L. C. SHARP.

COMBINED FLANGING AND HEADING MACHINE.

APPLICATION FILED DEC. 4, 1909.

1,154,661.

Patented Sept. 28, 1915.

4 SHEETS—SHEET 1.

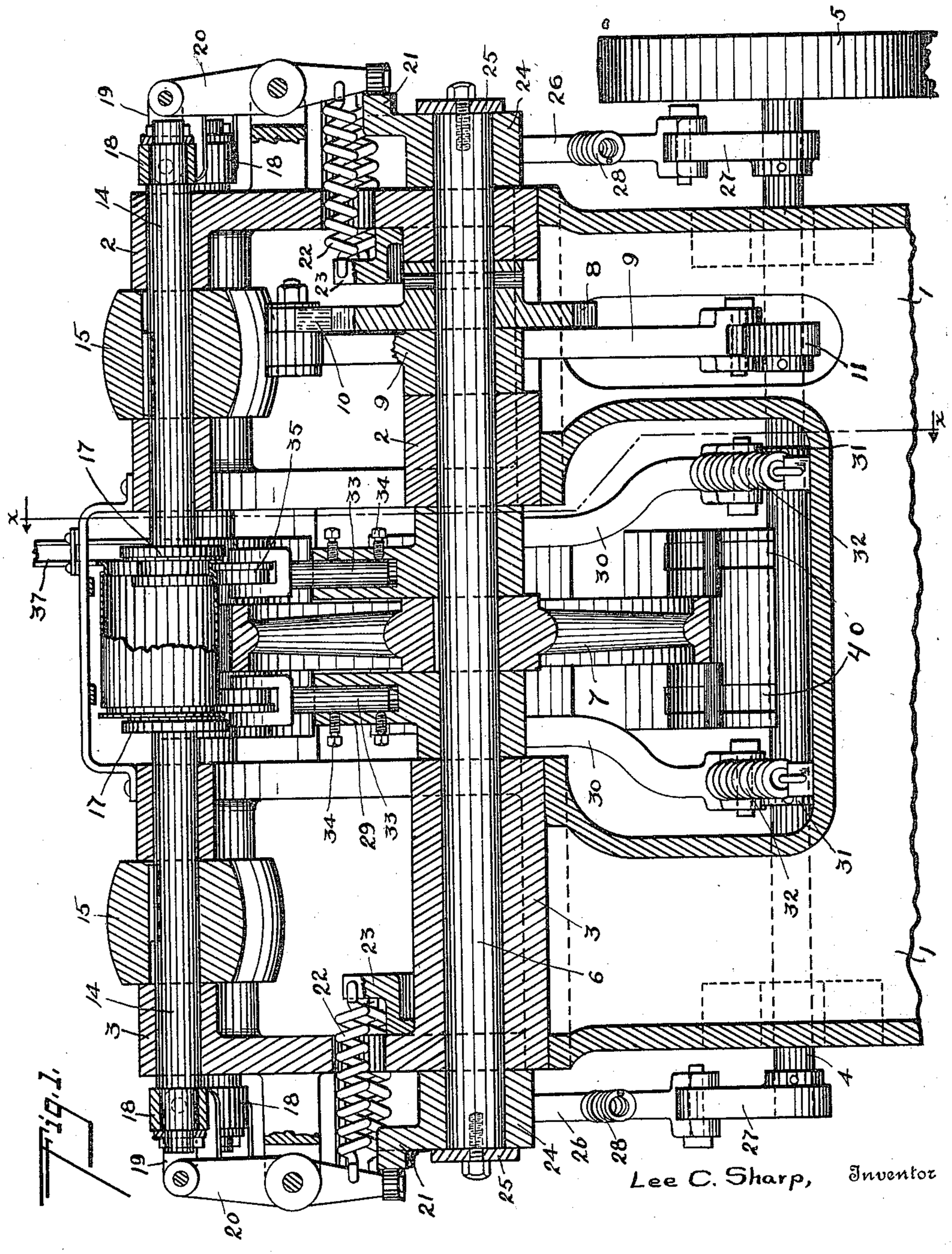

Fig. 1.

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4 SHEETS—SHEET 2.

Fig. 2.

