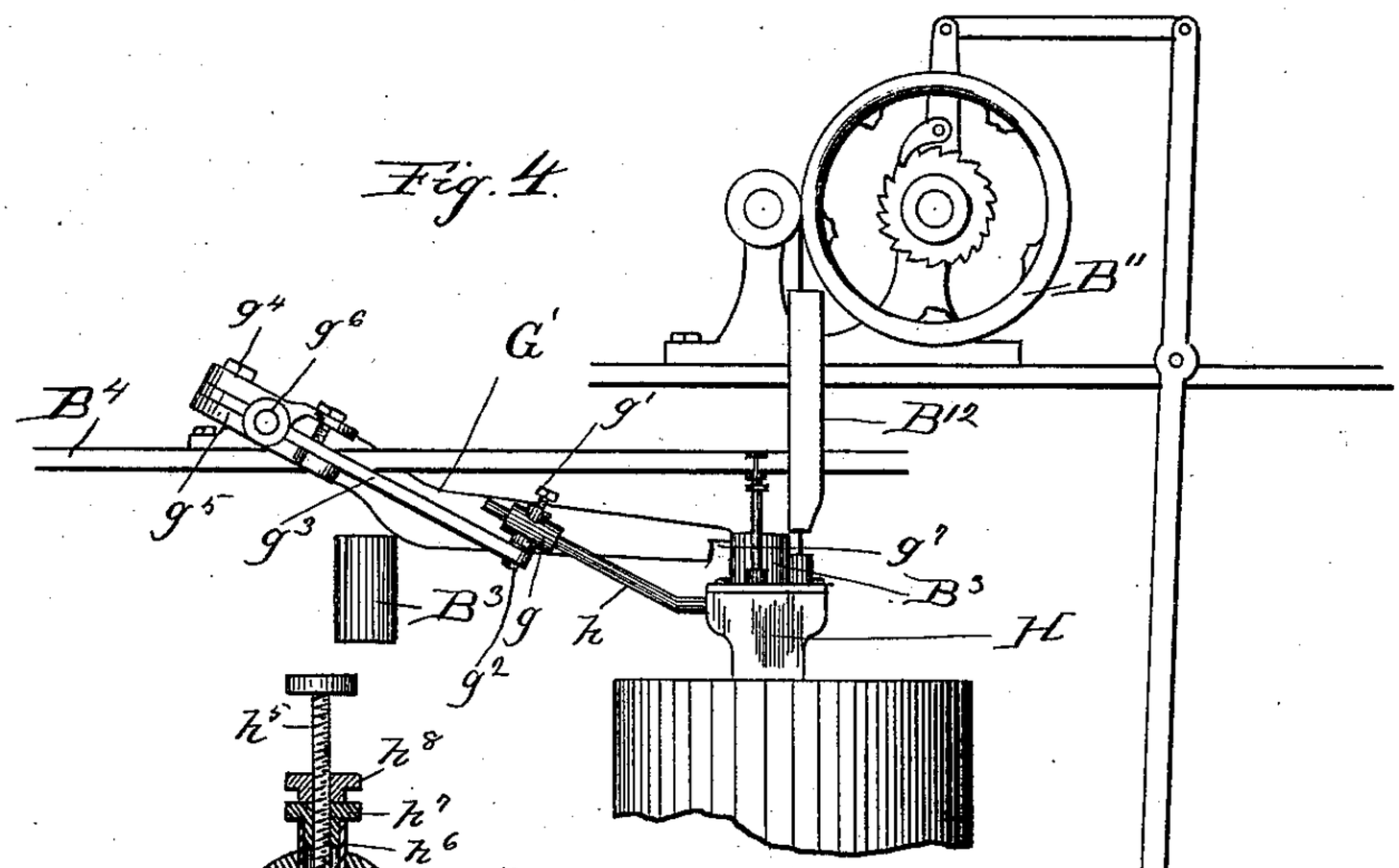


Fig. 5.

