

No. 876,364.

PATENTED JAN. 14, 1908.

W. D. LEGGE.
BOTTLE WRAPPER MACHINE.

APPLICATION FILED MAY 4, 1906.

6 SHEETS—SHEET 1.

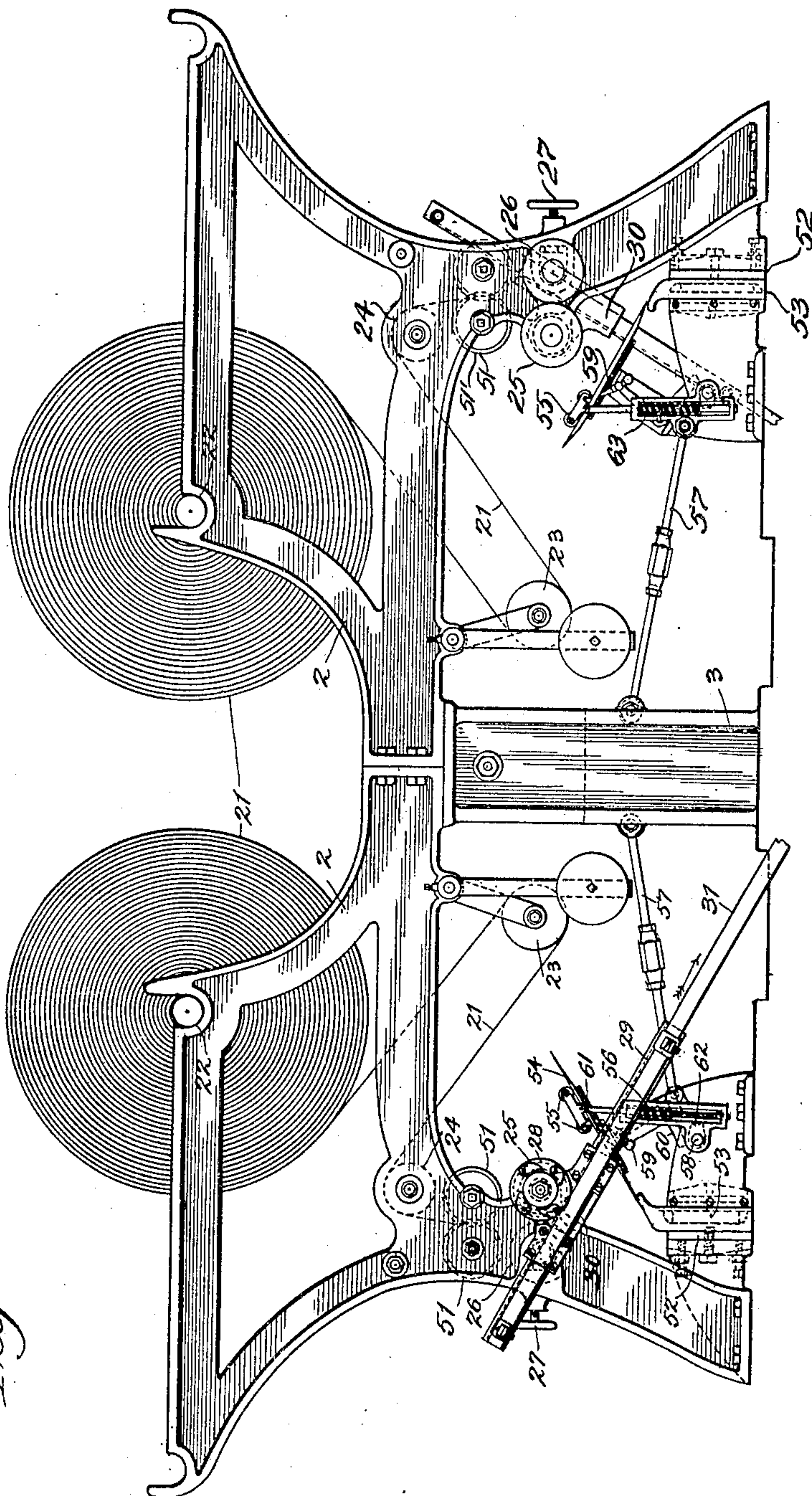


Fig. 1.

Witnesses
Harry B. White.
Ray White.

Inventor
W. D. Legge
By *Kumler & Kumler*
Attys.