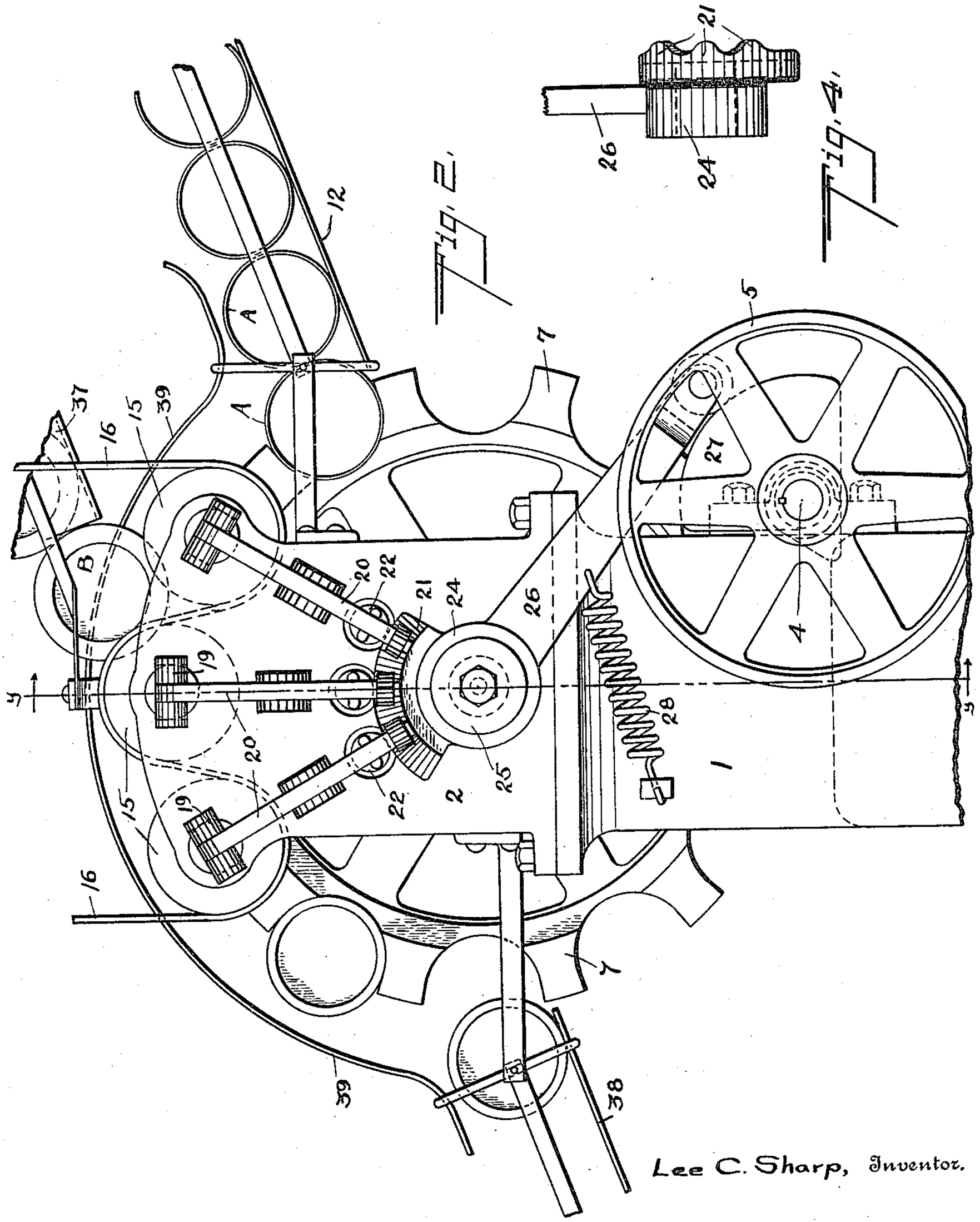

Fig. 3.

Fig. 4.

Witnesses:

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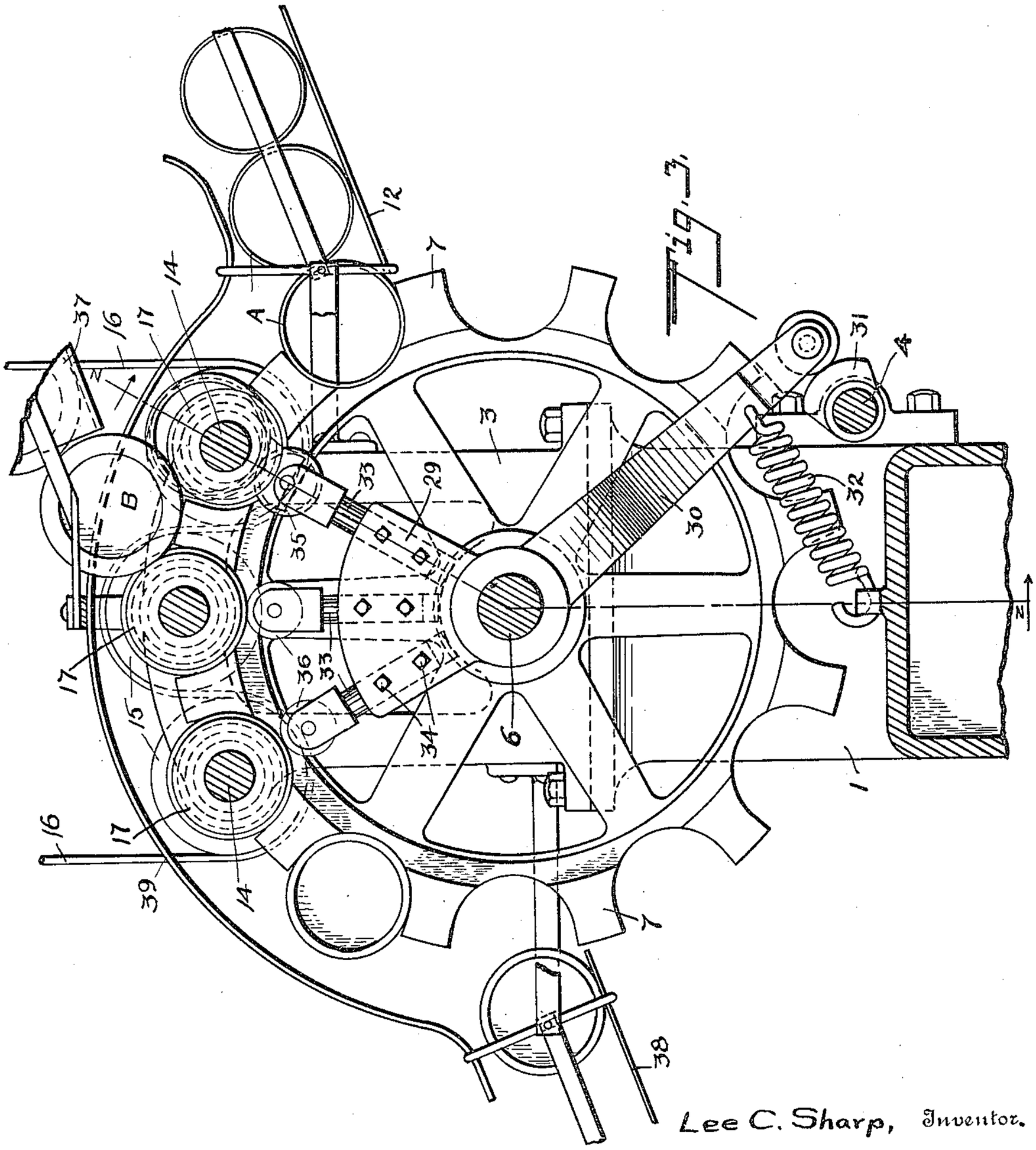