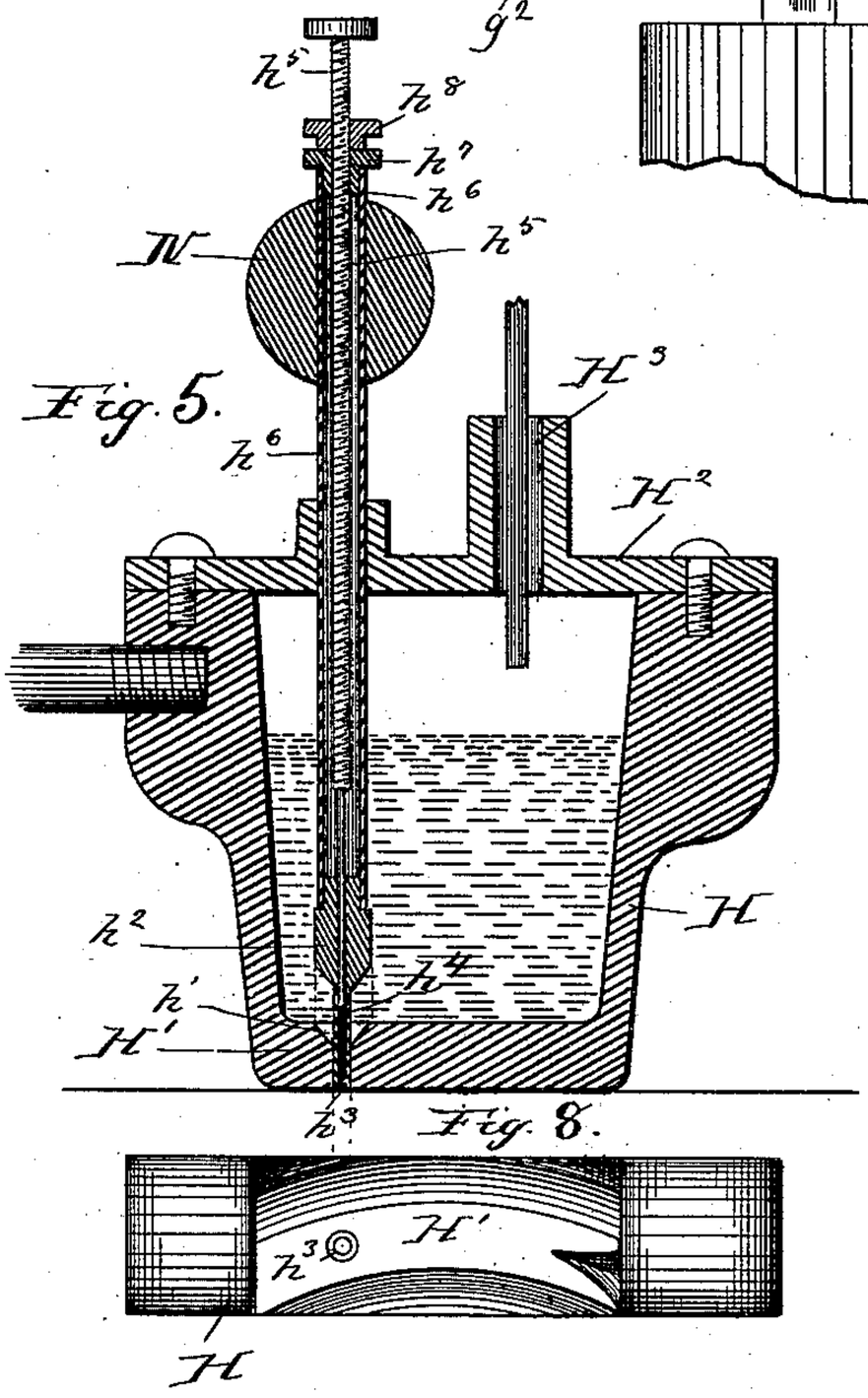


Fig. 8.

