

No. 725,070.

PATENTED APR. 14, 1903.

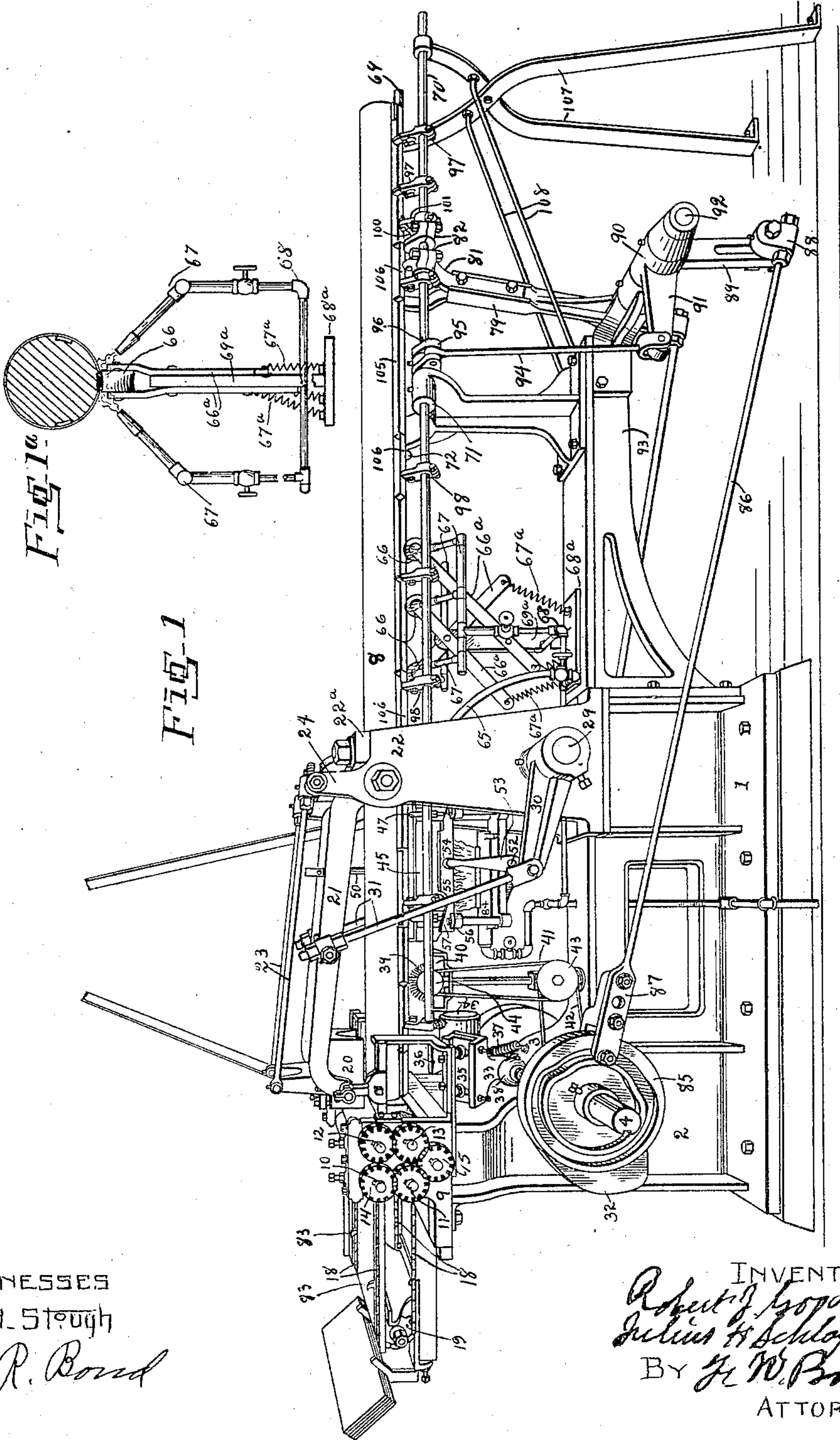
R. J. GOOD & J. H. SCHLAFLY.

