No. 767,222. PATENTED AUG. 9, 1904.

S. HAIGH.

MACHINE FOR VENTING AND RESTOPPING VENTS OF CANS.

APPLICATION FILED APR. 20, 1903.

NO MODEL. 5 SHEETS—SHEET 1.

Fig. 1.

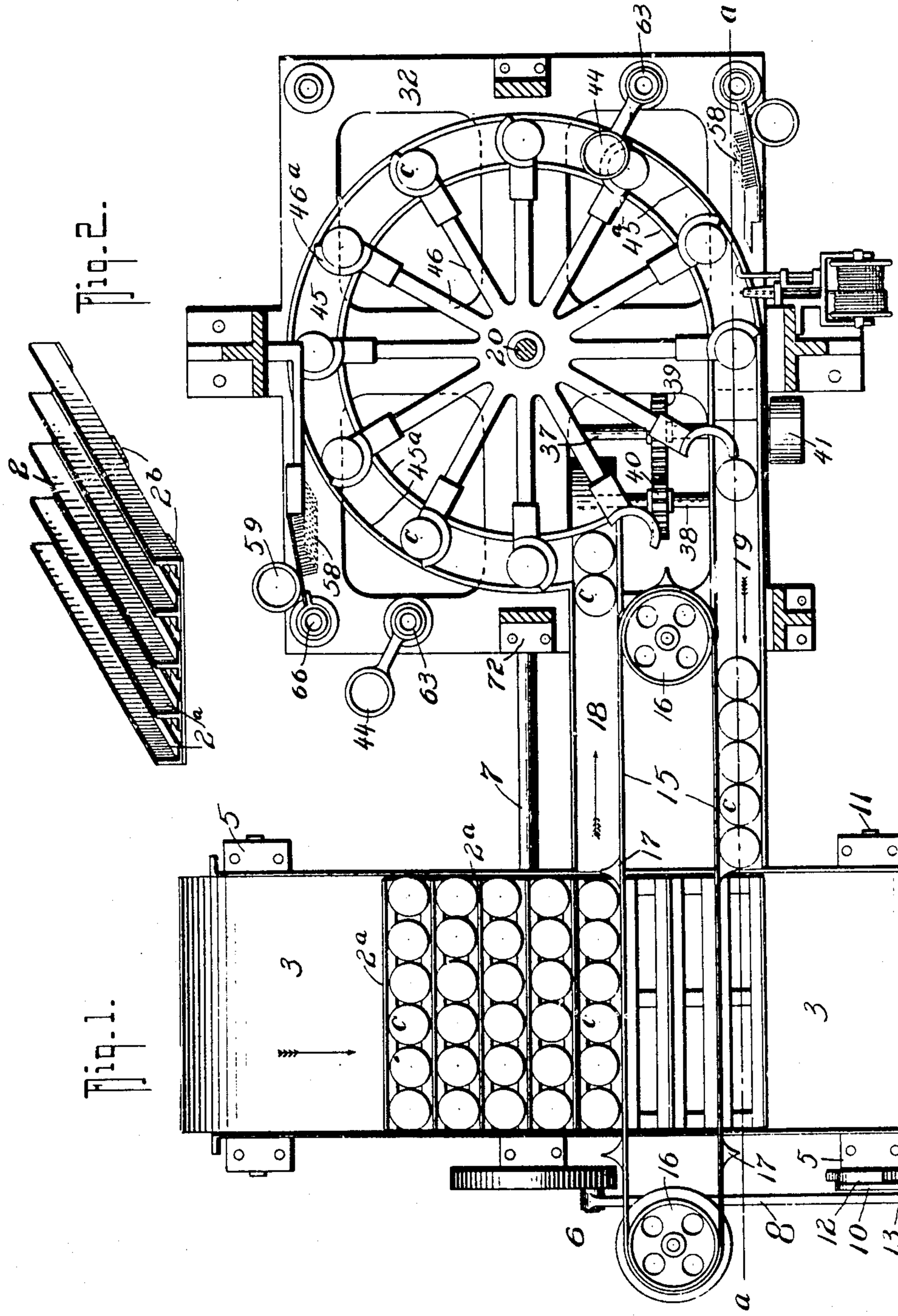

Fig. 2.

WITNESSES:

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NO MODEL. 5 SHEETS—SHEET 2.