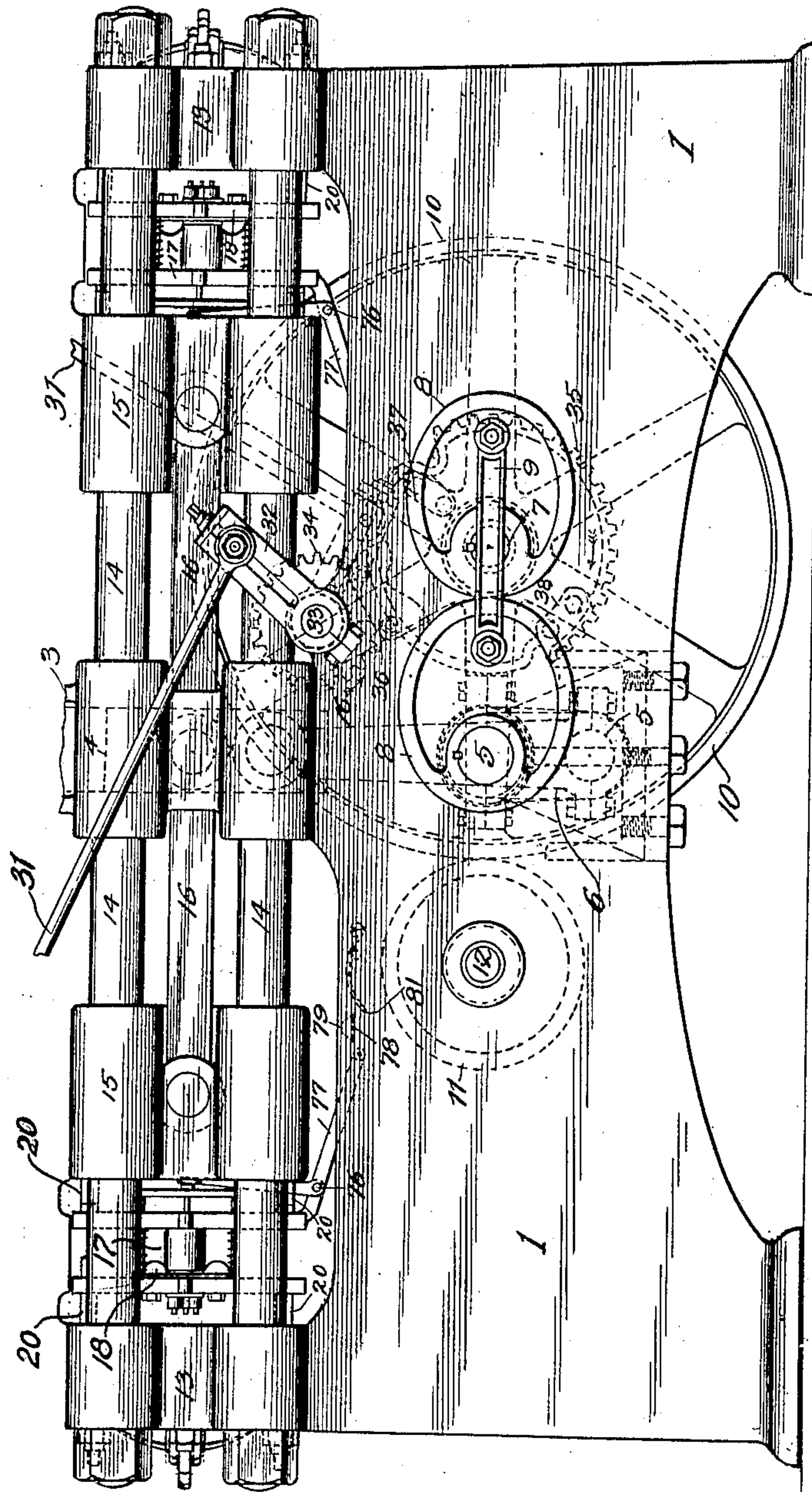
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6 SHEETS—SHEET 2

Fig. 2.



Witnesses
Harry B. L. White
Ray White.

Inventor
W. D. Legge,
By *Rummler & Rummler*
Attys.

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W. D. LEGGE.
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6 SHEETS—SHEET 3.

