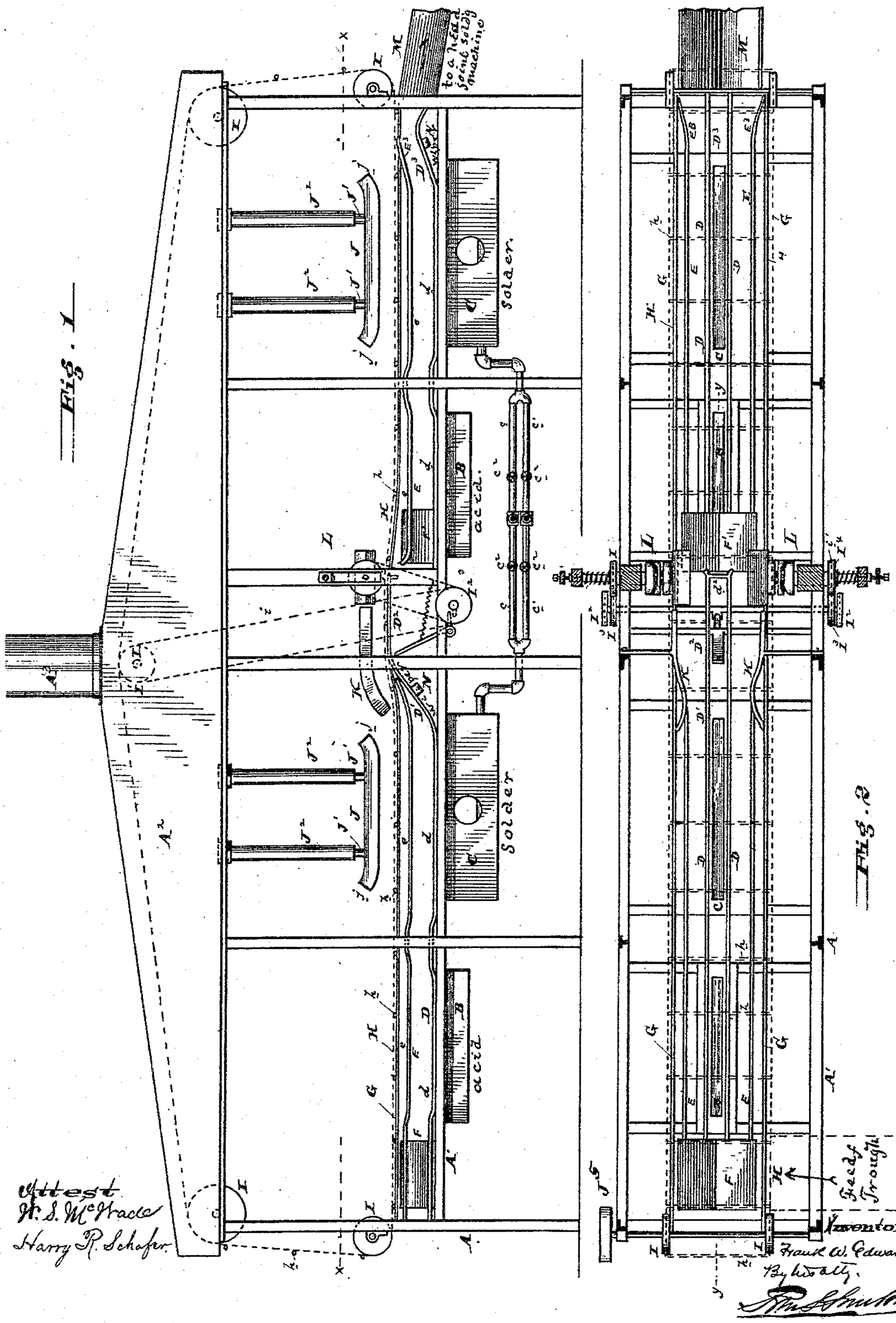
(No Model.) 5 Sheets—Sheet 1.

F. W. EDWARDS.

TIN CAN SOLDERING MACHINE.

No. 301,579 Patented July 8, 1884.



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F. W. EDWARDS.

TIN CAN SOLDERING MACHINE.

No. 301,579. Patented July 8, 1884.