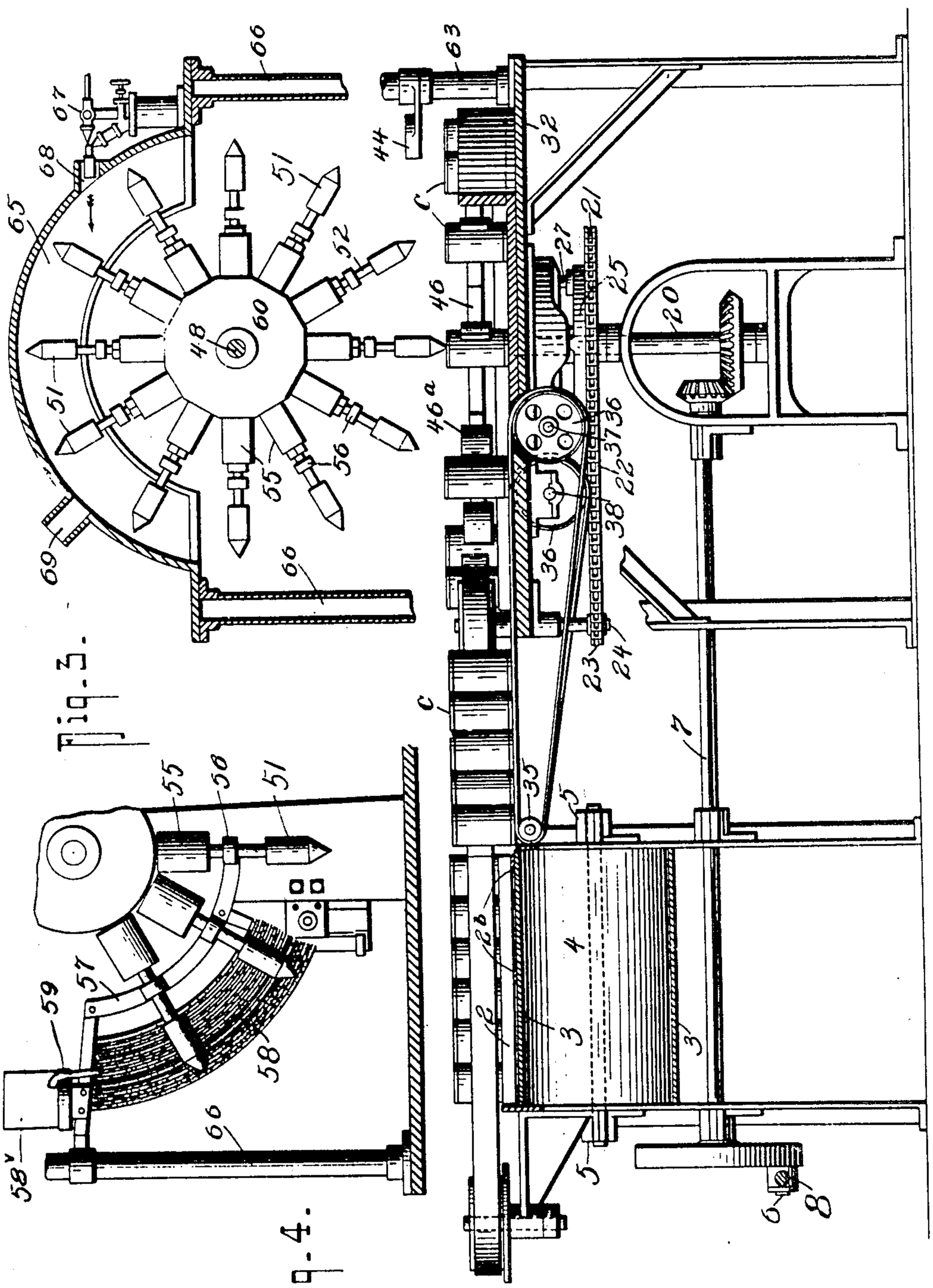

Fig. 1.

Fig. 4.

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NO MODEL. 5 SHEETS—SHEET 3.

Fig. 5.

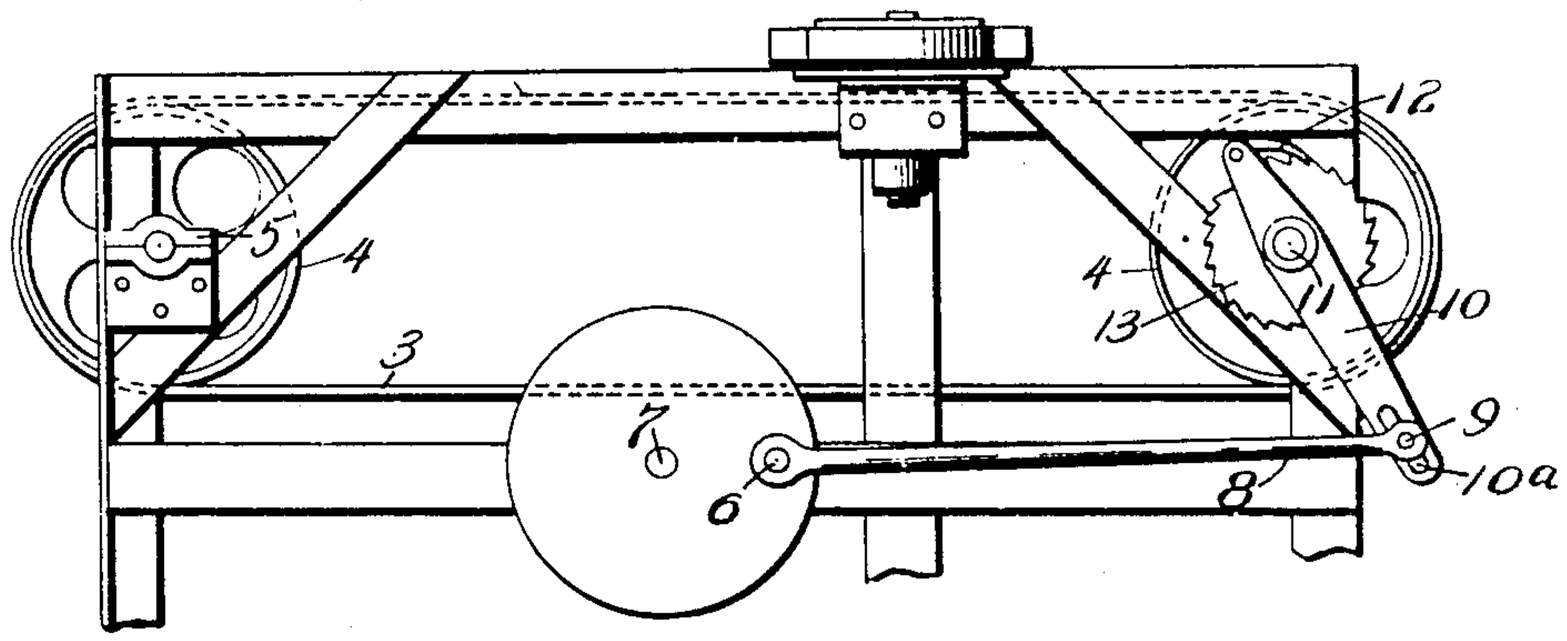


Fig. 7.

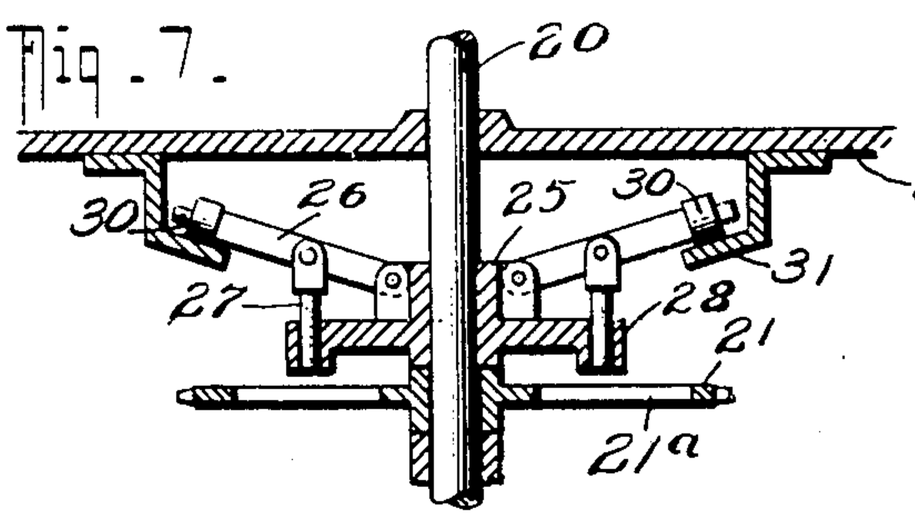
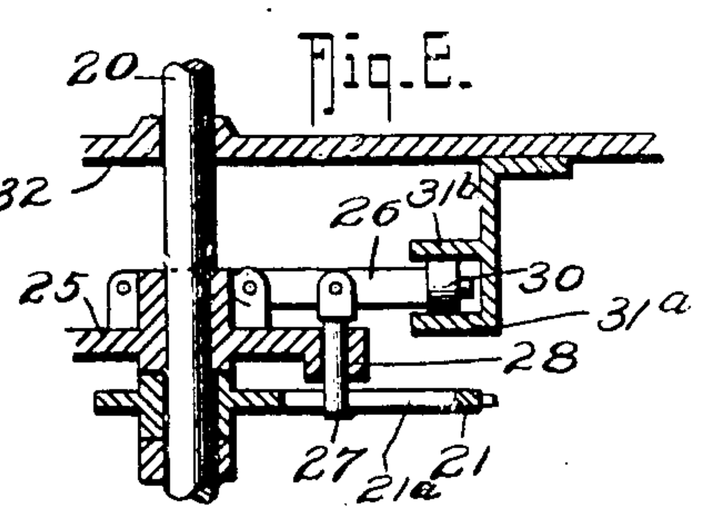


Fig. E.