Fig. 3.

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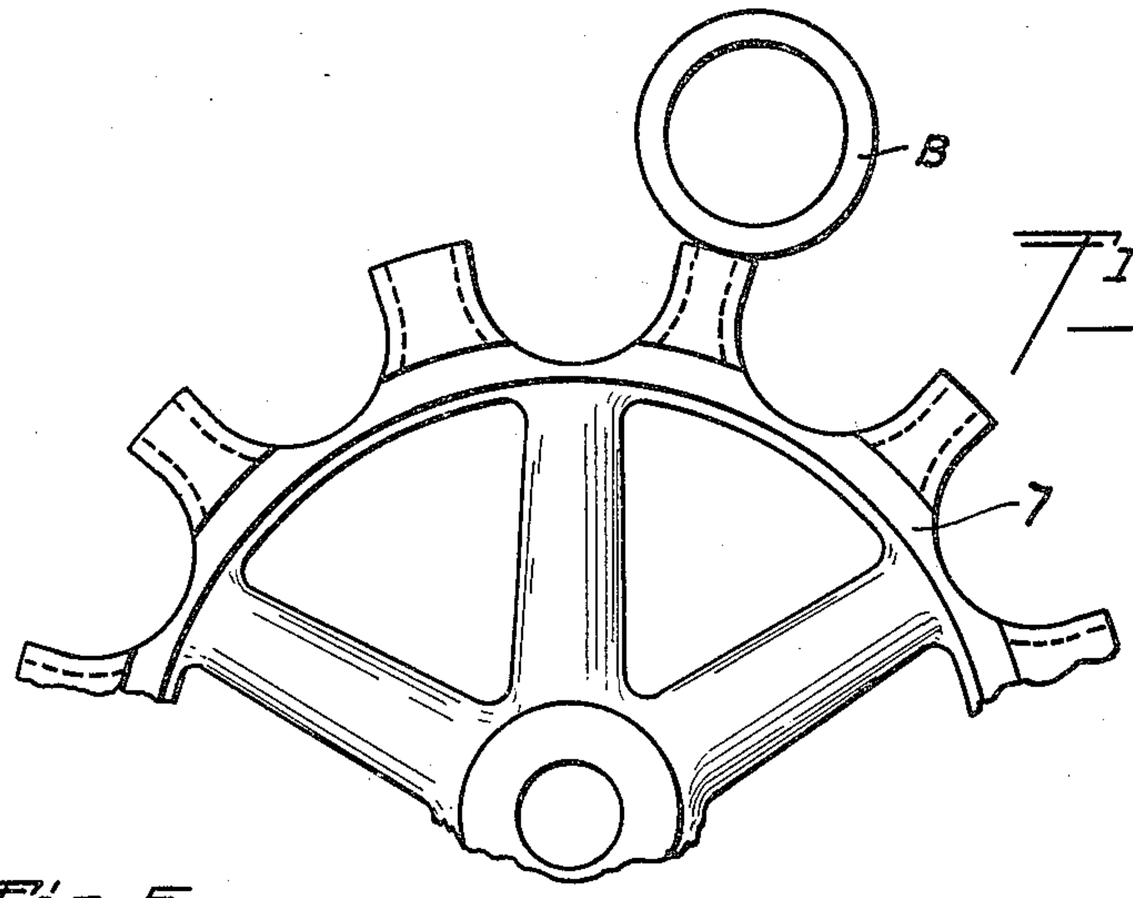
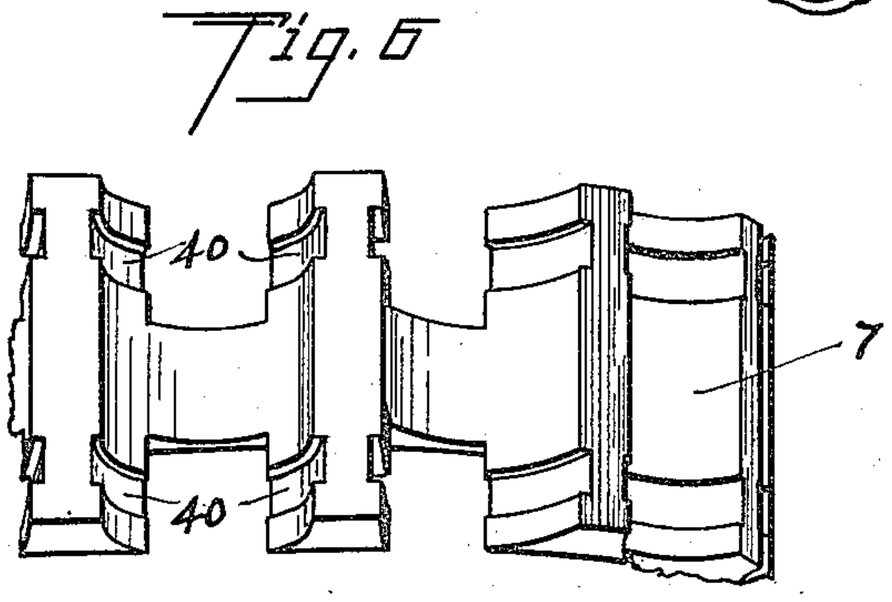