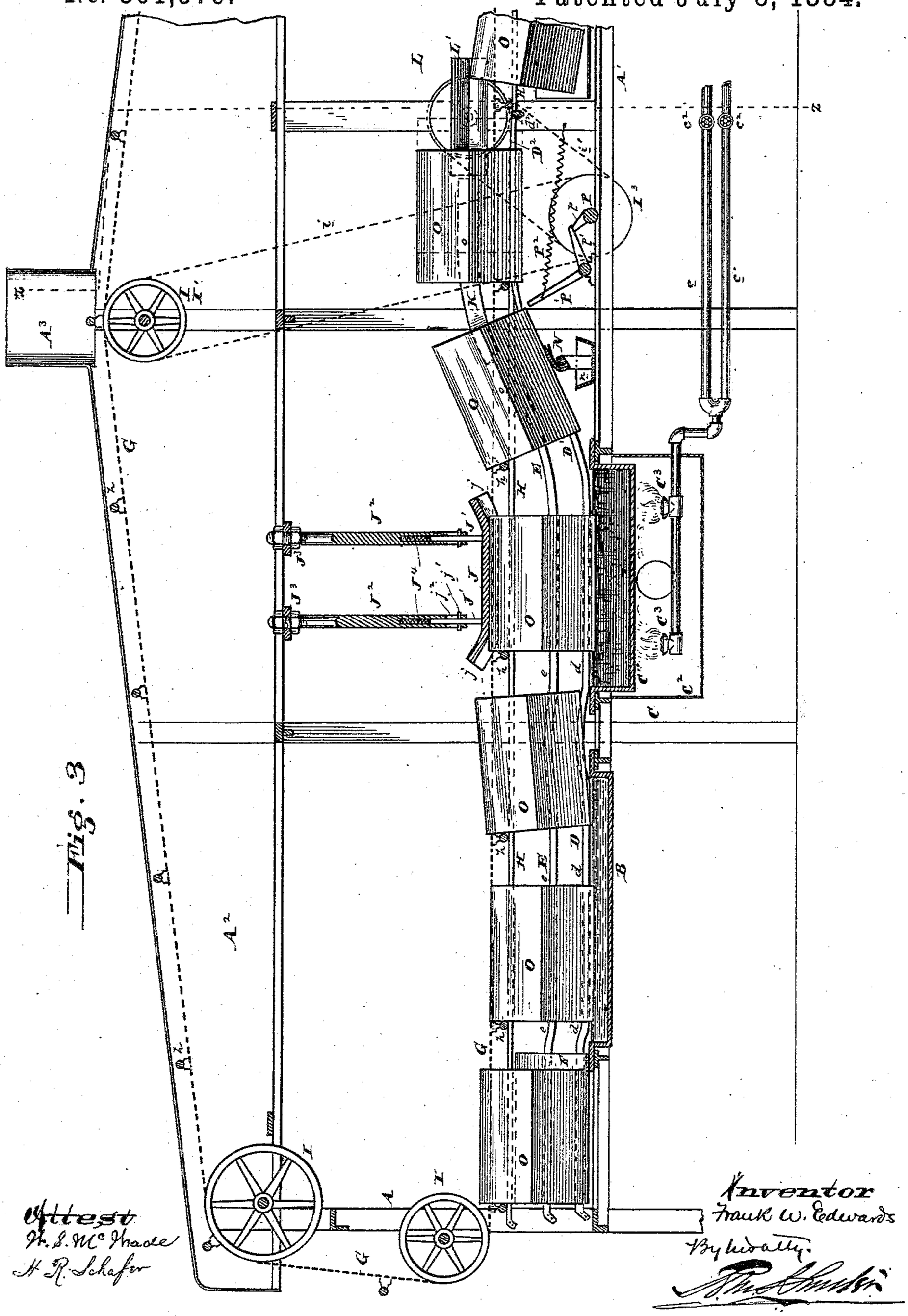

Fig. 3

Witnesses
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(No Model.) 5 Sheets—Sheet 3.

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TIN CAN SOLDERING MACHINE.