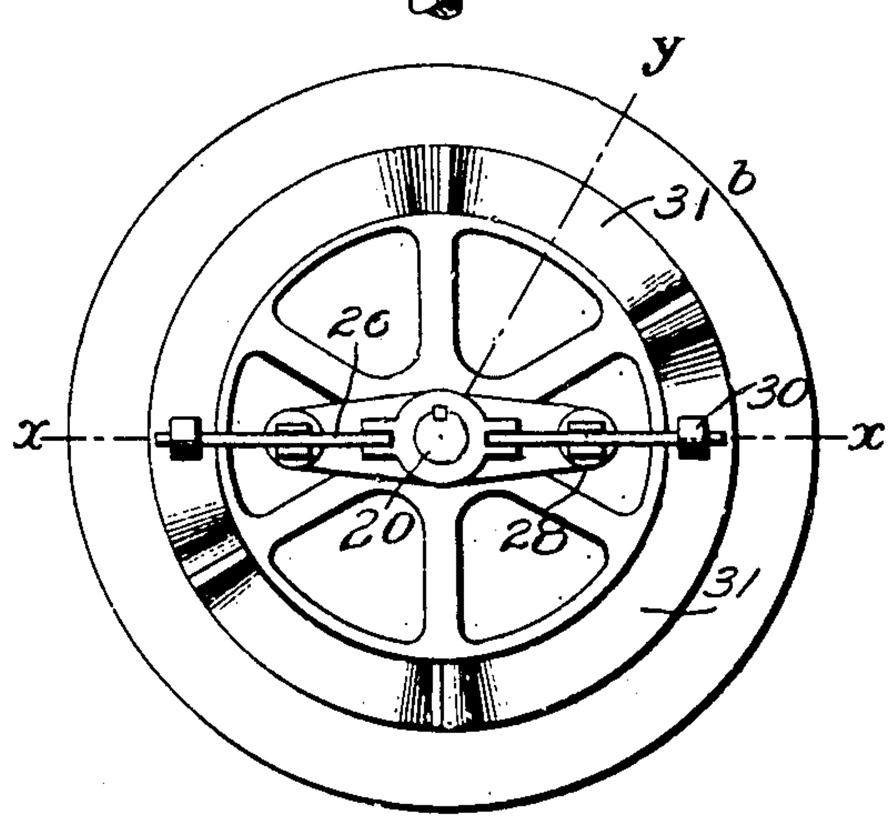
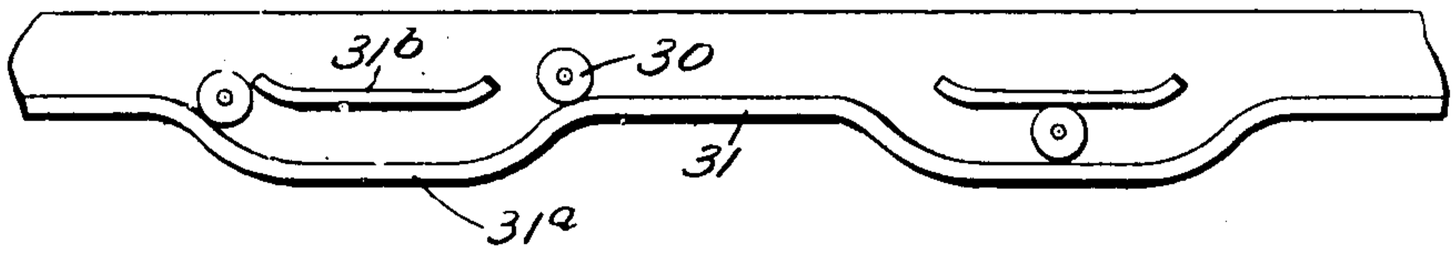


Fig. 6.

Fig 9



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NO MODEL. 5 SHEETS—SHEET 4.

Fig. 10.

