

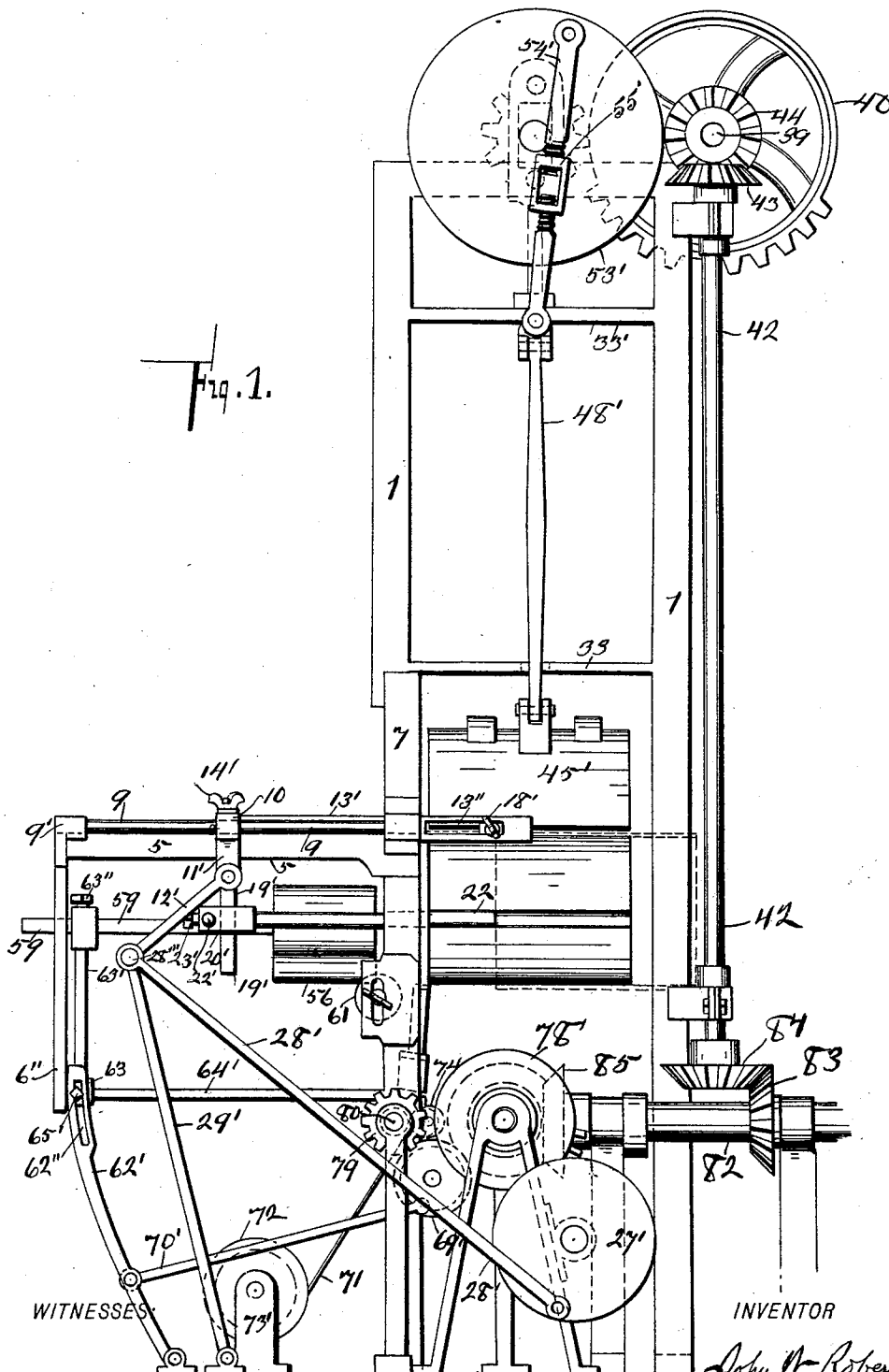
(No Model.)

6 Sheets—Sheet 1.

J. W. ROBERTS.
CAN SEAMING MACHINE.

No. 521,894.

Patented June 26, 1894.