Fig. 5

Fig. 6



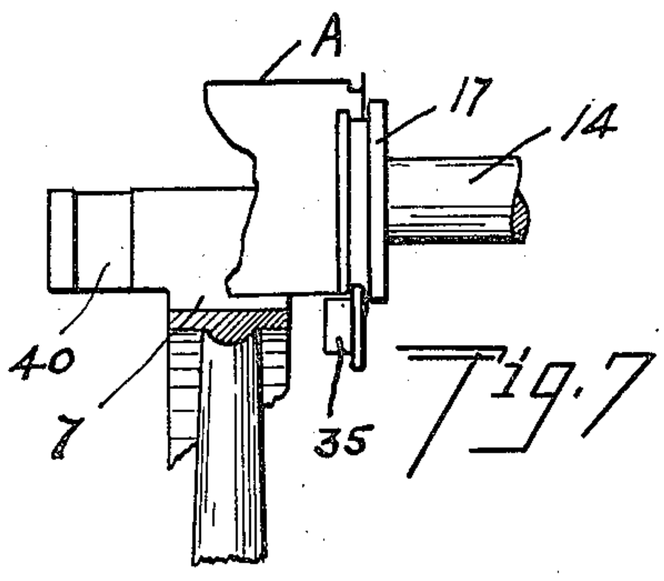


Fig. 7

Fig. 8

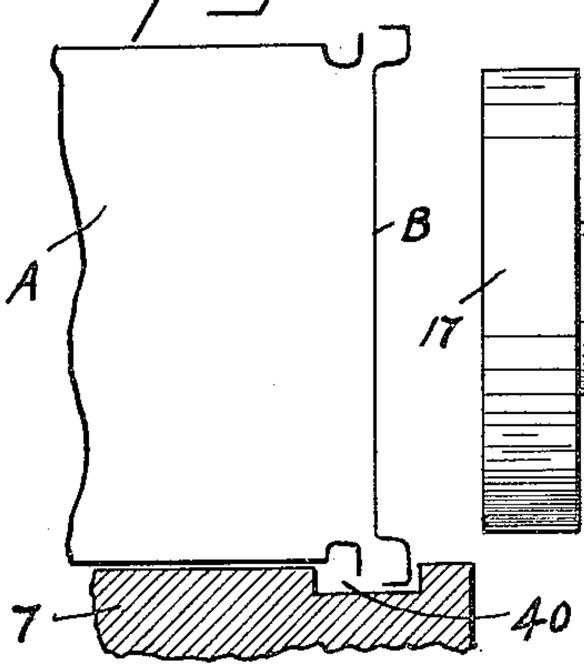


Fig. 9

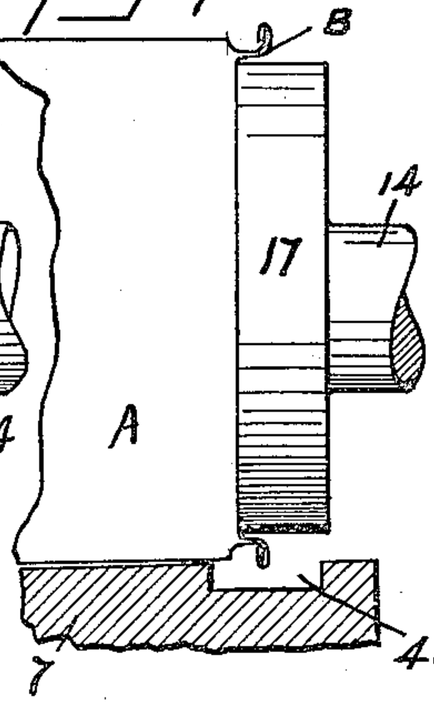
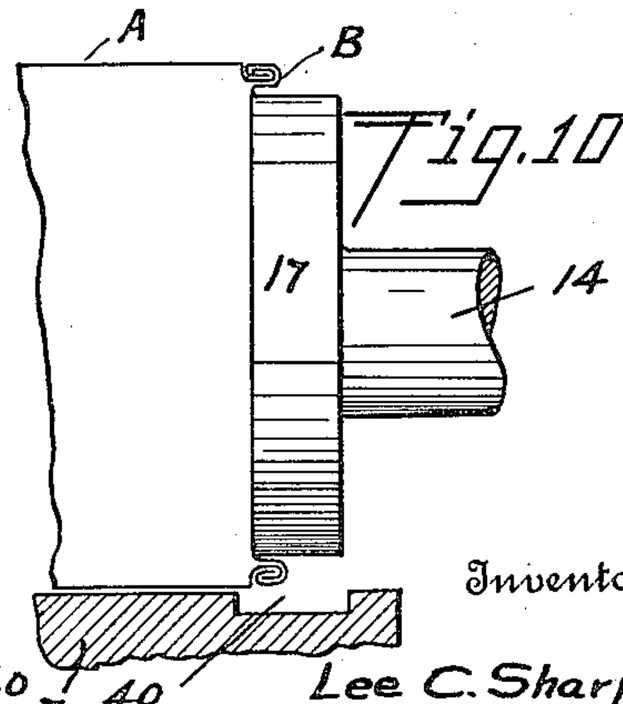


Fig. 10



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UNITED STATES PATENT OFFICE.

