

H. C. BLACK.

CAN END CRIMPING AND SEAMING MECHANISM.

APPLICATION FILED APR. 6, 1906.

3 SHEETS—SHEET 1.

Fig. 2

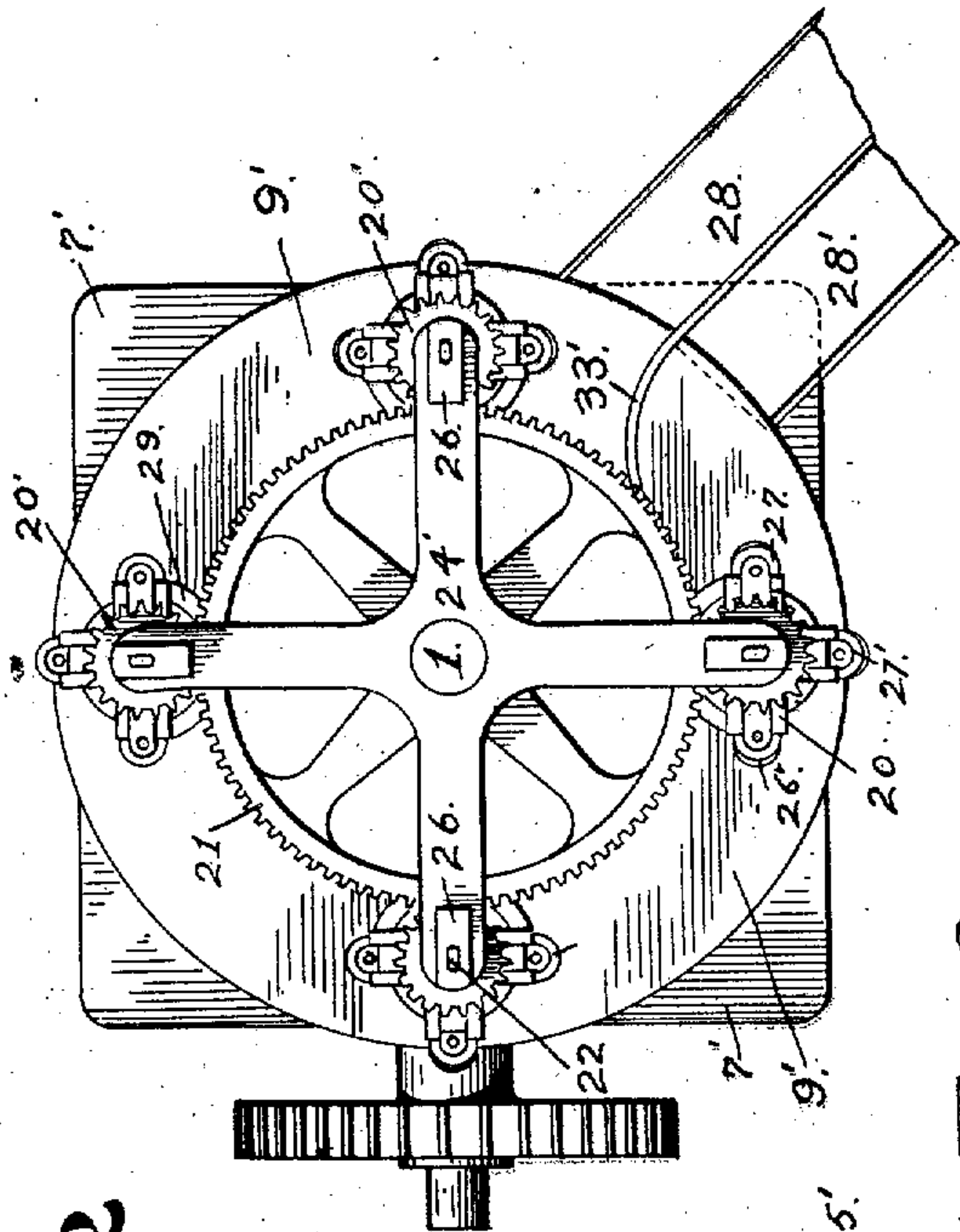


Fig. 3

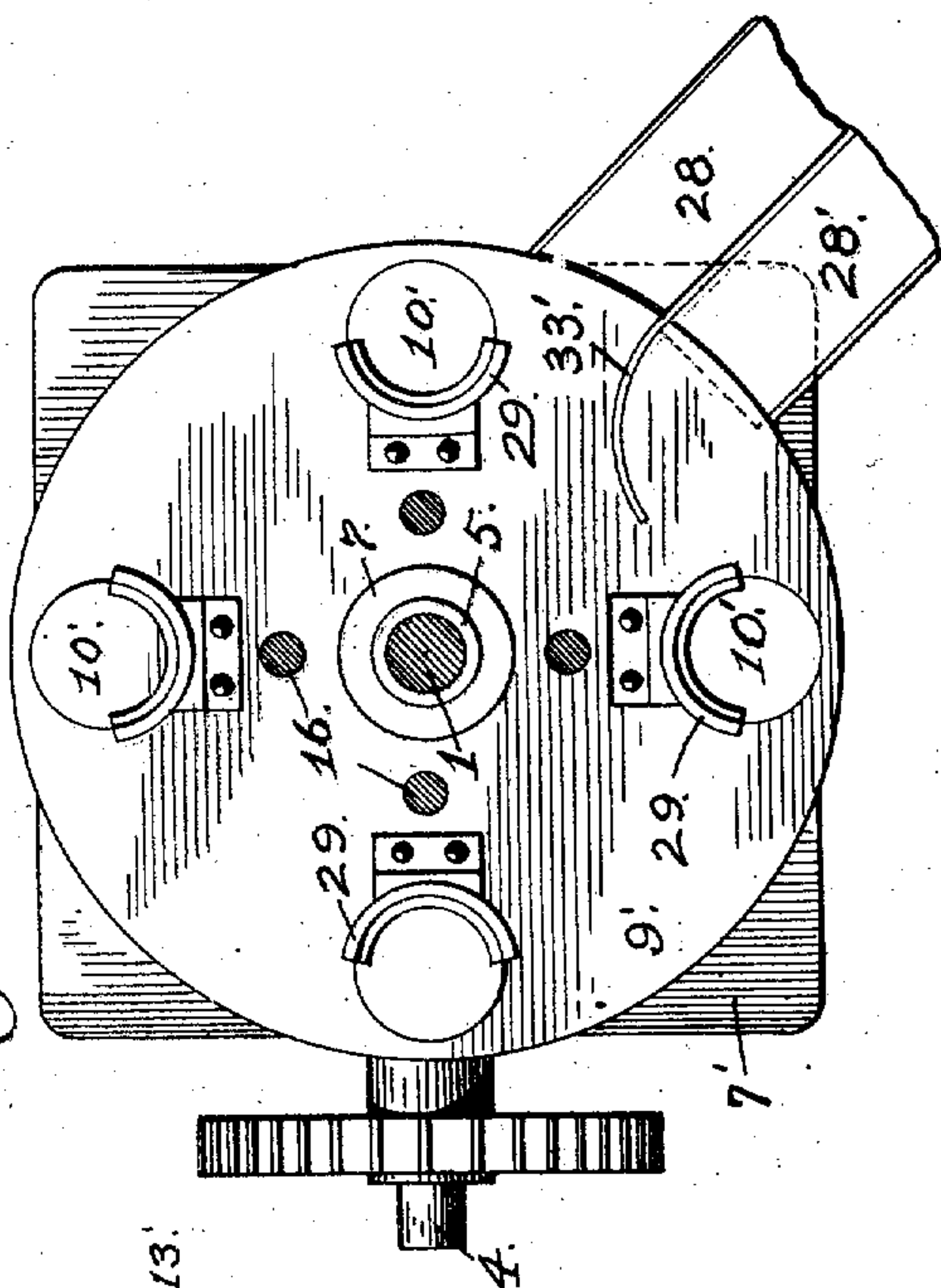
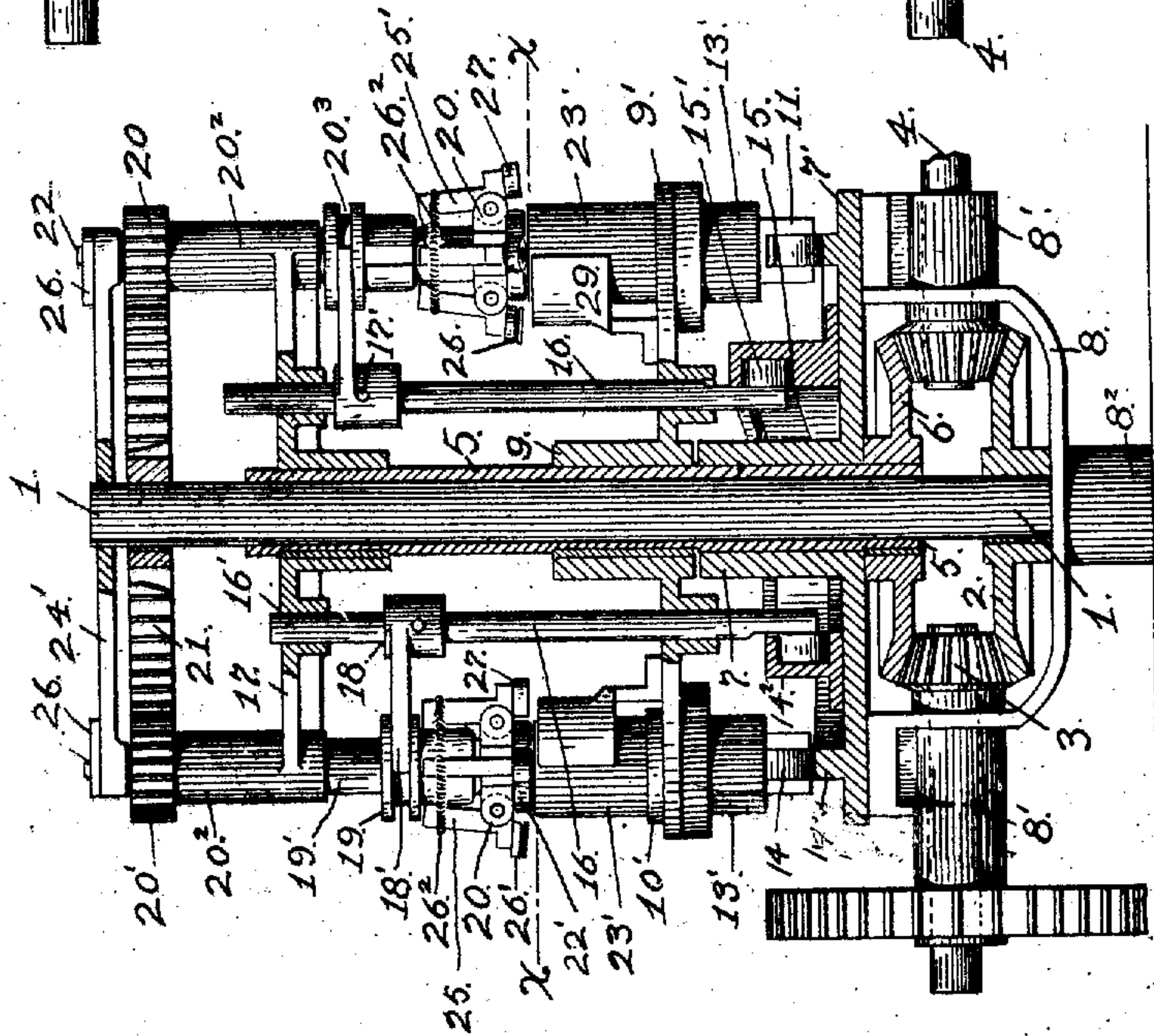


Fig. 1



Witnesses.