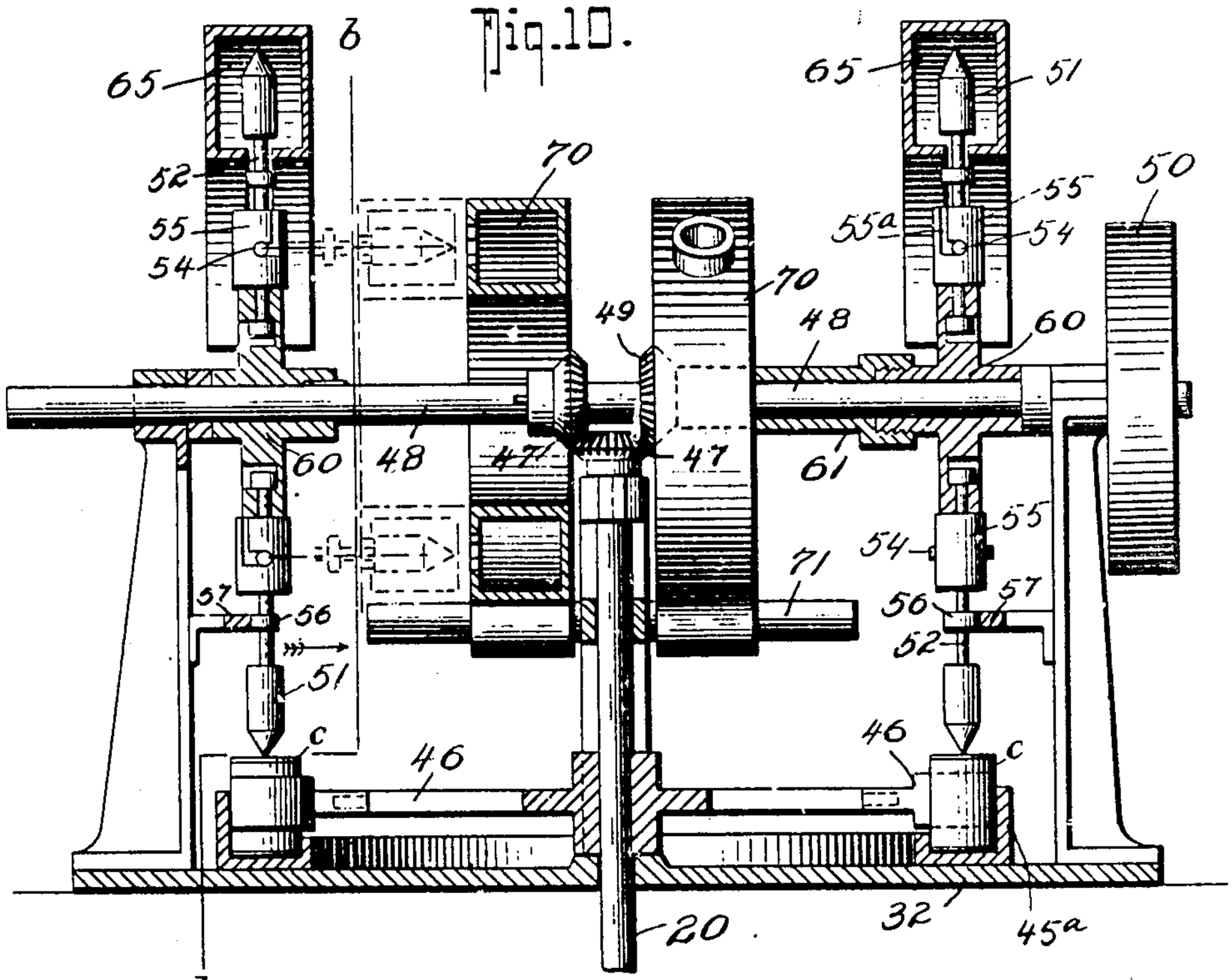
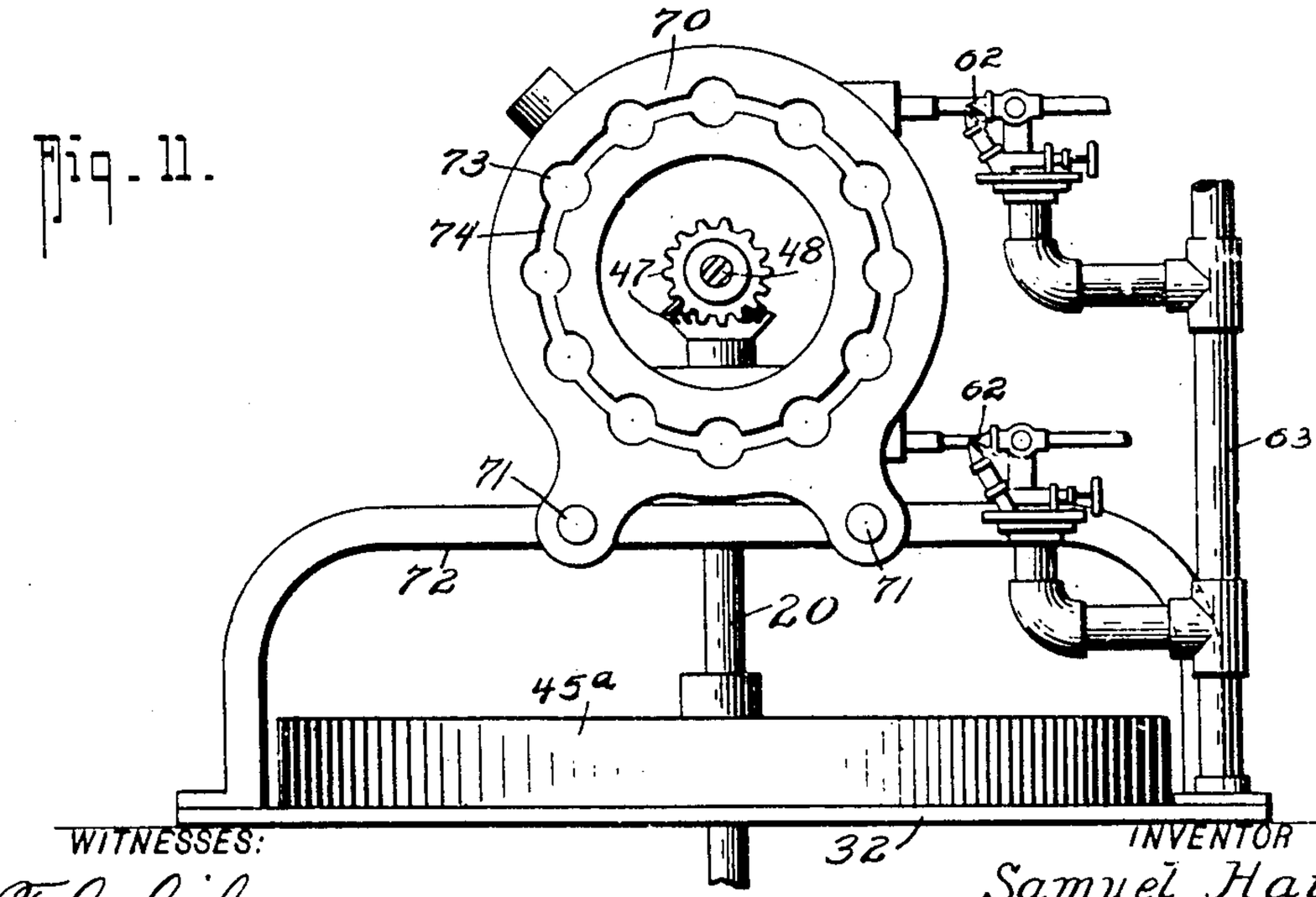


Fig. 11.



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APPLICATION FILED APR. 20, 1903.

NO MODEL. 5 SHEETS—SHEET 5.

Fig. 12.