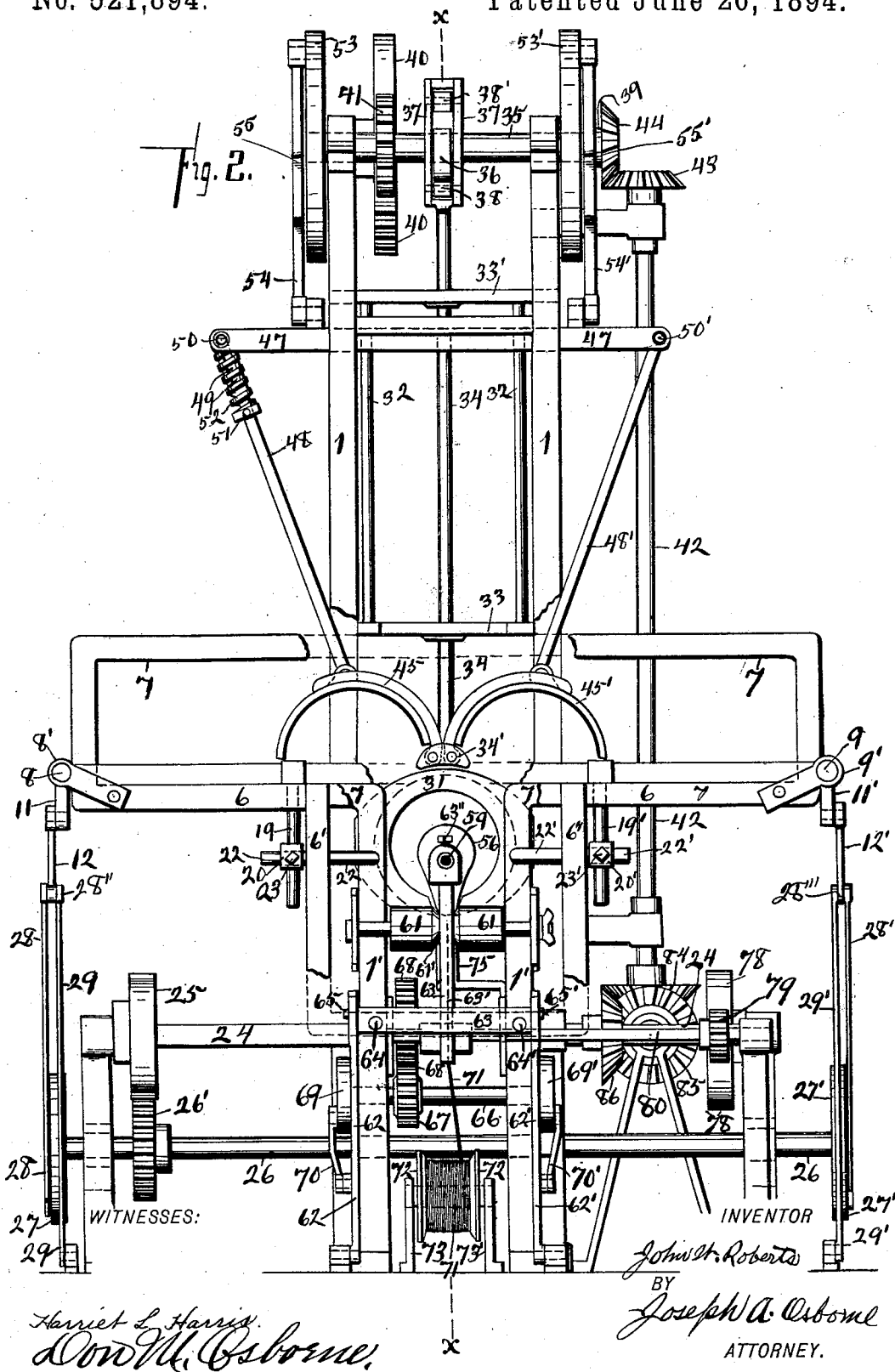
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J. W. ROBERTS.
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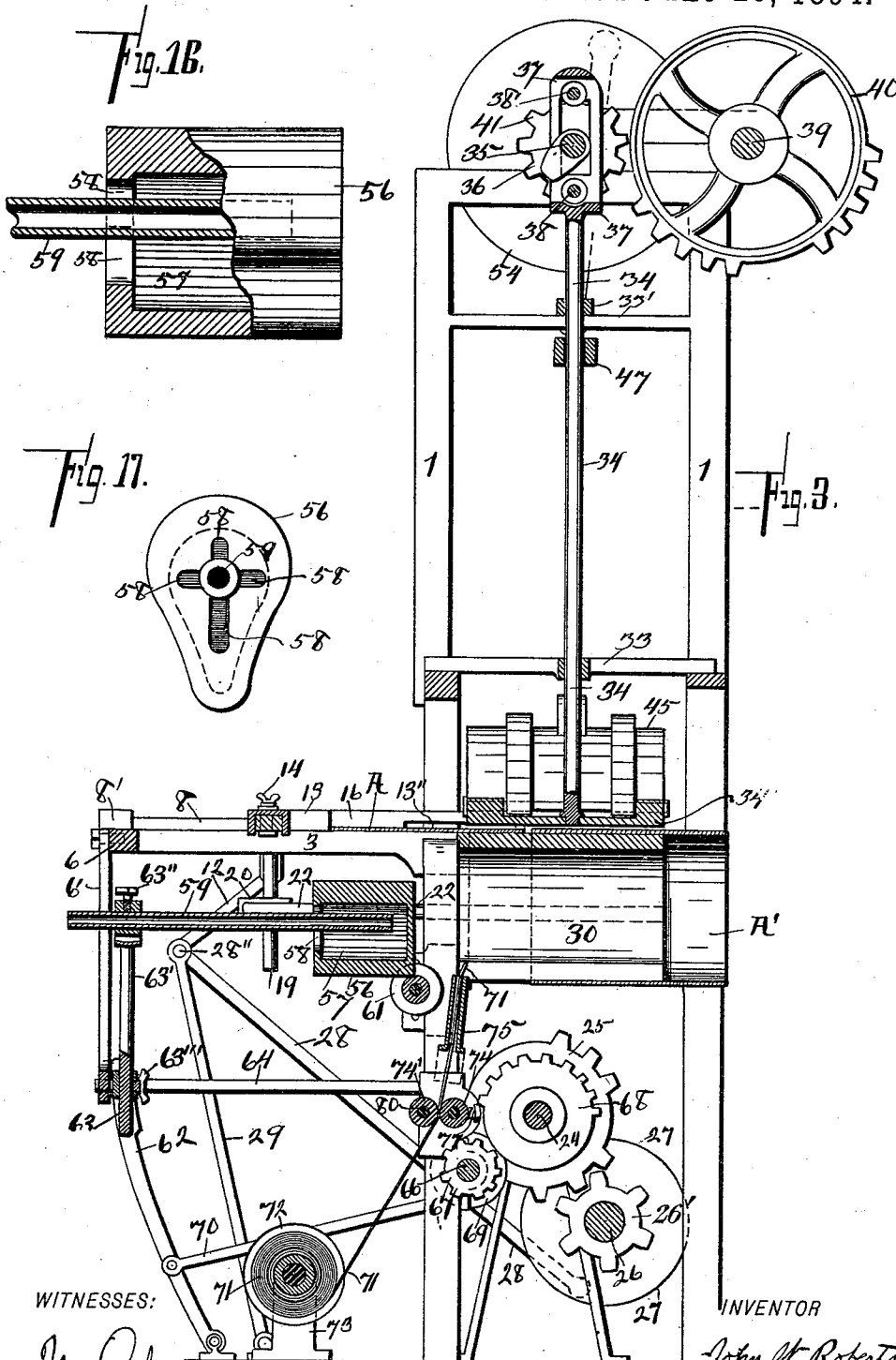
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6 Sheets—Sheet 3.

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6 Sheets—Sheet 4.

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Fig. 4.

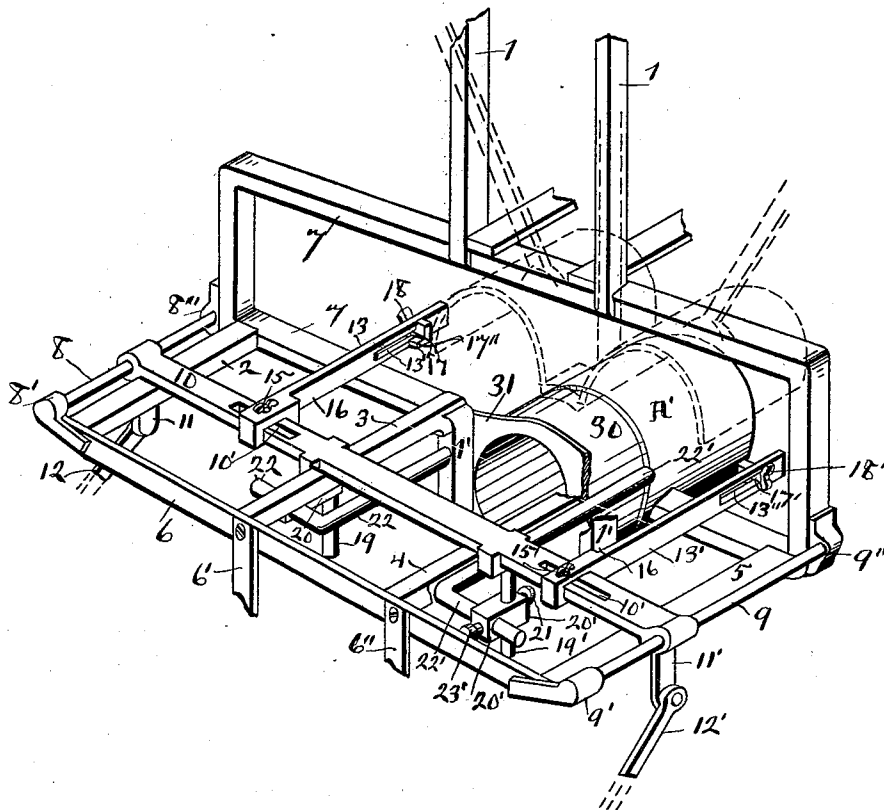
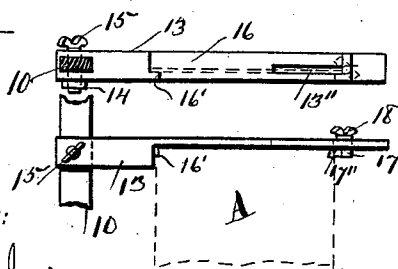


Fig. 5.