CAN FORMING MACHINE.

APPLICATION FILED OCT. 27, 1902.

NO MODEL.

7 SHEETS—SHEET 1.



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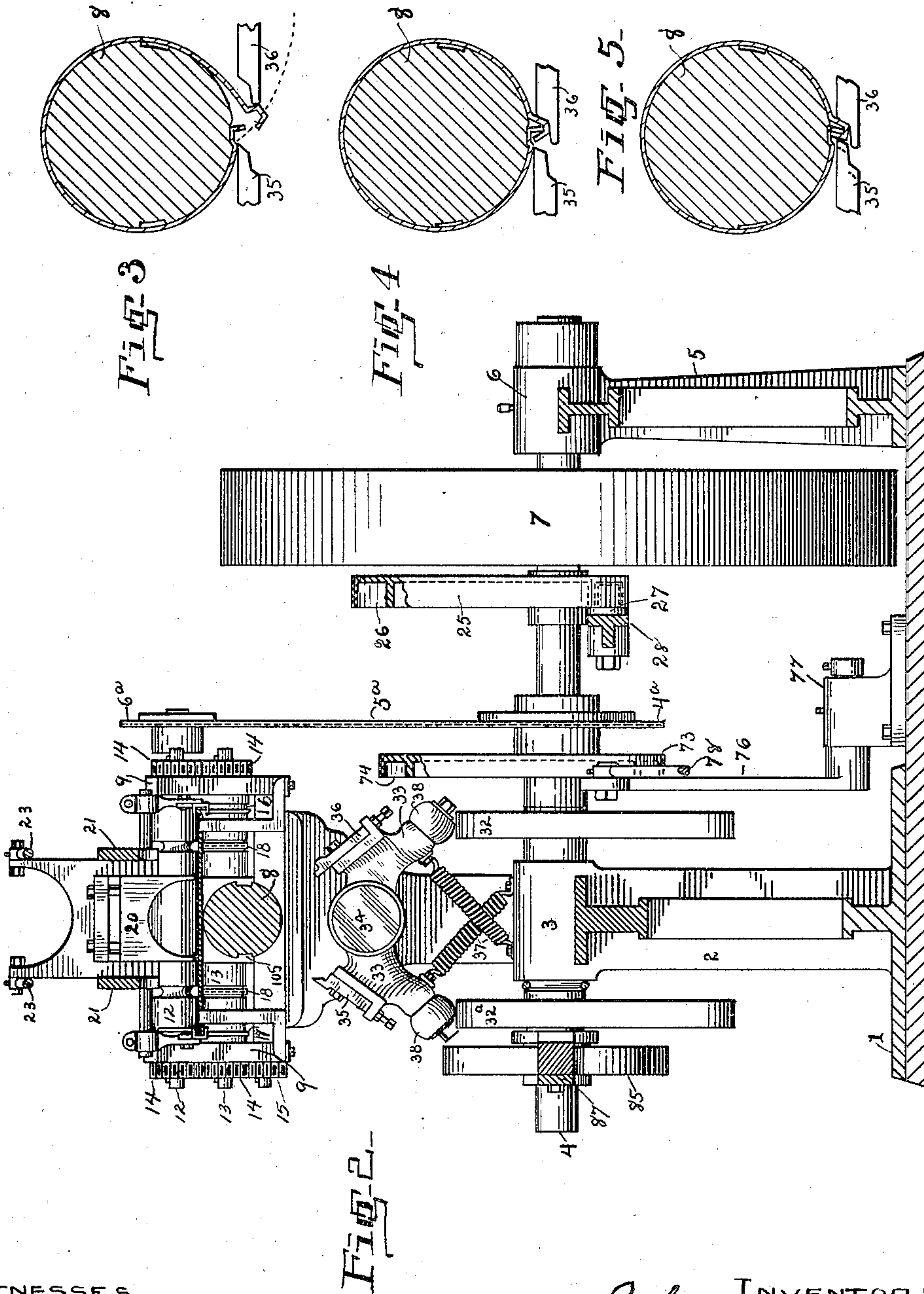
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7 SHEETS—SHEET 3.