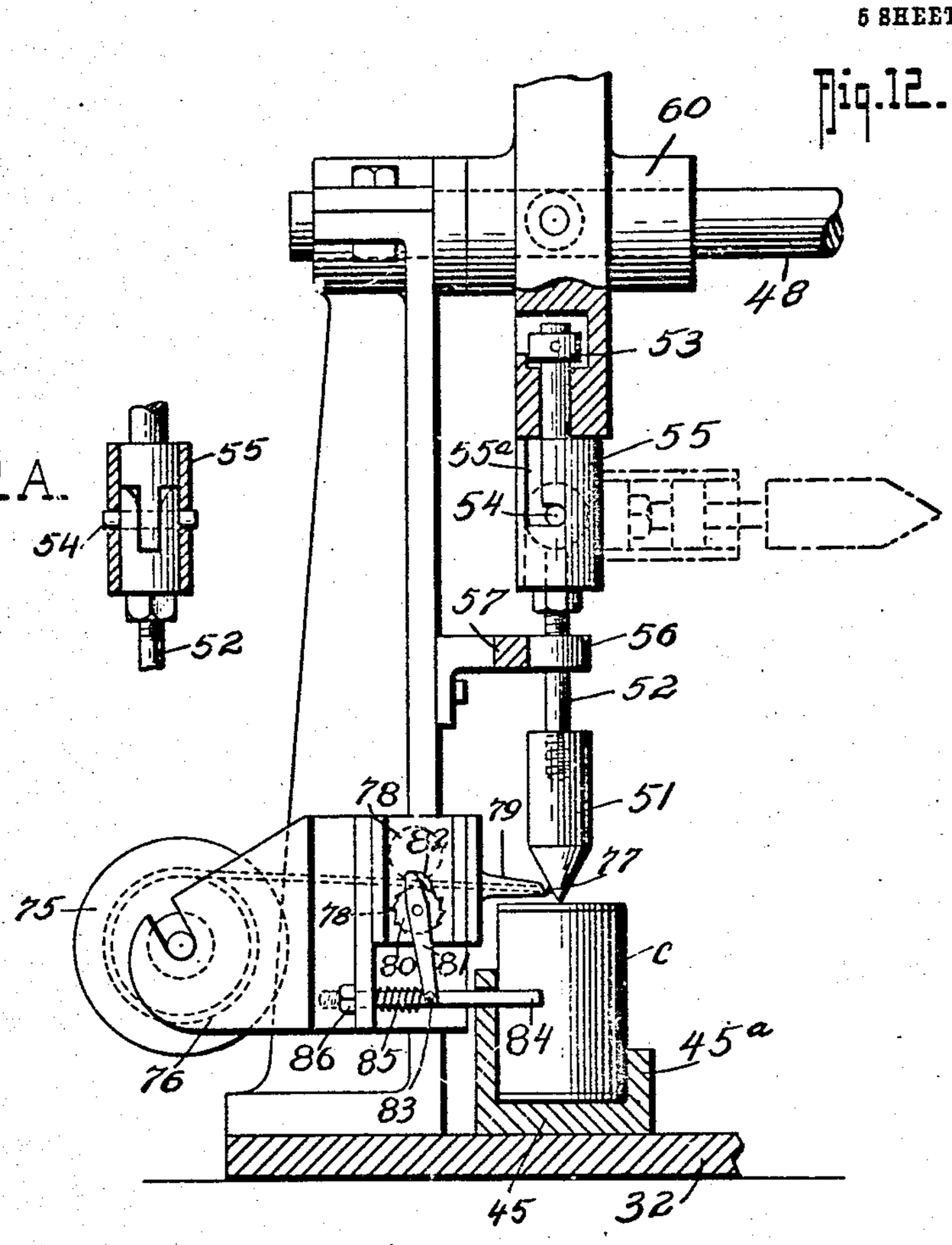
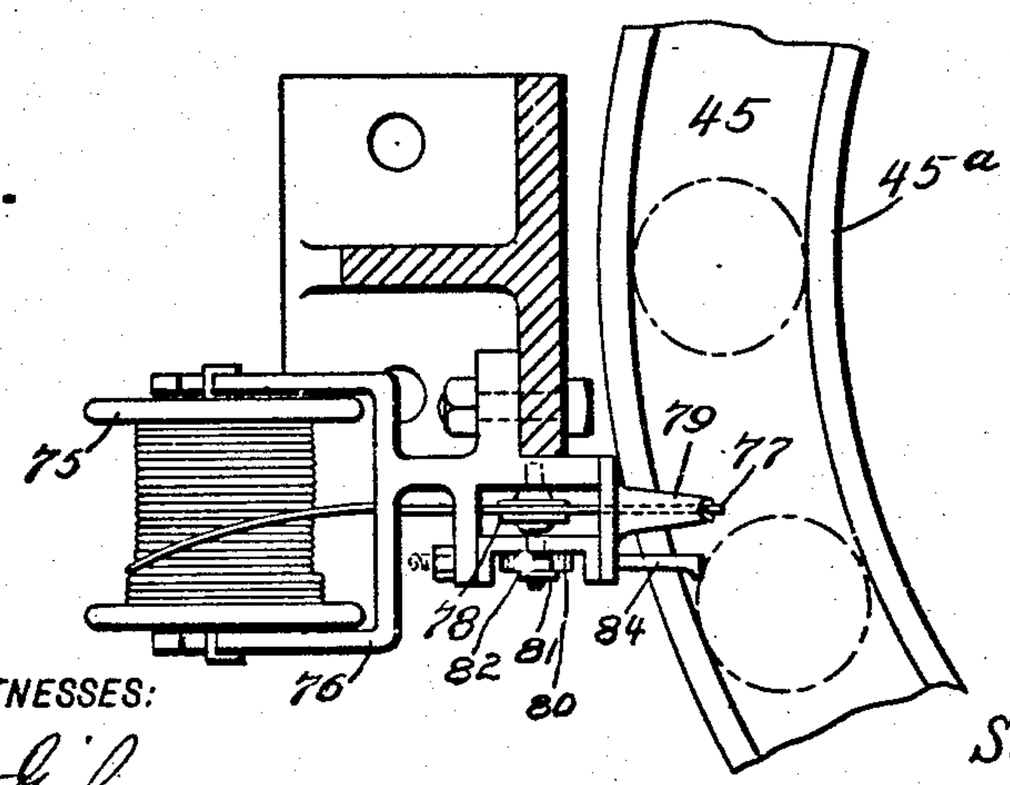


Fig. 12 A.

Fig. 13.



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No. 767,222. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

SAMUEL HAIGH, OF VANCOUVER, CANADA.

MACHINE FOR VENTING AND RESTOPPING VENTS OF CANS.

SPECIFICATION forming part of Letters Patent No. 767,222, dated August 9, 1904.

Application filed April 20, 1903. Serial No. 153,500. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL HAIGH, a citizen of the Dominion of Canada, residing at the city of Vancouver, in the Province of British Columbia, Canada, have invented a new and useful Machine for Venting and Restopping the Vents of Cans, of which the following is a specification.

My invention relates to an improved machine for venting and restopping or soldering the vents of cans where the removal of air from within is necessary during the process of cooking or sterilizing canned goods, and in order that the work my machine is designed to do may be fully explained I will first briefly describe that portion of the canning process where such work is required.

In the manufacture of the can-covers they are provided with a punctured vent or small aperture to permit the escape of the heat-expanded air as the filled can passes through the soldering-machine, and thus prevent such air from blowing through the joint of the cover which is being soldered. After the covers have been soldered on and before the cans are introduced into the cooking or sterilizing retorts these vents require to be sealed. This is usually done at present by hand by placing a drop of solder over the vent. After the cans have been sterilized the vents must then be reopened to release the expanded air and then again soldered or closed after the air has been allowed to escape. The mechanism to perform these distinctly separate but similar operations is practically identical; but to enable the process of unstopping—that is, the melting of the vent-seal to permit the escape of the air—and the subsequent resealing of the vent to be done more expeditiously I duplicate the mechanism in one machine, so that the unstopping and resealing may be performed in one operation, while the first process of simply sealing the vents may be done in a machine constructed with but one set of parts instead of a duplicate set, as is the case when the machine is to be used both for venting and resoldering.