Fig. 6.



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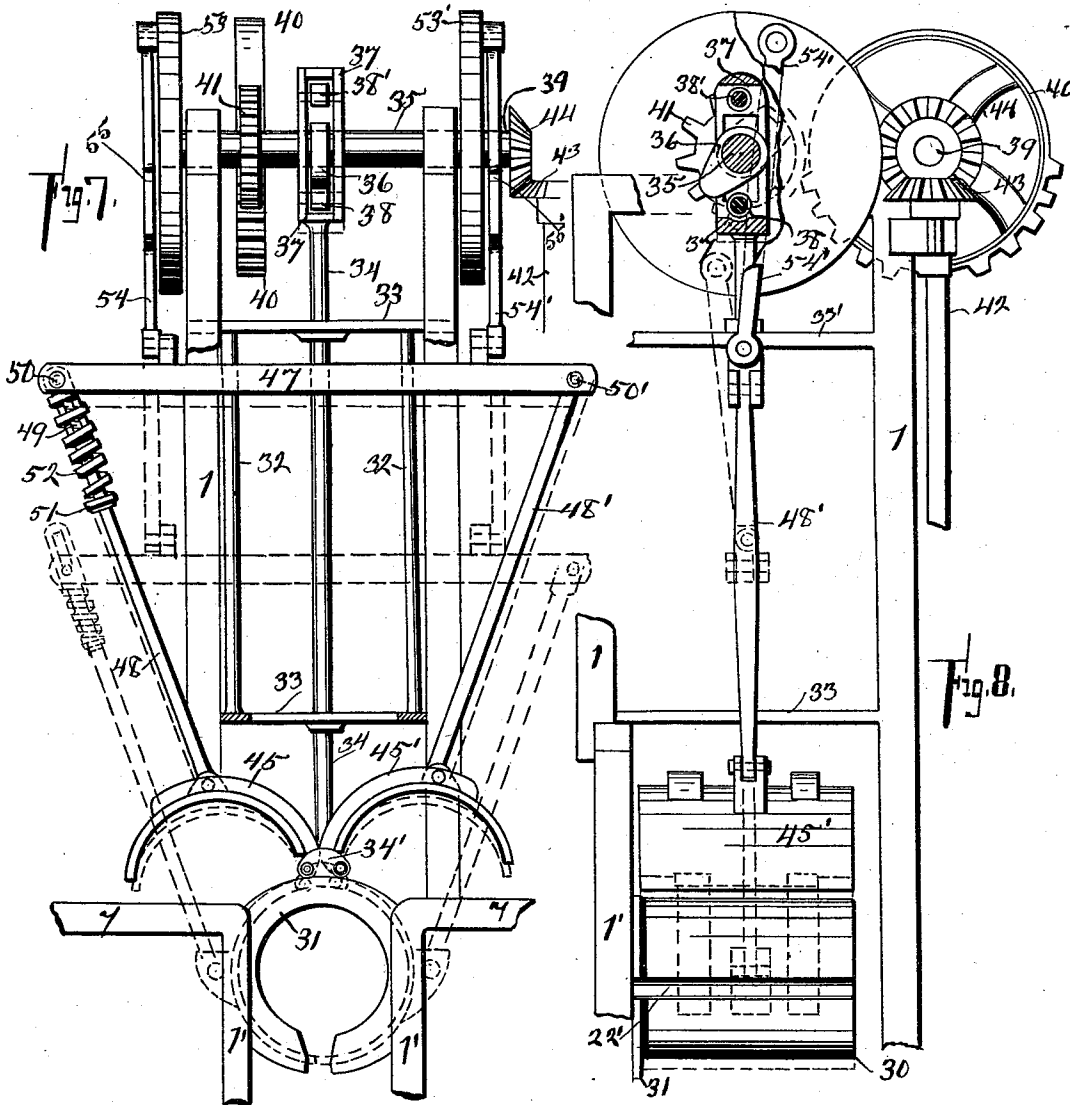
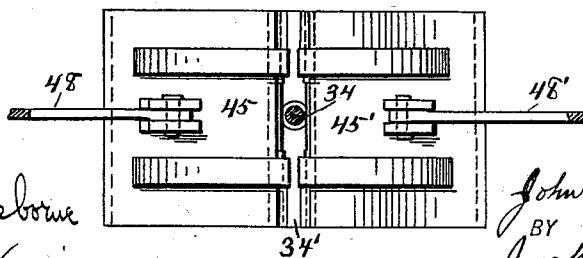


Fig. 9.



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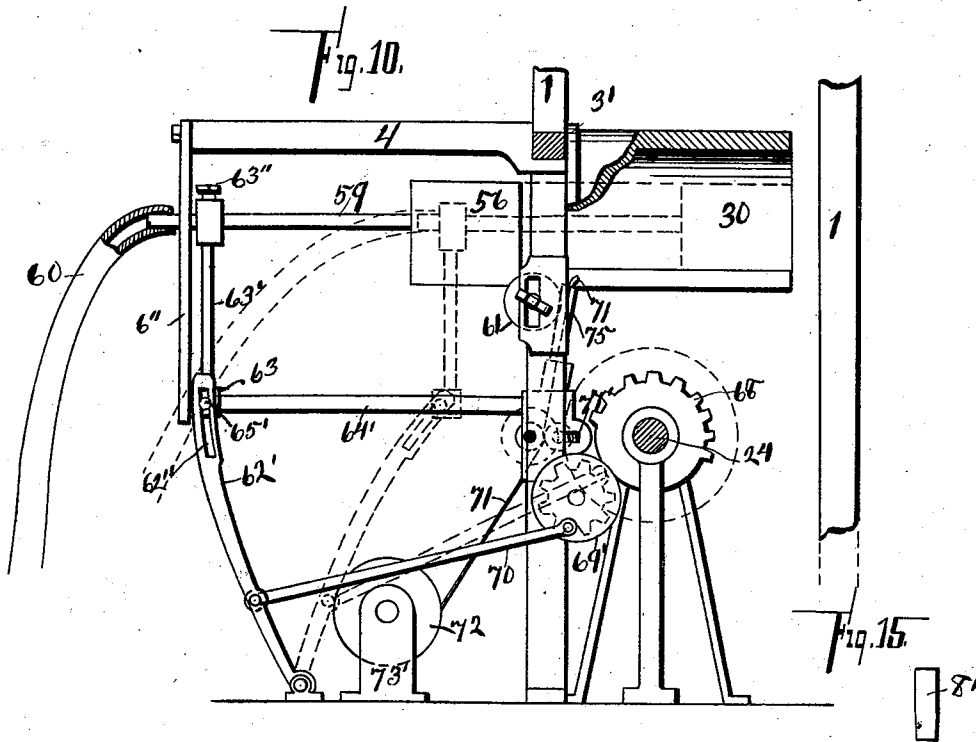
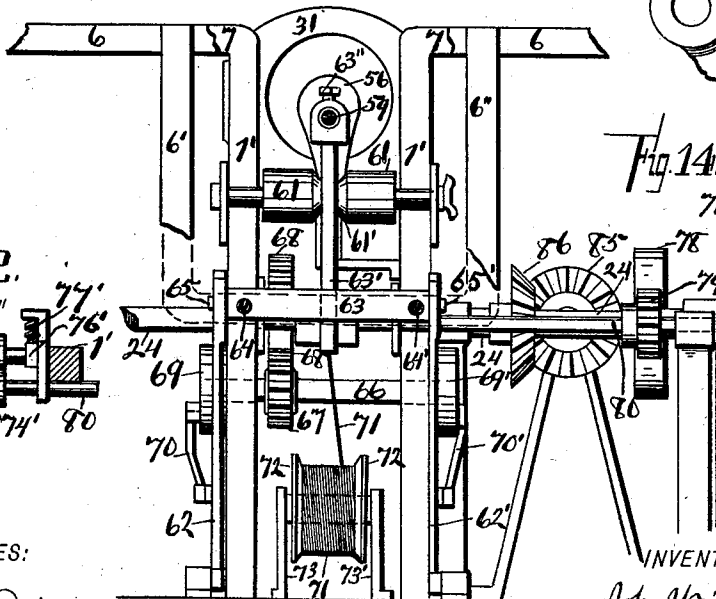
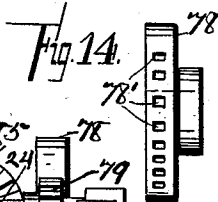
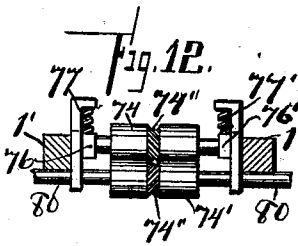
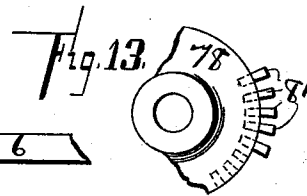


