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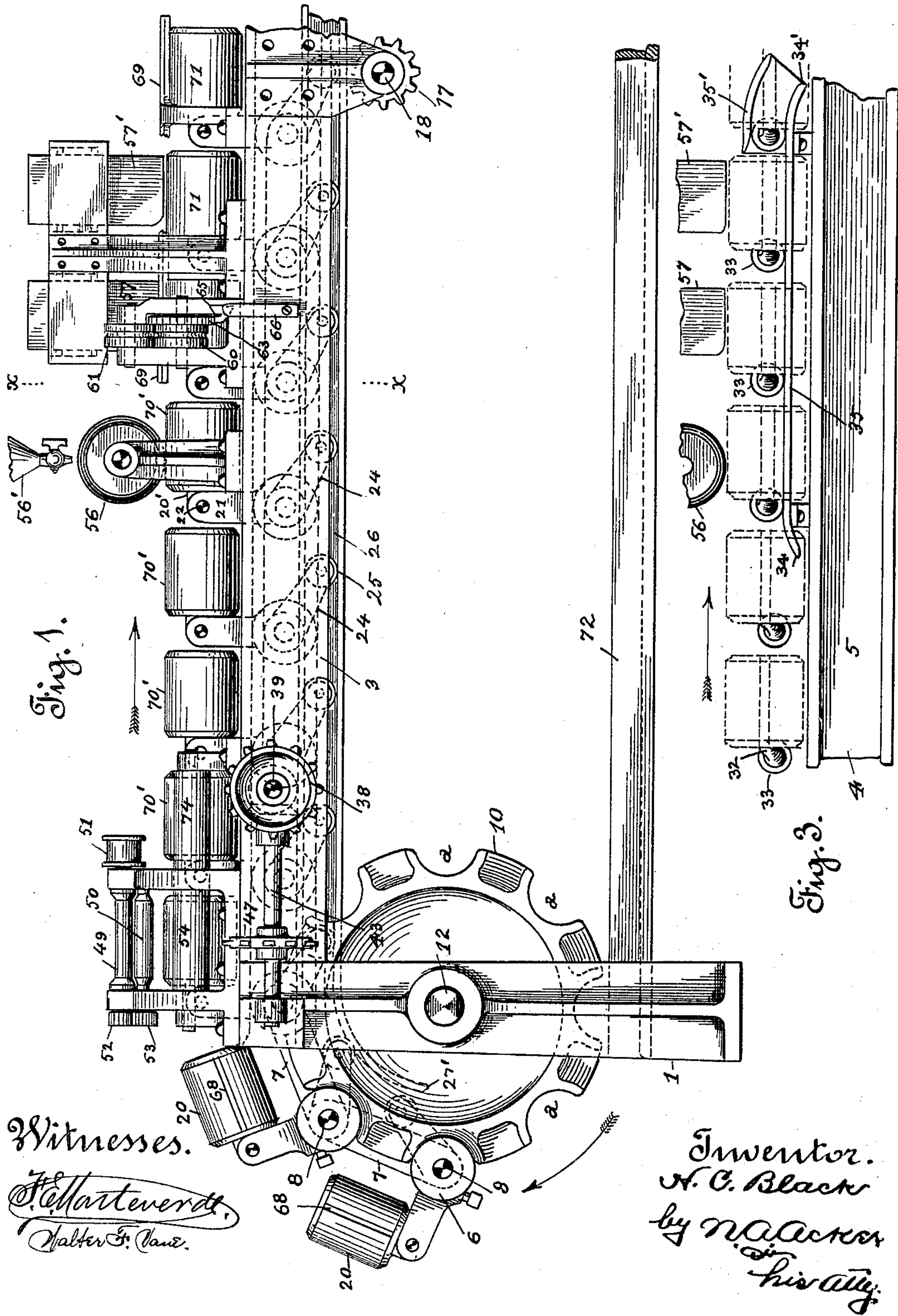
Patented Apr. 15, 1902.

H. C. BLACK.
CAN BODY FORMING AND SOLDERING MACHINE.

(Application filed June 14, 1901.)

(No Model.)

5 Sheets—Sheet 1.



No. 697,785.