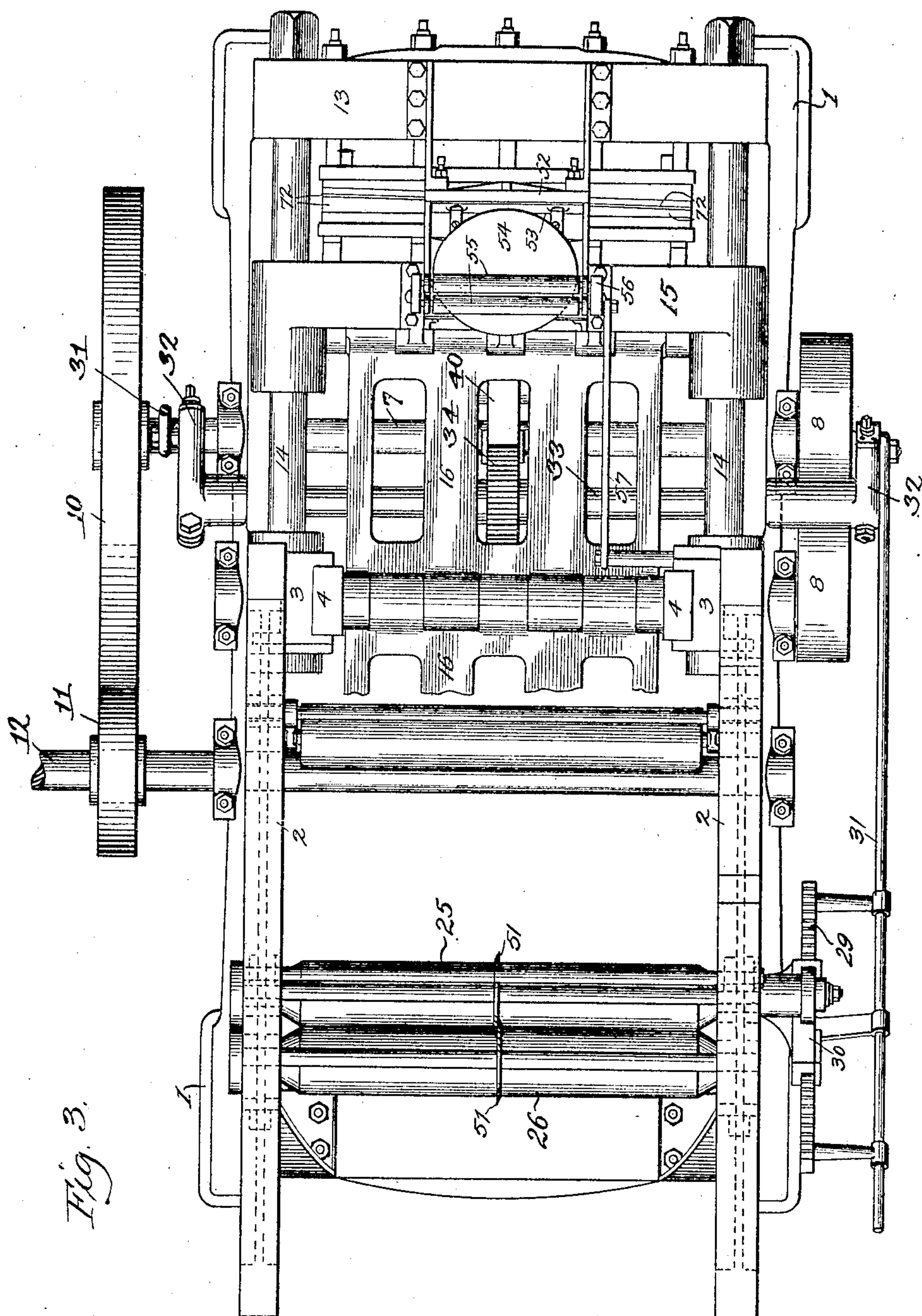


Fig. 3.

Witnesses
Harry R. L. White
Ray White.

Inventor
W. D. Legge,
By *Sumner & Sumner*
Attys.

No. 876,364.

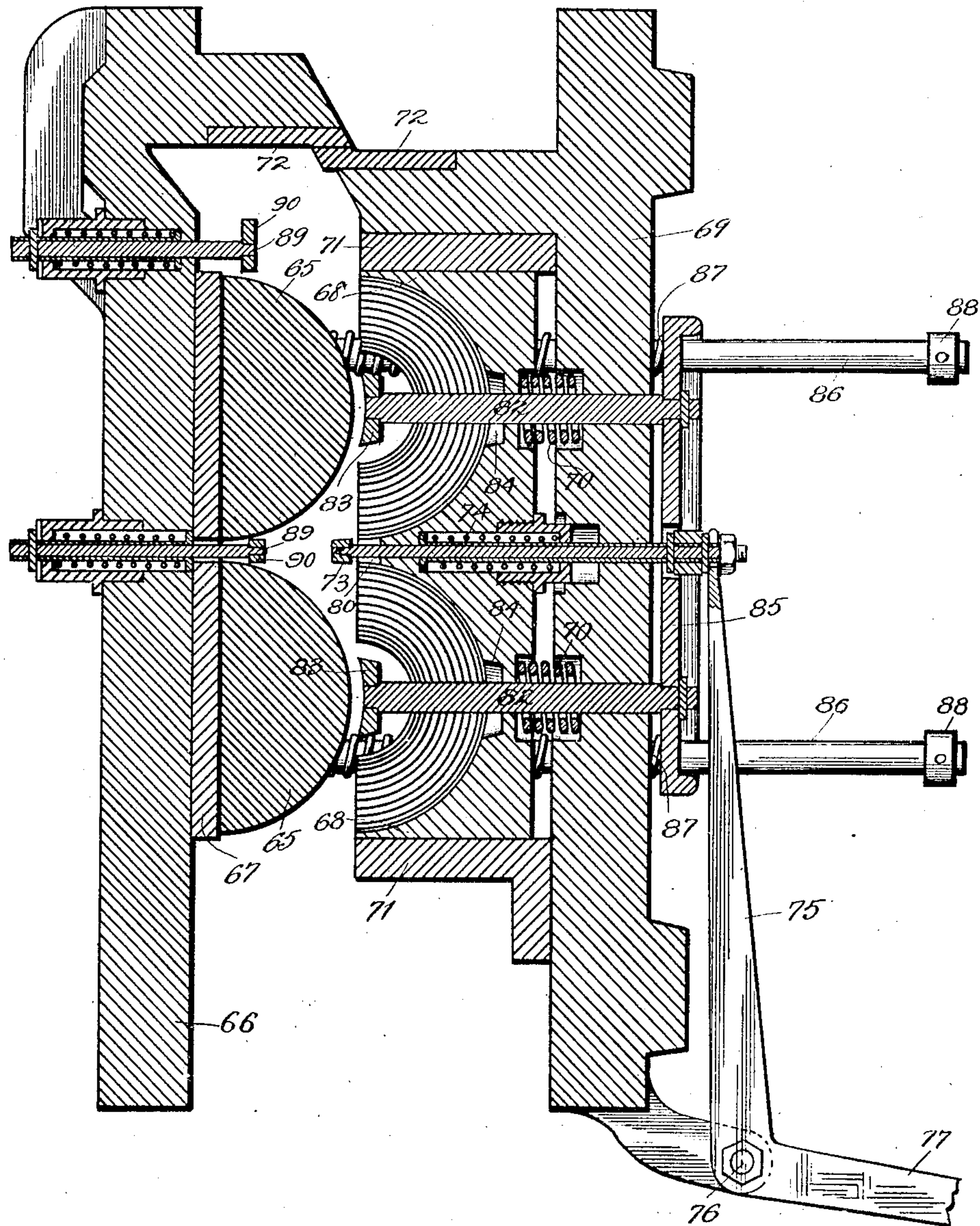
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6 SHEETS—SHEET 4.

Fig. 4.



Witnesses:
Harry P. White
L. A. Smith

Inventor,
W. D. Legge
by Rummel Rummel,
Attorneys.