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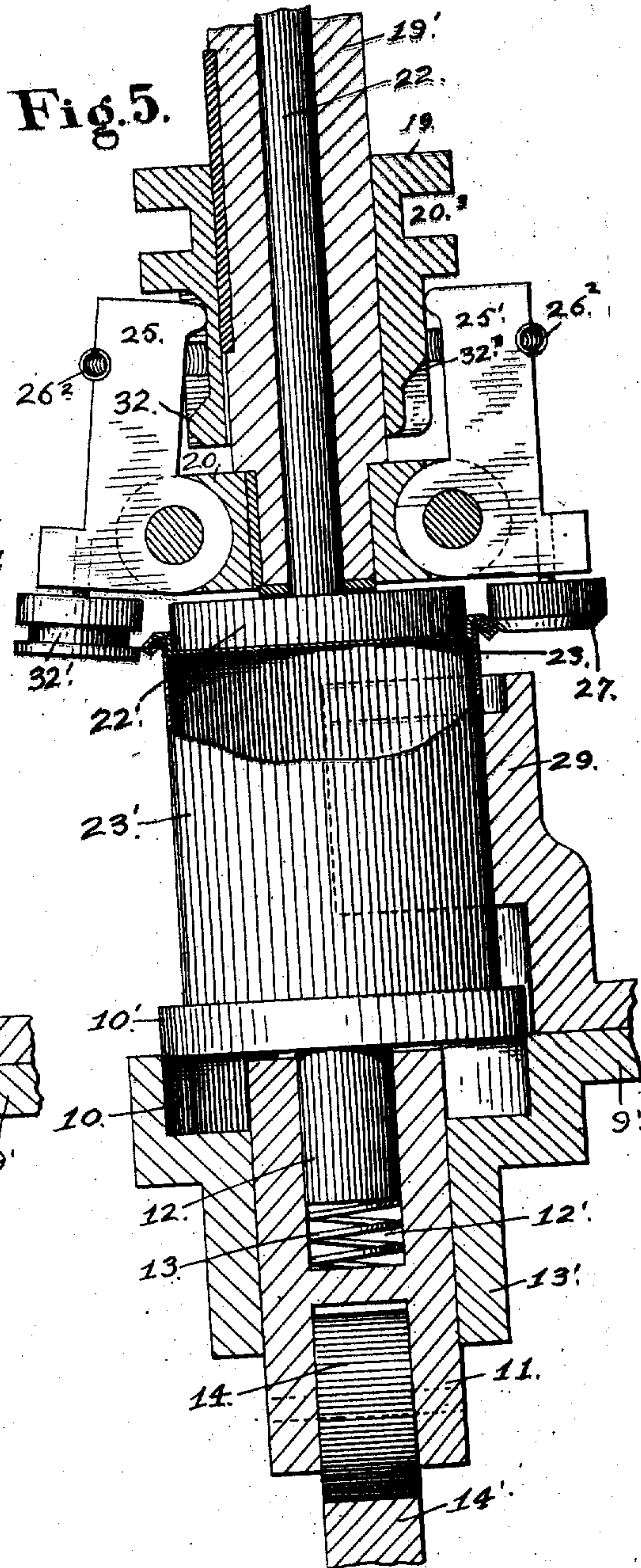
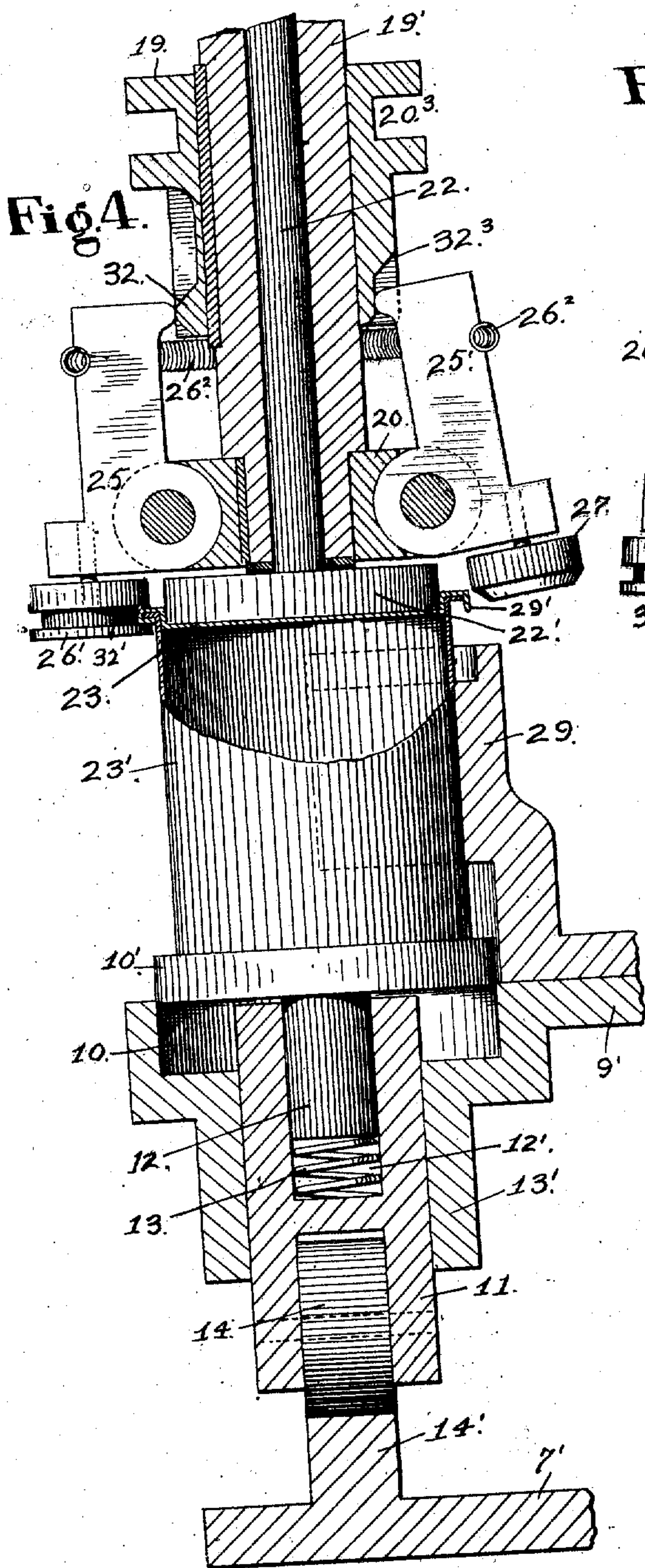
No. 858,784

PATENTED JULY 2, 1907.

H. C. BLACK.
CAN END CRIMPING AND SEAMING MECHANISM.

APPLICATION FILED APR. 8, 1906.

3 SHEETS—SHEET 2.



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No. 858,784.

PATENTED JULY 2, 1907

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CAN END CRIMPING AND SEAMING MECHANISM.

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3 SHEETS—SHEET 3.

Fig. 6.

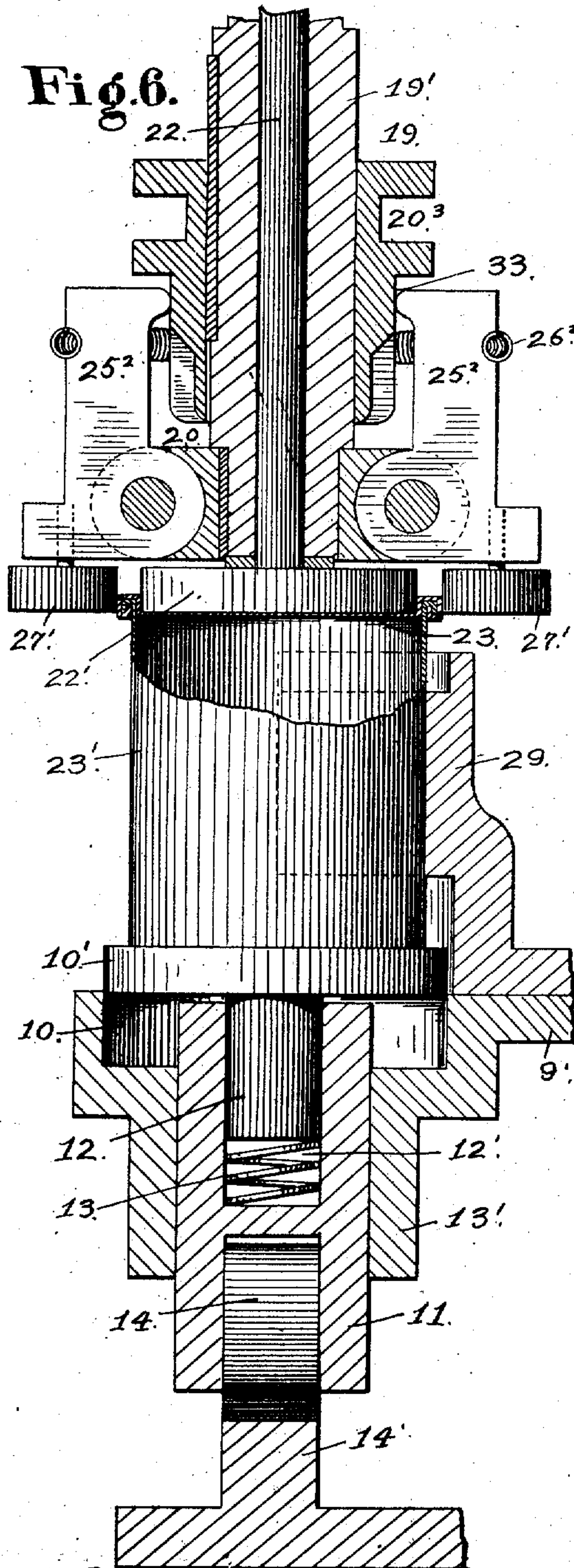


Fig. 7.