Fig. 11.



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UNITED STATES PATENT OFFICE.

JOHN W. ROBERTS, OF CLEVELAND, OHIO, ASSIGNOR TO THE ROBERTS
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CAN-SEAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 521,894, dated June 26, 1894.

Application filed April 6, 1893. Serial No. 469,367. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. ROBERTS, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Can-Seaming Machines, of which the following, with the accompanying drawings, is a specification.

The object of my invention is a machine which automatically bends the tin to form the cylindrical portions of tin packing cans, makes and solders the seam, and discharges the seamed can body from the machine ready to have the ends of the can crimped upon the cylindrical body.

My invention consists in the construction and combination of the several parts herein-after described and defined in the claims.

In the drawings, Figure 1 is a side elevation of my complete machine. Fig. 2 is a front elevation of the same, and Fig. 3 is a vertical section of the machine on the line x of Fig. 2. Fig. 4 is an enlarged perspective view of the feed table and apparatus connected therewith, the adjacent parts and power mechanism being broken away. Fig. 5 is a side elevation of one of the stock-guides, and Fig. 6 is a plan of the same showing in connection therewith, in dotted lines, a broken section of sheet tin. Fig. 7 is a front view of the forming and clamping apparatus, the adjacent parts of the machine being broken away, and Fig. 8 is a side elevation of the parts illustrated by Fig. 7. Fig. 9 is a plan view of the segmental clamps. Fig. 10 is a side elevation of the soldering mechanism, the other parts of the machine being removed, and Fig. 11 is a front elevation of the same. Fig. 12 is a plan of the solder-feed rolls. Fig. 13 is an enlarged broken section of the mutilated gear that operates the solder-feed. Fig. 14 is a face view of said mutilated gear, and Fig. 15 is a view of one of the removable cogs employed in said mutilated gear. Fig. 16 is an enlarged side elevation of the soldering iron, partly in broken section; and Fig. 17 is an enlarged end view of the soldering iron.

In my can-seaming machine, there are three distinct mechanisms which jointly co-operate to complete the work of seaming—the stock-feed mechanism, the forming and clamping

mechanism, and the soldering mechanism. For the sake of clearness, each of these mechanisms is separately described, and then their joint operation is explained. Carrying out this plan of deductive analysis in the description, the claim resolves itself into four classes of paragraphs: the first class being directed to the stock-feeding mechanism; the second class being directed to the forming and clamping mechanism; the third class being directed to the soldering mechanism; and the fourth class to the various combinations of the elements entering into these various mechanisms.

I will first describe the stock-feed mechanism. By reference to Figs. 4, 5 and 6, the stock-feed table and mechanism connected therewith are shown independently of the other mechanism entering into the complete machine. The driving power which connects this mechanism with the main shaft (24) of the machine will be seen in Figs. 1, 2 and 3. 1, 1, is an open rectangular frame which constitutes the main frame of the machine. In front of the main frame 1, 1, is a supporting frame forming what I term the table of the machine. This frame consists of the sills 2, 3, 4 and 5, with the outer tie 6. The rectangular frame 7 is formed at the back of the table. At each end of the table is fixed guide rods 8 and 9, which are held in place by the brackets 8' and 8'', and 9' and 9''. Upon these guide rods is sleeved a bar 10, which has movement along the guide rods. At the ends of the sleeved bar 10 are short projections 11 and 11', to which the connecting links 12 and 12' are pivoted. In the sleeved bar 10 are formed slots 10' longitudinally thereof. Upon the sleeved bar 10 are two stock-guides 13 and 13', which have lateral adjustment upon the sleeved bar 10, by means of bolts 14 and 14' which pass through the slots 10' and are secured in place by the thumb-nuts 15 and 15'. The inner sides of the stock-guides 13 and 13' are recessed, as seen at 16, leaving lugs, 16', to form a rest for the sheet of tin A. The stock-guides 13 and 13' have lateral slots 13'' through which pass the bolts 17, 17', which carry lugs 17'', similar to the lug or projection 16'', to form a rest for the sheet of tin A. These bolts 17 and

17', with the thumb-nuts 18 and 18', make the stock-guides adjustable longitudinally. These stock-guides 13 and 13', being adjustable laterally and longitudinally as described, may be adapted to feeding sheets of tin of various sizes to form cans of various sizes. From the under side of the sleeved bar 10 project rods 19 and 19'. Upon these rods are brackets 20 and 20', which have adjustment vertically upon the rods 19 and 19' by means of the set screws 21. Said brackets carry discharge-rods 22 and 22', which are L-shaped, the foot of the L passing through bores in said brackets and being adjustable therein by means of the set screws 23 and 23'. By means of the vertical adjustment of the brackets 20 and 20' upon the rods 19 and 19', and by the lateral adjustment of the discharge-rods 22 and 22' in said brackets 20 and 20', said discharge-rods are capable of vertical and lateral adjustment to accommodate them to the work of seaming cans of various sizes. Said stock-feed mechanism is operated from the main shaft 24 through the mutilated gear 25, gear 26', crank-wheels 27 and 27', and links 28 and 28'. The rocking-bars 29 and 29' are pivoted to the floor, as illustrated; and said rocking-bar 29, connecting link 28, and link 12, are pivoted together at 28''; and the rocking-bar 29', connecting link 28', and link 12', are pivoted together at 28''' . It will be seen by reference to Fig. 3 that the mutilated gear 25 has two sets of cogs with rests between the same, so that the stock-feed mechanism is thrown in carrying with it a sheet of tin, A, when there is a slight rest to allow the sheet of tin A to be clamped, as hereinafter described. The second series of cogs upon the mutilated gear 25 then comes into play and throws the stock-feed carrier back, giving it a longer rest at the end of its back stroke to keep the discharge-rods and the stock-guide rods out of the way while the clamping mechanism and the soldering mechanism are in operation, and also to give ample time for placing a sheet of tin in the recesses formed in the stock-guide rods.