FIG. 7—

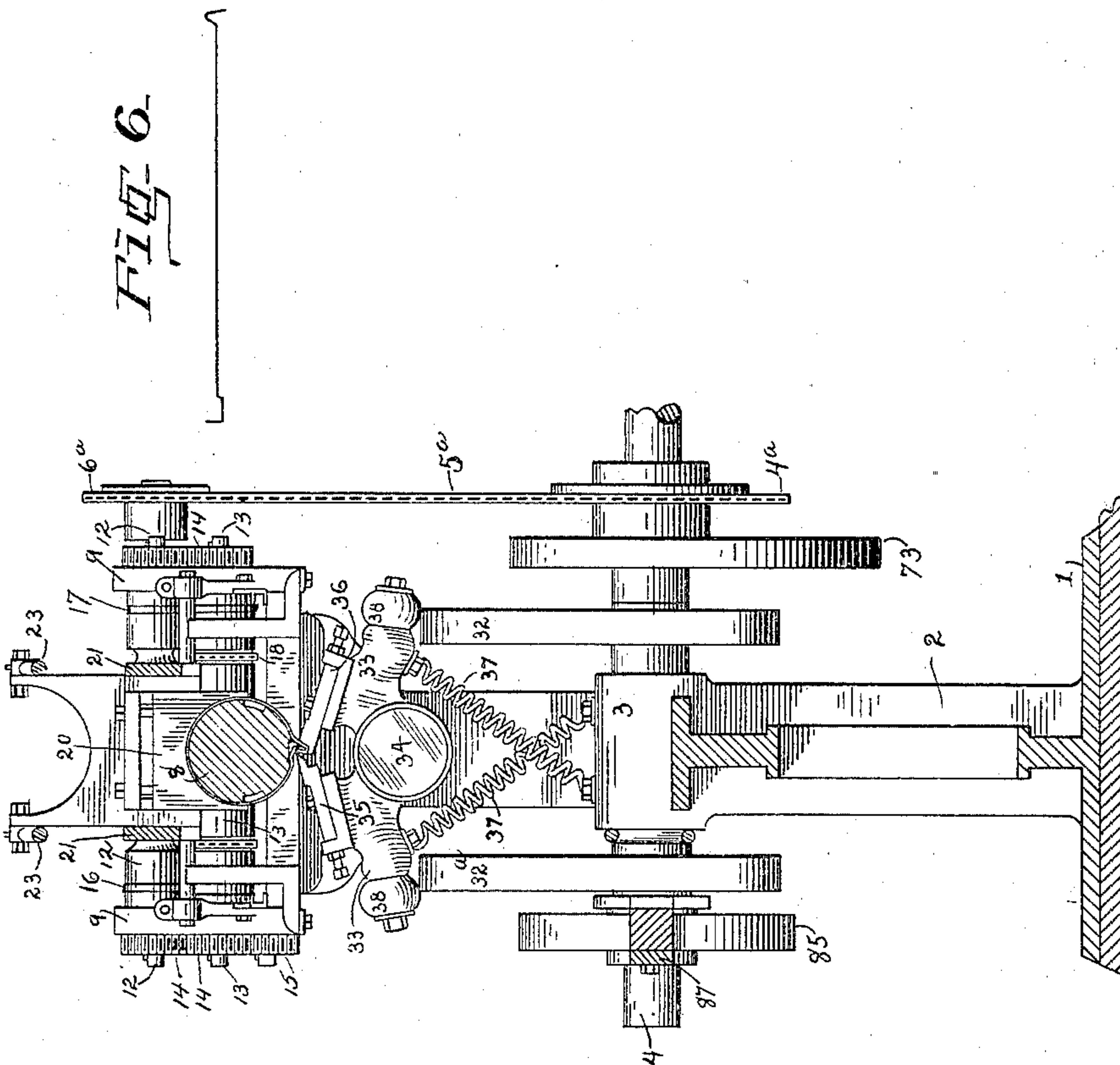


FIG. 6—

FIG. 8.