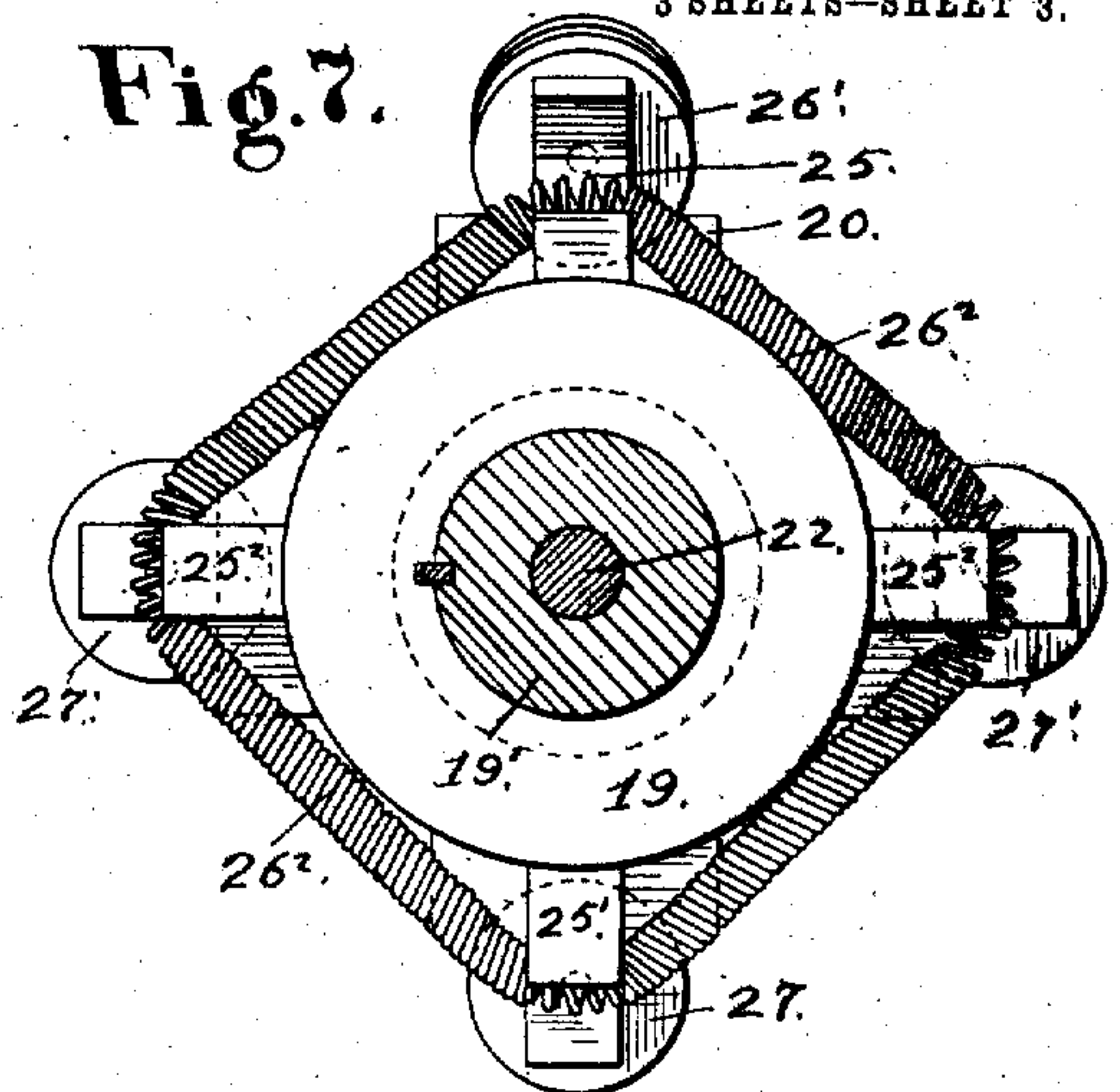


Fig. 8.

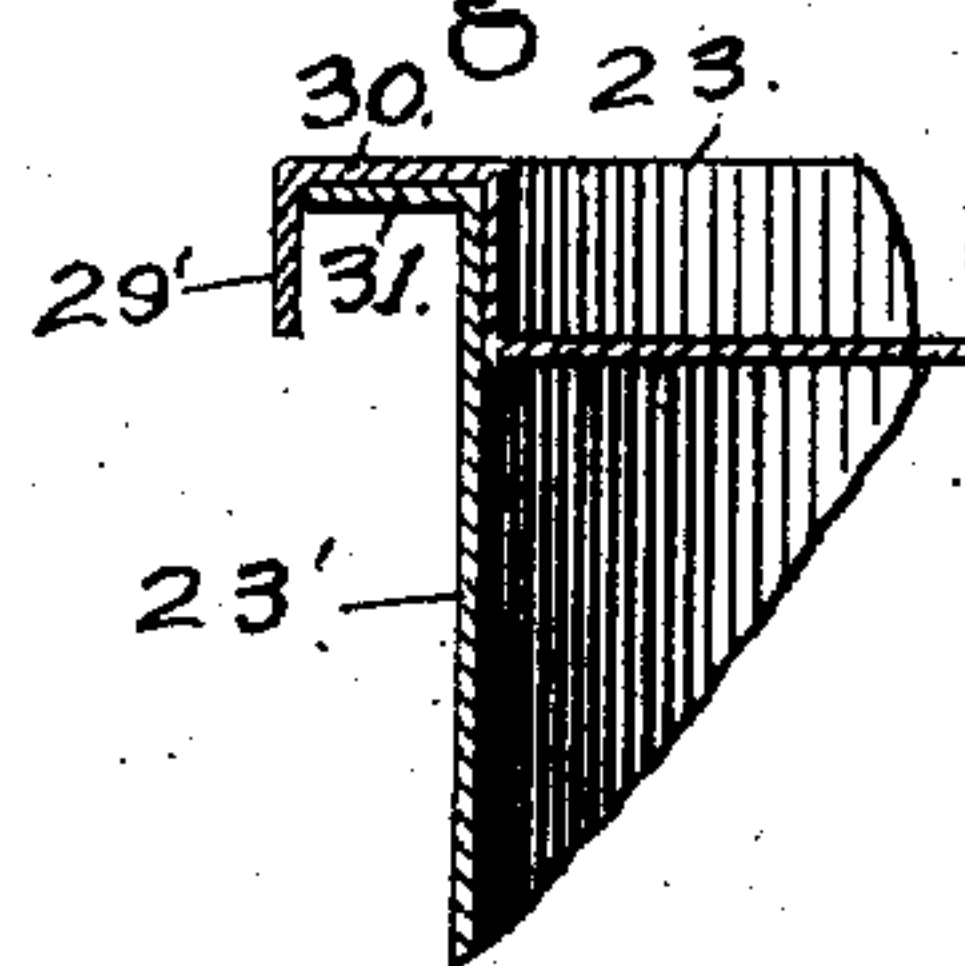


Fig. 9.