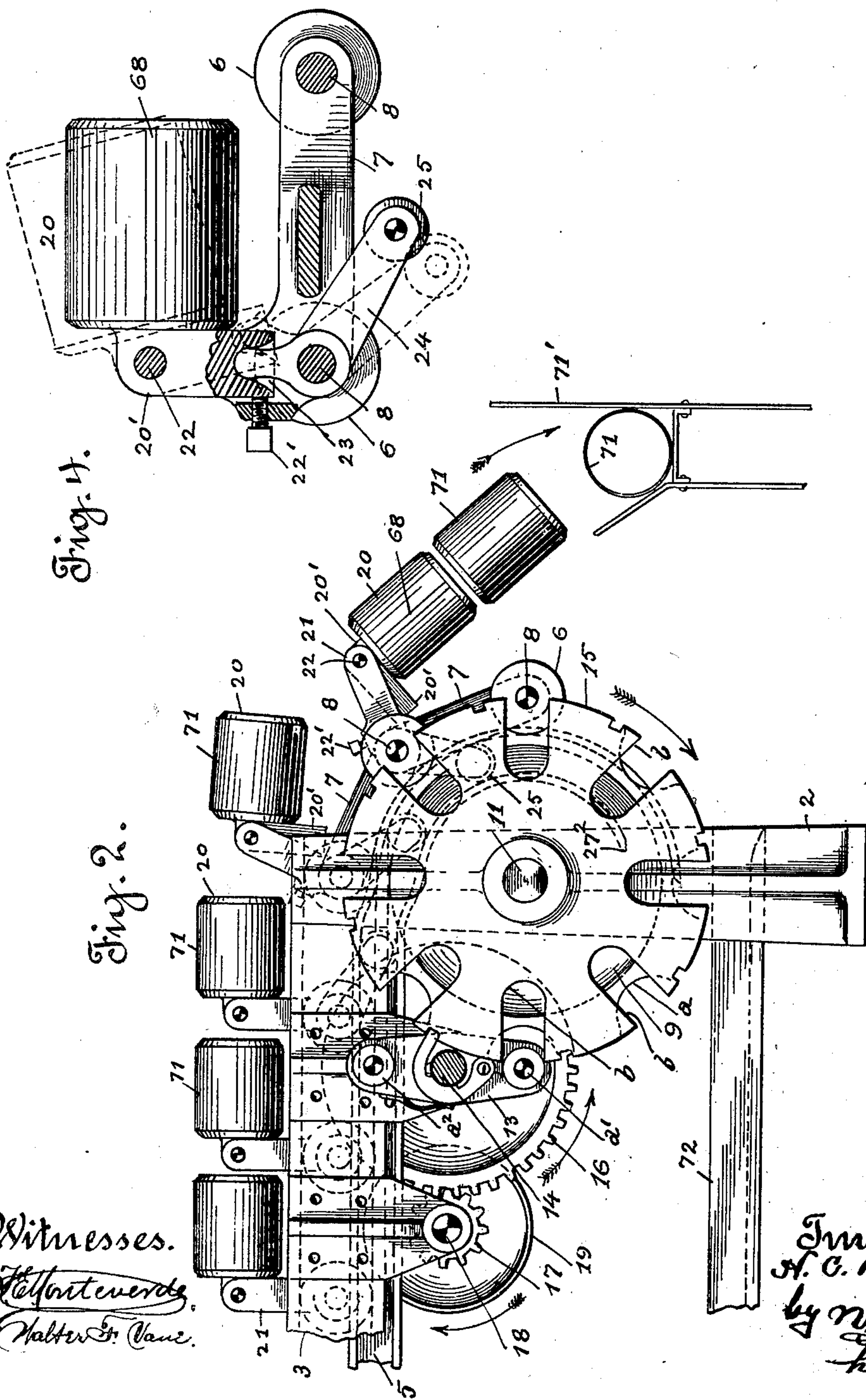
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(No Model.)

5 Sheets—Sheet 2.



Witnesses.
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No. 697,785.

Patented Apr. 15, 1902.

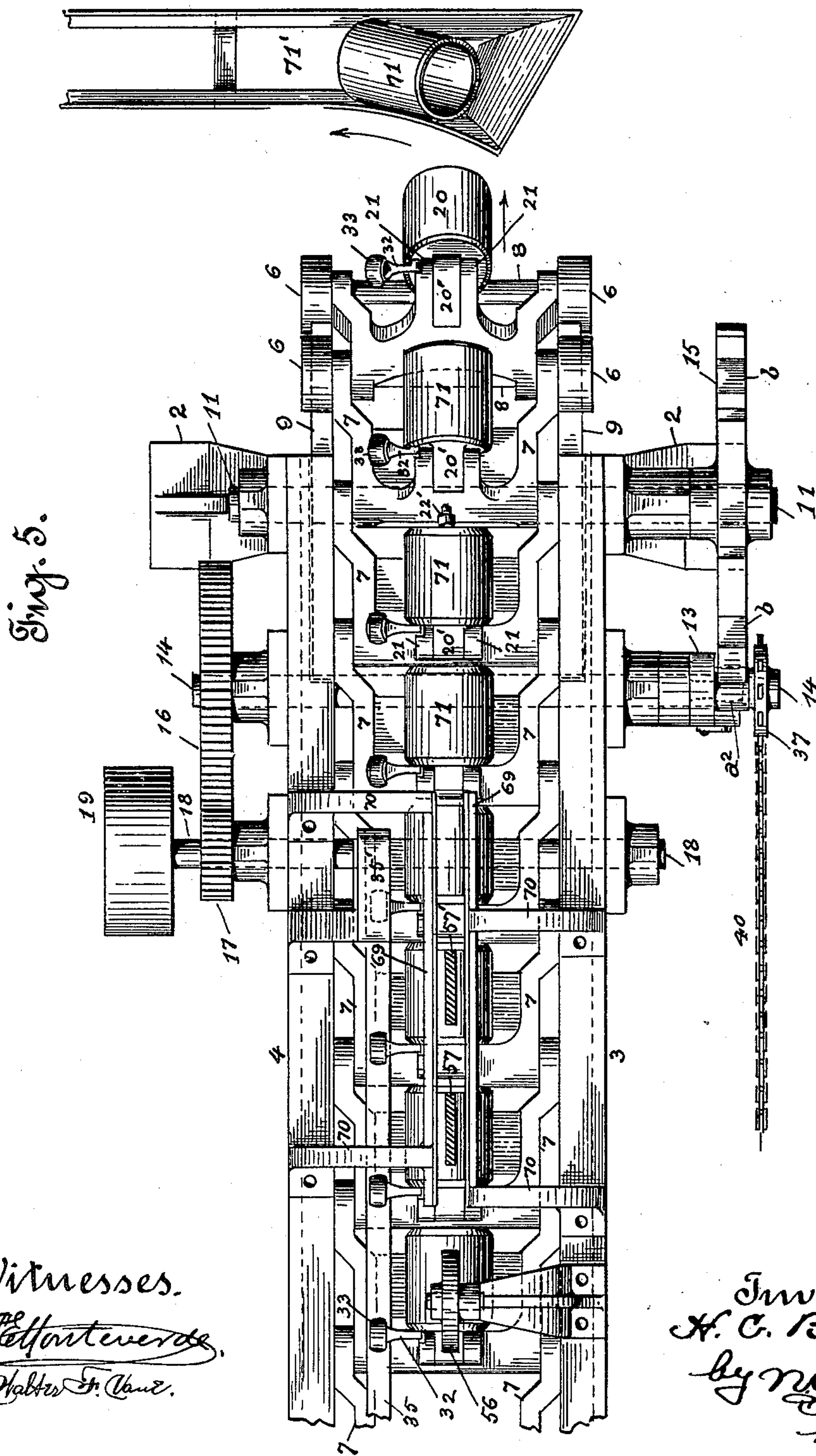
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(Application filed June 14, 1901.)