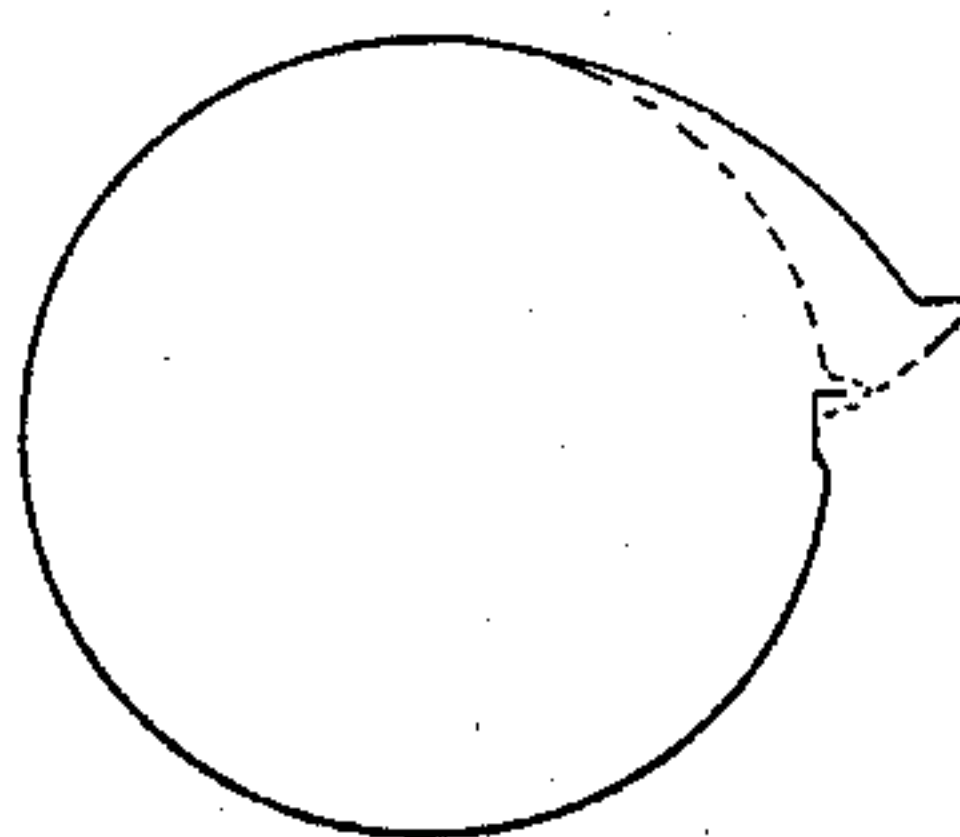
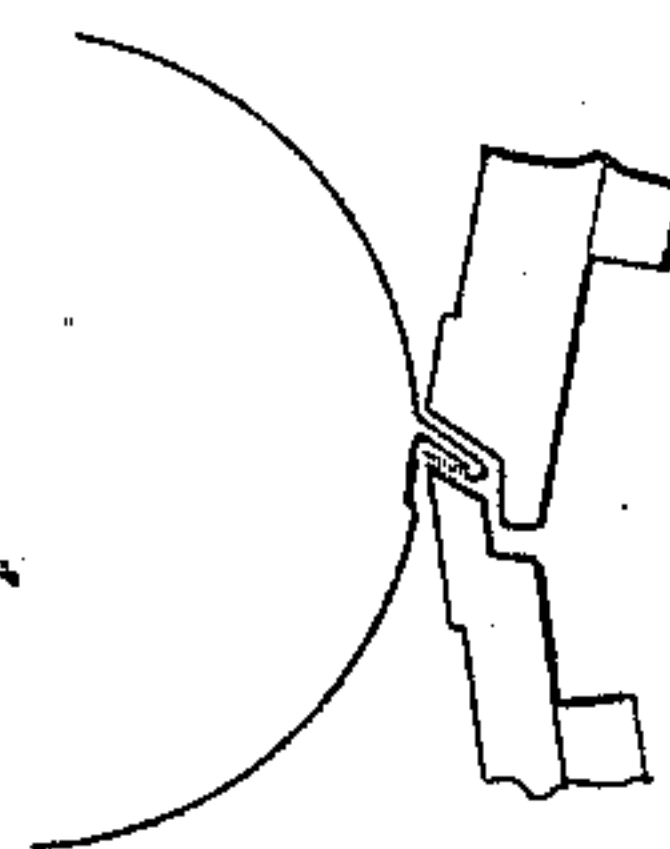


FIG. 9



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7 SHEETS—SHEET 4.