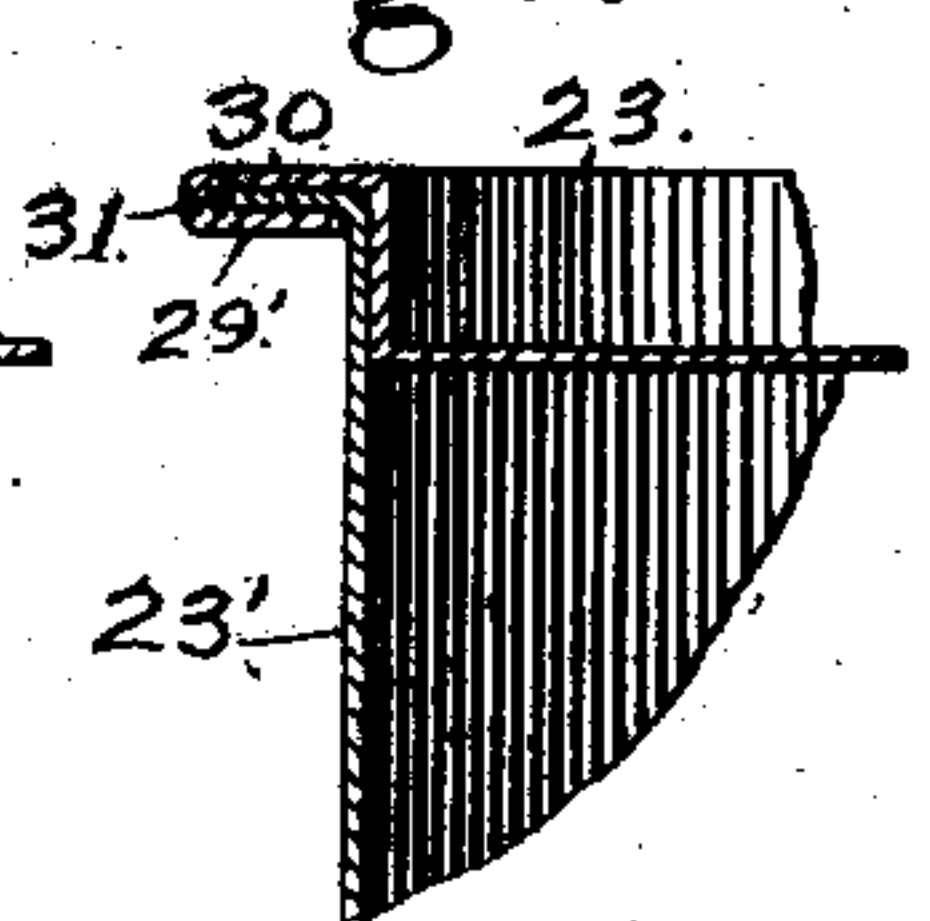


Fig. 10.

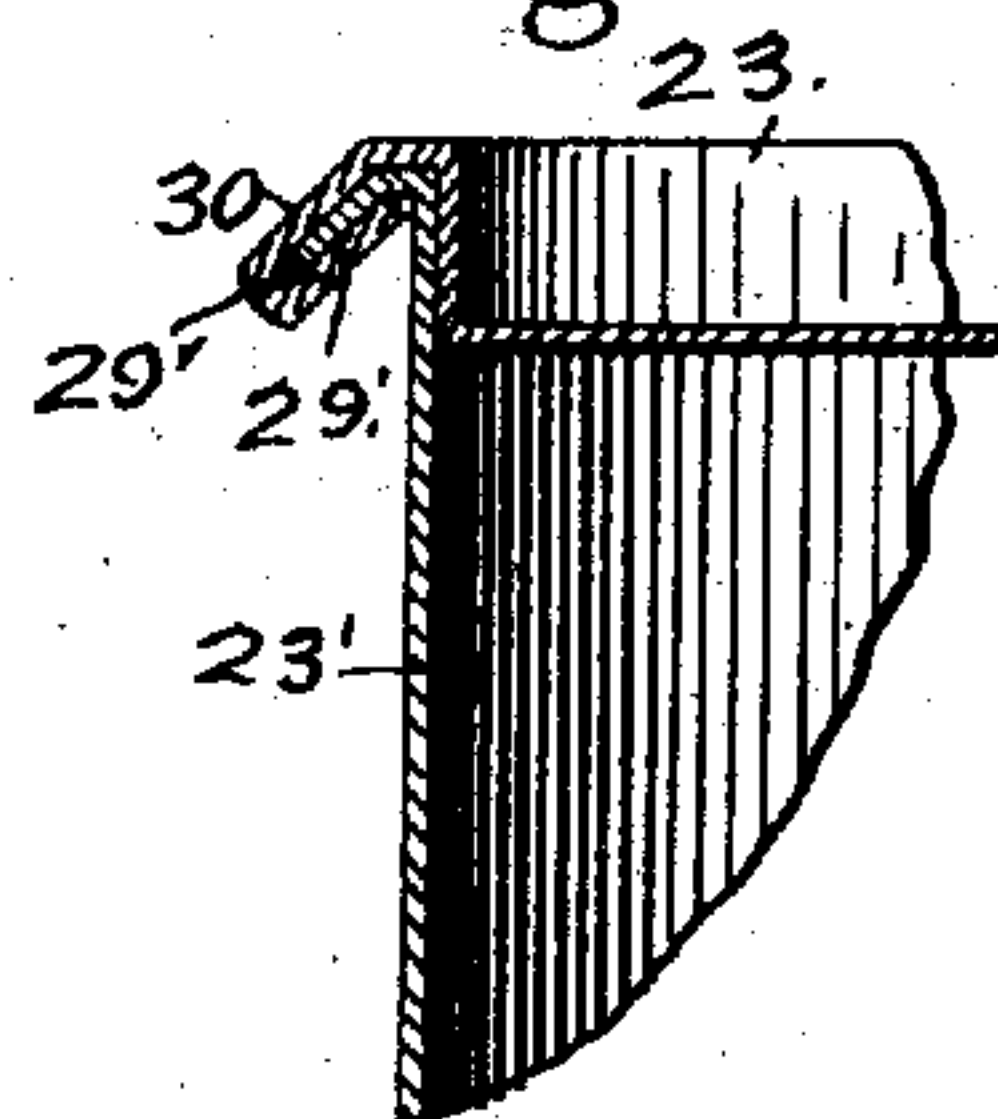
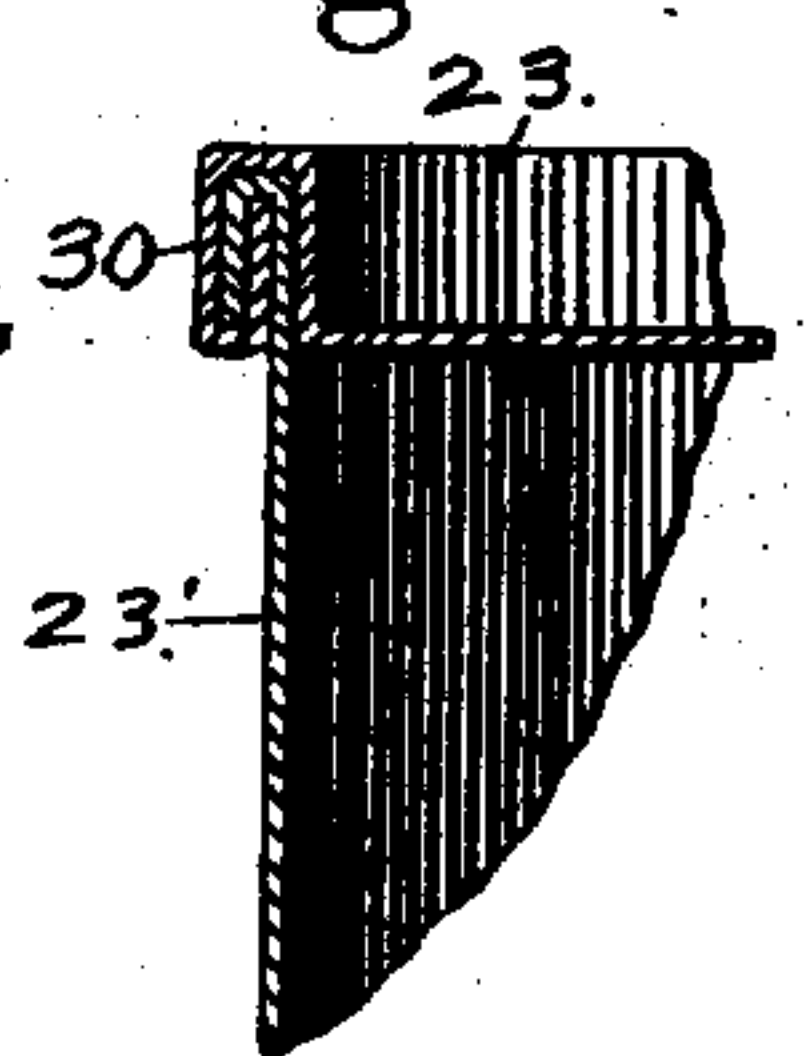