(No Model.)

5 Sheets—Sheet 3.



Witnesses.

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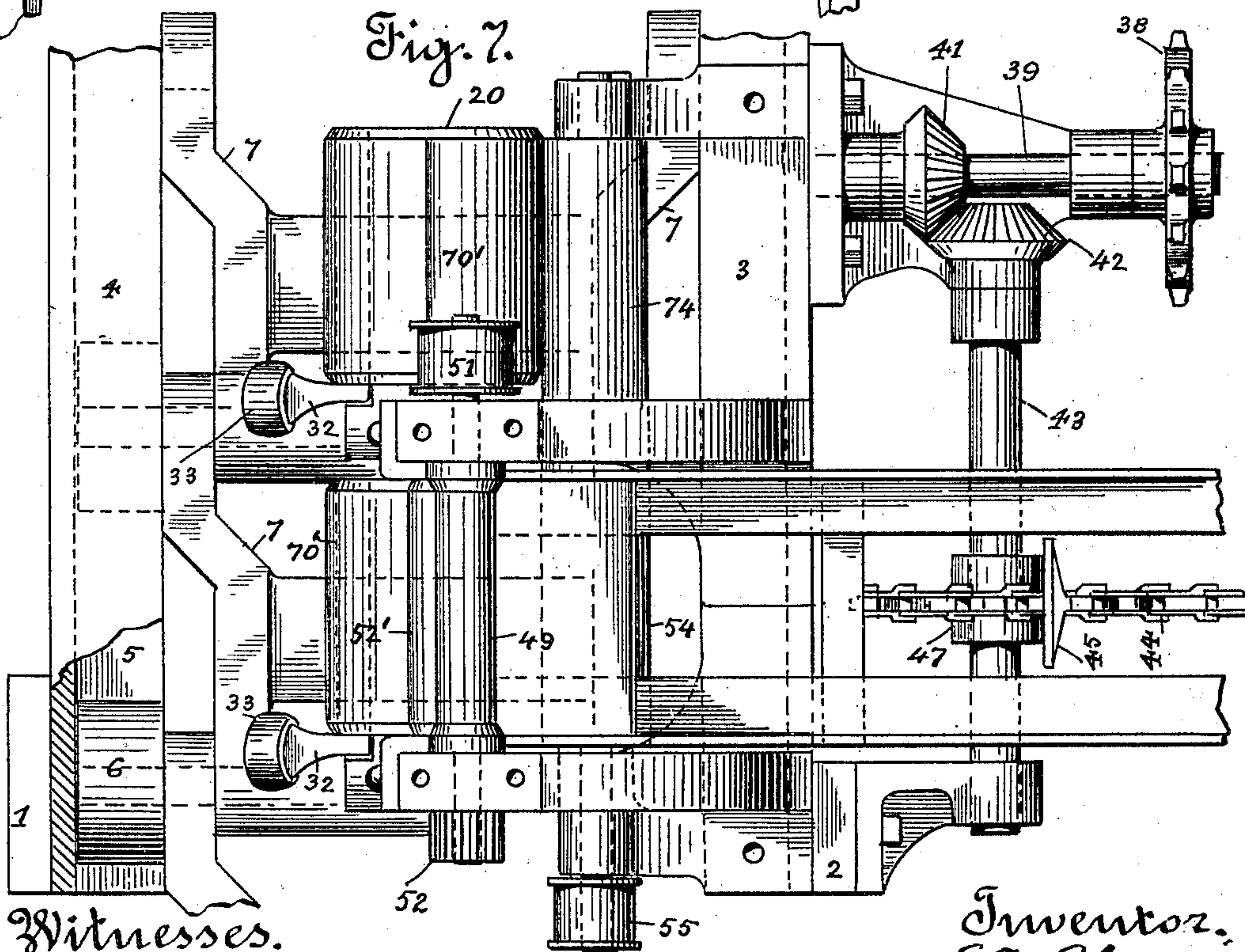
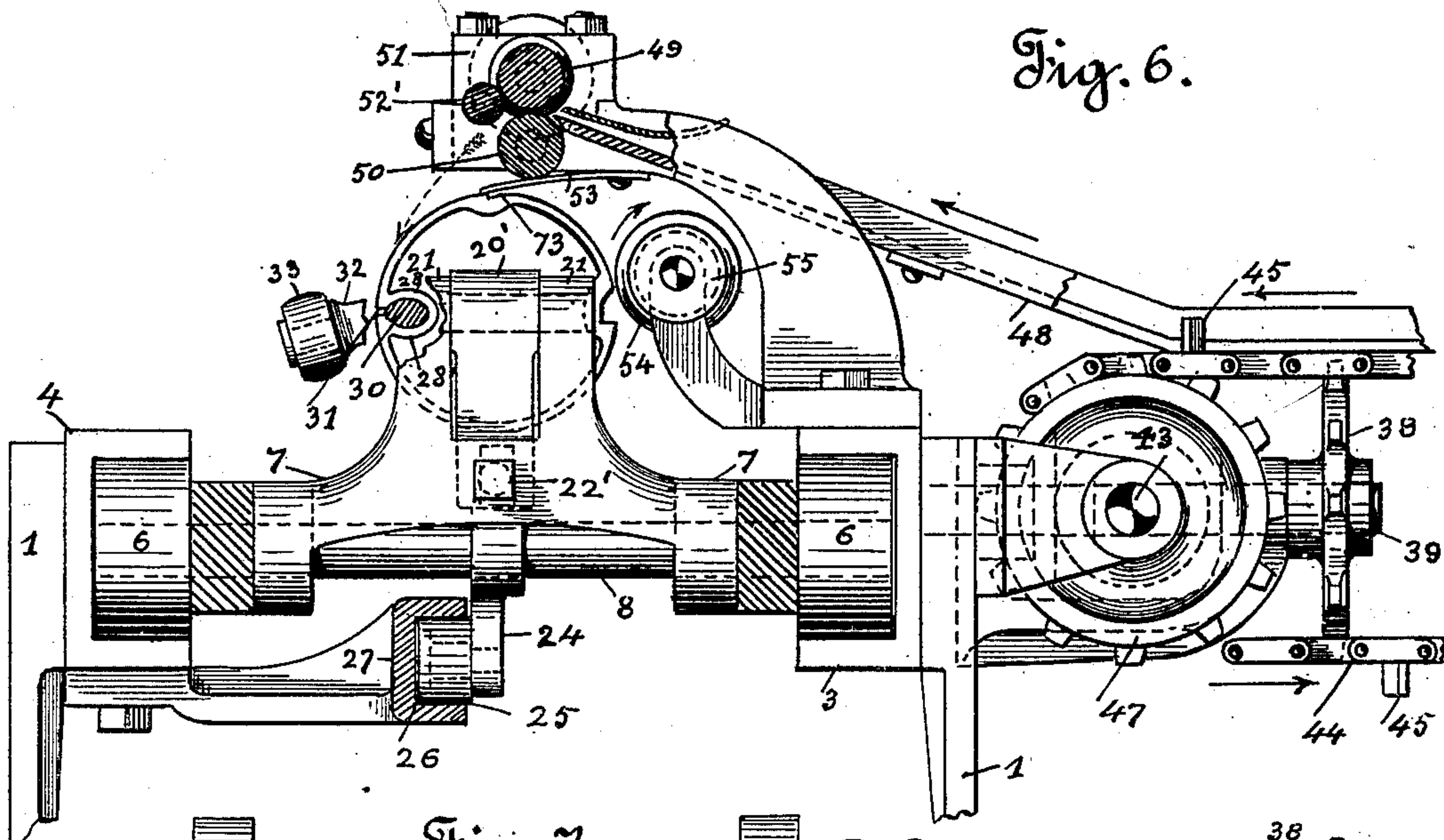
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(No Model.)