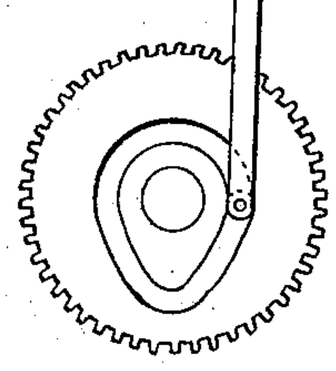
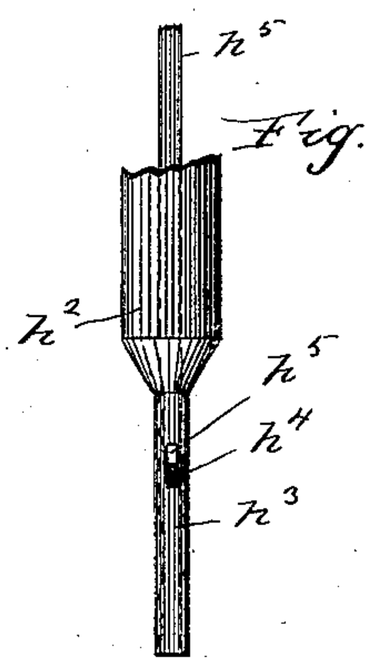


Fig. 6.



Witnesses:
Lew. C. Curtis
A. W. Munday.

Inventor:
Edwin Norton
By Munday, Evarts and Adcock
his Attorneys:

UNITED STATES PATENT OFFICE.

EDWIN NORTON, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND OLIVER W. NORTON, OF SAME PLACE.

CAN-CAP-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 365,316, dated June 21, 1887.

Application filed March 9, 1887. Serial No. 230,254. (No model.)

To all whom it may concern:

Be it known that I, EDWIN NORTON, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Can-Cap-Soldering Machines, of which the following is a specification.

My invention relates to machines for soldering caps on filled cans, and more particularly to improvements upon can-cap-soldering machines of the kind heretofore patented to John G. Hodgson and myself in Letters Patent No. 340,148, of April 20, 1886.

My present invention consists, in connection with revolving can holders and their moving-carrier and an acid or flux applying brush or device, of an air or other fluid pressure device for jetting and supplying the acid in measured and definite quantities to each can.

It further consists in the combination of a revolving can-holder, an acid-supply tank or reservoir, and air-pumps communicating with the acid-tank.

It further consists in providing such air-pump with a valve or device for suddenly releasing the fluid-pressure, and thus instantly stopping the flow of acid from the discharge-nozzle.

It further consists, in connection with a revolving can-holder, of a movable molten solder-vessel provided with a valve for discharging the molten solder upon the can or seam to be soldered, and a valve-operating pin adapted to engage or strike against the can as the soldering vessel or tool descends, and thus cause the can itself to open the solder-discharge valve, so that if no can happens to be in place in the can-holder the solder-vessel may descend and the machine go through its operations without discharging any solder.

It further consists in the novel devices and novel combinations of devices, herein shown and described, and more particularly set forth in the claims.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a side elevation of a device embodying my invention. Fig. 2 is a cross-section on line 2 2 of Fig. 1. Fig. 3 is a sectional or diagram-view illustrating the operation of the acid-supply device. Fig. 4 is an enlarged detail elevation of the soldering device. Fig. 5 is an enlarged vertical longitudinal section of the soldering-vessel. Fig. 6 is a detail elevation of the solder-discharge valve, and Fig. 7 is a detail elevation of the acid-brush and its operating device. Fig. 8 is a bottom view of the solder-vessel.

In the drawings, A represents the frame of the machine; B, the movable carrier, upon which the revolving can holders or disks B′ B^2 are mounted in the holder-frames B^3 B^3.