LEE C. SHARP, OF PLATTSMOUTH, NEBRASKA, ASSIGNOR TO AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

COMBINED FLANGING AND HEADING MACHINE.

1,154,661. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed December 4, 1909. Serial No. 531,442.

To all whom it may concern:

Be it known that I, LEE C. SHARP, a citizen of the United States, and a resident of Plattsmouth, in the county of Cass and State of Nebraska, have invented certain new and useful Improvements in Combined Flanging and Heading Machines, of which the following is a specification.

My invention relates to the manufacture of sheet-metal ware, and more particularly to machines for flanging can-bodies and securing the heads thereon by double-seaming operations.

It is the object of my invention to provide a combined flanging and heading machine to which the heads and plain bodies may be fed, the bodies being received by a carrier-wheel which is intermittently advanced to carry the bodies to a series of operating positions, at the first of said positions the ends of the bodies being flanged, and at subsequent positions the heads being applied to the flanged bodies and secured thereon by double-seaming.

My invention resides in the combinations and arrangements of parts by which the various operations are performed in the manner stated.

Constructions embodying my invention are illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of the machine, Fig. 2 is an end elevation thereof, Fig. 3 is a transverse vertical section on the plane of the line *x*—*x* of Fig. 1, Fig. 4 is a detail plan view of one of the multiple cams for reciprocating the chuck-spindles, Fig. 5 is a detail side view of a part of the carrier-wheel, Fig. 6 is an angular projection of a part of the carrier-wheel, Fig. 7 is a detail diagrammatic view illustrating the flanging operation, and Figs. 8, 9 and 10 are views showing different stages of the heading or seaming operation.

In each of Figs. 1, 2 and 3, the lower portion of the machine frame or base is broken away, in Figs. 2 and 3 portions of the feed-chutes or runways for the heads and can-bodies are broken away, and in Fig. 1 the plane of section is mainly that of the line *y*—*y* of Fig. 2, but through a part of the carrier-wheel the plane of section is deflected to that of the line *z*—*z* of Fig. 3.

In the construction shown, I provide a frame consisting of a suitable base 1 upon which at the ends thereof are secured the bearing-heads 2 and 3. The main driving shaft 4 is journaled in suitable bearings arranged at the side of the base, and on one end of the said shaft is carried the main driving pulley 5. In the lower portions of the heads 2 and 3 is journaled the shaft 6 and on said shaft between the heads is secured the carrier-wheel 7. Between the bearings of the shaft 6 in the head 2 a ratchet-wheel 8 is secured upon the shaft, and adjoining said ratchet-wheel the lever 9 is pivotally mounted upon the shaft. The upper end of the lever carries a suitable pawl 10 adapted to engage the teeth of the ratchet-wheel, and the lower end extends through an opening in the side of the base 1 and has a roller which engages a suitable cam 11 carried on the main driving shaft, the roller being held in engagement with the cam by the weight of the lever. The said cam is adapted to impart an oscillating movement to the lever which thus, by the engagement of the pawl 10 with the ratchet-wheel, intermittently advances the shaft and carrier-wheel by amounts proportional to the spacing of the ratchet teeth. In the rim of the carrier-wheel 7 are formed a number of semi-cylindrical recesses or pockets which are equidistantly spaced from each other and are the same in number as the teeth of the ratchet-wheel 8, so that as the shaft is advanced by the ratchet-wheel the pockets successively occupy like positions. At the front side of the machine is an inclined feed-chute or runway 12 in which are placed the can-bodies A to be operated upon, and which is so arranged that at each movement of the carrier-wheel one of the pockets therein stops adjoining the end of the chute so as to receive one of the can-bodies therefrom.

In the upper portions of the heads 2 and 3 are journaled six chuck-spindles 14 which are arranged at opposite sides of the carrier-wheel in pairs of which each is alined with the longitudinal axis of one of the pockets of the wheel. On said chuck-spindles between the bearings thereof in the heads 2 and 3 are secured pulleys 15 which are driven by means of belts 16 passing alternately below and over the same as shown in Figs. 2 and 3, and extending to suitable driving pulleys arranged above the machine. On the inner ends of the spindles are carried the chuck-plates 17 and on the outer

end portions of the spindles sleeves 18 are loosely mounted, being retained thereon by collars secured at the ends of the spindles. The said sleeves are connected by short links 19 with the upper ends of the levers 20 which are fulcrumed between lugs on the ends of the heads 2 and 3 and extend in radially toward the shaft 6. At the inner ends of the said levers 20 are rollers which engage the multiple cams 21. Said rollers are held in engagement with the cams by means of springs 22 which are connected with the levers near the lower ends thereof and extend in through openings in the ends of the heads 2 and 3 and are attached to suitable connecting-blocks 23 arranged inside the heads, as shown in Fig. 1. The cams 21 are formed upon hubs 24 which are pivotally mounted upon the ends of the shaft 6, being held thereon by plates 25, and from said hubs arms 26 extend diagonally downward and at their ends carry rollers which engage the cams 27 secured on the main driving shaft 4. The rollers are held in engagement with said cams 27 by means of the springs 28 connected with the arms and with lugs arranged on the base as shown. The cams 27 impart an intermittent oscillating motion to the arms 26, which movement is communicated through the hubs 24, cams 21, levers 20, links 19 and sleeves 18, to the chuck-spindles which are thus given an intermittent longitudinal reciprocating movement.