5 Sheets—Sheet 4.



Witnesses.

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No. 697,785.

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5 Sheets—Sheet 5.

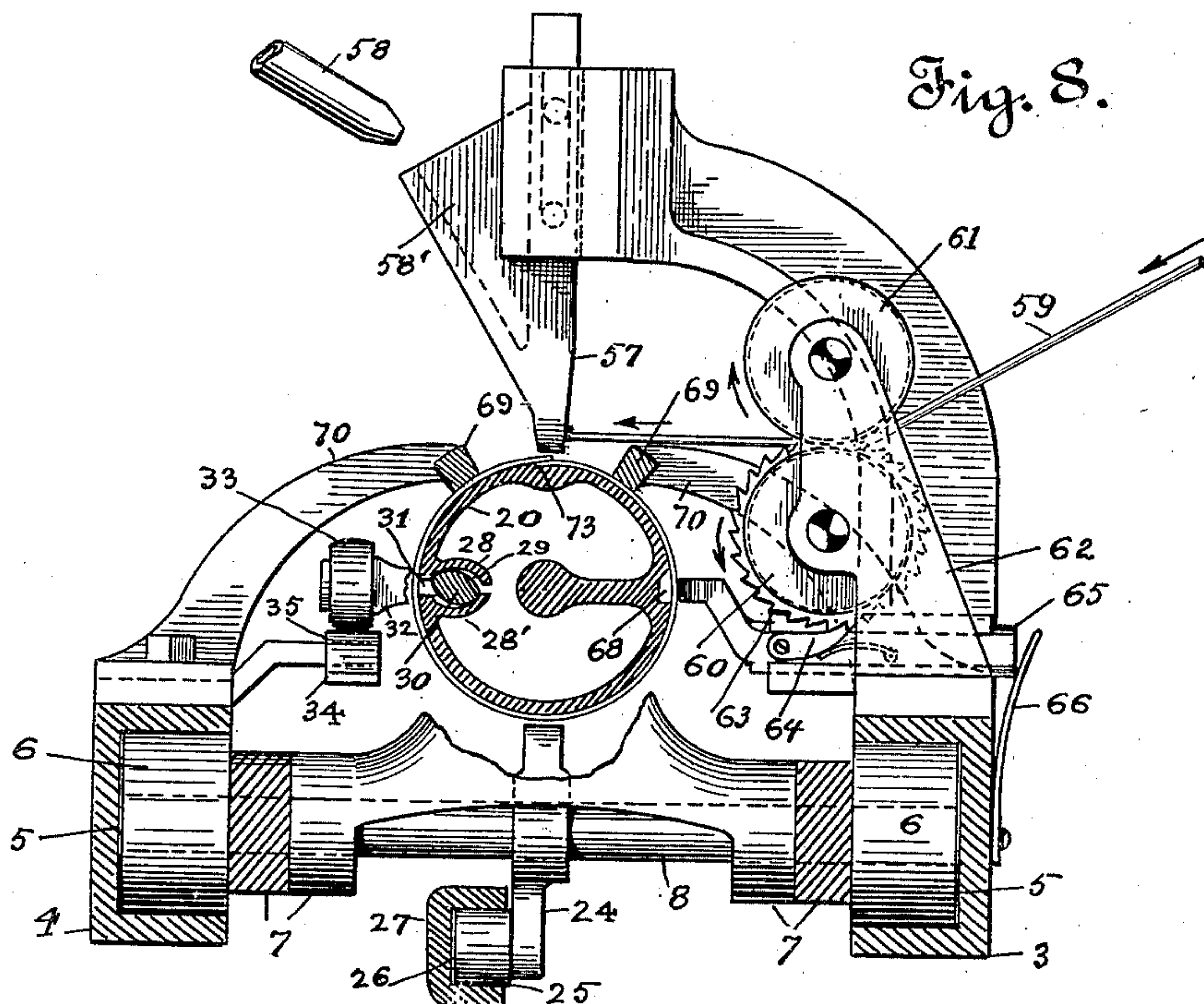


Fig. 8.