The mechanism by which I carry the cans through the machine and effect the unstopping and resealing of the vents is fully described and its operation explained in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a general plan of the machine with the soldering and venting wheels removed, showing the relation of the feeding means to the machine proper. Fig. 2 is a perspective view of the can-tray on which the cans are delivered to the machine. Fig. 3 is a vertical section and part elevation of the machine on the line *a a* of Fig. 1. Fig. 4 is an end elevation of the soldering-bolt-cleaning means. Fig. 5 is an end elevation of the can-receiving band and its operating means. Fig. 6 is a plan of the mechanism whereby an interrupted movement is imparted to the conveying-band. Fig. 7 is a section of the same on the line *x x* of Fig. 6. Fig. 8 is a section of the same on the line *y* of Fig. 6. Fig. 9 is a development of the roller-track of the same at its inner circumference. Fig. 10 is an end elevation and part section of the soldering and venting wheels and their heating-stoves. Fig. 11 is a front elevation of the preliminary heating-stove, the view being taken on the line *b b* in Fig. 10. Figs. 12 and 12ª show in detail the soldering-bolt connection to the wheel and in elevation the solder-feed devices. Fig. 13 is a plan view of the solder-feed devices.

Referring now to the accompanying drawings, it will be seen the machine consists of two principal parts, which are operative together—viz., the can-feeding device and delivery means and the venting and resoldering devices.

The cans C are delivered from the primary soldering-machine or the first cooking-retorts on trays 2, specially constructed of light angle and T iron members 2ª, secured together by the cross members 2ᵇ, so as to form a series of parallel channels or slides capable of each holding a suitable number of cans in a row, the securing-rivets of the cross members being flush, so as to oppose no obstacle to the free sliding of the cans. These trays of cans are placed with the rows across on a wide receiving-band 3, which is carried on the wheels or drums 4, suitably supported in the bearings 5, and the said band has an intermittent motion imparted to it in the direction

of the arrow in Fig. 1 by the mechanism illustrated in Fig. 5, by reference to which it will be seen a crank-pin 6 is carried by a disk which rotates with and is mounted on the shaft 7. A rod 8 connects the pin 6 to a pin 9 on the lower end of the lever 10. The lever 10 is pivotally mounted on the shaft 11 of one of the band-carrying wheels. The upper end of this lever is provided with a pawl 12, designed to engage the teeth of the ratchet-wheel 13, secured to the same shaft 11 on which the lever 10 is mounted. The band 3 may thus be fed forward an amount equal to the pitch of the rows of the cans on the tray and at intervals corresponding to the requirements of the soldering devices. The amount of feed may be varied to suit a changed diameter of can by means of a slot 10^a, in which the pin 9 is adjustable, the two mechanisms being driven from the same source of power, and their speed may be regulated one to the other.

Across from the upper side of the receiving-band 3 is an endless conveying-band 15, carried by the pulleys 16 and provided with cleats 17, arranged at such distances apart as will enable them to engage a row of cans at a time, which will enable them at the feed side to slide said cans laterally off the tray onto the receiving-band and onto the feed-band 18. Simultaneously at the delivery side a corresponding number of cans is moved off a delivery-band 19 and replaced by rows on the tray 2, which has been moved onward opposite to the delivery-band 19 while the cans have been individually passing through the machine. The conveying-band 15, which slides the rows of cans off the tray, has an intermittent movement sufficient to carry the row of cans clear of the receiving-band 3, such movement corresponding to the period of rest of the receiving-band. This intermittent movement is derived from the vertical shaft 20 of the machine by the following means: Running freely on the vertical shaft 20 is a sprocket-wheel 21, over which takes a chain 22, which in turn drives a sprocket-pinion 23, keyed to the lower end of the vertical shaft 24 of one of the pulleys 16, around which the conveying-band 15 passes, the ratio of sprocket-wheel, pinion, and band-wheel being so proportioned as to give the required movement in relation to one another. Keyed on the vertical shaft 20 (see Figs. 6, 7, 8, and 9) just above the loose sprocket-wheel 21 is a driving-head 25, toward the boss of which are pivotally mounted on opposite sides of the shaft two arms 26, each of which is provided with a driving-pin 27, slidable through bosses 28 on the head 25 and into engagement at their extreme downward movement with the arms 21^a of the sprocket-wheel 21, which they are designed to drive with the intermittent motion required. The ends of the arms 26 are provided with rollers 30, which run around a track 31, secured to the under side of the table-frame 32 of the machine, and which at the higher level sustains the levers up and the driving-pins 27 out of action with the arms 21^a of the sprocket-wheel 21. At diametrically opposite sides of the track 31 there is a depression 31^a, having an upper guide 31^b, which allows the arms 26 to fall and force the pins 27 through the bosses 28 of the head 25 and into driving engagement with the arms 21^a of the sprocket-wheel 21. The sprocket-wheel 21 is thus rotated, with the head 25, through a distance represented by the length of each depression 31^a and comes to rest as the rollers 30 are again elevated to the higher level of the track 31. This interrupted rotation gives the required movement to the conveying-band 15 which is necessary to sweep a row of cans off the tray onto the feed-band 18 and off the delivery-band 19 back onto the tray at such intervals as to satisfy the requirements of the soldering means.

The feed and delivery bands 18 and 19 are carried by pulleys 35 and 36 and driven at a uniform rate of speed by the shafts 37 and 38, which shafts by being driven one from the other by the gears 39 and 40 rotate in opposite directions to and from the machine. I preferably drive these shafts by a belt from an exterior shaft passing around the pulley 41 on one of them.

The foregoing description is of the feeding and delivery means which brings the cans within the reach of the venting and soldering machine proper, which I shall now describe.

In communication with the feeding and delivery bands 18 and 19 is a circular track 45, the cross-section of which is adapted to the size of the cans being operated upon and having edge guards 45^a to retain the cans on the track as they are moved around. The cans C, moved toward the track 45 by the feed-band 18, are each successively engaged and carried around the track to the delivery side by one of a series of radiating arms 46, the ends 46^a of which are adapted to the size and form of the can and are made removable for purposes of change, when desired, from one size of can to another. Opposite to the delivery-band 19 the track 45 tangentially diverges and leads to that band. The wheel of radiating arms 46 is secured to the vertical shaft 20, which is rotatable at the desired rate of speed by the bevel-pinions 47 from the horizontal shaft 48, which is the first motion-shaft of the machine, being driven through the pulley 50 by a belt from an exterior counter-shaft. On this shaft, with the plane of their rotation immediately over the center of the can-covers as they pass beneath, are two wheels of radiating soldering-bolts, the tips of which are designed to just press on the vent-holes of the can-covers as they pass, the number of bolts corresponding with the num-

ber of can-driving arms; and the pitch and adjustment also coincide. The boss 60 of one wheel of bolts may be secured to the shaft 48 to rotate therewith, but the other being required to rotate in the opposite direction is secured to the sleeve 61, rotatable on the shaft 48 and driven at the same speed by a bevel-pinion 49, meshing with the one, 47, on the vertical shaft.