On the shaft 6 adjoining the ends of the hub of the carrier-wheel are pivotally mounted the sector-shaped bodies 29 from which the arms 30 extend diagonally downward and at their ends carry rollers which engage cams 31 secured on the main driving shaft. The rollers are held in engagement with said cams by springs 32 connected with the arms and the base as shown, and the cams are adapted to impart an intermittent oscillating movement to the sector-shaped bodies 29. The said bodies 29 carry radially extending shafts 33 which are adjustably secured therein by set-screws 34. At the outer ends of the shafts 33 are heads in which are rotatably mounted the flanging-rollers 35 and seaming-rollers 36, and the shafts are so spaced that all of the rollers will be in substantially the same relation to the pockets of the carrier-wheel. The movement of the bodies 29 about the shaft 6 is such that the rollers move alternately from positions substantially in radial alinement with the pockets of the carrier-wheel to positions intermediate between the pockets. The side portions of the carrier-wheel rim are of less thickness than the depth of the pockets, so that at the ends the pocket recesses cut through said portions of the rim, as shown in Figs. 1, 2, 3, 5, 6 and 7. Thus the end portions of the can-bodies lying in the pockets are engageable at their inner sides by the rollers 35 and 36. Near each end of the pockets are formed grooves 40, as indicated in Figs. 1, 6 and 7.

In the operation of the machine, during each pause in the movement of the carrier-wheel, a can-body from the feed-chute or runway 12 enters the pocket of the wheel which is adjacent to the end of the chute. At the next movement of the carrier-wheel the said can body is carried to the first operating position between the chuck-plates 17 carried by the first pair of spindles 14. The spindles are then moved inwardly to cause the chuck-plates to pass into the ends of the body. The members 29 are then rotated upon the shaft 6 so as to bring the flanging-rollers 35 to the operating position shown in Figs. 3 and 7, at which said rollers engage the can-body and raise it up into engagement with the revolving chuck-plates of which the said first pair are so formed as to coöperate with the flanging rollers 35 to flange the body while it is held and revolved in the said position. The members 29 are then rotated upon the shaft 6 to carry the rollers to the positions intermediate between the pockets and thus disengage them from the can-bodies, the chuck-spindles are moved to withdraw the chuck-plates from the can-body, and the carrier-wheel is then advanced to carry the can-body to the next operating position between the next pair of chuck-plates and spindles. During the said movement a can-head B is dropped into the groove 40 of the pocket, adjoining the end of the flanged body, the head being centered with the body by said groove as shown in Fig. 8. The heads are discharged from the chute or runway 37 at a position intermediate between the first and second operating positions and rest upon the rim of the carrier-wheel between the pockets at said first and second operating positions, being held in place laterally by portions of the chute. As the carrier-wheel is moved forwardly a pocket passes beneath the head which then drops into the groove 40. In the construction shown in the drawings a head is applied to but one end of the can-body, it being ordinarily preferable to leave the other end of the body open for filling, and to apply the head after the can is filled. Upon reaching the second operating position, the chuck-spindles are again moved inwardly, the chuck-plates adjoining the head B engaging the same and forcing it onto the flanged body, after which the seaming roller 36 is moved to operating position and engages the head to perform the first part of the seaming operation. The movement of the can to the third operating position or second seaming position, and the performance of the second part of the seaming operation, are made in a manner similar to those for the

first part of the seaming operation. The exact form of seam produced and the form of the chuck-plates and seaming rollers for the production of the seam, are immaterial to my invention and may be varied as desired. One form of seam which the machine is adapted to produce is shown in Figs. 9 and 10, the seam being partially and entirely completed in the respective figures. Subsequent movements of the carrier-wheel bring the can to a position such that it is discharged by gravity from the carrier-wheel pocket into the discharge-chute 38 which is arranged as shown. Suitable guide bars 39 are extended over the carrier-wheel from the body-chute 12 to the discharge-chute 38, and serve to prevent the cans being thrown out of the pockets when engaged by the flanging and seaming rollers in passing from one operating position to another, but said guide-bars are spaced from the carrier-wheel sufficiently to permit the cans to be raised slightly out of the pockets in passing over the rollers.

It will be obvious that, as the various operations are performed simultaneously, one of the cans will be completed at each movement of the carrier-wheel; and that the flanging-rollers and seaming rollers, by engaging the cans from the inside of the carrier-wheel rim, tend to lift the cans out of the pockets and thus avoid any distortion which would result from the engagement of said rollers with the cans from a direction other than one tending to raise them out of the pockets.