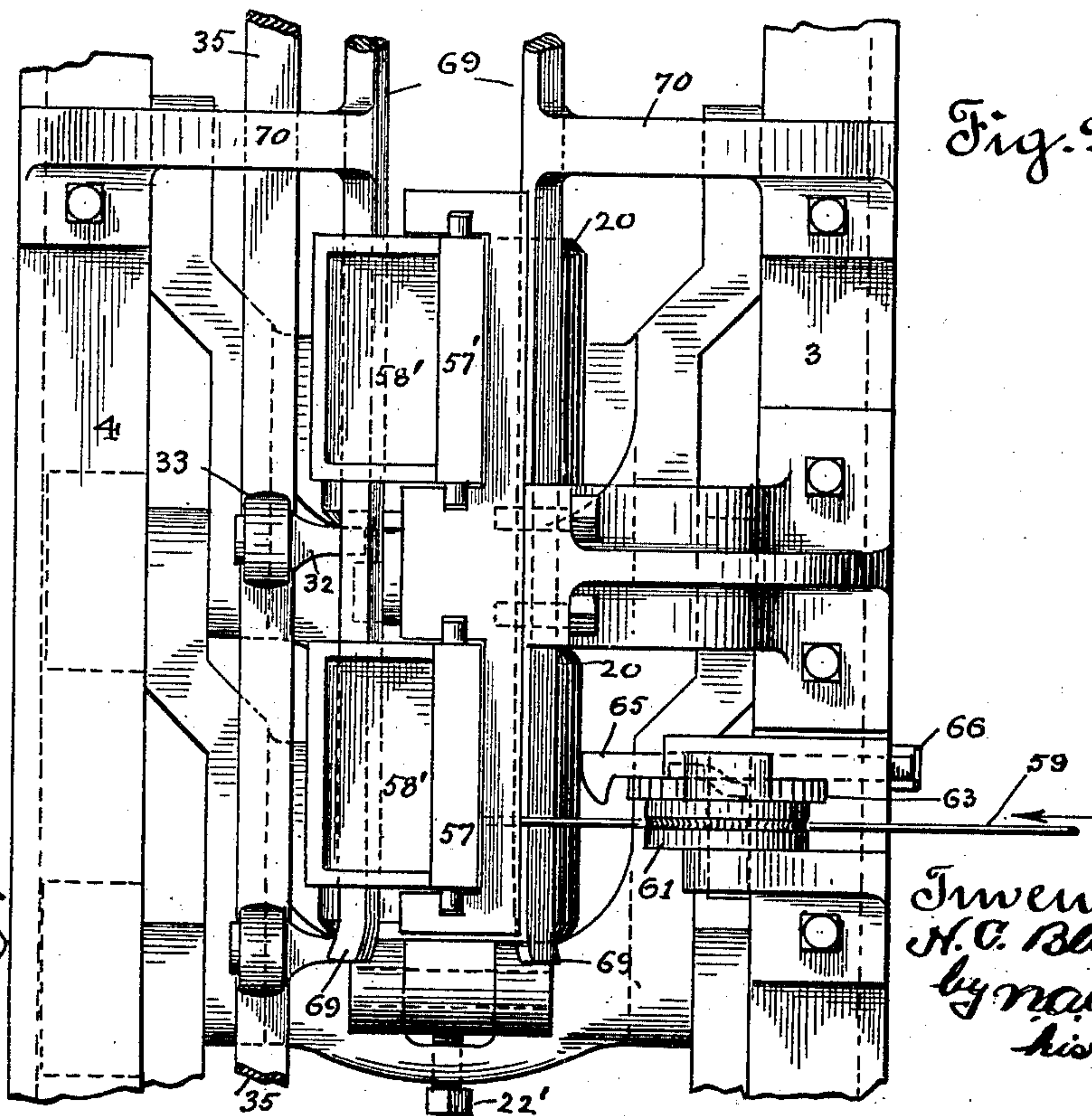


Fig. 9.

Witnesses.
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UNITED STATES PATENT OFFICE.

HENRY C. BLACK, OF OAKLAND, CALIFORNIA.

CAN-BODY FORMING AND SOLDERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 697,785, dated April 15, 1902.

Application filed June 14, 1901. Serial No. 64,549. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. BLACK, a citizen of the United States, residing at Oakland, county of Alameda, State of California, have
5 invented certain new and useful Improvements in Can-Body Forming and Soldering Machines; and I do hereby declare the following to be a full, clear, and exact description of the same.

10 The present invention relates to a certain new and useful apparatus for forming what is known as a "lap-seam" can-body, the object of the invention being to deliver a can-body blank to suitable forming mechanism,
15 whereby the said blank is curled or rolled directly around a seamer-horn and to hold the can-body so curled or rolled upon the horn until the lap-seam thereof has been soldered, after which the soldered body is discharged
20 from its seamer-horn, the invention comprising an intermittently-operated endless carrier having a series of expansible seamer-horns secured thereon and carried thereby, with means whereby the can-body blank is
25 rolled or curled upon the horn and gaged thereon, together with means carried by the seamer-horn and operated by the travel of the endless carrier whereby the horn is expanded prior to passing beneath the soldering-iron
30 and permitted to contract after being carried beyond the said irons, and means whereby solder is supplied to the seam of the can-body, said means being actuated by the can-body held upon the seamer-horn.