I have now described fully the feed mechanism. I will next describe the forming and clamping mechanism. A cylinder, 30, having a flange plate 31 at its front end, is secured to that portion of the main frame marked 1', 1', by any suitable means. Said cylinder 30 is grooved through on its under side through its whole length, forming what I, for convenience, term an open split cylinder. Within the rectangular main frame, 1, 1, above the open split cylinder 30, is a frame 32, having central cross-pieces 33 and 33', which cross-pieces have a central opening through them. A vertical shaft, 34, passes through the openings in the cross-pieces 33 and 33', said cross-pieces forming a guide for the vertical rod 34. At the top of the main frame 1 is journaled a shaft 35 which carries a cam 36. To the top of the vertical shaft 34 is fixed a rectangular open frame 37, through which the shaft 35 passes

laterally, and which incloses the cam 36, as illustrated. Within the top and bottom of said frame 37, are friction rollers 38 and 38' which engage said cam 36, as it rotates, to prevent wear and to lessen friction. As the shaft 35 rotates, it carries the cam 36 with it, thus reciprocating the vertical-bar 34 through the cross-pieces 33 and 33', as and for the purpose hereinafter stated. At the back of the main frame, at its top, there is also journaled a shaft 39, which is parallel with the shaft 35. Upon the shaft 39 there is fixed a mutilated gear 40, which meshes with the pinion 41 that is fixed upon the shaft 35. Said shaft 39 is driven by power through the upright shaft 42, bevel gear 43 fixed to the top of the shaft 42, and the bevel gear 44 that is fixed to the outer end of the shaft 39. Two segmental clamps, 45 and 45', are hinged at their inner ends to the T-end 34' of the vertical reciprocating shaft 34, as illustrated. A cross-bar, 47, passes laterally through the machine frame above the segmental clamps 45 and 45', and has a bore to allow the vertical shaft 34 to have an independent movement through it. Links 48 and 48' are pivoted to the segmental clamps 45 and 45', as illustrated, and are connected pivotally with the cross-bar 47. The link 48 is provided with a slot 49, near its upper end, through which the pin 50 passes. Upon said link 48, below the bar 47, is fixed a ring 51. A spring, 52, is interposed between the ring 51 and the bar 47. The bar 48 is slightly longer than the bar 48', for the purpose hereinafter stated. The pin 50' passes through a round bore in the upper end of the link 48', and there is no longitudinal play of the link 48' upon the pin 50' as there is with the link 48 upon the pin 50. Crank-wheels 53 and 53' are fixed to the outer ends of the shaft 35, and have driving connections, 54 and 54', with the cross-bar 47. These driving connections, 54 and 54', have longitudinal adjustment by means of turn buckles 55 and 55', with right and left threads at their opposite ends.

Having described the construction of the stock-feed mechanism and the forming and clamping mechanism, I will now describe the soldering mechanism. My soldering iron, 56, is substantially of the form illustrated by Figs. 16 and 17. It is provided with an inner chamber 57 and air openings 58 in the back end. The front end of the soldering iron is solid. A pipe, 59, enters the chamber of the soldering iron, as illustrated. A flexible gas tube, 60, is connected with the pipe 59 that enters the chamber 57 of the soldering iron 56. Said soldering iron is reciprocated through the open split cylinder 30, as hereinafter described. The soldering iron 56, in its reciprocating movement, travels over a roller 61, that is journaled upon the main frame 1', 1'. In the center of said roller 61 is formed an annular V-groove 61', which serves as a guide for the soldering iron. Two slotted rocking-bars, 62 and 62', are pivoted to the floor. A cross-bar, 63, adapted to slide upon the rods 64 and 64',

carry a support 63' which has a bore through its top through which the pipe 59 passes. Said pipe 59 is adjustable through the support 63' by means of the set screw 63''. Upon the ends of the cross-bar 63 are studs 65 and 65' which pass through the slots 62'' of the slotted rocking-bars 62 and 62'. The support 63' is adjustable vertically upon the sliding cross-bar 63 by means of a set screw 63'''. This set screw, 63''', passes through a slot in the usual way so well known to mechanics, and is not illustrated. The outer ends of the rods 64 and 64' are supported from the outer edge of the table of the machine by the drops 6' and 6''. Upon the shaft 66 there is fixed a pinion 67, and upon the shaft 24 there is fixed a mutilated gear 68 which is independent of the mutilated gear 25. Upon the outer ends of the shaft 66 are carried crank-disks, 69 and 69', and links 70 and 70' connect said crank-disks 69 and 69' with the slotted rocking-bars 62 and 62'. The mutilated gear 68, through the pinion 67, shaft 66, crank-wheels 69 and 69', links 70 and 70', and rocking-bars 62 and 62', reciprocates the sliding cross-bar 63 with its attached support 63', and the soldering iron 56, and allows the soldering iron to have rest after each revolution. The solder used in my machine is in the form of wire, 71, and is rolled upon spools 72, which are journaled in the standards 73 and 73'. The wire solder, 71, passes up between two rollers 74 and 74', and through a guide tube 75. A plan view of the solder-feed rolls is seen in Fig. 12. Said rolls are provided with V-grooves, 74'', which are serrated to insure a biting into the solder to at all times insure feeding. One of said rolls, 74, is carried in sliding-blocks 76, 76', which are held in gibbed ways to allow movement of the roller 74. Springs 77 and 77', hold the rollers together. The object of this construction is to allow a yielding of one of the rollers that it will feed regularly over the solder wire of uneven sizes. The solder is fed by means of the mutilated gear 78, which is fixed upon the shaft 24, and meshes with the pinion 79 that is fixed upon the shaft 80 that carries the feed-roll 74. The teeth, 81, of the mutilated gear 78, enter sockets 78', and are removable, so that a greater or fewer number of teeth may be employed and thereby regulate the amount of solder fed with each revolution of the machine. 82 is a shaft to which the drive-pulley (not shown) is attached. The shaft 82 rotates the vertical shaft 42 through the bevel-gears 83 and 84; and said shaft 82 rotates the main shaft 24 through the bevel-gears 85 and 86.