Now, having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a can-body flanging and heading machine, a carrier-wheel having peripheral pockets adapted to receive can-bodies and heads, means for intermittently advancing the wheel to bring the pockets successively to a series of operating positions, pairs of revoluble chuck-plates arranged on opposite sides of the carrier-wheel at each of the operating positions, means for directing can-bodies into the pockets before the same reach the first operating position, means for directing can-heads into the pockets between the first and second operating positions, means for moving the chuck-plates axially toward and away from the carrier-wheel, flanging-rollers and seaming-rollers mounted so that the axes thereof are movable in paths concentric to the axis of the carrier-wheel, and means for simultaneously moving all of said rollers to engage the flanging rollers with the can-body at the first operating position and to engage the seaming rollers with the can-heads at the subsequent operating positions.

2. In a can-body flanging and heading machine, an intermittently movable shaft, carrying devices mounted thereon, means for directing can-bodies and heads into said carrying devices, rotating elements arranged at a series of positions adjoining the successive carrying devices, and flanging rollers and seaming rollers arranged adjacent to said rotating elements and adapted to coöperate therewith to flange the can-bodies and seam the heads upon the flanged bodies, the said flanging rollers and seaming rollers being disposed in the path of the can-bodies and being movable in a direction concentric with said path to engage them with the can-bodies and heads.

3. In a machine of the class described, a series of carrying devices mounted so as to move in a circular path, means for actuating said carrying devices to bring the same successively to like positions, a series of elements rotating in planes parallel with the path of the carrying devices and movable axially toward and away from the carrying devices, a series of rollers adapted to cooperate with said rotating elements in acting upon the cans, and means for moving said rollers concentrically to the path of the carrying devices and maintaining said rollers at fixed distances apart to carry the same into and out of operative relation with the rotating elements.

4. In a machine of the class described, a carrier-wheel having a rim in which are formed a series of pockets opening radially outward, the said pockets being adapted to receive can-bodies and heads, a series of rotating chuck-plates arranged in pairs at the sides of the carrier-wheel, means for moving the chuck-plates axially toward and away from the wheel, means for moving the carrier-wheel to bring can-bodies contained in the pockets successively between each pair of the chuck-plates, a series of rollers arranged inside the rim of the carrier-wheel and intersecting the path of the can-bodies in the wheel pockets so that in passing the rollers said can-bodies are moved radially outward in the pockets, and means for moving the rollers concentrically with the wheel toward and away from the chuck-plates.

5. In a machine of the class described, a carrier-wheel having a rim in which are formed a series of pockets opening radially outward and adapted to receive can-bodies, a series of rotating chuck-plates arranged in pairs at the sides of the carrier-wheel, means for moving the carrier-wheel to bring can-bodies contained in the pockets successively between each pair of the chuck-plates, means for moving the chuck-plates axially toward and away from the can-bodies, and a series of rollers adapted to cooperate with the chuck-plates in acting upon the can-bodies, the said rollers being arranged inside the rim of the carrier-wheel so that in engaging the cans they tend to

raise the same out of the carrier-wheel pockets.

6. In a machine of the class described, a horizontally disposed shaft, a carrier-wheel mounted thereon and having peripheral outwardly opening pockets adapted to receive can-bodies, a series of rotating elements arranged in pairs at the sides of the wheel, means for actuating the wheel to bring can-bodies contained in the pockets successively between each pair of the rotating elements, means for moving said elements axially toward and away from the cans, bodies mounted on the horizontal shaft and oscillatable thereon, and rollers connected with said bodies and adjustable radially thereof, the said rollers being adapted to coöperate with the rotating elements in acting upon the cans, and said rollers being movable toward and away from the rotating elements by the oscillation of the bodies mounted upon the horizontal shaft.

7. In a combined can body flanging and seaming machine, the combination of a rotatable carrier, said carrier having a can holding pocket therein, means for flanging a can body at each end, and seaming mechanism, said flanging means and seaming mechanism both operating on the can while the same is in said pocket, substantially as specified.

8. In a combined can body flanging and seaming machine, the combination of a carrier rotatable about a horizontal axis and having a can holding pocket, a can body gravity feed chute, means for flanging a can body at each end thereof while the same is in said pocket, a can head feeder, and seaming mechanism for uniting the can body and head while in said pocket, substantially as specified.

9. In a combined can body flanging and double seaming machine, the combination of a carrier rotatable about a horizontal axis and provided with a combined can body and can end holder, can body flanging means for operating on the opposite ends of a can body while in said holder, and double seaming devices for uniting a can head to a can body while in said holder, substantially as specified.

10. In a combined can body flanging and double seaming machine, the combination of a carrier rotatable about a horizontal axis and provided with a plurality of pockets on its periphery, two sets of can treating means comprising can body flanging and double seaming mechanisms adjacent which each pocket of the carrier is presented successively, one set of said can treating means being adapted to operate at both ends of the can body and the other set at one end of the can body.

11. In a combined can body flanging and double seaming machine, the combination of a carrier rotatable about a horizontal axis, and provided with a plurality of pockets on its periphery, two sets of can treating means comprising can body flanging and double seaming mechanisms adjacent which each pocket of the carrier is presented successively, one set of said can treating means being adapted to operate at both ends of the can body and the other set at one end of the can body, and means for operating all of said can treating means simultaneously.

12. In a can body flanging machine, in combination: a carrier in which can bodies are adapted to rest on their sides; means for intermittently advancing said carrier; can body flanging means arranged to grip within and without the ends of the can bodies; and mechanism for actuating said flanging means to cause the can bodies to be pushed away from their supports and to cause the flanging means and the can bodies to be rotated.