FIG. 11

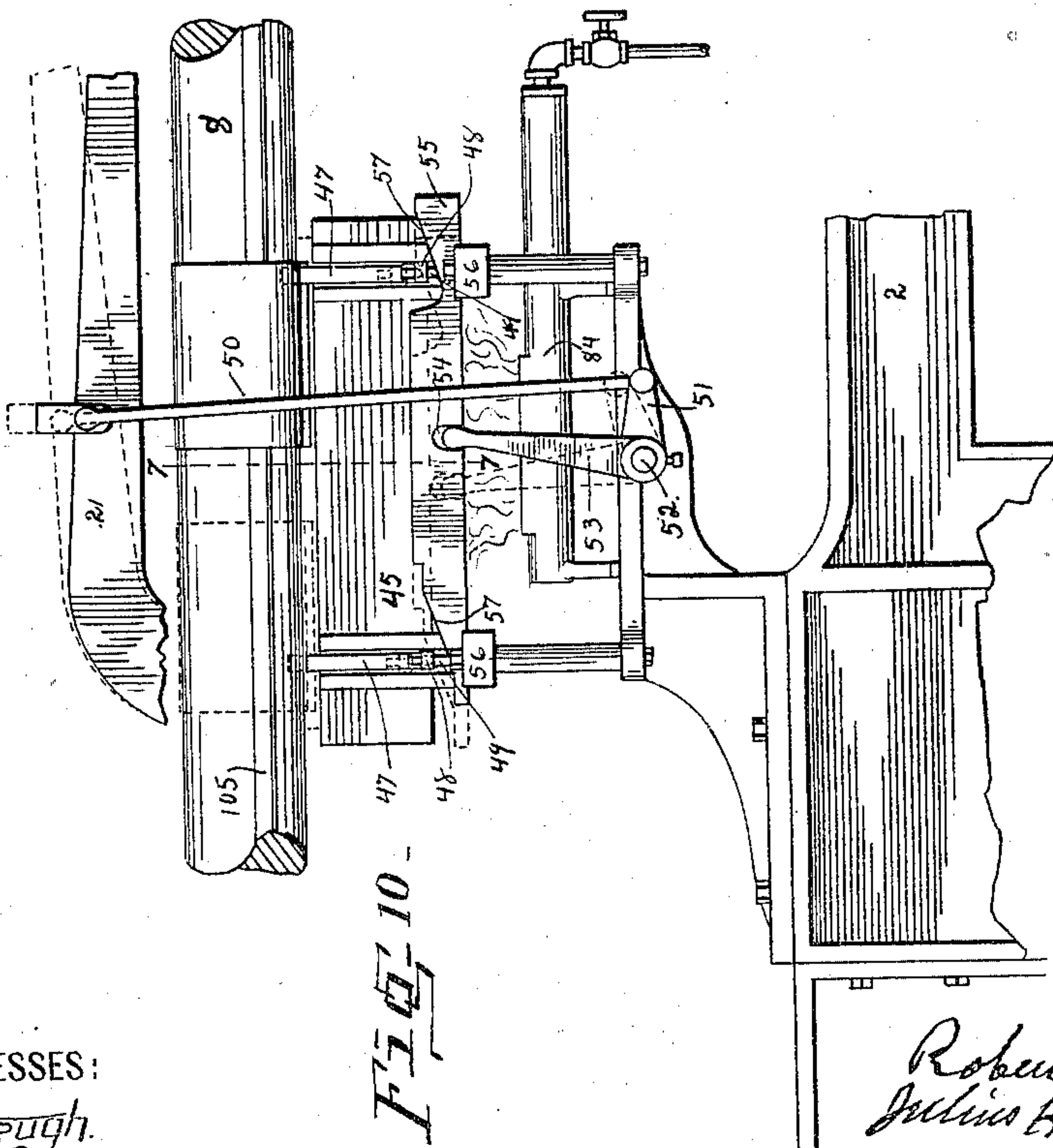