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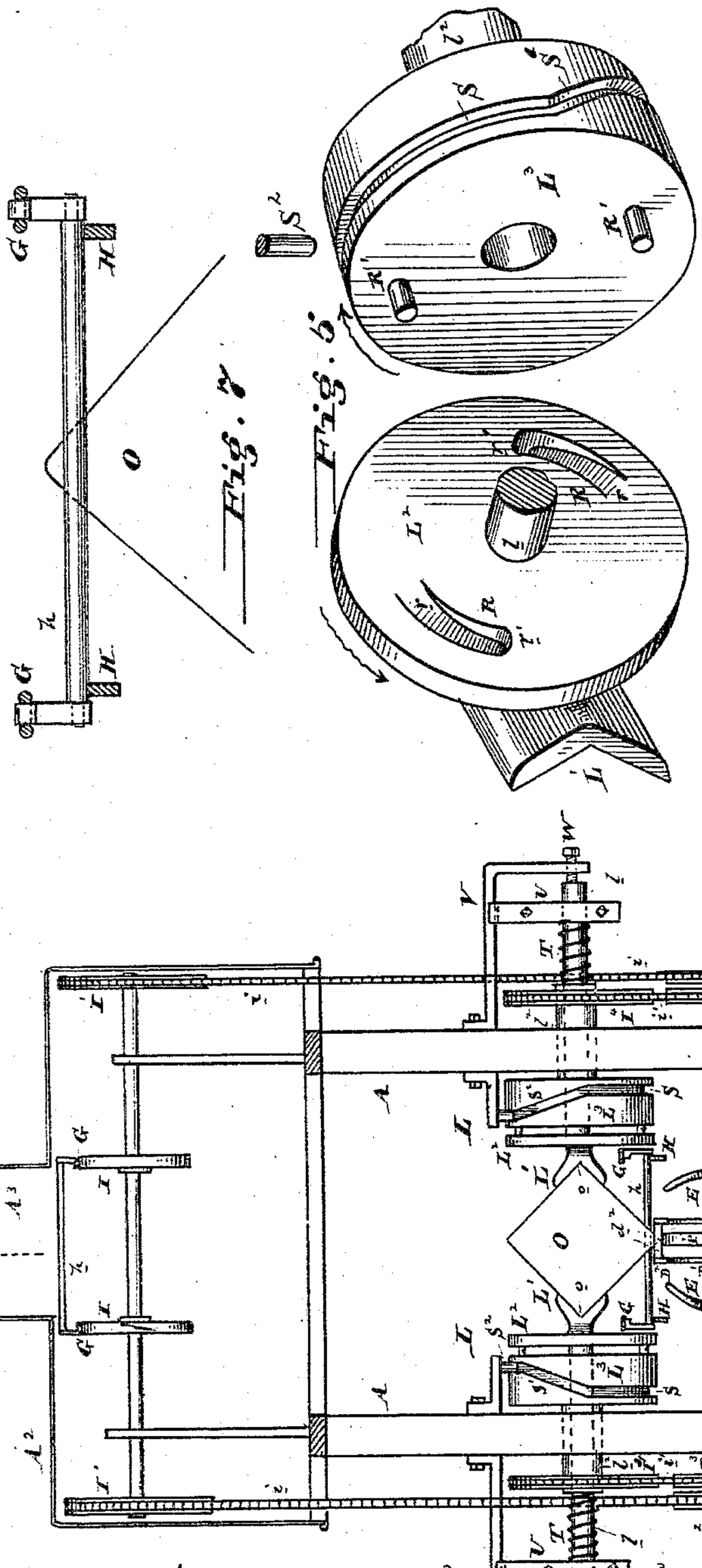

Fig. 4

Fig. 5

Fig. 7

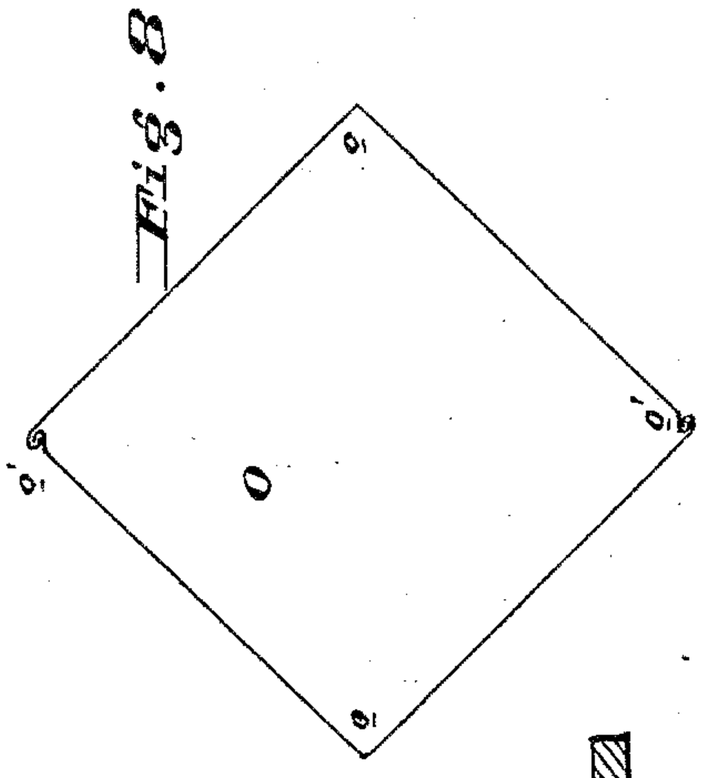

Fig. 8

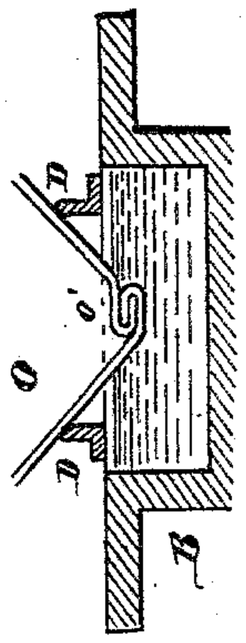

Fig. 6

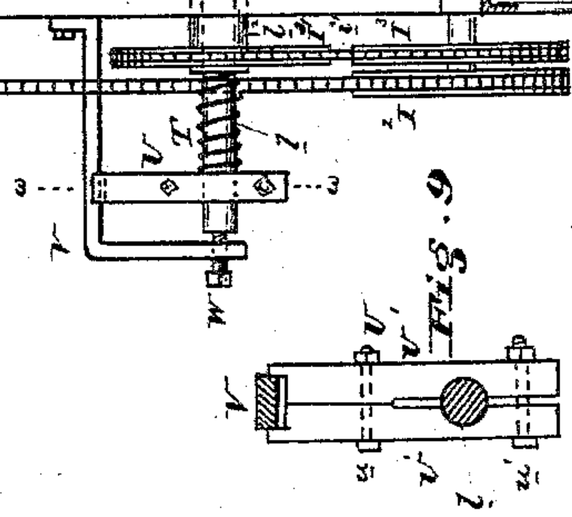

Fig. 9

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[illegible]