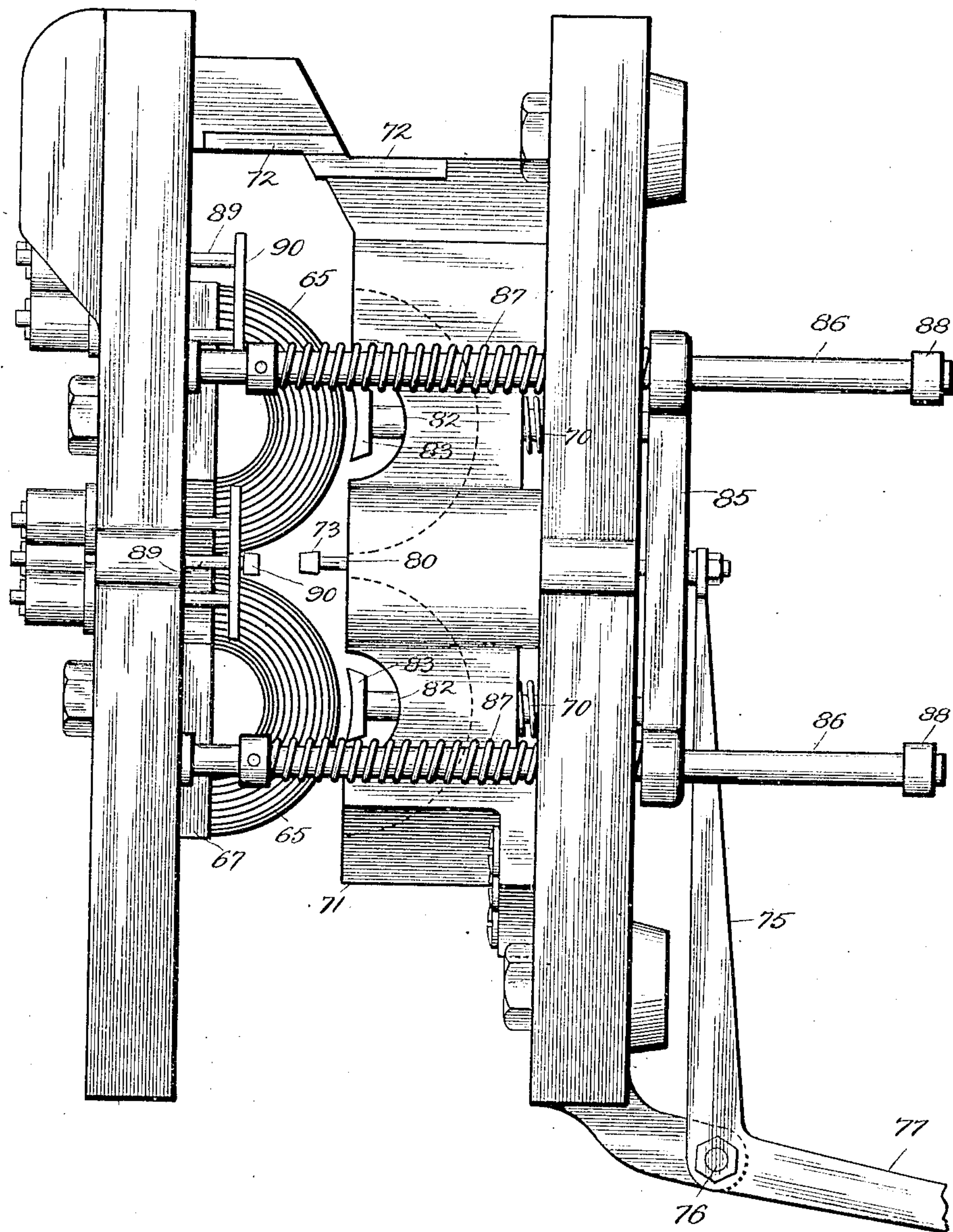
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6 SHEETS—SHEET 5.

Fig. 5.