Fig. 11.



Witnesses.

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UNITED STATES PATENT OFFICE.

HENRY C. BLACK, OF SAN FRANCISCO, CALIFORNIA.

CAN-END CRIMPING AND SEAMING MECHANISM.

No. 858,784.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed April 6, 1906. Serial No. 310,315.

To all whom it may concern:

Be it known that I, HENRY C. BLACK, a citizen of the United States, residing at the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Can-End Crimping and Seaming Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the same.

The present invention is more particularly designed for use in connection with packing and canning establishments for the hermetically sealing of fruits, vegetables, fish and kindred articles in metallic bodies having the heads and tops secured to the body portion thereof, by being crimped and seamed thereon, the use of solder for uniting the tops and bottoms to the body of the cans being dispensed with, the goods thus being sealed in what is known as a "sanitary can."

The object of the invention is to provide automatically actuated devices for crimping and seaming the tops and bottoms to the can body by a double seamed joint, the can during such crimping operation being held against rotation.

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

Figure 1 is a view of the apparatus in elevation, illustrating the relative position of the various parts, the vertical drive sleeve for imparting horizontal rotary travel to the receiving table and to the crimping and seaming mechanism for the cans being sectioned, the said receiving table, the spider carrying the guide sleeves, and the cam grooved ring for the vertically movable plunger rods being illustrated in part section; Fig. 2 is a top plan view of the mechanism illustrated in Fig. 1 of the drawings, said view disclosing the feed device for supplying the cans to the rotatable receiving table, and the means for removing the cans therefrom after the top or end has been crimped and seamed thereon; Fig. 3 is a longitudinal sectional top plan view taken on line x—x of Fig. 1 of the drawings; Fig. 4 is an enlarged detail part sectional view of one of the crimping and seaming means for the can head or end, said view disclosing a broken section of a portion of the receiving table and the can to be crimped and seamed held thereon, the can head or end being applied to the end of the can body, the said view illustrating the position of the crimping roll after having completed the crimping of a portion of the can head or end to the circular flange of the can body, such being the first step of the crimping and seaming operation, the first seaming roll which acts on the flanged portion of the can body being shown swung outward or away from the can body, the plunger or head on which rests the can to be crimped or seamed being moved upward, to force the head or end of the can against the mandrel which holds the can head firmly in position and receives the pressure of the rolls of the crimping means; Fig. 5 is a view similar to Fig. 4, of

the drawings, illustrating the second step of the crimping and seaming operation; in this view the first seaming roll being illustrated as having partially seamed the flanged end to place the same at an inclination to the can body, the crimping roll having completed its work and being moved away from the body of the can; Fig. 6 is a similar view illustrating the position of the final seaming rolls which force the metal of the crimped and partially seamed end firmly against the body of the can, such being the last step in the crimping and seaming operation; these seaming rolls are not shown in Figs. 4 and 5 of the drawings, the section of the parts disclosed by said views being taken on such lines as to remove the said rolls; Fig. 7 is a plan view of one of the crimping means, said view illustrating the spring connection for holding the upper portion of the hinged arms carrying the rolls of the crimping and seaming means inward, and the vertically movable collar for actuating said rolls, the rotating spindle to which said collar is feathered and the mandrel stem about which said sleeve rotates axially being sectioned. Fig. 8 is a broken enlarged detail section of a can with its head or end to be crimped and seamed loosely applied thereto; Fig. 9 is a similar view showing the position of the flange of the can head or end after the action of the crimping roll, which is the first step of the crimping and seaming operation; Fig. 10 is a similar view showing the position of the flange of the can head or end and the flange of the can body after the action of the first seaming roll, which is the second step of the crimping and seaming operation; and Fig. 11 is a similar view of the can with its head completely seamed thereto, which is the final step of the crimping and seaming operation.

In the drawings the numeral 1 is used to designate a central vertical shaft, to which is keyed a gear 2. Motion is imparted to this gear for rotating the shaft 1, by means of the pinions 3, which pinions are secured to the drive shafts 4.