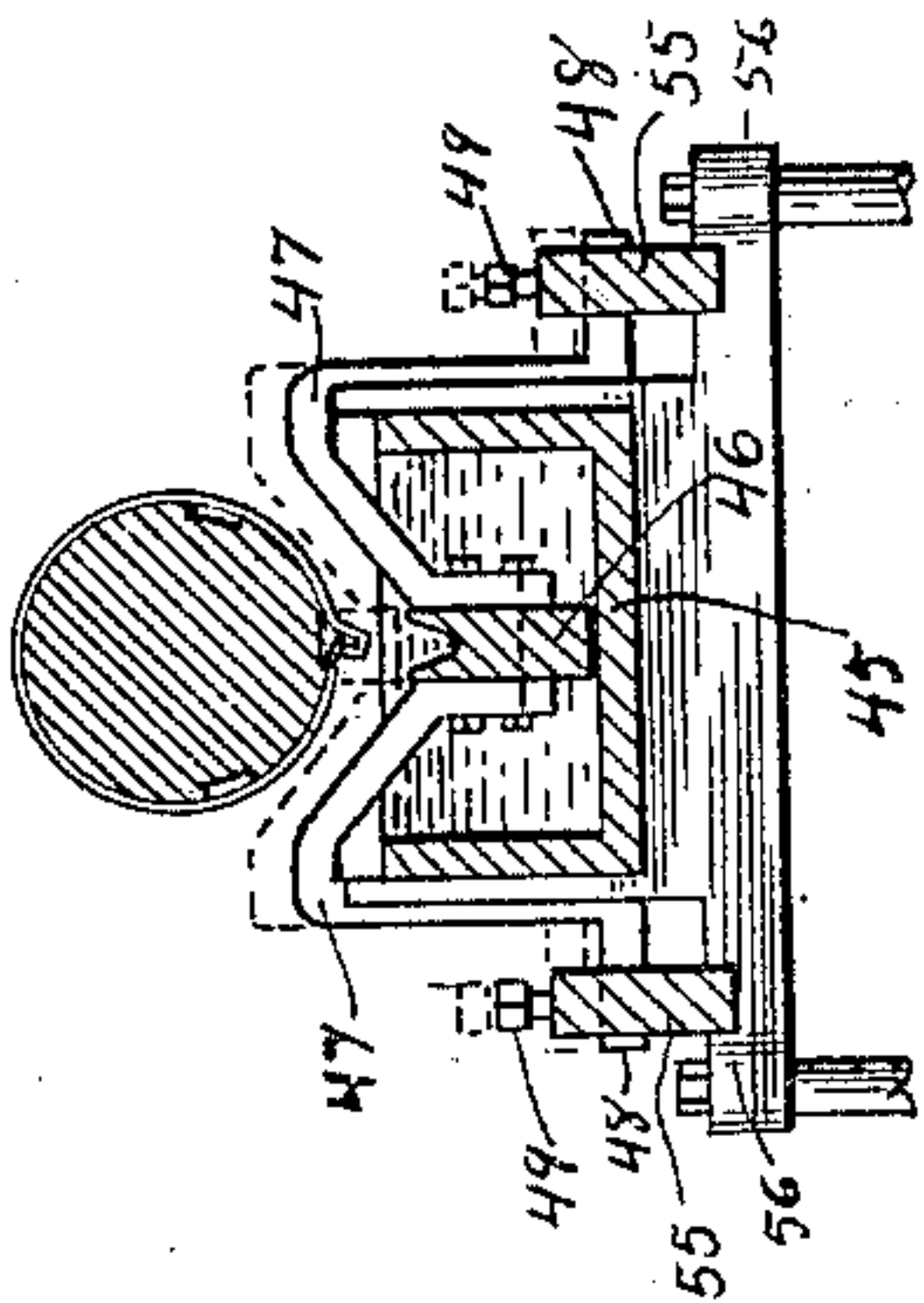