When my machine is used exclusively as a soldering-machine in the first instance, I use but one of the soldering-wheels; but when the machine is designed to be used as a venting and also as a resealing machine two soldering-wheels are required, one for melting the solder over the vent to unseal the can and the other to reseal the can after the air has escaped. As both sets of bolts are of the same construction, it is thought a detail description of one set will suffice.

The copper ends 51 of the bolts are fastened to their spindles 52 by a screw-thread, and the spindles 52 are secured in the enlargement of the boss 60 of the wheel by the pinned collar 53, which leaves the spindles 52 free to rotate independently on their axes, while each has a limited end movement, as shown in Fig. 12. This end movement prevents any injury to a can which may happen to be slightly above the regular height and insures that only the weight of the bolt and spindle rests on the vent of each can as it comes under operation.

Just opposite the rim of the boss 60 each bolt-spindle is provided with a pivoted joint-pin 54, which joint is inclosed by an external slidable sleeve 55, provided with a bayonet-clutch 55^a, designed to engage the projecting end or ends of the pin 54. Thus when the sleeve is secured over the joint the spindle is retained in a rigid straight line; but when the clutch is disengaged and the sleeve moved clear of the joint each spindle may be turned at right angles to its normal position, as shown in dot-and-dash line, Fig. 12. The reason for this construction will be described later. Between the bolt 51 and the sleeve 55 a collar 56 is provided on each spindle 52, which engages a segmental track 57, suitably supported in the path of said collars to cause a rotation of the bolt-spindles as they pass a cleaning brush or pad 58, situated at the approach to the point of soldering. (See Fig. 4.) This brush or pad 58 is kept moist with soldering fluid from a vessel 58^v on a stand 59 on the upper part of the pad-framework. (See Fig. 3.)

The stove which maintains the required heat in the bolts during work is a segmental chamber 65. (see Figs. 3 and 10,) inclosing the upper part of the path of the bolt ends, which pass through apertures provided in its end and inner walls.

The stove 65 is supported on columns 66 from the table 32 of the machine, and the said stove may be heated by any means that will maintain an easily-controlled and uniform temperature. My drawings illustrate the application of an oil-burner at 67, the flame being directed through the aperture 68 and a flue 69, provided at the opposite side.

As each stove 65 only occupies a small fraction of the rotary path of each bolt end and as the stove temperature which will maintain the required heat in the bolts during use would take a long time to bring them up to that heat at the start, I furnish an auxiliary heating-stove for each wheel of bolts, in which at the start the bolts may be quickly brought to the required temperature. Each auxiliary stove consists of an annular heated chamber 70, slidably supported on rods 71, projecting horizontally from the frame 72, spanning the circular can-track 45. Each auxiliary stove 70 is provided on the lateral wall next to the wheel of bolts with a series of apertures 73 sufficient to permit the free passage of the bolt "end on" to within and a ring space 74, connecting the apertures and permitting the spindles of the bolt to pass freely as the wheel is rotated. The dot-and-dash line in Fig. 10 shows the application of these auxiliary stoves to the purpose required, the bolts being all turned on their joint-pins 54 to the position shown and the stoves moved on their supports 71 in such a manner as to inclose the bolt ends. In this position the stoves 70 are opposite to the oil-burners 62, which are provided for heating them, the flame being projected through the apertures provided.

Reverting again to the wheel of radiating can-moving arms 46, as the cans being moved around the track approach the point of soldering the can-tops are brushed with soldering fluid from a vessel (not shown, but of similar construction as the vessel 58^v shown in Fig. 3) on a bracket 44, pivotally mounted on one of the columns 63, which support the oil-burners 62 of the auxiliary heating-stoves 70. Just before reaching the point of soldering—that is, where the ends of the soldering-bolts contact with the vent-holes of the can-covers—I apply the required amount of solder to the point of each bolt. I prefer to make this application by the use of solder-wire coiled on a reel 75, rotatable in the supports 76, removably secured to the frame of the machine. (See Figs. 12 and 13.) The end of the wire 77 is passed between grooved feed-rollers 78 and through a nozzle 79, which projects the end of the wire against the point of the passing bolt. The lower feed-roller has secured to it a ratchet-wheel 80, on the axis of which is pivotally mounted a lever 81, having a pawl 82 at its upper end. This pawl is designed to engage the teeth of the ratchet-wheel and at its lower end is engaged by the pin 83 on a slidable bolt 84, projecting in the path of an approaching can, the movement of the bolt being controlled by the can and by a spring 85, coiled on said bolt between the pin 83 and the

frame of the support 76. Thus as a can approaches the soldering-point the slidable bolt 84 is pressed in against the resistance of the spring 85 and the lever 81 and its attached pawl 82 carry around the ratchet-wheel 80 and the roller 78, secured to the same axle, is rotated in the direction to feed forward to solder-wire 77 the amount required. This amount may be adjusted by the nut 86 on the end of the slidable bolt 84, which regulates the movement of the bolt by limiting the amount it projects in the path of the cans.

Having now described in detail the mechanism of my machine, the manner of its operation may be readily explained as follows: For clearness and convenience I will now designate one set of bolts as the "venting-bolts" and the other set as the "soldering-bolts." Both sets of bolts having been severally bent at right angles, as suggested by the dotted lines of Fig. 10, and secured in that position by any suitable means, (not shown, as the same *per se* forms no part of my present invention,) the auxiliary heating-stoves 70 are slidably moved to inclose the bolt ends and the machine is slowly rotated. When the desired heat has been attained, the machine is stopped, the stoves 70 are withdrawn, and the bolts 51 are restored to and locked to their operative position. A tray of cans is then placed on the receiving-band 3 and the machine restarted. The cans C are moved a row at a time by the cleats 17 of the conveyer 15 onto the foot-band 18, which band 18 moves them along to the entrance to the track 45, where they are engaged one at a time by the ends 46^a of the arms 46, which arms 46 carry them around the track 45 and beneath the venting-bolts or first wheel. As each can comes under the point of contact of the said venting-wheel a hot bolt is pressed onto the soldered vent and the expanded air within the can is allowed to escape. Care must be taken that the ends of the bolts are not so sharp as to penetrate the aperture of the vent, or they may in some cases prevent the exit of the air while the solder is hot. The cans after the vent is opened by the venting-bolts carried by the first wheel then pass around the track to the second wheel, carrying the second set of bolts and now designated as the "soldering-bolts." Each can as it approaches the second or soldering set of bolts presses in the bolt 84 of the soldering-wheel, and a proper amount of solder is fed off the reel and projected through the nozzle 79 into the path of the rotating soldering-bolts. Each bolt having been wiped clean and having had soldering fluid applied by the rotation past the brush or pad 58 will readily take up the solder, which will drop toward the point and be deposited onto the vent of each can as it comes under the soldering-bolt. Care should be taken to see that the spacing of the can-carrying arms 46 and that of the points of the soldering-bolts exactly correspond. After being soldered the cans pass onto the belt 19, which, traveling in the direction of the arrow in Fig. 1, crowds the cans against the cleats 17 until the required number of cans have been brought together to form a row of the desired length. The row of cans is then swept by the conveyer 15 onto the tray of the receiving-band 3, to be removed for further treatment.