35 To comprehend the invention, reference should be had to the accompanying sheets of drawings, wherein—

Figures 1 and 2 illustrate the machine in side elevation, the mechanism disclosed by
40 Fig. 2 of the drawings being a continuation of that set forth in Fig. 1 of the drawings. Fig. 3 is a broken diagrammatic view disclosing the cam plate or rail, upon which rides the roll of the eccentric for expanding the
45 seamer-horn during travel of the endless carrier, the seamer-horns being illustrated in dotted lines. Fig. 4 is a detail view of one of the seamer-horns and its actuating-lever, the link of the endless carrier to which it is fulcrumed being in section. Fig. 5 is a top plan
50 view of the machine from the flux-applying roll to the discharge end thereof. Fig. 6 is an

enlarged end view in elevation viewed from the feed end of the machine, the carrier-disks being removed and the endless carrier being
55 sectioned, the forward bracket for the forming-rolls being broken and the rolls being in section. Fig. 7 is a top plan view of the feed mechanism illustrated in Fig. 6 of the drawings. Fig. 8 is an enlarged sectional end
60 view taken on line *x x*, Fig. 1, and viewed from the feed end of the machine; and Fig. 9 is an enlarged top plan view of the soldering portion of the machine.

The frame of the machine consists of the
65 standards or supports 1 2 and the side pieces 3 4. These side pieces preferably are formed of channel-iron, within the channel 5 of which work the rolls 6 of the endless carrier. The endless carrier comprises a number of link-
70 frames 7, united by link-pins 8, to the ends of which pins the rolls 6 are secured. The endless carrier works over end disks 9 10, secured to shafts 11 12, working in bearings of the supports 2 1. In the periphery of each
75 disk semicircular seats *a* are formed, into which fit or rest the link-pins 8 during travel of the endless carrier.

The end disks 9 in the present case constitute the drive-disks for the endless carrier,
80 being driven with a step rotation by means of cam 13, secured to one end of cross-shaft 14. This cam carries the rolls *a' a'*, Fig. 2 of the drawings, which alternately work in and out of the slots *b*, cut in the periphery of disk
85 15. Said disk is secured to cross-shaft 11, and to the same a step rotation is transmitted from the continuously-rotating shaft 14 by cam 13. To the opposite end of cross-shaft
90 14 is secured the gear-wheel 16, which meshes with pinion 17, attached to cross drive-shaft 18. Said shaft is driven by means of a belt (not shown) working over belt-wheel 19, attached to the drive-shaft.

Inasmuch as connecting-pins 8 of the link-
95 frames rest within the semicircular seats of the disks 9 10, it is obvious that as the drive-disks 9 are driven by a step rotation an intermittent travel is imparted to the endless carrier.

To the endless carrier are attached the seaming-horns 20. Each horn is provided with a depending lug or tailpiece 20', which is fulcrumed between the shoulders 21 of the
100

link-frame by pin 22. Being thus connected, the seaming-horn is free to move vertically upon its link-frame, its downward movement being regulated by set-screw 22, working through the rear wall of the said link-frame. The lower end of lug 20' is provided with a transverse groove 23, within which rests or fits the upper arm of the lever 24, which lever works upon the pins 8. To the lower end of said lever is attached a roll 25, which roll travels within longitudinal groove 26 of guide-rail 27, Figs. 1, 2, 5, and 8 of the drawings. This guide-rail extends the entire length of the machine through the center of the frame, being attached to the end supports of the frame and by suitable brackets throughout the length thereof. The forward and outer ends 27' and 27² are downward curved, so as to permit of the roll 25 gradually entering therein to place the seamer-horns into horizontal position as carried toward the feed mechanism and to move off the guide-rail gradually at the discharge end of the machine.

The seamer-horns are hollow and cylindrical in shape and each horn is split longitudinally along one side, thus permitting a slight spring to the horn. Each horn is formed with two curved shoulders or shelves 28 28', which form a seat 29 for an eccentric cam 30. This cam is shaped to conform to the seat it occupies and is of such size as to approximately fill the seat when the seamer-horn is compressed to close the longitudinal open seam 31, Fig. 6 of the drawings. The eccentric cam 30 projects a slight distance beyond the seamer-horn and is provided with a crank-arm 32, to which a bearing-roll 33 is attached. The roll as the seamer-horn approaches the flux and soldering mechanism rides upon the forward inclined end 34 of the cam-plate 35, attached by suitable brackets to side piece 5 of the frame. As the roll 33 rides upon the inclined end 34 the crank-arm 32 is thrown or turned upward, which partly turns the eccentric cam 30 edgewise within its seat 29, Fig. 8 of the drawings, and forces the split horn apart a slight distance or expands the same. The object of thus expanding the seamer-horn is to true the unsoldered can-body thereon as it is carried to the soldering-irons, so that after being soldered it will fit loosely upon the horn after it has been contracted and slip therefrom as the horn is carried over the drive-disk. The horn is contracted or reduced in diameter after the can-body has been soldered thereon by the eccentric cam being restored to its normal position, Fig. 6 of the drawings, due to the roll 33 moving onto the downwardly-inclined end 34' of the cam-plate 35, Fig. 3 of the drawings, being gradually forced downward by the inclined plate 35', beneath which it is carried. Crank-arm 32 is likewise moved downward, thus imparting an opposite throw to the eccentric cam 30 than that previously described. When thus released, the spring of the metal will cause the seamer-horn to "collapse," so

to speak, leaving the soldered can-body fitting loosely thereover.

To cross-shaft 14, Fig. 5 of the drawings, is attached the sprocket-wheel 37, which is connected to sprocket-wheel 38, Figs. 1 and 7 of the drawings, secured to shaft 39 by chain 40. To shaft 39 is attached pinion 41, which meshes with pinion 42, secured to longitudinal shaft 43. By this form of connection motion of the drive-shaft 18 is transmitted to shaft 43 for driving the endless body-blank carrier. This carrier consists of an endless chain 44, provided with a series of fingers, figures, or plates 45, located a distance apart equal to the width of the can-body blank. Said carrier is driven by the sprocket-wheel 47, secured to shaft 43, over which it works. The can-body blanks are placed upon this carrier one at a time between the projecting fingers or plates 45 and are carried thereby toward the inclined plate 48, over which the can-body blank is forced until its upper edge is placed between the forming-rolls 49 50. The length of the feed-plate 48 is slightly less than that of the can-body blank. Consequently the edge of the blanks will be forced between the rolls 49 50 prior to the fingers or plates 45 being carried over the sprocket-wheel 47.