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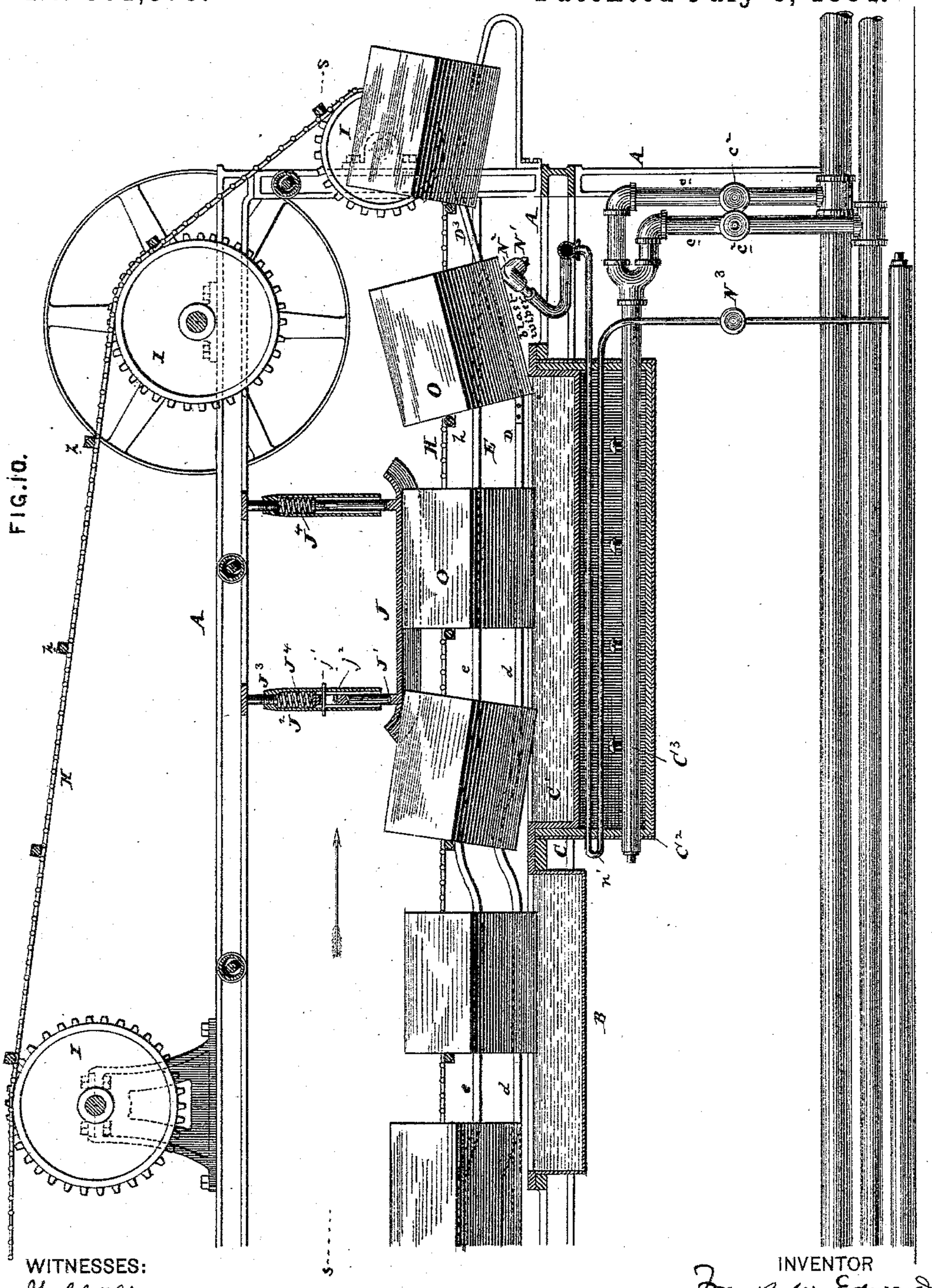
F. W. EDWARDS.

TIN CAN SOLDERING MACHINE.

No. 301,579. Patented July 8, 1884.

FIG. 10.



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(No Model.) 5 Sheets—Sheet 5.

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TIN CAN SOLDERING MACHINE.