As before intimated, my machine may be primarily used as a soldering-machine *per se* instead of a venting and soldering machine, and when this is done I simply remove one set of bolts from operative connection with the cans.

Having now particularly described my invention and the manner of its operation, I declare that what I claim as new, and desire to be protected in by Letters Patent of the United States, is—

1. In a machine of the character stated; means for venting the passing cans, means for again soldering the vents in the said cans, said means comprising a series of radially-disposed soldering-bolts mounted upon a solder-carrier, a heating-chamber disposed in the path of the movement of the radially-disposed bolts, can conveying and spacing mechanism which co-operates with the rotary soldering-bolt carrier, and adapted to successively bring the cans into position to be engaged by the successively-advancing soldering-bolts, and means for applying solder to the bolts to effect the soldering of the vents of the cans.

2. In a machine of the character described; the combination with a rotary carrier, a series of soldering-bolts mounted thereon and projected radially therefrom, a heating-chamber through which the soldering-bolts pass in their rotary movement with the carrier, a can feeding and spacing mechanism, and devices for synchronously actuating the said mechanism and the soldering-bolt carrier whereby to successively bring the several bolts into contact with the successively fed and spaced cans to vent the cans and allow the air therein to escape, substantially as set forth.

3. In a machine of the class described, comprising in combination with venting or unsealing means of means for again closing said vents, comprising a rotatable wheel of radiating soldering-bolts, each one rotatable on its own axis, a heated chamber through which the bolt ends successively pass, means for rotating the bolts on their own axes during a portion of their rotation as a wheel, a brush or pad against which the bolt ends may be rotated, means for keeping such brush or pad moistened with soldering fluid, means for applying solder to the bolts when required, and means for feeding and spacing cans to the soldering-bolts.

4. In a machine for the purpose specified having a wheel or wheels of radiating soldering-bolts, a joint in each bolt-spindle whereby

they may be turned at right angles to the plane of their rotation, an annular heated chamber concentric with the circle of rotation of each wheel of bolts and having a ring-aperture in the wall of the chamber adjacent to the wheel enabling the annular chamber to be moved over to inclose the bolt ends when they are bent over, means for sliding the annular chamber into such position, means for rotating the wheel or wheels within the chamber or chambers, a segmental stove through which the bolt ends will pass when restored to their normal straight position and which will maintain the required heat in the bolts, and means for feeding and spacing cans to the soldering means.

5. In a machine for the purpose specified, an automatic can-operated solder-feed comprising a rotatable wheel adapted to hold solder-wire grooved rollers between which the wire is led to the delivery-spout, a ratchet-wheel secured to one of the rollers, a lever pivotally mounted on the axis of the ratchet-wheel, a pawl at one end of the lever designed to engage the teeth of the ratchet-wheel and rotate the roller to feed the wire, and a slidable bolt connected to the pawl-lever, one end of which bolt projects in the path of the cans as they approach and is designed to be pressed in by each can.

6. In a machine for the purpose specified, the combination with a vent-soldering means, of can-feeding devices comprising trays with division-strips separating the cans into rows, a band adapted to receive such trays with the divisions across the band, an intermittent feed movement to the band adjustable to the distance from center to center of the rows of cans, a feed and a delivery band from the receiving-band to the machine and from the machine to the receiving-band, means for driving such at uniform rates of speed in opposite directions, a conveyer-band across the receiving-band and extending alongside the feed and delivery bands toward the machine, such band being provided with can-engaging cleats at intervals to correspond with the length of the rows of cans, and means for communicating an intermittent motion to such band to sweep a row of cans from a tray onto the feed-band and simultaneously a row from the delivery-band back onto the tray, such movement to correspond with the period of rest of the receiving-band.

7. In a machine of the class described having a wheel of radiating soldering-bolts for melting the vent-seal of cans and another similar wheel for resealing the same, and means for feeding cans to and delivering them from such; a spacing device comprising a circular track connecting the feeding and delivery bands and passing under the wheels of radiating bolts, a series of can-engaging arms adapted to slide the cans round the track and bring them individually under each wheel of bolts, and means for rotating the wheels of bolts and the series of can-engaging arms in exact time with one another so that the center of a can shall coincide with the point of a bolt at the point of contact of their respective circles of rotation.

8. In a machine of the class described, the combination with a soldering means of a can-feeding device comprising trays 2 having divisions 2^a, the band 3 over the pulleys 4, the shaft 7, crank-pin 6, connecting-rod 8, pin 9, lever 10, pawl 12 and ratchet-wheel 13; the feed-band 18 and delivery-band 19 driven at uniform speed in opposite directions to and from the spacing mechanism of the machine by the pulleys 36 on the shafts 37, 38 and the gears 39 and 40; the conveyer-band 15 over the pulleys 16 and having the can-engaging cleats 17; the driving mechanism therefor comprising the free wheel 21 on the shaft 20, the chain 22 over the pinion 23 on the spindle 24 of the pulley 16, the driving-head 25 secured on the shaft 20 and having the pivotally-mounted arms 26 connected to pins 27 slidable in the bosses 28 of the driving-head 25; the rollers 30 on the arms 26 and the track 31 designed to sustain the pins 27 out of driving contact with the free wheel 21, and the dips 31^a in such track designed to allow the pins to fall into driving contact for the period required.

9. In a machine for the purpose specified, the combination with suitable can-feeding means of the wheel of radiating arms 46 having can-engaging ends 46^a, the whole rotatable with the shaft 20; the track 45; the stand 44 for soldering fluid; the horizontal shaft 48 driving the vertical shaft 20 by bevel-pinions 47; the bevel-pinion 49 secured to the sleeve 61 rotatable on the shaft 48; the two wheels of radiating bolts 51 having spindles 52 secured in the boss 60 by the collars 53, one wheel being secured to the shaft 48 and the other to the sleeve 61; the heat-maintaining stove 65; the auxiliary stoves 70; and the pulley 50 secured to the shaft 48, by means of which the whole mechanism is rotated.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL HAIGH.

In presence of—
BENJAMIN HAIGH,
ROWLAND BRITTAIN.