Having fully described separately the three different mechanisms that enter into my machine, I will now describe their joint operation. The stock-guides 13 and 13' are adjusted laterally and longitudinally, as described, to take the required size of sheet-tin A; and the discharge-rods 22 and 22' are properly adjusted vertically and horizontally so that in their travel they will pass close to the

side of the open split cylinder 30. The open split cylinder 30 and the segmental clamps 45 and 45' being of a required size to form the cylindrical part of the can, the drivers 54 and 54' are adjusted by means of the turn-buckles 55 and 55' to give the segmental clamps 45 and 45' the requisite depression to tightly inclose a sheet of tin A over the open split cylinder 30. The sheets of tin A are placed by the operator in the stock-guides 13 and 13'. In the revolution of the machine, the main shaft 24 is constantly rotated by the driving-shaft 82, as described, and the shaft 42, is constantly rotated from the shaft 82, as described. The first series of cogs upon the mutilated gear 25 engages the gear 26' that is fixed upon the shaft 26, throwing the stock-feed in, and carrying the sheet of tin A in over the open split cylinder 30, and below the segmental clamps 45 and 45'. The stock-feed carrier is then at rest, as the cog-wheel 26' is in the shorter of the two spaces between the two series of cogs of the mutilated gear 25. While the stock-feed is at rest with the sheet of tin over the open split cylinder 30, the first series of cogs upon the mutilated gear 40 engages the cog-wheel 41 that is fixed upon the shaft 35, thus rotating the shaft 35 and carrying with it the cam 36, which cam 36 engages the lower friction roller 38 and depresses the vertical shaft 34 down so that the T-end 34' of the vertical bar 34 (to which the segmental clamps 45 and 45' are hinged) firmly grasps the sheet of tin A along the longitudinal center of the open split cylinder, at which instant the mutilated gear 40 has so far turned as to leave the pinion 41 at rest between the series of teeth of the mutilated gear 40. The second series of teeth upon the mutilated gear 25 then comes into engagement with the gear 26' and rotates crank-wheels 27 and 27', thus withdrawing the stock-feed guides 13 and 13' and the discharge-rods 22 and 22' clear of the open split cylinder 30. The second series of teeth upon the mutilated gear 40 then engage the pinion 41 and rotate the shaft 35, which, through the drivers 54 and 54', forces down the cross-bar 47, and through the links 48 and 48' closes the segmental clamps 45 and 45' over the open split cylinder 30 with the sheet of tin A between the clamps and the open split cylinder. It was stated in the description of this part of the mechanism that the link 48 was a trifle longer than the link 48' and that it was slotted at its upper end and provided with a spring. The purpose of making the link 48 slightly longer than the link 48', and of providing said slot and spring, is to bring the segmental clamp 45 down upon the open split cylinder 30 a little in advance of the closing of the segmental clamp 45' in order that one side of the sheet of tin A will be bent down in advance of the other side and always insure a lapping over of the meeting edges without their so coming into contact as to prevent the edges of the tin passing by each other. The slot and spring of the

link 48 allow a sufficient depression of the cross-bar 47 and lowering of the link 48' to close down the segmental clamp 45', after the closing of the segmental clamp 45, upon the open split cylinder to grip the sheet of tin tightly on the right side of the split cylinder. While the segmental clamps 45 and 45' are closed upon the open split cylinder with the sheet of tin A clamped upon the split cylinder as described, the soldering mechanism of the machine comes into play. The mutilated-gear 78 (having the movable teeth 81) engages the pinion 79 that is fixed to the shaft 80, thus rotating the rollers 74 and 74'. It will be seen that by increasing or diminishing the number of cogs, 81, that are to be placed in the socket 78' of the gear 78, a greater or lesser quantity of solder may be fed with each revolution of the machine. The amount of solder fed should be regulated by the size of the can bodies being made. At the time the solder is fed as just described, the mutilated-gear 68 engages the pinion 67 that is fixed upon the shaft 66, thus rotating the crank-wheels 69 and 69' and carrying forward, through the links 70 and 70', slotted rocking-bars 62 and 62', lateral sliding bars 63 and the vertically adjustable support 63', and the soldering iron 56. The end of the solder, 71, as it is fed up comes immediately in front of the lapped edges of the sheet of tin A, and opposite the groove through the bottom of the open split cylinder 30. As the heated soldering iron 56 is thrust forward as described, it travels over the solder wire as it is fed up, thus melting the solder and spreading it along the seam of the folded sheet of tin A. The soldering iron 56 is carried through the open split cylinder to its extreme end and back again beyond the front limit of the cylinder. In other words, the soldering iron 56 is reciprocated through the open split cylinder 30 and outside of said cylinder at its front end. Upon its return to its position of rest, the soldering iron 56, by reason of the mutilation of the gear 68, is allowed to remain at rest until a second sheet of tin shall have been fed into the machine, formed and clamped, as already described. Immediately upon the withdrawal of the soldering iron 56 from the open split cylinder 30, the rotation of the mutilated gear 40 releases the pressure of the T-end 34' of the vertical reciprocating-rod 34 and releases the segmental clamps 45 and 45', from the tin operated upon and the cylinder 30. Immediately as the segmental clamps 45 and 45' are released from their grip upon the tin and the cylinder 30, the stock-feed mechanism again comes into play, as already described, and a second piece of tin is fed into the machine. The discharge-rods 22 and 22', being longer than the stock-feed guides 13 and 13', travel in advance thereof, and as they travel close to the sides of the split cylinder 30, they force the can body that has been seamed from the cylinder. In Fig. 3, A' represents such can body seamed

and partially forced off the split cylinder, while another sheet of tin A, is being pushed over said split cylinder ready to be operated upon.

The description of the operation of the machine now given describes one completed revolution of the machine. It will be seen how successively the stock-feed mechanism, then the forming and clamping mechanism, and then the soldering mechanism, come into action, and how the combined action of the three mechanisms completes the process of seaming a single can body; and that a single can body is seamed with each complete revolution of the machine. It will further be noted that as the feed mechanism carries a sheet of tin A over the split cylinder 30, the feed mechanism has a slight rest, during which slight rest the vertical bar 34 is depressed so as to grip the sheet of tin between the T-end 34' of the vertical bar 34 and the open split cylinder; and that while the sheet of tin is so gripped, the stock-feed mechanism is withdrawn so as to be clear of the cylinder before the segmental clamps 45 and 45' are closed upon the split cylinder with the sheet of tin between. And it will be observed that the segmental clamps remain closed upon the split cylinder to hold the formed tin firmly while the solder is being fed and while the soldering iron makes its travel through the split cylinder and back again; and that while the segmental clamps are closed upon the split cylinder, and while the soldering iron is in operation, the stock-feed mechanism is at rest. And it will be seen that the stock-feed mechanism again operates immediately upon the return of the soldering mechanism to its position of rest and upon the release of the segmental clamps.

It will be seen that the soldering iron is kept hot by means of gas which is carried to the chamber within the iron through the flexible gas tubing 60 and through the pipe 59 that enters the chamber of the soldering iron. In practice, the burning gas comes from the inner end of the pipe 69 and is deflected by the back wall of the iron down and around the walls of the chamber, and the escaping gases come out through the air passages 58.

By having the open split cylinder 30 removably attached to that portion of the main frame 1', 1', by means of bolts passing through the flange 31, and by making the segmental clamps 45 and 45' interchangeable, the machine may be used for seaming cans of various sizes by having a variety of sizes of split cylinders and segmental clamps.

In employing split cylinders and segmental clamps of different sizes, the stock-feed mechanism and the length of the drivers which operate the segmental clamps will be adjusted to the size of the cylinder and segmental clamps used.