The forming-rolls are driven by a belt (not shown) working over pulley-wheel 51, secured to shaft of roll 49. To the opposite end of said shaft is attached a pinion 52, which meshes with pinion 53, secured to the shaft of roll 50. These rolls are driven at a high rate of speed, and the moment the edge of the can-body blank is received therebetween the same is carried between the rolls. As carried therebetween the body-blank is guided downward by guide-roll 52' and prevented from curling under or around roll 50 by guard 53. The operation of the machine is so timed that a seamer-horn 20 is at rest directly under the forming-rolls as the can-body blank is passed therethrough. As the body-blank leaves the forming-roll it gradually curls itself around the seamer-horn, being aided by the roll 54. This roll holds the can-body blank against the mandrel, and as it is a rotating roll, being driven by a belt (not shown) working over pulley 55, attached to its shaft, it assists in feeding the blank around the horn until the edges thereof overlap. By its own spring the can-body will firmly grasp the seamer-horn. The moment the can-body has been formed around the seamer-horn the endless carrier advances by an intermittent travel toward the soldering mechanism.

As the seaming-horn, with the can-body blank curled thereon, approaches the flux and soldering devices the roll 33 rides upon the cam-plate 35, so as to throw the eccentric cam within the horn in order to expand same, as hereinbefore described. The horn, with its rolled can-body expanded, is carried below the flux-applying roll 56, which supplies flux to the longitudinal seam of the can-body.

The flux-wheel has an absorbent covering which receives the flux from supply-reservoir 56'. After being fluxed the can-body is carried below the soldering-irons 57 57', which are heated by a flame from nozzle 58, directed into fire-box 58' of the irons. These irons bear upon the can-body seam as the same is moved thereunder by the intermittent travel of the endless carrier.

In order to guard against waste of solder, I have so arranged that the solder is not fed forward until a can is in position to be soldered. To accomplish this, the solder-feeding mechanism is operated by the can-body upon the horn. The wire solder 59 is fed against the face of soldering-iron 57 by the grooved feed-rolls 60 61, between which the wire solder is held, Figs. 1, 8, and 9 of the drawings. As these rolls are rotated the strip of solder is fed inward until its end bears against the hot iron, by which it is melted and falls onto the seam of the can-body beneath the iron. Solder-feed rolls 60 and 61 are secured to shafts working in bracket 62. To the shaft of roll 60 there is attached the ratchet-wheel 63. This ratchet-wheel is engaged and driven by pawl 64, carried by slide-plate 65, which lever is normally held pressed inward by spring 66. The inner end of said slide-plate, which is outwardly inclined, Fig. 9 of the drawings, rests within a longitudinal groove or channel 68, cut in the side of each seamer-horn. During the travel of the horn in case a can-body is not thereon the said end of the slide-plate is held within said groove or channel by pressure of spring 66. However, as the horn is moved toward the soldering-irons with a can-body blank wrapped therearound the end of said slide-plate cannot enter the groove or channel 68, as it is covered by the can-body blank held thereon. Such being the case, the slide-plate by the pressure of the traveling horn is gradually forced outward, causing the pawl 64 to rotate ratchet-wheel 63 a given distance, which in turn rotates the solder-roll 60 and causes the inward feed of the solder. In this manner the feed of solder to the soldering-iron is regulated by the movement of the can-body toward the soldering-irons, for unless a can-body is upon the seaming-horn the slide-plate 65 will not be forced outward to actuate the solder-feed mechanism, but its inner end will be held within the groove or channel of the seamer-horn.

Inasmuch as the eccentric expands the seamer-horn and holds the body while the horn approaches the soldering-irons, the lapped edges of the can-body are liable to separate too much or spring apart. To obviate this and hold the same firmly down, the rods 69 are provided. These rods are attached to brackets 70, Figs. 1, 5, 8, and 9 of the drawings, and are so arranged that as the seamer-horns, with the can-bodies, are carried toward and beneath the soldering-irons they bear against the can-body adjacent to the lap edges

thereof and hold the same firmly pressed down upon its expanded horn.

As the seamer-horn, with the soldered can-body, is carried beyond the soldering-irons by the intermittent movement of the endless carrier the eccentric cam 30 is thrown into position illustrated in Fig. 6 of the drawings by roll 33, moving beneath inclined plate 35', throwing crank-arm 32, as before explained, to restore the eccentric cam to its normal position. The split seamer-horn being thus released, it will contract by its own spring, leaving the soldered can-body fitting loosely thereupon.

During the travel of the endless carrier over the drive-disks 9 the loosely-held soldered can-bodies 71 slip from off the seamer-horn into discharge-chute 71', Figs. 2 and 5 of the drawings.

The under run of the endless carrier is supported by the rails 72, upon which the rolls 6 ride during travel of the said carrier toward the feed end of the machine.

Each seamer-horn is formed on its upper surface with a gage-shoulder 73, Figs. 6 and 8 of the drawings, against which the under edge of the can-body bears after being formed around the horn. This shoulder gages the can-body blank and prevents the rolled blank going beyond a given point around the horn. It is possible that the body-blank may not be forced its full distance by means of the forming-rolls and roll 54. To provide against the same and insure the under edge of the rolled body-blank bearing against the gage-shoulder 73 of the horn, a second roll 74 is employed, Figs. 1 and 7 of the drawings. This roll is mounted upon the same shaft as roll 54 and bears upon the rolled can-body as carried beyond the forming-rolls by the intermittent travel of the endless carrier. By frictional contact with the rolled body-blank 70' it forces the under edge of same firmly against the gage-shoulder 73 and trues the can-body upon the horn.

As the seamer-horns are carried toward the feed mechanism the roll 25 of fulcrumed lever 24 enters the groove or channel 26 of guide-rail 27 at its curved end 27' and causes the fulcrumed lever to gradually throw its seamer-horn into a horizontal position and to hold same so aligned during its entire travel throughout the machine or until roll 25 moves from within the groove or channel 26 at the downwardly-curved discharge end 27² of the guide-rail.