No. 301,579. Patented July 8, 1884.

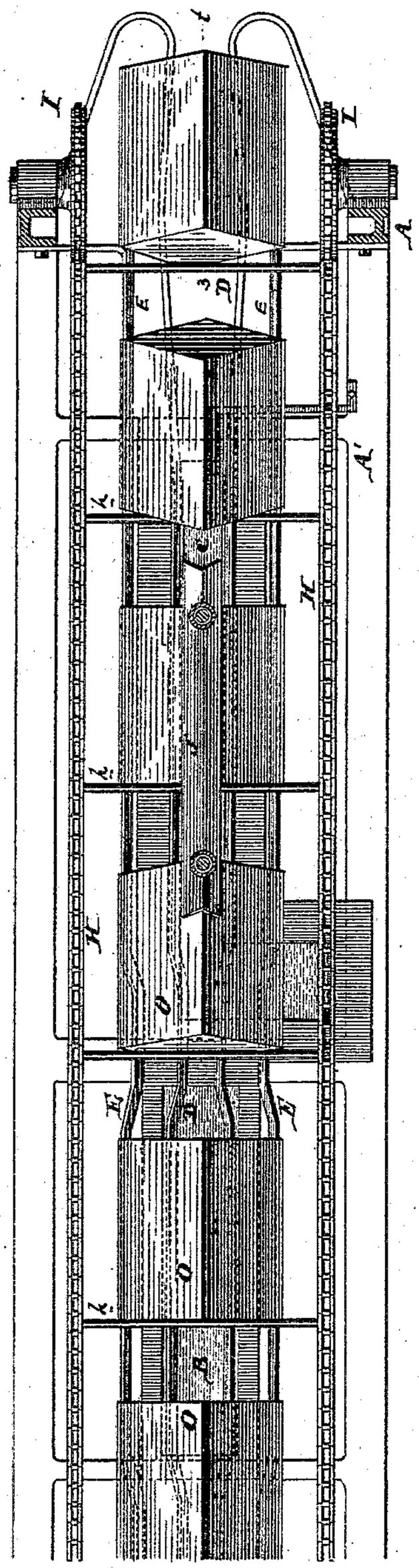

FIG. 11.

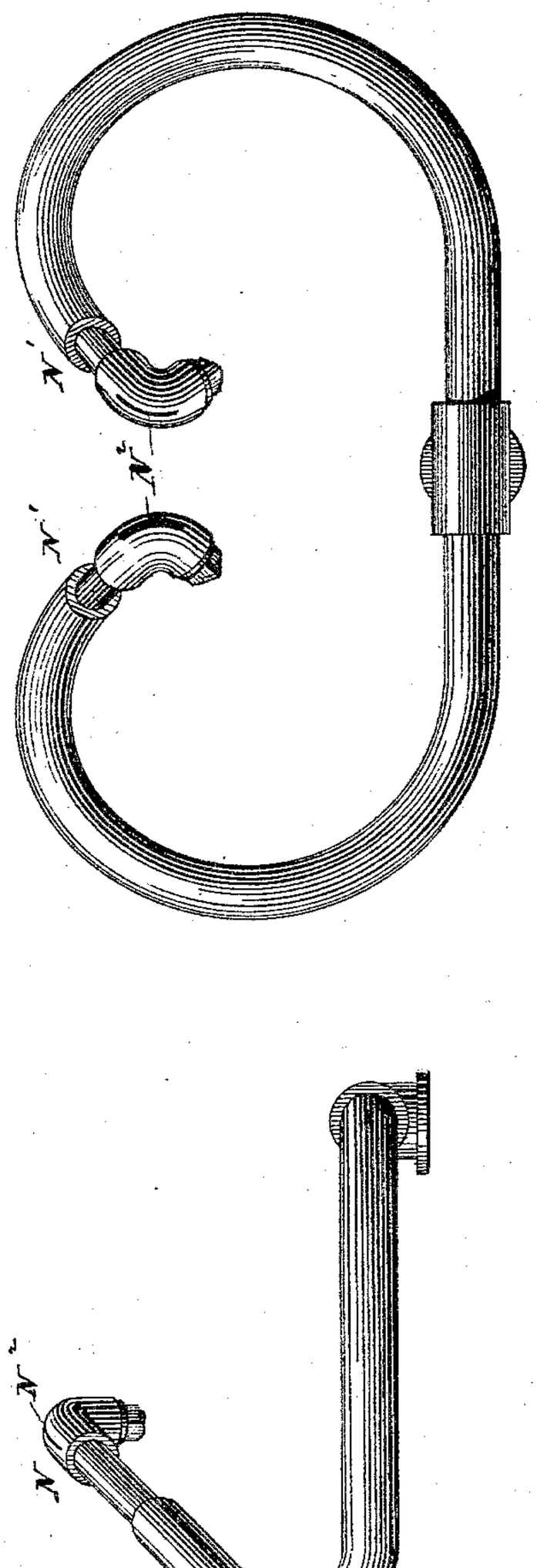

FIG. 13.