B^4 B^4 are the tracks upon which the carrier travels; B^5, the chain or mechanism by which the can-holders are revolved; B^6, the heaters or gas-jets arranged in the path of the can-holders and at intervals equal to the intervals between the can-holders on the can-carrier.

B^7 is the cooling device for cooling the cans after they are soldered, consisting, preferably, of air-jet pipes arranged in the path of the can-holders like the heaters.

B^8 B^9 are the gas and air supply pipes; B^{10}, a wire-solder reel; B^{11}, the wire-solder-feed wheel, and B^{12} the wire solder-guide tube.

B^{13} is the cross-head or reciprocating slide, through which intermittent motion is communicated to the chain-carrier B.

All these parts are fully shown and described in the prior patent before mentioned, and I here show and describe my invention as applied to a can-capping machine of this particular construction for sake of convenience.

My invention does not relate to the particular construction or operation of these parts, and they therefore need not be here shown or described in detail.

For more full description of these parts of the machine reference is made to the prior patent before mentioned.

My invention is applicable to other suitable forms of can-carriers, revolving can-holders, heaters, &c.

C represents the acid brush or device by which the acid or fluxing material is distributed over the joint. The brush C is mounted upon the end of a lever, *c*, which is pivoted to a bracket, *c′*, secured to the upper track, B^4. This lever carries an adjustable weight, c^2, on its outer end, by means of which the acid-brush

is elevated out of the way of the moving cans, so that the head of the can will not besmeared with acid as it advances into position. As each can moves into position, the round head *b* of the stem *b'* of the upper can-holder disk, B', comes in contact with the rounded end c^3 of the adjustable projection c^4 on the lever *c*, and thus depresses the acid-brush until it comes in contact with the joint. This mechanism is also the same as that shown and described in the prior patent before referred to, and for such mechanism any suitable equivalent or substitute device may be used in my invention.

D represents the acid-tank, preferably located on the frame of the machine below the can carrier B.

D' is the acid-discharge nozzle, connected by a pipe, D^2, with the acid-tank. The acid-tank D is a closed tank or reservoir, so that the acid may be forced out through the nozzle D' by compressed air forced into the tank near the top thereof.

D^3 is an acid-supply reservoir above the tank D and connected thereto by a pipe, D^4, furnished with a stop-cock, D^5.

E represents an air-pipe connecting the acid-tank D with the air-pump F. The pipe E leads into the end of the pump-cylinder F, and is furnished with an adjustable outlet or escape valve, *d*, so that by regulating the size of this outlet a greater or less proportion of the air compressed by the pump may be forced into the acid-tank. The piston F' of the pump or its stem F^2 is pivotally connected to an arm or projection, F^3, on the reciprocating cross head or slide B^{13}, which intermittently drives the can-carrier B, so that the pump will be intermittently operated once for each can as it is presented to the acid-brush C by the carrier B. The piston F' of the pump is furnished with a valve-opening, *f*, and a check-valve, *f'*, which is automatically closed as the piston F makes its forward stroke to compress the air, and which valve is opened, so as to instantly release the air-pressure when the piston begins to make its backward stroke by means of a spring pin or catch, f^2, which projects through the pump-cylinder F near the rear end of the same and catches on a projecting lip or edge, f^3, of the valve *f'*. This yielding catch-pin is mounted in a suitable barrel or socket, f^4, and a coil-spring, f^5, therein forces the pin up to engage the projection f^3 as soon as the valve passes the pin. The valve-opening *f* in the piston-head F' is of large diameter, so that the instant the valve *f'* is open the air-pressure on the acid in the tank D will be instantly relieved and the discharge of acid through the nozzle D' instantly stopped. The piston-stem F^2 is made hollow and provided with air inlet and outlet openings f^6, and there are similar air-outlet openings, f^7, through the end of the pump-cylinder.