Witnesses:
L. A. Smith
Harry R. White

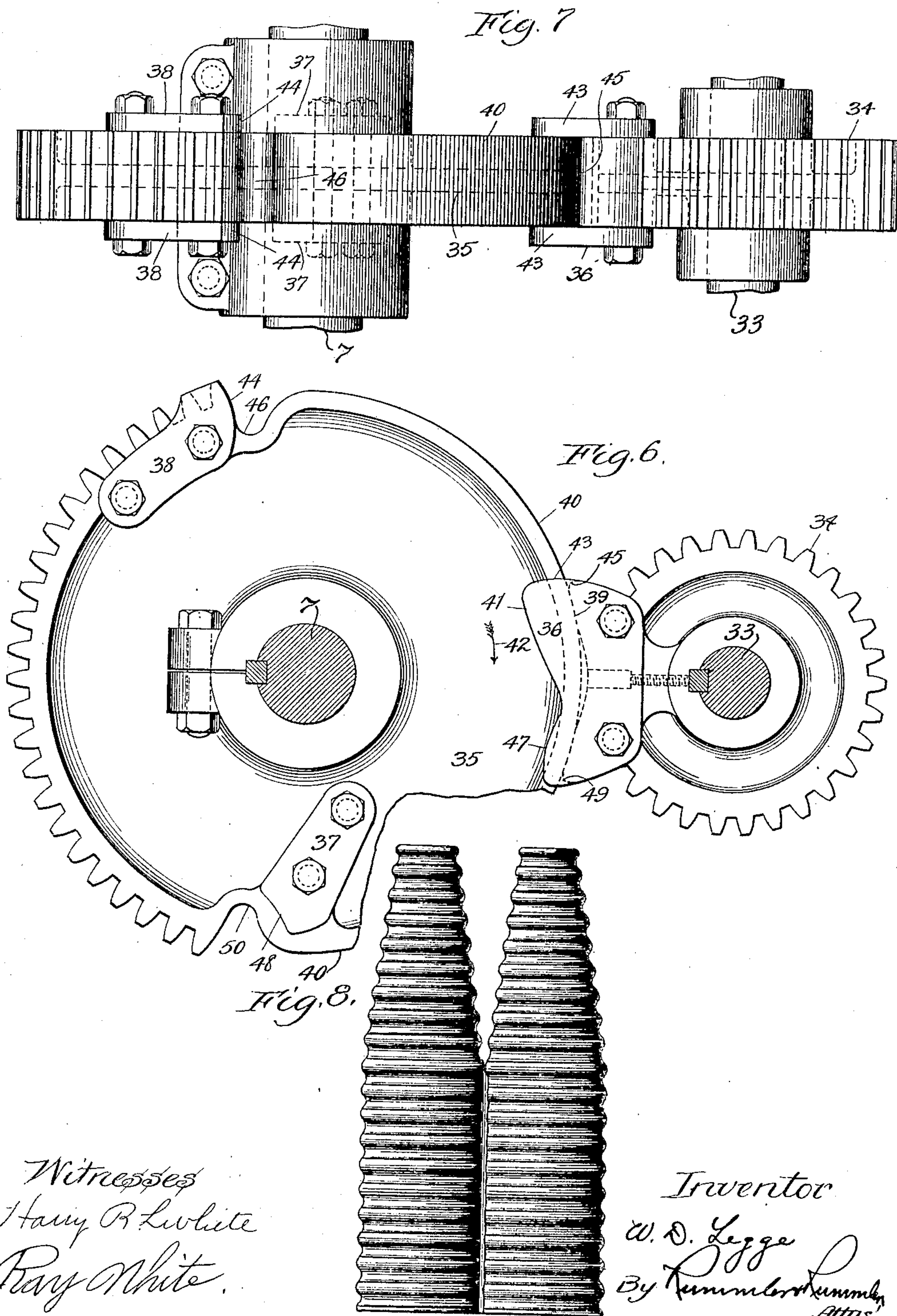
Inventor,
W. D. Legge
by Rumber & Rumber,
Attorneys.

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W. D. LEGGE.
BOTTLE WRAPPER MACHINE.
APPLICATION FILED MAY 4, 1906.

6 SHEETS—SHEET 6.



Witnesses
Harry R. White
Ray White.

Inventor
W. D. Legge
By *Sumner & Sumner*
Attys

UNITED STATES PATENT OFFICE.

WILLIAM D. LEGGE, OF CHICAGO, ILLINOIS, ASSIGNOR TO UNIVERSAL BOTTLE WRAPPER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF SOUTH DAKOTA.

BOTTLE-WRAPPER MACHINE.

No. 876,364.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed May 4, 1906. Serial No. 315,248.

To all whom it may concern:

Be it known that I, WILLIAM D. LEGGE, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Bottle-Wrapper Machines, of which the following is a specification.

The main object of this invention is to provide an improved form of machine for embossing sheets of paper or like material, to form wrappers for bottles; to provide embossing dies of improved form; to provide improved stripping mechanism for removing the completed wrappers from the dies; to provide an improved form of printing press for labeling the wrappers as they pass to the embossing dies; to provide improved means operating in advance of the dies for causing the paper to roughly approximate the form to which it is to be pressed by the dies, thus reducing the liability of tearing or weakening the paper through the action of the dies; to provide improved feeding mechanism for intermittently advancing a web of paper to the dies; to provide an improved arrangement of cutters whereby sheets of proper size will be cut from a continuous web before being formed to shape by the dies and will be finally accurately trimmed after having been compressed to shape; and to provide improved operating mechanism for controlling and timing the successive operations of the feeding mechanism, printing mechanism, dies, cutters and strippers.

These objects are accomplished by the device shown in the accompanying drawings, in which:

Figures 1 and 2 are respectively upper and lower portions of a side elevation of a machine constructed according to this invention, for making bottle wrappers. Fig. 3 is a top plan of the same, partly broken away. Fig. 4 is a longitudinal section showing in detail the structure of the embossing dies. Fig. 5 is a side elevation of the same. Fig. 6 is a detail of the mutilated gears which control the relative operations of the feeding and embossing mechanisms, as viewed from the face of the gears. Fig. 7 is an elevation of the same as viewed from the edge thereof. Fig. 8 illustrates the type of wrapper made by the machine shown in the drawings.

In the construction shown, the feeding,

printing and embossing mechanisms are in two double sets mounted respectively at opposite ends of the supporting frame and all operated by one central set of driving mechanism. The supporting frame of the device shown consists of a main frame 1 on which is mounted a superstructure consisting of two pairs of similar parts 2 bolted to the main frame at opposite sides thereof. In the middle of the main frame are a pair of vertically disposed guides 3 between which is a cross head 4, which is vertically slidable on the guides 3. The cross head 4 is connected with a crank shaft 5, Fig. 2, by means of a link 6 which imparts a vertical reciprocating movement to the cross head 4. The crank shaft 5 is connected with the main driving shaft 7 by means of a pair of elliptical gears 8 which are held in mesh with each other by the link 9. The main shaft 7 is connected by the gear 10 and pinion 11 with the shaft 12 which connects with the source of power.

The frame is provided with a vertical abutment 13 at each end and these abutments are connected to each other by two pairs of horizontally disposed guide rods 14. On these guide rods are mounted the cross heads 15 which are movable toward and away from the abutments at the respective ends of the machine and which are slid along the guides 14 by means of toggle links 16 which connect the cross heads 15 with the cross head 4. Fig. 2 shows the cross heads 15 in their extreme positions with the dies 17 and 18 in engagement with each other. The dies 17 and 18 are heated as will be hereinafter described, and for this reason are mounted upon studs 20 so as to avoid the waste of heat by conduction to the cross heads 15 and the main frame of the machine.