Having thus described the invention, what is claimed as new, and desired to be protected by Letters Patent, is—

1. In a can-body forming and soldering machine, the combination with the endless carrier, of means whereby a non-reciprocating intermittent travel is imparted thereto, a series of expansible seamer-horns carried thereby, mechanism whereby can-body blanks are fed to and rolled directly upon the seamer-horns, and means actuated during the move-

ment of the endless carrier for expanding the seamer-horns.

2. In a can-body forming and soldering machine, the combination with an endless carrier, 5 of means for imparting a non-reciprocating intermittent movement to the carrier, a series of expansible seamer-horns carried thereby, devices by means of which can-body blanks are rolled upon the seamer-horns, the soldering-irons beneath which the can-bodies are 10 carried, the solder-feed mechanism, means for expanding the seamer-horns and holding same expanded while traveling beneath the soldering-irons, and devices actuated by the 15 can-body carried upon the seamer-horn for controlling the feed of the solder to the soldering mechanism.

3. The combination with the endless carrier, of means for imparting a non-reciprocating 20 intermittent travel thereto, a series of expansible seamer-horns carried thereby, of means whereby can-body blanks are rolled upon the seamer-horns, of devices actuated by the travel of the endless carrier for expanding the 25 seamer-horns, soldering mechanism beneath which the rolled can-bodies are carried, and devices for holding down the lap edge of the can-bodies as carried beneath the soldering mechanism.

4. The combination with the endless carrier, of means for imparting an intermittent non-reciprocating travel thereto, a series of seamer-horns fulcrumed to the endless carrier, of 30 means whereby can-body blanks are fed to and rolled directly upon the seamer-horns, soldering mechanism beneath which the rolled can-bodies are carried, means actuated during the movement of the carrier for expanding the seamer-horns as they approach 40 the soldering mechanism, and devices whereby the seamer-horns are thrown into a horizontal position as they approach the feed mechanism and so held during travel through the machine.

5. The combination with the endless carrier, of means for imparting an intermittent travel 45 thereto, a series of expansible seamer-horns secured to the endless carrier, of means whereby can-body blanks are fed to and rolled around the seamer-horns, the soldering mechanism, means actuated during the travel of 50 the carrier whereby the horns and the body-blanks rolled thereupon are expanded during travel toward the soldering mechanism and held expanded while carried thereunder and 55 means operated by the held can-bodies whereby solder is fed to the soldering mechanism as the can-bodies move thereunder.

6. The combination with the endless carrier, 60 of means for imparting an intermittent non-reciprocating travel thereto, a series of seamer-horns attached to and carried by the endless carrier, of means whereby can-body blanks are rolled directly upon the seamer-horns, soldering mechanism beneath which the rolled 65 can-bodies are carried, and devices by means of which the lap edge of the can-bodies are

held down as carried beneath the solder mechanism.

7. The combination with the endless carrier, 70 of means for imparting an intermittent non-reciprocating movement thereto, a series of split seamer-horns hinged to and carried by the endless carrier, of means for rolling can-body blanks around the seamer-horns, of soldering 75 mechanism, means for holding down the lap edge of the can-bodies as carried beneath the soldering mechanism, and devices actuated during the travel of the endless carrier for expanding the seamer-horns as carried to- 80 ward the soldering mechanism.

8. The combination with the endless carrier, of means by which the carrier is driven with an intermittent movement, a series of seamer-horns fulcrumed to and carried by the carrier, 85 of devices for placing the seamer-horns into horizontal alignment and so holding the same while traveling through the machine, of mechanism whereby can-body blanks are fed to and rolled around the seamer-horns, the soldering devices, of means actuated during the 90 travel of the endless carrier by means of which the seamer-horns and body-blanks rolled thereon are expanded as the horns move toward the soldering devices, of means for supplying solder thereto, and devices actuated 95 by the can-body upon the horns during travel of the carrier and by which is operated the solder-supplying means.

9. The combination with the endless intermittently non-reciprocating traveling carrier, 100 of a series of expansible seamer-horns secured to and carried thereby, means whereby can-body blanks are fed to and rolled around the seamer-horns, an eccentric cam arranged 105 within each seamer-horn, a crank-arm attached to said cam, devices located in the path of travel for the seamer-horn whereby the crank-arm is actuated during travel of the endless carrier to throw the eccentric cam so 110 as to expand or permit of its seamer-horn being contracted, soldering mechanism beneath which the rolled can-bodies are during travel of the endless carrier, and means actuated by the can-bodies during the travel of 115 the carrier for feeding solder to the soldering mechanism.

10. The combination with the endless carrier, of means for imparting an intermittent non-reciprocating travel thereto, a series of 120 expansible seamer-horns hinged to and carried by the endless carrier, of means whereby can-body blanks are fed to and rolled directly upon the seamer-horns, and a gage-shoulder carried by each horn and against which the 125 under lap of the rolled can-body blank bears.

11. The combination with the endless carrier, of means for imparting an intermittent non-reciprocating travel thereto, a series of 130 seamer-horns hinged or fulcrumed to and carried by the endless carrier, of means whereby can-body blanks are fed to and rolled upon the seamer-horns, means for expanding the seamer-horns and its body-blank rolled there-

on during travel of the endless carrier, the
soldering mechanism, and devices by means
of which the expanded bodies are held firmly
to the horns as carried beneath the soldering
5 mechanism.

12. The combination with the endless car-
rier, of means for imparting an intermittent
non-reciprocating travel thereto, a series of
expansible seamer-horns hinged to and car-
ried thereby, of means whereby can-body
10 blanks are rolled directly upon the seamer-
horns, the soldering mechanism, the wire-sol-

der feed, and devices actuated by the can-
bodies during travel of the seamer-horns and
by means of which the solder-feed is operated 15
to feed the wire solder to the soldering mech-
anism.

In witness whereof I have hereunto set my
hand.

HENRY C. BLACK.

Witnesses:

N. A. ACKER,

D. B. RICHARDS.