On the shaft 1 is loosely fitted the drive sleeve 5, rotation being given to sleeve 5 by the said pinions 3, which mesh with the gear 6, keyed to the lower end portion of the said sleeve 5, Fig. 1 of the drawings. This sleeve 5 thus rotates axially about the rotating shaft 1 and the said sleeve imparts rotary travel to the hereinafter described receiving table for the cans, and the means for crimping and seaming the can head or end to the can body held to the rotary impelled receiving table. The drive sleeve 5 passes through a hub 7, upwardly projecting from a suitably supported stationary base plate 7', which plate carries the depending brackets 8, which serve as supports for the bearings 8' and are connected to the lower bearing 8² for the central shaft 1.

To the rotatable drive sleeve 5 is keyed the hub 9 of the receiving table 9', within counter-sunk circular

seats 10 of which work the detached heads 10' of the plunger rods 11, the stem 12 of each head 10 fitting within a socket 12', in the end of each plunger rod 11, the lower end of each stem 12 bearing on a spring 13, fitted within the sockets 12'. Each plunger rod 11 works through a guide extension 13', depending from the receiving table 9', and, in the lower bifurcated end of each plunger rod 11 is secured a roller 14. These rollers ride upon the inclined circular track 14', secured to the base plate 7', as the plunger rods 11 are carried around by the rotary travel of the receiving table 9'.

To the base plate 7' there is also attached a ring 14², said ring having formed in its inner face an inclined cam groove 15. Within this cam groove 15 work the rollers 15', which rollers are secured to a stud or pin outwardly projecting from the lower end of the vertically movable lift rods 16. These rods work through openings 16' formed in the rotatable disk 17, which disk is keyed to the drive sleeve 5. Each rod 16 has secured thereto by a set screw 17', a collar 18, each collar carrying a lift plate 18'. The outer end of each lift plate 18' is forked so as to straddle a vertically movable collar 19, feathered to a hollow spindle 19', carrying the head 20, to which the arms of the crimping and seaming rollers are hinged. The forked end of the lift plate 18' fits within a circular groove or channel 20², cut in each of the vertically movable collars 19, the purpose of said plates is to raise and lower the vertically movable collars 19, as the lift rods 16 are forced up and down by the rollers 15', riding onto and off of the inclined portions of the cam groove 15, of the ring 14².

To the disk 17 is attached a series of guide bearings 20², within which guide bearings work the hollow spindles 19'. Each spindle 19' projects beyond the said guide bearings 20², and to the projecting end portion thereof is secured a pinion 20'. Said pinions mesh with and are driven by means of the gear 21, which gear is secured to the upper end of the central shaft 1, the rotation of said shaft being thus transmitted for imparting rotation to the pinions 20' for rotating the spindle 19'. Through each spindle 19' extends a stem 22 of the mandrel 22' secured to the lower end of each stem, which mandrel engages with the head or end 23, loosely fitted onto the open flanged end of the can 23', and holds the same so positioned during the operation of crimping and seaming the said head or end onto the open end of the can. The upper end of each mandrel stem 22, extends through a guide opening formed in the spider 24', secured to the end of the rotating shaft 1, each stem being held against rotary movement by reason of its flattened end fitting within a similarly shaped socket formed in the plates 26, attached to the spider 24', immediately above the guide openings 24, within which guide openings is fitted the upper end of the spindle 19'.

To the head 20, keyed to each of the rotatable spindles 19' are hinged, in the present case, four arms, 25, 25', 25² which arms are held inwardly pressed at their upper end, by means of the spring ring 26², Fig. 7 of the drawings. To the lower end of the arm 25 is secured the circumferentially grooved crimping roller 26', the arm 25', at its lower end, carrying the beveled face seaming roller 27, while the opposed hinged arms

25², located intermediate the arms 25 and 25', carry at their lower end the seaming rolls 27', each of the described rollers being so disposed that the faces thereof work against the metal to be crimped and seamed.

The cans 23' or the bodies onto which an end or head 23 is to be seamed, are fed onto the receiving table 9', by means of any suitable feed conveyer 28, the can, or can body, after having an end or head 23 seamed thereto is removed from the receiving table 9' onto any suitable delivery conveyer or device 28', for receiving the headed can, or the can body to which an end has been seamed.

While either end or head may be applied to a can body, in describing the operation of the apparatus, the body shall be treated as having had its bottom applied thereto and that the same has been delivered to the machine as a filled can, onto the open end of which a head is to be seamed, and in the following of such operation, the movements of only one of the crimping and seaming devices will be given, as the action of the remaining devices constitutes a mere repetition.

The operation of the machine may be briefly given as follows: During the horizontal rotation of the receiving table 9', driven by the sleeve 5, the lowermost can of the series held by the feed conveyer 28, is gradually removed therefrom and engaged by the advancing inner edge of one of the fixed molds 29, secured to the receiving table 9', and the said can 23' moved onto the table immediately above the vertically movable plunger head 10', working in connection with the crimping and seaming mechanism associated with such mold or semi-circular jaw 29. As the receiving table 9' continues its rotation, the roller 14, of the plunger rod 11, for actuating said plunger head 10', rides upon the upwardly inclined portion of the circular track 14', which lifts the plunger rod 11 and raises the plunger head 10' and can 23' resting thereon, forcing the head 23, previously loosely placed onto the open end of the can, firmly against the mandrel 22', thus holding the can 23' clamped against rotary movement. The mandrel 22' fits within the depressed central portion of the head 23, the depending portion 29' of the circular flange 30 of the said head 23 encircling the outwardly projecting circular flange 31 of the can 23'. The spring 13, within the socket 12', of the plunger rod 11, permits of the head 10' giving slightly to compensate for any slight variation in the height of the can. As the can with its head loosely fitted thereto is clamped between the plunger head 10' and the mandrel 22', the roller 15' commences to ride upon the downwardly inclined portion of the cam groove 15, of the ring 14², lowering the lift rod 16, and, through the medium of the lift plate 18', carrying therewith the slide collar 19. As this collar is forced downward, the outwardly inclined lower end portion 32 thereof, bears against the upper end portion of the hinged arm 25, swinging the same to force the crimping roll 26' inward, the depending portion 29' of the can head flange 23, being engaged by the periphery of the said roll 26', and being gradually crimped or turned under the circular flange 31, of the open end of the can 23', until the roll 26' stands in a position parallel to the body of the said can 23', the circular groove 32' in the periphery of the roll 26', permitting the said roll to gradually crimp or turn under the depending portion of the can head flange 30, Figs. 4 and 9, of the