Rolls of paper 21 are mounted in open Y's 22 in the superstructure of the frame and the web of paper is passed over a swinging counterweighted idler 23, then over a second idler 24 from which it is led directly downward to the dies. The feeding of the web of paper is accomplished by means of a pair of opposed rollers 25 and 26 which have finely corrugated or knurled peripheries for gripping the web of paper. The feed roll 26 is adjustable into gripping engagement with the feed roll 25 by means of screws 27.

The feed roller 25 is driven by means of a pinion 28 which meshes with a reciprocating

rack 29. The pinion is loose on the shaft and is connected with the roller 25 by a ratchet and pawls so that the roller 25 will be rotated only in the direction for advancing the web of paper. The rack 29 is guided by a member 30 which is loosely journaled on the shaft of the roller 25. The rack 29 is driven by a pitman 31, rigidly connected with the rack and pivotally connected with an arm 32 which is mounted to rotate on the shaft 33. The pitman 31 is adjustable radially along the arm 32 for controlling the relative movement of the roller 25 for each rotation of the shaft 33. The shaft 33 is connected with the main driving shaft 7 by the mutilated gears 34 and 35 which transmit an intermittent rotation to the shaft 33 through a continuous rotation of the shaft 7. The relative rotations of the gears 34 and 35 are controlled by means of peculiarly formed cams 36, 37 and 38. These gears and cams are shown in detail in Fig. 6. Although the gears 34 and 35 are of different diameters for the purpose of rotating at different relative speeds, the toothed portions of the periphery of each is of equal length. The cam 36 which extends between the ends of the toothed portion of the gear 34 is provided with a curved face 39 fitting the curvature of the smooth portion 40 of the periphery of the gear 35. The cam lugs 37 and 38 of the gear 35 are suitably formed to engage the cheek-plates 41 of the gear 34. These cheek-plates extend beyond the surface 39 at each side of the gear 35.

In operation, the gear 35 rotates in the direction of the arrow 42. The surface 39 therefore rides upon the smooth periphery 40 of the gear 35 and prevents rotation of the gear 34 until the surface 43 of the cheek-plates 41 engages the surface 44 of the starting lugs 38. This causes the spur 45 of the cam 36 to enter the depression 46 and, through sliding and rolling contact between the surfaces 43 and 44, brings the teeth of the gear 34 into mesh with those on the gear 35. The toothed surfaces then roll upon each other until the surface 47 of the cheek-plates is engaged by the surface 48 of the cam lugs 37, causing the spur 49 of the cam 36 to fall into the recess 50. The action of the surfaces 47 and 48 upon each other causes the cam surface 39 to again rest upon the surface 40 of the gear 35 and stop the rotation of the gear 34 until the cam 36 again engages the cam 38.

The arm 32 is fastened upon the shaft 33 in such angular position that movement of the feed rollers 25 and 26 will take place only during intervals when the dies are separated, said rollers being at rest while the dies are in engagement with the paper. The respective cam surfaces on the gears 34 and 35 are so formed that the starting of the movement of the feed rollers will be gradually increased

from a position of rest to their highest speed, during the interval in which the surfaces 43 and 44 are in engagement with each other. Then the feed will be uniform until the action of the surface 48 upon the surface 47 causes a gradual slowing down of the speed of said feed rollers until they are brought to rest when the surface 39 engages the surface 40.

It will be seen from Fig. 6 that the interval during which the feed rollers are brought to a standstill is of considerably less duration than the interval during which they are brought up to their full speed. These gradual changes of speed are respectively for the purpose of preventing injury to the web of paper by a jerk as would happen if the feed rollers started at full speed, and for the purpose of preventing inertia from causing the roll of paper 21 to continue to rotate after the feed rolls have stopped and thereby producing an undesirable amount of slack in the web of paper. The counterweighted idler 23 takes care of the slack due to any ordinary difference in the speeds of the roll of paper 21 and the feed rollers 28.

Immediately in advance of the feed rollers 28 is a pair of shafts which carry a pair of rotary cutters 51, Fig. 3. The cutters 51 separate the web of paper into two strips, one for each set of dies.

For rapidity in manufacturing bottle wrappers by means of the herein described machine, besides having similar embossing dies at each end of the machine, each cross head 15 and each abutment 13 has mounted thereon two sets of dies. Four complete wrappers are thus formed at each operation.

The printing mechanism is constructed as follows: A platen 52 is rigidly mounted upon the abutment 13 and has a face lying in the plane of the dies at a point immediately above said dies. A printing member 53 having its face opposed to the platen 52 and adapted to support a block of type or a printing plate, is rigidly mounted upon the cross-head 15 and is in proper position for engaging the paper for printing thereon, when the dies have been forced together for compressing the paper. The inking mechanism consists of an ink disk 54 journaled upon the top of the printing member 53 and a set of inking rollers 55. The inking rollers 55 are carried by a pair of extensible arms 56 and are normally urged into contact with the printing plate by the spring 63 which normally urges the contraction of said arm. Movement of the rollers 55 across the plate 54 and downward over the face of the type is effected by means of a link 57 which connects the arm 56 with the supporting frame of the machine, in such manner that the arm 56 will rotate on its axis 58 through the movement of the cross head 15. The plate 54 is rotated by a pawl 59, which is carried by a

bell-crank lever 60 and engages an annular ratchet 61 on the under surface of the disk 54. The bell-crank lever 60 is operated by means of a cam 62 on the shaft 58.