FIG. 10

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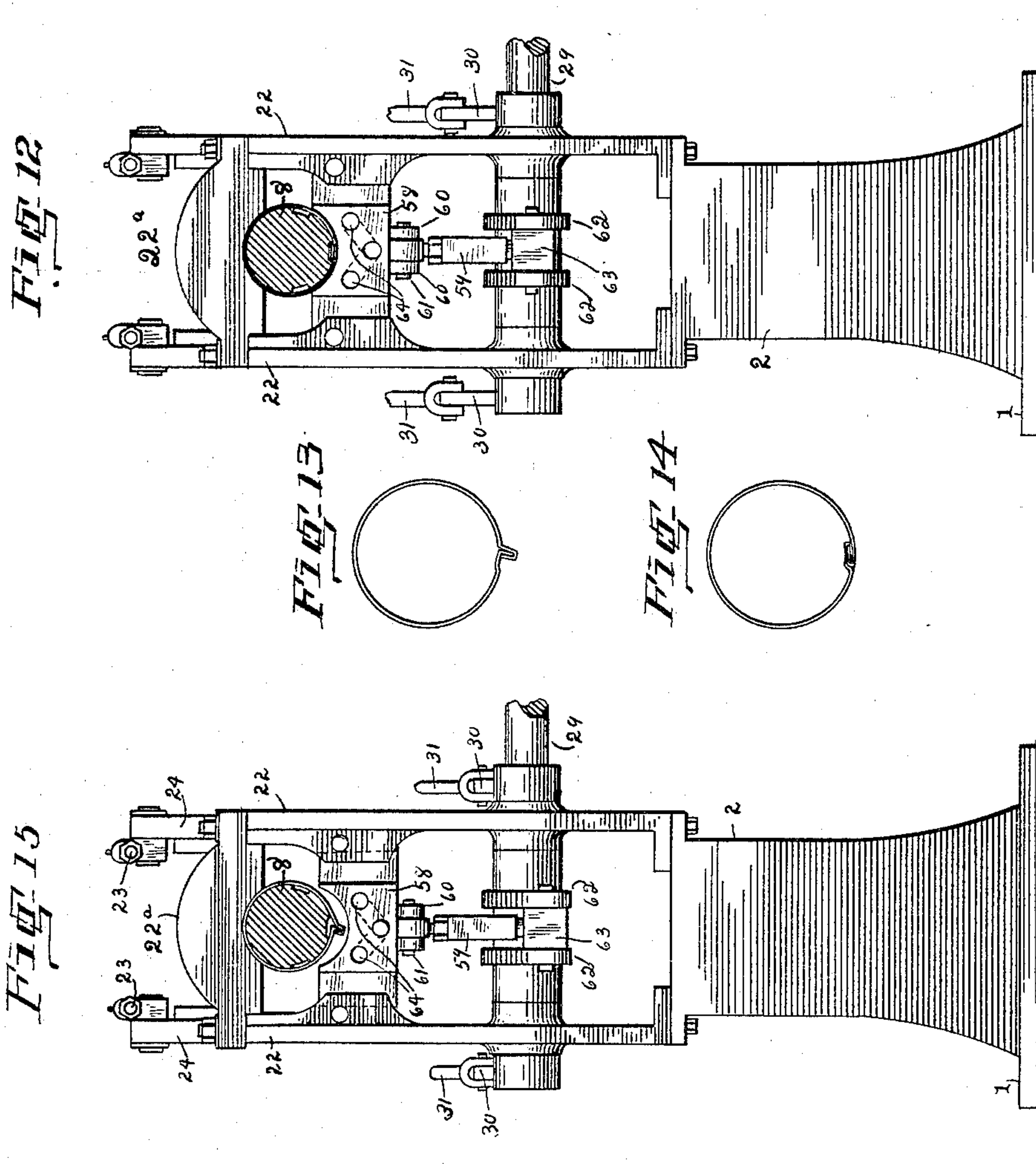
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7 SHEETS—SHEET 5.