I have now fully described my machine as illustrated. It will be seen that the said machine may take on various changes in details

of construction, and I do not, therefore, limit my claim to the exact form and arrangement of parts as illustrated and described.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An automatically operated stock-feed consisting of sliding stock-guides having lateral and longitudinal adjustment, and means for reciprocating the sliding stock-guides, substantially as illustrated and described.
2. An automatically operated stock-feed consisting of sliding stock-guides having lateral and longitudinal adjustment, with means for reciprocating stock-guides and giving them a rest at the end of each stroke, substantially as illustrated and described.
3. Sliding stock-guides, a rocking-bar, any suitable connection between the sliding stock-guides and the rocking-bar, a mutilated gear, and connection between the mutilated gear and rocking-bar, substantially as illustrated and described.
4. Sliding stock-guides having lateral and longitudinal adjustment, a rocking-bar, any suitable connection between the rocking-bar and the sliding stock-guides, a mutilated gear and connection between the mutilated gear and the rocking bar, substantially as illustrated and described.
5. A supporting frame forming a table, guide rods secured to the table, a bar sleeved upon the guide rods and having movement along the guide rods, stock-guides secured to the bar sleeved upon the guide rods, and means for reciprocating the same, substantially as illustrated and described.
6. A supporting frame forming a table, guide rods secured to the table, a bar sleeved upon the guide rods, and having movement thereon, stock-guides secured to the bar secured upon the guide rods, a rocking-bar, a link pivoted to the rocking-bar and to the bar sleeved upon the guide rods, a mutilated gear and connection between the mutilated gear and the rocking-bar, substantially as illustrated and described.
7. Sliding stock-guides having lateral and longitudinal adjustment, discharge rods, and means for reciprocating the sliding stock-guides and discharge rods, substantially as illustrated and described.
8. Discharge rods, sliding stock-guides, a rocking-bar, any suitable connection between the sliding stock-guides and rocking-bar, a mutilated gear, and connection between the mutilated gear and the rocking-bar, substantially as illustrated and described.
9. A supporting frame forming a table, guide rods secured to the table, a bar sleeved upon the guide rods and having movement thereon, stock-guides and discharge-rods carried by the bar sleeved upon the guide-rods, a rocking-bar, any suitable connection between the rocking-bar and the bar sleeved upon the guide-rods, a mutilated gear, and connection between the mutilated gear and rocking-bar, substantially as illustrated and described.

10. The combination of an open split cylinder, hinged segments, and means for closing the hinged segments upon the open split cylinder, one of the hinged segments closing slightly in advance of the other, and opening them, substantially as illustrated and described.

11. The combination of an open split cylinder, hinged segments, means for raising and lowering the hinged segments vertically above the open split cylinder, and means for closing the segments upon the split cylinder, one of the segments being closed slightly in advance of the other, and opening them, substantially as illustrated and described.

12. The combination of an open split cylinder, a vertical bar having a reciprocating movement above the split cylinder, segments hinged to said vertical bar, and means for closing the segments upon the split cylinder, one being closed in advance of the other, and opening them, substantially as illustrated and described.

13. An open split cylinder, a vertical bar, a cam to give the vertical bar reciprocating movement, segments hinged to the vertical bar, a cross-bar above the segments, links between the cross-bar and the segments, drivers to raise and lower the cross-bar whereby the segments are alternately closed upon the split cylinder and opened free of the split cylinder and a soldering iron to reciprocate through the split cylinder, substantially as illustrated and described.

14. A soldering iron, a slotted rocking-bar, suitable connection between the soldering iron and the slotted rocking-bar, a mutilated gear and connection between the slotted rocking-bar and the mutilated gear, substantially as illustrated and described.

15. A soldering iron having a chamber therein, air openings to the chamber and a pipe entering the chamber, flexible gas tubing connected with the pipe that enters the chamber, a slotted rocking-bar, suitable connection between the slotted rocking-bar and the soldering iron, a mutilated gear and connection between the mutilated gear and the slotted rocking-bar, substantially as illustrated and described.

16. A soldering iron having a chamber therein, a pipe entering said chamber, flexible gas tubing connected with the pipe that enters the chamber, a slotted rocking-bar, suitable connection between the slotted rocking-bar and the soldering iron, a mutilated gear, connection between the mutilated gear and the slotted rocking-bar, and an automatic solder-feed, substantially as illustrated and described.

17. An open split cylinder, a soldering iron, and means for reciprocating the soldering iron within the split cylinder and outside the front end of the split cylinder, substantially as illustrated and described.

18. An open split cylinder, a soldering iron to reciprocate in the split cylinder, a slotted

rocking-bar, suitable connection between the soldering iron and the slotted rocking-bar, and means for reciprocating the slotted rocking-bar and the soldering iron, substantially

5 as illustrated and described.

19. An open split cylinder, a soldering iron, a slotted rocking-bar, suitable connection between the soldering iron and the slotted rocking-bar, a mutilated gear and connection between the slotted rocking-bar and the mutilated gear, substantially as illustrated and described.

20. An open split cylinder, a soldering iron having a chamber therein to reciprocate in the split cylinder, air openings to the chamber and a pipe to enter the chamber, substantially as illustrated and described.

21. An open split cylinder, a soldering iron having a chamber therein to reciprocate in the split cylinder, air openings to the chamber, a pipe entering the chamber, flexible gas tubing connected with the pipe that enters the chamber, and means to reciprocate the soldering iron, substantially as illustrated and described.

22. An open split cylinder, a soldering iron having a chamber therein to reciprocate in the split cylinder, air openings to the chamber, a pipe entering the chamber, flexible gas tubing connected with the pipe that enters the chamber, a slotted rocking-bar, suitable connection between the slotted rocking-bar and the soldering iron, a mutilated gear, and connection between the mutilated gear and the slotted rocking-bar, substantially as illustrated and described.

23. An open split cylinder, hinged segments, means for closing the segments upon the split cylinder and opening them, a soldering iron, and means for reciprocating the soldering iron through the open split cylinder, substantially as illustrated and described.

24. An open split cylinder, hinged segments, means for closing the segments upon the split cylinder and opening them, a soldering iron, a slotted rocking-bar, suitable connection between the soldering iron and the slotted rocking-bar, and means for reciprocating the slotted rocking-bar and the soldering iron, substantially as illustrated and described.

25. An open split cylinder, hinged segments, means for closing these segments upon the split cylinder and opening them, a soldering iron, a slotted rocking-bar, suitable connection between the soldering iron and the slotted rocking-bar, a mutilated gear, and connection between the slotted rocking-bar and the mutilated gear, substantially as illustrated and described.

26. An open split cylinder, hinged segments, means for closing the segments upon the split cylinder and opening them, a soldering iron having a chamber therein, air openings to the chamber, a pipe to enter said chamber, and means to reciprocate the soldering iron within the open split cylinder, substantially as illustrated and described.

27. An open split cylinder, hinged segments, means for closing the hinged segments upon the split cylinder and opening them, a soldering iron having a chamber therein to reciprocate in the split cylinder, air openings to the chamber, a pipe entering the chamber, flexible gas tubing connected with the pipe that enters the chamber, a slotted rocking-bar, suitable connection between the slotted rocking-bar and the soldering iron, a mutilated gear and connection between the mutilated gear and the slotted rocking-bar, substantially as illustrated and described.

28. An open split cylinder, a vertical bar having reciprocating movement above the split cylinder, segments hinged to the vertical bar, means for closing the segments upon the split cylinder and opening them, and a soldering iron to reciprocate within the split cylinder, substantially as illustrated and described.