5 There are four sets of dies as has been hereinbefore mentioned, and each set consists of two opposed pairs of male and female dies arranged side by side so as to form the two halves of a wrapper shaped to fit a bottle.
10 The surfaces of the dies are provided with registering grooves and ridges to corrugate the wrapper and give stiffness thereto.

The male dies 65 are mounted upon a die plate 66 which is rigidly secured to the studs 15 20 on the abutments 13. Interposed between the die plate 66 and each pair of dies 65 is a cutter plate 67 whose periphery is shaped to the exact form to which the completed bottle wrappers are to be cut. The female dies 68 are directly opposed to the male dies 65 and each pair is preferably formed in the same piece of metal. The dies 68 are carried by a die plate 69 which is fastened to the studs 20 on the cross head 15.
25 The dies 68 are normally urged away from the die plate 69 by means of springs 70 and are limited in such movement by means of suitable stops, not shown. Each pair of dies 68 is surrounded by a cutter blade 71 of hardened steel which is shaped to conform with the periphery of the plate 67 and adapted to have shearing contact therewith for trimming the wrapper. An additional set of knives 72 co-act with each other above
30 the dies and extend a considerable distance beyond the faces of their respective dies, so as to cut a sheet of the proper length from the web before said sheet is engaged by the dies.

40 A buckling bar 73 is carried by the movable die plate 69. This bar 73 extends along the space between the two dies and is adapted to buckle the paper so that it will approximate the shape of the dies 65 before the paper is engaged by the dies 68. This buckling prevents undue strain and consequent tearing of the paper at this point. The movement of the buckling bar 73 is controlled by means of a bell-crank lever 75,
50 which is pivoted at 76 on the cross head 15 and which has an arm 77 lying along one side of the frame and adapted to coöperate with a cam lug 78 on the frame. This lug is arranged to give the desired movement to the buckling bar 73.

55 The portion 79 of the lug 78 holds the buckling bar 73 in an advanced position, so as to cause the buckling of the paper while the die is moving in a forward direction and before the die has come into engagement with the paper. After the arm 77 has been moved clear of the surface 79, the closing of the dies causes the bar 73 to recede into a cavity 80 of the die plate and this recession causes the arm 77 to swing downward
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so that the roller at its end will pass below the lug 78 on the return stroke of the cross head 15. Near the end of this stroke, the arm 77 is kicked upward by means of a spring 81, thus again advancing the buckling bar 73
70 and causing the same to discharge the completed wrapper from the dies. The discharge of the wrapper is also assisted by means of a pair of plungers 82 which will be hereinafter described.

75 The plungers 82 extend through the female dies 68 and have pads 83 at their ends conforming with the surfaces of the dies and adapted to be withdrawn into the recesses 84 so that their faces will form a continuation of the surface of the dies. The plungers 82 are connected by a frame 85 which is mounted to slide on guide rods 86. Springs 87 surrounding the guide rods 86 yieldingly resist the movement of the plate 85 toward the dies 65
80 after the same has arrived at the position shown in Fig. 4. These springs cause the plungers 82 to recede so that their pads 83 conform with the surface of the dies 86 before the final forming pressure is put upon the paper.
85 The pads 83 assist the buckling bar or stripper 73 in discharging the completed wrapper from the female die. This movement of the plungers 82 is accomplished by means of adjustable stops 88 on the guide rods 86. These stops engage the plate 85 during the return
90 stroke of the cross head 15 and advance the plates 83 at the same time that the bell-crank lever 75 advances the buckling bar 73.

The male die is also provided with spring pressed plungers 89 which serve to discharge the completed wrapper from the male die. The plungers 89 and the stripper bars 90 which are carried thereby are adapted to yield with the paper when the dies are forced
100 together. The stripper bars 90 are preferably curved to conform approximately to the shape of each male die 65.

105 As may be seen from Figs. 4 and 5, the opposed surfaces of the dies 65 and 68 are provided with corrugations disposed transversely of the length of the wrapper. These form a wrapper which is provided with annular corrugations and therefore having maximum strength in proportion to the thickness of paper used. The curvature of the wrapper reinforces it against buckling along a transverse line, while the transverse corrugations strengthen it against buckling along a longitudinal line.
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115 The operation of the device shown is as follows: Assume that the various parts of the machine are in the position shown in Figs. 1 and 2, that the rolls of paper are in position and that the webs of paper are threaded through the cutters, feed rollers and printing presses as is indicated. Power is applied at the shaft 12 and transmitted therefrom to the shaft 7 by means of the gears 11 and 16. The elliptical gears 8 which connect the
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shafts 7 and 5 insure that the movement of the cross heads 15 will be slow while the dies are close to each other, but will be rapid at times when the dies are separated. When the cross heads 15 are driven toward the abutments 13 for bringing the dies into engagement with each other, the printing members are simultaneously forced toward the platens 52.