drawings. The continued rotation of the receiving table causes the roller 15' to continue its travel on the downwardly inclined portion of the cam groove 15, drawing the slide collar 19 downward, until the edge of the hinged arm 25 clears the inclined portion 32 thereof, when the tension of the spring ring 26² forces the upper end portion of the said arm 25 inward, so as to move the roller 26' away from the crimped joint of the held can. At the same time, the upper end of the hinged arm 25' is forced outward by the inclined shouldered portion 32³ of the gradually lowering slide collar 19, forcing its lower end inward and causing the first seaming roller 27 to gradually move inward toward the can and to partially force the crimped joint toward the body of the can 23', Figs. 5 and 10, of the drawings. The continued downward movement of the slide collar 19, causes the upper portion of the hinged arms 25², to move onto the surface 33 of the collar 19, which gradually moves inward the lower end of the said hinged arms and causes the seaming rollers 27' to force the crimped and partially seamed joint firmly down onto the body of the can 23', a double seamed joint being thus formed, Figs. 6 and 11 of the drawings. It will be understood that the mandrel 22' resists the pressure of the described rollers during the operation of crimping and seaming the end joint, likewise that during the described operation the slide collar 19 is carried around by the rotation of the spindle 19', to which the said collar is feathered. As the roller 15' moves from off the downwardly inclined portion of the cam groove 15, and onto the upwardly inclined portion thereof, the lift rod 16 is raised and the slide collar 19, through its connection therewith, gradually moves its full upward distance, the pressure of the spring ring 26 restoring the hinged arms 25' and 25² and the rollers carried thereby, to normal position. The moment the said arms carrying the seaming rollers 27' move away from the seamed end of the can, the roll 14 moves onto the downwardly inclined portion of the track 14' and the plunger rod 11 gradually descends by gravity, lowering therewith its head 10', until the seamed can 23' is flush with the surface of the receiving table 9'. The seamed can is then engaged by a fixed curved plate 33', located at one side of the conveyor 28. This curved plate for guiding the cans from off the receiving table 9' onto the delivery device 28', is arranged immediately above the surface of the said receiving table, the seamed cans carried by the said table striking against the said plate and being gradually deflected from off the table 9' onto the said delivery device 28'.

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

1. An apparatus for receiving loosely headed cans and automatically seaming the head thereto, the same comprising a receiving table, devices for clamping a can thereto against rotation, mechanism for crimping the flange of the head to the end flange of the can and seaming the same thereto by a double seamed joint, and means for moving the crimping and seaming mechanism into and out of engagement with the held can, including a vertically reciprocating lift rod, and actuating means at the lower end of the rod, and a transversely arranged lift plate secured to the rod intermediate its ends.
2. An apparatus for the described purpose, the same comprising a rotatable receiving table, a series of vertically movable plungers carried thereby, a mandrel for each plunger, a semi-circular clamp engaging the can body

of devices for raising the plungers to force a can placed thereon against the mandrel for clamping the same against rotation and lowering the plunger to release the can after its head has been seamed thereto, a series of crimping and seaming rolls, means for normally holding the crimping and seaming rolls away from the end of the clamped can, and devices for successively forcing the crimping roll against the flange of the head loosely applied to the can to crimp the same to the end flange of the held can, the seaming rolls against the crimped flange to unite the same to the can by a double seam joint, and releasing the crimping and seaming rolls as the head of the can is crimped and seamed thereto, the said devices including a stationary cam track and a vertical reciprocating lifting rod passing through an aperture in said table and engaging said track.

3. In an apparatus for the described purpose, the combination with a series of crimping and seaming rolls, of a rotatable head, to which said rolls are united by hinged arms, of devices for imparting rotation to said head, comprising a rotary shaft, a gear on said shaft, and an intermeshing pinion having connection with the head, of a tension device for normally holding the arms upward, and means for moving the arms to successively move the crimping rolls and seaming rolls inward to force the crimping rolls against the flange of the can head to crimp the same to the end flange of a held can and the seaming rolls against the crimped flange to unite the same to the can by a double seam joint, and actuating devices for said means, including a stationary cam track, a sleeve rotatable about the axis of the shaft and a lift rod carried by the sleeve and operatively associated with said first-mentioned means.

4. An apparatus for receiving loosely headed cans and automatically seaming the head thereto, the same comprising a vertically arranged rotatable shaft, a sleeve rotatable about the axis of the shaft, a can-receiving table carried by the sleeve, seaming and crimping rolls, a spindle therefor and means for transmitting the motion of said shaft to said spindle, means for holding the cans against rotation, devices for moving the seaming and crimping rolls towards and from the held cans, and means for imparting rotation to the sleeve and shaft, including gear wheels mounted respectively upon the shaft and sleeve, and a drive pinion intermeshing with each of said gear wheels.

5. In an apparatus for the described purpose, the combination of a vertically arranged rotatable shaft, a sleeve rotatable about the axis of the shaft, a can-receiving table carried by the sleeve, seaming and crimping rolls, a spindle therefor and means for transmitting the motion of said shaft to said spindle, means for holding the cans against rotation, and devices for guiding and moving the seaming and crimping rolls toward and from the held cans, including an apertured disk, carried by said sleeve, a lift rod slidable in the aperture of said disk, and a lift plate in engagement with the seaming and crimping attachment.

6. In an apparatus for the described purpose, the combination with a central shaft, of a drive sleeve loosely fitted thereon, of means for imparting rotation to the said shaft and sleeve, of a receiving table secured to the said sleeve, a series of vertically movable plungers carried by the table, of devices for raising and lowering the plungers, of a series of non-rotating mandrels held above the plungers and against which cans delivered to the plungers are clamped when the plungers are raised, of a series of rotating thimbles, of devices for transmitting the rotation of the central shaft to the said thimbles, of a slide collar feathered to each thimble, of a series of crimping and seaming rolls carried by the rotating thimbles, and means actuated by the movement of the receiving table for actuating said rolls for successively forcing the crimping roll against the flange of a can head to crimp the same to the end flange of a held can and the seaming rolls against the crimped flange to double seam the flanges to the end of the can.

7. In an apparatus for receiving loosely headed cans and automatically seaming the head thereto, the same comprising a vertically arranged rotatable shaft, a sleeve rotatable about the axis of the shaft, a can-receiving table carried by the sleeve, vertically movable seaming and crimping rolls, a head therefor, and means for trans-

mitting the motion of said shaft to said head, means for holding the cans against rotation, and means for moving the seaming and crimping rolls towards and from the holding cans, including a stationary cam track, and a
 5 rod connecting with the head and movable with said sleeve, and actuated by said cam track.

8. In an apparatus for receiving loosely headed cans and automatically seaming the head thereto, the combination of a rotatable receiving table, means for clamping the can
 10 thereto, means operating successively for crimping the flange of the head to the end flange of the can and seaming the same thereto by a double seamed joint and comprising a circumferentially grooved crimping roll, a beveled-face seaming roll, and a straight face roll, and means
 15 actuated by the movement of the receiving table for moving the crimping and seaming mechanism into and out of engagement with the held can.

9. In an apparatus of the character described, the combination of a vertically arranged rotatable shaft, of a sleeve

rotatable about the axis of said shaft, a receiving table 20 keyed to said sleeve, an apertured disk carried by the sleeve, seaming and crimping rolls carried by the sleeve, a spindle for said rolls, means for imparting to said spindle the rotary movement of said shaft, means for imparting movement to the spindle whereby the rolls are
 25 brought towards and from the held cans, including a vertically movable lift rod having connection with the spindle and passing through the aperture of the disk, means for imparting the movement to said rod, and means for imparting movement to said sleeve and shaft, including
 30 gears mounted upon each, and a pinion common to both gears.

In witness whereof I have hereunto affixed my signature in the presence of witnesses.

HENRY C. BLACK.

Witnesses:

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D. B. RICHARDS.