FIG. 12

WITNESSES:
W. S. McWade
H. R. Schafer

INVENTOR
Frank W. Edwards
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UNITED STATES PATENT OFFICE.

FRANK W. EDWARDS, OF THURLOW, PENNSYLVANIA.

TIN-CAN-SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 301,579, dated July 8, 1884.

Application filed February 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, FRANK W. EDWARDS, of Thurlow, county of Delaware, and State of Pennsylvania, have invented an Improvement in Tin-Can-Soldering Machines, of which the following is a specification.

My invention has reference to tin-can-soldering machines; and it consists in certain devices adapted to treat the two diagonally-opposite edges of a cubical can first with acid and then with solder, whereby one edge of the body is soldered and then the other, the said operations being performed automatically and in a continuous manner, and in many details of construction, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

The object of my invention is to provide suitable automatic mechanism adapted to handle tin cans in such a way that their body-seams are soldered and the cans delivered in a continuous manner one after the other in close succession, the heads being soldered to said body by means of a machine set forth in another pending application.

In the drawings, Figure 1 is a side elevation of a can-soldering machine embodying my improvement. Fig. 2 is a sectional plan view of same on line *x x*. Fig. 3 is a sectional elevation of one-half of same on line *y y*, and shows the cans in the act of being soldered. Fig. 4 is a cross-section on line *z z*. Fig. 5 is a perspective of one of the heads used to turn the can after having one seam soldered, showing the two parts forming said heads separated. Fig. 6 is a cross-section showing how the tin-can edge sets down into the acid or solder trough. Fig. 7 is a cross-section through the conveyer-chain and its guides. Fig. 8 is a cross-section through a can-body adapted to be soldered by this machine. Fig. 9 is a cross-section on line *w*, and shows the friction device to prevent spinning of the head, which turns the can. Fig. 10 is a sectional elevation of the rear half of the machine, taken on line *t t* of Fig. 11. Fig. 11 is a sectional plan view of same on line *s s*. Fig. 12 is a side elevation of the solder-wiper, in which a blast of air or gas under pressure is used; and Fig. 13 is a plan view of same.

A is the frame of the machine.

A′ is a horizontal table formed of iron framing.

A^2 is a hood adapted to cover the upper part of the entire machine, and terminates in a stack, A^3.

The table A′ may be conceived as being divided into five sections, two of which are utilized to apply acid to the cans, and two solder, and the fifth located in the middle, being provided with mechanism to revolve the can, to bring the diagonally-opposite seam into position to receive acid and solder from the next two sections.

B are the acid-troughs, and C the soldering apparatus, which consists of the solder-trough C', inclosed in a sheet-iron case, C^2, and kept hot by means of a furnace or gas-burners, C^3, which receive a supply of air by pipe *c*, and gas by pipe *c′*, the respective supplies being controlled by valves c^2.

The cans O, after having their heads clamped on, are ready for soldering, and are fed into the machine from a trough, *f*, (indicated in dotted lines.) These cans are received in the machine on a V-shaped trough, F, and are fed therefrom through the machine by bars or rods *h*, secured to the endless chains G and guided by rails H. These chains G run over sprocket-wheels I, and may be driven by a band-wheel, J^5. For convenience the chains pass over the machine in one direction in contact with the cans; but in returning they are carried up within the hood A^2 and back to the starting-point. The cans O, as they are pushed along by the rods *h*, (see Fig. 3,) are kept in the proper position by guide-rails E and D, which rails are slightly depressed, as at *e d*. They pass over the acid and soldering troughs B and C′, to allow the seams *o′* of the cans to dip down first into the acid and then into the solder. Owing to the solder being of a very high specific gravity, it is desirable to press the can down into it as it passes through to insure the seam being thoroughly filled with solder. To do this I provide an inverted-Λ-shaped guide, J, having its ends *j* curved upward, to allow the ready entrance of the can. This guide is provided with rods J′, which are guided vertically in tubes J^2, and allow of a vertical movement to the guide J, which latter is prevented from falling by pins *j′*, which work in slots j^2. Springs J^4 tend to press the