13. In a can body flanging machine, in combination: a carrier in which can bodies are adapted to rest on their sides; means for intermittently advancing said carrier; internal and external flanging means arranged to grip within and without the lower parts of the ends of the can bodies; and mechanism for actuating the external flanging means to cause the can bodies to be lifted and presented to the internal flanging means and to cause the flanging means and the can bodies to be rotated.

14. In a can body flanging machine, in combination: a rotary carrier in which can bodies are adapted to rest on their sides; means for intermittently rotating said carrier and advancing the can bodies therein; internal and external can body flanging means arranged to grip within and without the ends of the can bodies; and mechanism for turning the external flanging means on the axis of the carrier to cause the can bodies to be pushed away from their supports and to cause the flanging means and the can bodies to be rotated.

15. In a can body flanging machine, in combination: a carrier having pockets in which can bodies are adapted to rest on their sides; means for intermittently advancing said carrier; can body flanging means arranged to grip within and without the ends of the can body; and mechanism for actuating said flanging means to cause the can body to be pushed away from the pocket and to cause the flanging means and the can body to be rotated free from the pocket.

16. In a can body flanging and heading machine, in combination: a carrier having means for supporting can bodies in horizontal position and can heads in corresponding position; means for intermittently ad-

vancing the said carrier; internal can body flanging members having means for moving them horizontally into the ends of the can bodies; external can body flanging members having means for moving them toward the can bodies to lift the same and engage them between the said external and internal flanging members; mechanism for rotating the flanging members; means for feeding can heads to the flanged cans; and seaming devices for seaming the heads to the can bodies.

17. In a can body flanging and heading machine, in combination: a rotary carrier having means for supporting can bodies in horizontal position and can heads in corresponding position; means for intermittently rotating the said carrier; internal can body flanging members having means for moving them horizontally into the ends of the can bodies; external can body flanging members having means for turning them on the axis of the carrier and moving them toward the can bodies to lift the same and engage them between the said external and internal flanging members; mechanism for rotating the flanging members; means for feeding can heads to the flanged cans; and seaming devices for seaming the heads to the can bodies, the external seaming devices having means for turning them on the axis of the carrier to cause them to engage the under sides of the can bodies.

18. In a can body flanging and heading machine, in combination: a carrier having means for supporting can bodies in horizontal position and can heads in corresponding position; means for intermittently advancing the said carrier; internal can body flanging members having means for moving them horizontally into the ends of the can bodies near the lower part of the same; external can body flanging members below the can bodies having means for moving them toward the can bodies to lift the same and engage them between the said external and internal flanging members; mechanism for rotating the flanging members; means for feeding can heads to the flanged cans; and seaming devices for seaming the heads to the can bodies.

19. In a can body flanging and heading machine, in combination: a carrier having means for supporting can bodies in horizontal position and can heads in corresponding position; means for intermittently advancing the said carrier; internal can body flanging members of less diameter than the can bodies and having means for moving them horizontally into the ends of the can bodies out of contact therewith; external can body flanging members having means for moving them toward the can bodies to lift the same and engage them between the said external and internal flanging members; mechanism for rotating the flanging members; means for feeding can heads to the flanged cans; and seaming devices for seaming the heads to the can bodies.

20. In a can body flanging and heading machine, in combination: a carrier having pockets in which can bodies are adapted to rest on their sides; means for intermittently advancing the carrier to bring the pockets to successive operating stations; revoluble flange-forming plates arranged one at each side of the carrier at the first operating station; means for projecting the said plates horizontally within the ends of a can body at said first station; flanging rollers arranged below the path of the pockets at said first station and adapted to coöperate with said plates to flange the ends of can bodies; means for moving the said rollers toward the under sides of the ends of the can bodies to press the same against the said revoluble plates; and seaming means arranged at the other of said operating stations.

21. In a can body flanging and heading machine, in combination: a carrier having pockets in which can bodies are adapted to rest on their sides; means for intermittently advancing the carrier to bring the pockets to successive operating stations; revoluble flange-forming plates of less diameter then the interior of the can bodies and arranged one at each side of the carrier at the first operating station; means for projecting the plates within the ends of and out of contact with a can body at said first station; flanging rollers arranged below the path of the pockets at said first station and adapted to coöperate with said plates to flange the ends of can bodies; means for moving the said rollers toward the under sides of the ends of the can bodies to press the same against the said revoluble plates; and seaming means arranged at the other of said operating stations.

22. In a can body flanging machine, in combination: a carrier having successive holding means for the can bodies; means for intermittently advancing said carrier; can body flanging means arranged to grip within and without the ends of the can bodies; and mechanism for actuating said flanging means to cause the flanging means and the can bodies to be rotated with the can bodies free from their said holding means.

23. In a can body flanging machine, in combination: a carrier having successive holding means for the can bodies on which the can bodies are adapted to rest with their axes substantially horizontal; means for intermittently advancing said carrier; internal and external can body flanging means arranged to grip within and without the ends of the can bodies; and mechanism for actuating the said flanging means to cause

the can bodies to be rotated and flanged while free from their said holding means.

24. In a can body flanging machine, in combination: a carrier having successive holding means for the can bodies by which the can bodies are adapted to be supported; means for intermittently advancing said carrier; internal and external can body flanging means arranged eccentrically of the can body to grip within and without the same; and mechanism for actuating the said flanging means to cause the can bodies to be rotated and flanged.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

LEE C. SHARP.

Witnesses:
D. O. BARNELL,
ROY G. KRATZ.