29. An open split cylinder, a vertical bar, a cam to give the vertical bar reciprocating movement, segments hinged to the vertical bar, a cross-bar above the segments, links between the cross-bar and the segments, drivers to raise and lower the cross-bar whereby the segments are alternately closed upon the split cylinder and opened, a soldering iron having a chamber therein, air openings to the chamber, a pipe entering the chamber, flexible gas tubing connected with said pipe, and means for reciprocating the soldering iron within the open cylinder, substantially as illustrated and described.

30. An open split cylinder, a vertical bar, a cam to give the vertical bar reciprocating movement, segments hinged to the vertical bar, a cross-bar above the segments, links between the cross-bar and the segments, drivers to raise and lower the cross-bar whereby the segments are alternately closed upon the split cylinder and opened, a soldering iron having a chamber therein, air openings to the chamber, a pipe entering the chamber, flexible gas tubing connected with said pipe, a slotted link, connection between the slotted link and the soldering iron, a mutilated gear, and connection between the mutilated gear and the slotted rocking-bar, substantially as illustrated and described.

31. A supporting frame forming a table, sliding stock-guides upon the table, means for reciprocating the sliding stock-guides, an open split cylinder, hinged segments, and means for closing the segments upon the split cylinder and opening them, substantially as illustrated and described.

32. A supporting frame forming a table, sliding stock-guides upon the table, means for reciprocating the sliding stock-guides, an open split cylinder, a vertical bar having reciprocating movement above the split cylinder, segments hinged on the said vertical bar and means for closing the segments upon the split cylinder and opening them, substantially as illustrated and described.

33. A supporting frame forming a table, sliding stock-guides upon the table, means for reciprocating the sliding stock-guides, an open split cylinder, a vertical bar above the split cylinder, a cam to give the vertical bar reciprocating movement, segments hinged to the vertical bar, a cross-bar above the segments, links between the cross-bar and the segments, and drivers to raise and lower the cross-bar whereby the segments are alternately closed upon the split cylinder and opened free of the split cylinder, substantially as illustrated and described.

34. A supporting frame forming a table, guide rods secured to the table, a bar sleeved upon the guide rods and having movement thereon, stock-guides secured to the bar sleeved upon the guide rods, a rocking-bar, suitable connection between the rocking-bar and the bar sleeved upon the guide rods, a mutilated gear, connection between the mutilated gear and the rocking-bar, an open split cylinder, a vertical bar above the split cylinder, a cam to give the vertical bar reciprocating movement, segments hinged to the vertical bar, a cross-bar above the segments, links between the cross-bar and the segments, and drivers to raise and lower the cross-bar whereby the segments are alternately closed upon the split cylinder and opened, substantially as illustrated and described.

35. A supporting frame forming a table, guide rods secured to the table, a bar sleeved upon the guide rods, and having movement thereon, stock-guide rods and discharge rods carried by the bar sleeved upon the guide rods, means for reciprocating the sleeved bar carrying the stock-guide rods and discharge rods, an open split cylinder, a vertical bar above the split cylinder, a cam to give the vertical bar reciprocating movement, segments hinged to the vertical bar, a cross-bar above the segments, links between the cross-bar and segments, and drivers to raise and lower the cross-bar whereby the segments are alternately closed upon the split cylinder and opened, substantially as illustrated and described.

36. A supporting frame forming a table, sliding stock-guides upon the table, means for reciprocating the sliding stock-guides, a soldering iron, a slotted rocking-bar, suitable connection between the soldering iron and the slotted rocking-bar, a mutilated gear and connection between said mutilated gear and rocking-bar, substantially as illustrated and described.

37. A supporting frame forming a table, guide-rods secured to the table, a bar sleeved upon the guide-rods and having movement thereon, stock-guides secured to said bar, a pivoted rocking-bar, suitable connection between said pivoted rocking-bar and the bar sleeved upon the guide rods, a mutilated gear, suitable connection between said mutilated gear and rocking-bar, a soldering iron, a slotted rocking-bar, suitable connection between

the slotted rocking-bar and the soldering iron, and a mutilated gear with which the slotted rocking-bar has connection, substantially as illustrated and described.

38. A supporting frame forming a table, guide rods secured to the table, a bar sleeved upon the guide rods and having movement thereon, stock-guides secured to the bar sleeved upon the guide rods, a rocking-bar, suitable connection between the rocking-bar and the bar sleeved upon the guide rods, a mutilated gear, connection between said mutilated gear and said rocking-bar, a soldering iron having a chamber therein, air openings to the chamber, a pipe entering the chamber, flexible gas tubing connected with said pipe, a slotted rocking-bar, suitable connection between the slotted rocking-bar and the soldering iron, and a separate mutilated gear with which the slotted rocking-bar is connected, substantially as illustrated and described.

39. An open split cylinder, hinged segments, means for closing the segments upon the split cylinder and opening them, a soldering iron, means for reciprocating the soldering iron through the split cylinder, and means for feeding stock into the machine, substantially as illustrated and described.

40. An open split cylinder, a vertical bar above the split cylinder having a reciprocating movement, segments hinged to the vertical bar, means for closing the segments upon the split cylinder and opening them, a soldering iron reciprocating through the split cylinder by means of a mutilated gear and intermediate connection between the mutilated gear and the soldering iron, and reciprocating stock-guides, substantially as illustrated and described.

41. An open split cylinder, a vertical bar above the split cylinder, a cam to give the vertical bar reciprocating movement, segments hinged to the vertical bar, a cross-bar above the segments, links between the cross-bar and the segments, drivers to raise and lower the cross-bar whereby the segments are closed upon the split cylinder and opened, reciprocating stock-guides, a soldering iron having a chamber therein, air openings to the chamber, a pipe within the chamber, flexible gas tubing connected with said pipe, a slotted rocking-bar, suitable connection between the slotted rocking-bar and the soldering iron, a mutilated gear, and connection between the mutilated gear and the slotted rocking-bar, substantially as illustrated and described.

42. A split cylinder, a vertical bar above the split cylinder, a cam to give the vertical bar reciprocating movement, segments hinged to the vertical bar, a cross-bar above the segments, links between the cross-bar and the segments, drivers to raise and lower the cross-bar whereby the segments are closed upon the split cylinder and opened, a supporting frame forming a table, guide rods secured to the table, a bar sleeved upon the guide rods and having movement thereon, stock-guides

and discharge-rods carried by the barsleeved
upon the guide-rods, a rocking-bar, suitable
connection between the rocking-bar and the
bar sleeved upon the guide rods, a mutilated
5 gear, connection between the mutilated gear
and the rocking-bar, a soldering iron having
a chamber therein, air openings to the cham-
ber, a pipe within the chamber, flexible gas
tubing connected with said pipe, a slotted
10 rocking-bar, suitable connection between the
slotted rocking-bar and the soldering iron,

a mutilated gear with which the slotted rock-
ing-bar has connection, and a solder feed,
substantially as illustrated and described.

In testimony whereof I affix my signature, 15
in the presence of two witnesses, this 25th day
of March, 1893.

JOHN W. ROBERTS.

Witnesses:

J. A. OSBORNE,
DON M. OSBORNE.