guide J down upon the can as it passes under, thereby insuring its entrance into the solder. These tubes or rods J^2 are adjustably secured to the frame A, as at J^3, so as to adjust the guide J to a nicety. After having one seam *o'* soldered, the cans are moved up the inclined parts D' of the rails D, and during this operation the excess of solder may be wiped off by a wiper, N, and collected in a box, *n*, thereby saving solder and improving the appearance of the seam. The wiper may be made of any spongy or soft material, which presses against the seam of the can; or a blast of air or steam or any gas may be blown against the freshly-soldered seam, as shown in Fig. 10, in which nozzles N', having slits N^2, are directed against the can as it rises out of the solder, and blows the excess back to the rear edge of the seam and off into the solder trough or a box, leaving a highly-finished seam. This air or gas is preferably heated by passing first by a pipe, *n'*, through the furnace or heating apparatus for the solder-trough, to prevent any possibility of chilling the solder on the seam, and its supply and pressure may be regulated by a valve, N^3. As the can is moved forward, it rises and leaves the rails E, but is sustained against lateral displacement by guides K, which support the can by its edges *o*. After being raised as far above the rods *h* as it was before below, the can is received upon the horizontal part D^2 of rails D, which terminate in a cross-bar, d^2, to prevent the can moving too far into the reversing devices L. As the can is in the position shown in Fig. 3, the arm P' is suddenly tripped by shaft P, cam *p*, and arm *p'*, and a spring pulls it quickly against the can, causing the latter to be projected forward into the jaws L' of the reversing device, as indicated in dotted lines, and thereby give it time in which to be revolved half a revolution and discharged just as its rod *h* arrives over the stop d^2 or center of the jaws L'. After being turned over, the seam which has been soldered is now on top, and the can is pushed out of the jaws L' by rod *h* into the trough F', similar to F, and the same operation of soldering this seam is now carried on as before, only in the two last sections of the machine. After the can has both of its body-seams soldered, it is raised on inclines E^3 D^3 and discharged into the chute M and conveyed to the head-soldering machine.

The device to turn the can a half-revolution may be made as follows, (see Sheet 3 of the drawings:) The cam-heads L^3 are secured to hollow sleeves l^2, to the outer end of which are secured sprocket-wheels I^4. The faces of these heads have two pins, R', set diagonally opposite, and the peripheries are provided with camways consisting of two straight parts, S S, and two oblique parts, S' S', in which stationary pins S^2 work. As these heads move around, the pins S^2 cause them to be reciprocated back and forth at specified intervals. Working through the sleeves l^2 are shafts *l*, which carry on their ends heads L^2, provided on their faces with the reversing-jaws L', and on their backs with grooves R, preferably having oblique floors *r*, terminating in the faces of the heads on one end, and forming abrupt terminals at the other. As the heads L^3 move around and begin their reciprocation, their pins R' enter the grooves R, and when the pin S^2 enters the straight part S of the cam-slot the head L^2 is moved around with the head L^3; but the moment the pin enters the other oblique groove, S', the pins R' are withdrawn from the grooves R and leave the heads L^2 and their jaws stationary and in a position to receive another can. The head L^3 makes one revolution to every half-revolution by head L^2. The jaws L' are adjusted to or from each other by screws W, working through brackets V and pressed against the ends of shafts *l*. When the head L^3 revolves, and before the pins R' enter the grooves R, these pins do not touch the face of the head L^2, and the said head is held stationary by friction-clamp U, consisting of two pieces of wood, U', clamped together by bolts *u u'*, and prevented from turning by the bracket V. Springs T tend to keep the shafts *l* against the adjusting-screws W. The longitudinal grooves of the reversing-jaws L' always remain horizontal except during their revolution. The wheels I^4, which operate the reversing mechanism, are rotated by chains *i'*, wheels I^3 I^2 I', and chain *i*. As the can is only fed into the jaws L' half-way, when they revolve they throw the main part of the can forward, thus gaining on the traveling rods *h*, so that when the rod arrives at the center of the jaws the can is turned, and is pushed out of said jaws by the rod and carried onto the guide-rails E D of the last two sections.

In place of using an acid-trough, into which the can-seam dips, the acid may be applied with a brush or sponge or in any other suitable manner.

While I prefer this form of mechanism for turning the can, I do not limit myself to its construction, as other devices might be used in lieu thereof. For instance, the can might be turned sidewise or in any manner so as to present the unsoldered seams in succession.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an organized machine for soldering side or panel seams of cubical tin cans, the following instrumentalities in combination: an endless carrier, an acid-trough, a solder-trough, and means to keep the solder in a liquid condition, guide-rails to support said cans in a proper position and allow of their seam being dipped first in the acid and then in the solder, and finally raise the can out of the solder at an incline, and a wiper arranged close to the solder-trough to wipe off the excess of solder, and cause it to flow back into the said solder-trough, substantially as and for the purpose specified.

2. In an organized machine for soldering

side or panel seams of cubical tin cans, the following instrumentalities in combination: an endless carrier, an acid-trough, a solder-trough, and means to keep the solder in a liquid condition, guide-rails to support said cans in a proper position and allow of their seam being dipped first in the acid and then in the solder, and a spring-pressure guide free to rise at both ends, and having a V-shaped groove upwardly turned at each end, to force the seam of the can positively down into the solder, substantially as and for the purpose specified.

3. In an organized machine for soldering side or panel seams of cubical tin cans, the following instrumentalities in combination: an endless carrier, an acid-trough, a solder-trough, and means to keep the solder in a liquid condition, guide-rails to support said cans in a proper position and allow of their seam being dipped first in the acid and then in the solder, a spring-pressure guide free to rise at both ends, and having a V-shaped groove upwardly turned at each end, to force the seam of the can positively down into the solder, and a wiper to wipe off the excess of solder, substantially as and for the purpose specified.