The acid-discharge pipe D^2 is provided with a stop or check valve, *d'*, to prevent the acid in the pipe D^2 flowing back into the tank D, and thus seeking its level after the air-pressure is relieved by the opening of the valve *f'*. This check-valve *d'* keeps the acid-pipe D^2 full, so that the acid will begin to discharge from the nozzle D' the instant sufficient pressure is applied upon the acid in the tank D.

By means of the air-outlet valve *d* in the air-pipe E the air-pressure produced by the stroke of the pump on the acid in the tank D may be regulated or adjusted to any desired amount, and by this means, and by means of the cock d^3 in the discharge-nozzle D', the amount of acid jetted upon the acid brush or can by each stroke of the pump-piston may be regulated as desired. The relief-valve *f'* in the pump-piston serves to instantly stop the flow of acid from the nozzle D' the moment the pump-piston completes its forward stroke and begins to recede. The discharge-nozzle D' is or should be arranged, as indicated in the drawings, to jet the acid upon the acid-brush C, and not directly upon the can or its joint. The pump-piston F' is operated to make its forward or air-compressing stroke while the cross head or slide B^{13} is making its backward stroke—that is, while the can-carrier B is stationary. The acid is thus jetted upon the acid-brush while the can-carrier is stationary and the can being revolved in its holder under the acid-brush. When the cross-head B^{13} makes its forward stroke to move the can-carrier B forward, the piston F' makes its backward stroke and opens the valve *f*, thus relieving the pressure and cutting off the discharge of acid from the nozzle D'.

G G represent the stirrer-bars for distributing the solder over the seam. The stirrer-bars G are secured in an adjustable socket, *g*, by a set-screw *g'*, the socket *g* being adjustably fixed by a set-screw, g^2, on the arm g^3. The arm g^3 is pivoted by a pin, g^4, to a plate or projection, g^5, on the rock-shaft g^6. The shaft g^6 is furnished with a curved arm or shoe, G', having a notch or depression, g^7. (See Fig. 4.) This shoe G' rides upon the can-holder frames B^3, and operates to automatically raise and lower the stirrer-bars as the can-carrier moves intermittently forward. The construction and operation of these stirrer-bars are fully shown and described in Letters Patent No. 356,469, dated January 25, 1887, and are not of my invention.

H represents a vessel for containing molten solder. It is automatically movable up and down, and the lower end of this vessel serves as a soldering-iron to distribute the solder over the seam. This molten-solder vessel is moved up and down to bring the same into contact with the seam to be soldered when the can is presented under the same by the carrier.

The solder-vessel may be moved up and down by any suitable means or mechanism. It may, for example, be automatically operated by the same mechanism as that employed to operate the stirrer-bars G; and I have usually connected the solder-vessel H with the adjustable socket-piece *g* by means of an arm,

h, fixed in the socket-piece by the set-screw *g'*, the same as the stirrer-bars G are fixed. By this means the intermittent movement of the carrier B will operate to intermittently raise the solder-vessel while the can-carrier moves forward, and allow the same to be depressed against the can-cap or seam when the can is moved into place under the same by the carrier. If preferred, however, the solder-vessel H may be moved up and down by any other suitable means.

The solder-vessel H is furnished with a valve opening or seat, *h'*, and valve h^2. The valve h^2 is furnished with a hollow projecting-stem or pin, h^3, having an opening or passage, h^4, for the admission of the solder from the vessel H into the interior of the hollow stem.

The opening h^4 through the wall of the hollow stem h^3 may be adjusted in size by means of an adjustable rod or screw, h^5, which projects up through the hollow sleeve or rod h^6 of the valve. The adjusting screw-rod h^5 fits in a hollow threaded nut, h^7, secured by screw-threads in the end of the sleeve h^6. The adjusting-rod h^5 is further provided with a stop-nut, h^8, to hold it in place. The hollow stem h^3 of the valve projects through the bottom or base H' of the solder-vessel, and when the solder-vessel is depressed against the can it comes in contact with the cap or head of the can, and is thus lifted sufficiently to open the valve and permit the molten solder to flow out upon the seam.