On account of the intermittent action of the gear 34, as has been described, said gear is inactive when the dies are in engagement with each other or near each other. When the lug 38 engages the cam 36 and starts the rotation of the gear 34, the rack 29 will slide forward and back in the guide 30 during the rotation of the gear 34. Motion in one direction does not affect the roller 25 on account of its ratchet and pawl connection with the pinion, but motion in the opposite direction caused the feed roller 25 to rotate and advance the web of paper to bring a new portion between the dies. This feeding mechanism is so adjusted with respect to the motion of the cross-heads 15 that during each interval when the dies are separated, the paper which was printed upon at the previous operation of the machine will be advanced into position between the dies. As the dies approach each other, the knives 72 first cut off from the main web the portion which is between the dies. The buckling bar 73 engages the sheet of paper before the same has been cut loose from the web and serves to prevent the paper from falling when the cut is completed. Continued movement of the cross head causes the buckling bar to buckle the sheet of paper so as to provide enough paper in the valley between the male dies to prevent the paper from tearing when the dies are forced together. The pads 83 also engage and support the paper opposite the high points of the dies 65. The springs 87 prevent the pads 83 from pressing too hard upon the paper at the time of buckling and also cause the pads 83 to yield under the continued advance of the cross head 15 so that they enter the sockets 84 and conform to the surface of the dies at the time when the two dies are brought together. The strippers 89 yield as the two dies enter engagement with each other. After the dies have formed the paper to fit their opposed surfaces, the spring 70 yield and permit a still further movement of the die plate 69. This causes the cutter 71 to advance and shear off the surplus paper around the edges of the cutter 67. When the dies separate, the stripper 90 which is between the two dies 65 causes a completed wrapper to follow the female die, from which it is discharged through the advance of the stripper 73 and the pads 83 hereinbefore described. The stripper 90 which is above the upper die 65 in Fig. 4 causes the waste portion of the paper to be discharged before

a new sheet is advanced into position by the feeding mechanism.

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

1. In a device of the class described, the combination of a pair of opposed dies, one of said dies being movable toward and away from the other and said dies being adapted to co-act with each other for embossing a sheet of material, means acting on the sheet in advance of the dies while the sheet is interposed between said dies, said means being adapted to buckle the sheet to conform approximately with the dies before said sheet is compressed by the dies.

2. In a device of the class described, the combination of a pair of opposed embossing dies, one of the same being movable toward and away from the other, means for imparting a reciprocating movement to said movable die, feed mechanism controlled by said means and adapted to feed a sheet of material into position between said dies when the same are separated, and means adapted to operate in advance of the dies for buckling a sheet to approximately conform to the shape of the dies before said sheet is compressed thereby.

3. In a device of the class described, the combination of a pair of opposed dies, one of said dies being movable toward and away from the other and said dies being adapted to co-act with each other for embossing a sheet of material, and a part mounted on one die extending in advance thereof for buckling the paper to approximately conform to the shape of the dies, said part being adapted to yield to permit the remainder of the die to engage the sheet for pressing the same to form.

4. In a device of the class described the combination of a pair of opposed dies, one of said dies being movable toward and away from the other and said dies being adapted to co-act with each other for embossing a sheet of material, a part mounted on the movable die, being normally extended in advance thereof for buckling the paper to approximately conform to the shape of the dies and being adapted to yield to permit the remainder of the die to engage the sheet for embossing the same, and means for causing said part to recede with said movable die for a certain distance and then to assume its advanced position for discharging the sheet.

5. In a device of the class described, the combination of a pair of opposed dies, one of said dies being movable toward and away from the other and said dies being adapted to co-act with each other for embossing a sheet of material, a part mounted on the movable die and having a limited sliding movement longitudinally of the path of the movement thereof, and a stop adapted to engage said part when said die is moving away

from the other die and cause said part to shift on the die for discharging a sheet therefrom.

6. In a device of the class described, the combination of a pair of opposed dies, one of said dies being movable toward and away from the other and said dies being adapted to co-act with each other for embossing a sheet of material, a part mounted on the movable die, said part extending in advance of said movable die for buckling the paper to approximately conform to the shape of the dies and being adapted to yield to permit the remainder of the die to engage the sheet for embossing the same, yielding means extending outward from the other die and adapted to free the sheet from said other die when the movable die is withdrawn, and means for discharging the sheet from the movable die after the same has been withdrawn.

7. In a device of the class described, the combination of a pair of opposed embossing dies, one of the same being movable toward and away from the other, means for moving the dies alternately toward and away from each other, feeding mechanism controlled by said means and adapted to advance a web of paper to bring successive portions thereof into position for engagement with the dies at successive operations thereof, a cutter movable in advance of said movable die and adapted to cut a sheet from said web, yielding means adapted to buckle the sheet to approximately conform with the shape of said dies before said sheet is compressed by the dies.

8. In a device of the class described, the combination of a pair of opposed embossing dies, one of the same being movable toward and away from the other, means for imparting such relative motion to the dies, feeding mechanism adapted to operate alternately

of the successive operations of said dies for successively advancing a web of material to bring a new portion thereof into position for engagement with the dies at each operation thereof, a cutter movable in advance of said movable die and adapted to cut a sheet from said web, yielding means adapted to buckle the sheet to approximately conform with the shape of said dies before said sheet is compressed by the dies, and cutters adapted to follow one of said dies and trim the edges of the sheet after the same has been compressed by said dies.

9. The combination of a frame, feeding mechanism adapted to advance a sheet of paper along said frame, dies mounted in said frame at opposite sides of the path of said sheet and movable toward and away from each other for embossing said sheet, a platen mounted on one of said dies and a printing member mounted on the other die and opposed to said platen, said feeding mechanism being arranged to operate intermittently for advancing the sheet of paper during intervals when the dies are separated, all of said parts being arranged to print upon the sheet and then advance the same to said dies.

10. In a machine of the kind described, the combination of a pair of opposed dies, means for feeding blanks between said dies, and a reciprocative bar adapted to buckle the blank to conform the same approximately to the finished form in advance of the closing of the dies, and also adapted to discharge the completed product from the dies.

Signed at Chicago this 10th day of February 1906.

W. D. LEGGE.

Witnesses:

LOUIS WEIL,
EUGENE A. RUMMLER.