4. In an organized can-soldering machine, the combination, with two sets of soldering mechanism, of intermediate mechanism to turn the can to present a fresh or unsoldered seam opposite to the seam previously soldered, to be soldered by the second of said sets of soldering mechanism, and a carrier to move said cans along over the soldering mechanism, substantially as and for the purpose specified.

5. In an organized can-soldering machine, an endless carrier, in combination with two sets of soldering devices, each consisting of an acid and a solder trough, and guide-rails to allow the seam of the can to dip into said acid and solder during its passage over them, and means, located between said sets of soldering devices, for turning a semi-revolution, the can to present an unsoldered seam to the second set of soldering devices, substantially as and for the purpose specified.

6. In a can-soldering machine, the combination of an endless carrier, means to apply acid to the can-seams, a solder-trough, means to keep the solder liquid, receiving-plate F, and guides to support the cans, substantially as and for the purpose specified.

7. In a can-soldering machine, guides to support a can, in combination with an endless carrier adapted to push the can forward, and mechanism to turn said can end for end and deliver it again to said carrier, substantially as and for the purpose specified.

8. In a can-soldering machine, guides to support a can, in combination with an endless carrier having a cross-rod adapted to push the can forward, and mechanism to turn said can end for end and deliver it again to said carrier in front of the same cross-bar, substantially as and for the purpose specified.

9. In a can-soldering machine, guides to support a can, in combination with an endless carrier adapted to push the can forward, mechanism to turn said can end for end and deliver it again to said carrier, and means to force said can forward into said turning mechanism with a greater velocity than the travel of the endless carrier, substantially as and for the purpose specified.

10. In a tin-can-soldering machine, the combination of carrier G, having rods h, rails H, guides E D D′ D² K, acid-trough B, solder-trough C′, means to keep the solder hot, jaws L′, and means to give them intermittent semi-revolutions, substantially as and for the purpose specified.

11. In a can-soldering machine, the combination of carrier G, having rods h, rails H, guides E D D′ D² K, acid-trough B, solder-trough C′, means to keep the solder hot, and organized reversing mechanism L, to turn the can end for end, substantially as and for the purpose specified.

12. In a can-soldering machine, the combination of carrier G, having rods h, rails H, guides E D D′ D² K, acid-trough B, solder-trough C′, means to keep the solder hot, feed-arm, and means to intermittently vibrate it, jaws L′, and means to give them intermittent semi-revolutions, substantially as and for the purpose specified.

13. In a can-soldering machine, the combination of carrier G, having rods h, rails H, guides E D D′ D² K, bar d^2, acid-trough B, solder-trough C′, means to keep the solder hot, jaws L′, and means to give them intermittent semi-revolutions, substantially as and for the purpose specified.

14. The combination of solder-trough C′, means to keep the solder hot, stationary guides for the can, spring-pressure guide J, having a V-shaped guiding-groove, and means to move the can, substantially as and for the purpose specified.

15. The combination of guides for the can, jaws L′, secured to heads L², having grooves R and shafts l, pin S²; cam-heads L³, having grooves S S′, and pins R′, and sleeve l^2, and wheels I⁴, substantially as and for the purpose specified.

16. The combination of guides for the can, jaws L′, secured to heads L², having grooves R and shafts l, pin S², cam-heads L³, having grooves S S′, and pins R′, and sleeve l^2, friction devices to prevent shafts l from spinning, and wheels I⁴, substantially as and for the purpose specified.

17. The combination of guides for the can, jaws L′, secured to heads L², having grooves R and shafts l, pin S², cam-heads L³, having grooves S S′, pins R′, sleeve l^2, friction devices to prevent shafts l from spinning, springs T, and wheels I⁴, substantially as and for the purpose specified.

18. The combination of guides for the can, jaws L′, secured to heads L², having grooves R and shafts l, pin S², cam-heads L³, having grooves S S′ and pins R′, sleeve l^2, friction devices to prevent shafts l from spinning,

springs T, adjusting-screws W, and wheels I⁴, substantially as and for the purpose specified.

19. The combination of guides for the can, jaws L′, secured to heads L², having grooves R and shafts *l*, pin S², cam-heads L³, having grooves S S′ and pins R′, sleeve *l*², friction devices to prevent shafts *l* from spinning, adjusting-screws W, and wheels I⁴, substantially as and for the purpose specified.

20. In a can-soldering machine, guides to support a can, and means to apply solder to its seams, in combination with an endless carrier adapted to push the can forward, and devices to turn the said can a semi-revolution at one operation, so as to present the unsoldered seams in succession to said soldering appliances, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

FRANK W. EDWARDS.

Witnesses:

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FRANCIS S. BROWN.