By means of the adjusting-rod, which regulates the size of the discharge-opening in the hollow stem h^3, the amount of solder discharged may be regulated as desired.

Instead of making the sliding pin h^3, which operates by its contact with the can to raise the valve, integral with the valve or rigidly secured thereto, it may be made separate from the valve and mounted on a different part of the vessel H or its operating-arm *h*, and connected in any suitable way or by any suitable mechanism with the valve or its sleeve h^6, so that by the raising of the pin the valve will be opened and the molten solder discharged upon the seam. It is, however, the more improved form or perfected construction of my invention to connect the operating-pin h^3 directly or integrally with the valve and to make such pin hollow, so that the solder may be discharged in a fine stream through the pin itself. It is preferable, also, to employ a sliding valve; but other forms of valves may be used. The base or lower end, H', of the solder-vessel is made curved, to correspond to the curve of the can-cap groove, as indicated in the drawings.

The solder-vessel is preferably made of a single piece or hollow casting, and it is furnished with a cover, H^2, secured in place by screws, so as to close the vessel tight and thus prevent the oxidation of the molten solder.

The solder may be delivered into the vessel in any suitable way. I deem it preferable, however, to employ wire-solder and feed the same gradually into the solder-vessel through a suitable opening, H^3, in the cover H^2 by means of a suitable wire-solder-feed device; and one feature of my invention consists in the combination of the movable valved solder-vessel with a wire-solder-feed device. The wire-solder feed which I prefer to employ is that shown and described in the prior patents before referred to, and which is here indicated in the drawings. The solder-vessel H is depressed against the can head or cap by its own gravity and that of the solder therein. The valve is also depressed against the valve seat to close the valve-opening by the gravity of the valve and valve-sleeve. To increase the weight, I load the valve-sleeve with a metal ball or other suitable weight, N. The solder in the vessel H is melted and kept in a molten condition by a suitable heater, B^6, preferably a gas-jet operating to project the flame against the iron vessel H, and preferably near the lower end of the same, as indicated in the drawings.

My invention is not limited to the use of can-holders mounted upon movable carriers, nor to revolving can-holders having two revolving disks. The upper disk of the can-holder, which presses against the can-cap and serves to hold it in place, may, for example, consist simply of a non-rotatable pin which presses against the center of the can-cap, and thus permits the can to revolve while the soldering-vessel is depressed against the seam.

I also desire it to be distinctly understood that my invention is not limited to any particular kind of air-compression device, and that other suitable or equivalent means may be used in place of an air-pump for compressing the air, and thus forcing the acid in measured quantities out of the acid-tank through the discharge pipe or nozzle. The acid-tank D should not be completely filled with acid or flux; but a space should be left above the acid for compressed air, as indicated by the dotted line *t* in the drawings.

As an equivalent construction, the solder-vessel H may be made stationary and the revolving can-holder made movable up and down without affecting the operation of the solder-discharge valve or its operating-pin.

I hereby disclaim as not of my invention the soldering-machine shown and described in Letters Patent No. 219,569, granted September 16, 1879, to Dillon and Cleary.

I claim—

1. The combination, with a rotatable can-holder, of an acid-applying brush or device and a closed acid-tank adapted to contain compressed air and provided with a pipe leading to said acid-applying brush or device, substantially as specified.

2. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of an acid or flux applying device, a closed tank, an air-compression device leading into said tank, and a discharge-pipe leading from said tank to said

acid-applying device, substantially as specified.

3. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of an acid or flux applying device, a closed tank, an air-pump connected with said tank, and an acid-discharge pipe leading from said tank to said acid-applying device, substantially as specified.

4. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of an acid or flux applying device, a closed tank, an air-pump connected with said tank, an acid-discharge pipe leading from said tank to said acid-applying device, and an acid-discharge nozzle, substantially as specified.

5. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of an acid or flux applying device, a closed tank, an air-pump connected with said tank, an acid-discharge pipe leading from said tank to said acid-applying device, and an adjustable air outlet or valve between said air-pump and said closed tank, substantially as specified.

6. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of an acid or flux applying device, a closed tank, an air-pump connected with said tank, an acid-discharge pipe leading from said tank to said acid-applying device, said acid-tank being located below said acid-applying device, and a check-valve in the pipe leading from said tank to said acid-applying device, substantially as specified.

7. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of a like intermittently-operated air-pump, a closed acid or flux tank connected with said air-pump, and an acid-discharge pipe and nozzle, substantially as specified.

8. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of a like intermittently-operated air-pump, a closed acid or flux tank connected with said air-pump, an acid-discharge pipe and nozzle, and an adjustable air outlet or valve between said air-pump and acid-tank, substantially as specified.

9. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of a like intermittently-operated air-pump, a closed acid or flux tank connected with said air-pump, an acid-discharge pipe and nozzle, and an adjustable air outlet or valve between said air-pump and acid-tank, and a check-valve in the discharge-pipe, substantially as specified.

10. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of a like intermittently-operated air-pump, a closed acid or flux tank connected with said air-pump, an acid-discharge pipe and nozzle, an adjustable air outlet or valve between said air-pump and acid-tank, and a check-valve in the discharge-pipe, said discharge-nozzle being provided with an adjusting-valve, substantially as specified.

11. The combination, with an intermittently-moving can-carrier having revolving can-holders mounted thereon, of a like intermittently-operated air-pump, a closed acid or flux tank connected with said air-pump, an acid-discharge pipe and nozzle, an adjustable air outlet or valve between said air-pump and acid-tank, and a check-valve in the discharge-pipe, the piston of said pump being provided with a valve and means for opening the same as it makes its backward stroke, substantially as specified.

12. The combination, in a can-cap-soldering machine, of a closed acid-tank furnished with a discharge-pipe with an air-pump connected with said tank, the piston of said pump being furnished with a valve, f', and a yielding pin, f^2, for opening said valve at the backward stroke of said piston, substantially as specified.

13. In a can cap soldering machine, the combination of cross head or slide B^{13} with air-pump F, piston F', valve-opening f, valve f', pin f^2, acid-tank D, and pipe connecting said pump and acid-tank, substantially as specified.

14. The combination, in a can-cap-soldering machine, of a revolving can-holder, a vertically-moving solder-vessel furnished with a valve for discharging the molten solder, and a vertically-sliding pin mounted thereon, connected with the valve and arranged to come in contact with the can cap or head as the solder-vessel descends, whereby on the descent of the solder-vessel the solder is discharged, substantially as specified.

15. The combination, in a can-cap-soldering machine, of a revolving can-holder, a vertically-moving solder-vessel furnished with a valve for discharging the molten solder, and a vertically-sliding pin mounted thereon, connected with the valve and arranged to come in contact with the can cap or head as the solder-vessel descends, whereby on the descent of the solder-vessel the solder is discharged, and a weight connected with the valve or its stem for closing the same, substantially as specified.

16. The combination, in a can-cap-soldering machine, of a revolving can-holder, a vertically-moving solder-vessel furnished with a valve for discharging the molten solder, and a vertically-sliding pin mounted thereon, connected with the valve and arranged to come in contact with the can cap or head as the solder-vessel descends, whereby on the descent of the solder-vessel the solder is discharged, and a gas jet or heater for heating said vessel, substantially as specified.

17. The combination, with a moving molten-solder vessel, of a sliding valve mounted thereon, having its stem projecting through the base or bottom of the solder-vessel for opening the valve by contact with the can as the

solder-vessel descends against the same, substantially as specified.

18. The combination, with a revolving can-holder, of a moving molten-solder vessel, a sliding valve mounted thereon, having a stem projecting through its bottom for opening the valve by the descent of the vessel, substantially as specified.

19. The combination, with a revolving can-holder, of a moving molten-solder vessel, a sliding valve mounted thereon, having a stem projecting through its bottom for opening the valve by the descent of the vessel, and a weight for closing the valve as the vessel ascends, substantially as specified.

20. The combination, with a revolving can-holder, of a vertically-moving molten-solder vessel, a sliding valve mounted thereon, having a hollow stem projecting through its bottom, said hollow stem being provided with an opening through its wall, substantially as specified.

21. The combination, with a revolving can-holder, of a vertically-moving molten-solder vessel, a sliding valve mounted thereon, having a hollow stem projecting through its bottom, said hollow stem being provided with an opening through its wall, and an adjustable rod or screw for regulating the size of said opening, substantially as specified.

22. The combination, in a can-cap-soldering machine, of a revolving can-holder, a vertically-moving solder-vessel furnished with a valve for discharging the molten solder, and a vertically-sliding pin mounted thereon, connected with the valve and arranged to come in contact with the can cap or head as the solder-vessel descends, whereby on the descent of the solder-vessel the solder is discharged, said solder-vessel being furnished with a closed top, substantially as specified.

23. The combination, in a can-cap soldering machine, of a revolving can-holder, a vertically-moving solder-vessel furnished with a valve for discharging the molten solder, and a vertically-sliding pin mounted thereon, connected with the valve and arranged to come in contact with the can cap or head as the solder-vessel descends, whereby on the descent of the solder-vessel the solder is discharged, said solder-vessel being furnished with a closed top and a wire-solder-feed device for feeding the solder into said molten-solder vessel, substantially as specified.

24. The combined soldering-tool and molten-solder-containing vessel furnished with a discharge-valve and a valve-operating movable pin adapted to open the valve by contact with the can, substantially as specified.

25. The combined soldering-tool and molten-solder-containing vessel furnished with a discharge-valve and a valve-operating movable pin adapted to open the valve by contact with the can, in combination with a revolving can-holder, substantially as specified.

26. The combined soldering-tool and molten-solder-containing vessel furnished with a discharge-valve and a valve-operating movable pin adapted to open the valve by contact with the can, in combination with an intermittently-moving can-carrier and a series of revolving can-holders mounted thereon, substantially as specified.

27. The combined soldering-tool and molten-solder-containing vessel furnished with a discharge-valve and a valve-operating movable pin adapted to open the valve by contact with the can, in combination with a gas-jet or heater, substantially as specified.

28. The combined soldering-tool and molten-solder-containing vessel furnished with a discharge-valve and a valve-operating movable pin adapted to open the valve by contact with the can, in combination with an intermittently-moving can-carrier, and a series of revolving can-holders mounted thereon, and a series of gas-jets or heaters arranged at intervals in the path of said can-holders, one of said heaters being adapted to project a flame against said molten-solder vessel, substantially as specified.

29. In a soldering-machine, the combination of a vertically-movable molten-solder vessel with revolving can-holders adapted to rotate the can beneath the solder-vessel, said solder-vessel being provided with a valve for discharging a given quantity of molten solder, said valve being further provided with mechanism whereby the can operates to open the valve and discharge the required quantity of solder, substantially as specified.

30. In a soldering-machine, the combination, with a movable can-carrier and revolving can-holder mounted thereon, of a molten-solder-containing vessel furnished with a discharge-valve and mechanism operated by contact with the can for opening said valve, said valve being provided with a device for regulating the amount discharged, substantially as specified.

31. The molten-solder-containing vessel furnished with a discharge-valve and mechanism for operating said valve by contact with the can, substantially as specified.

EDWIN NORTON.

Witnesses:
EDMUND ADCOCK,
H. M. MUNDAY.