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7 SHEETS—SHEET 6.

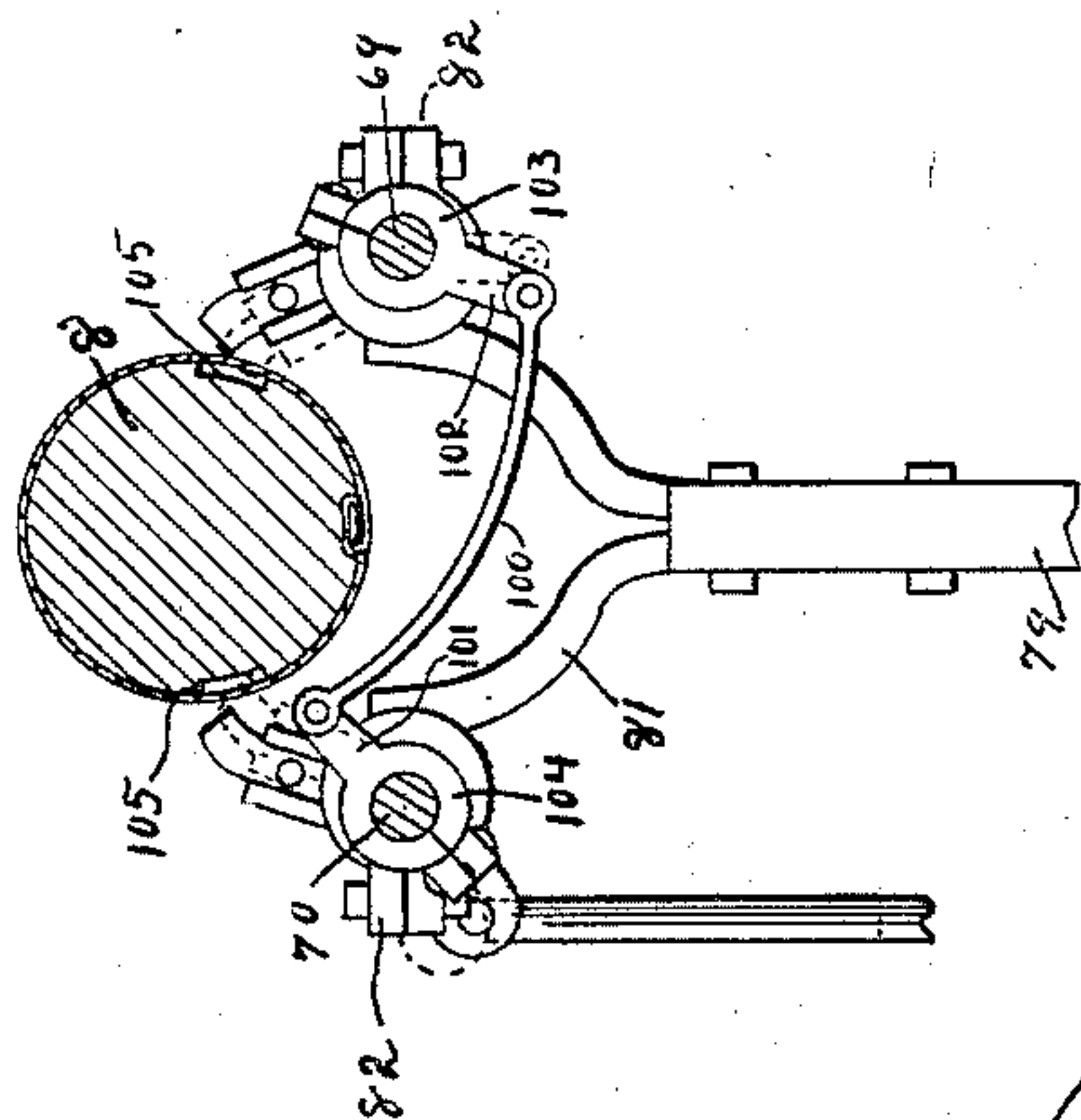


Fig. 17

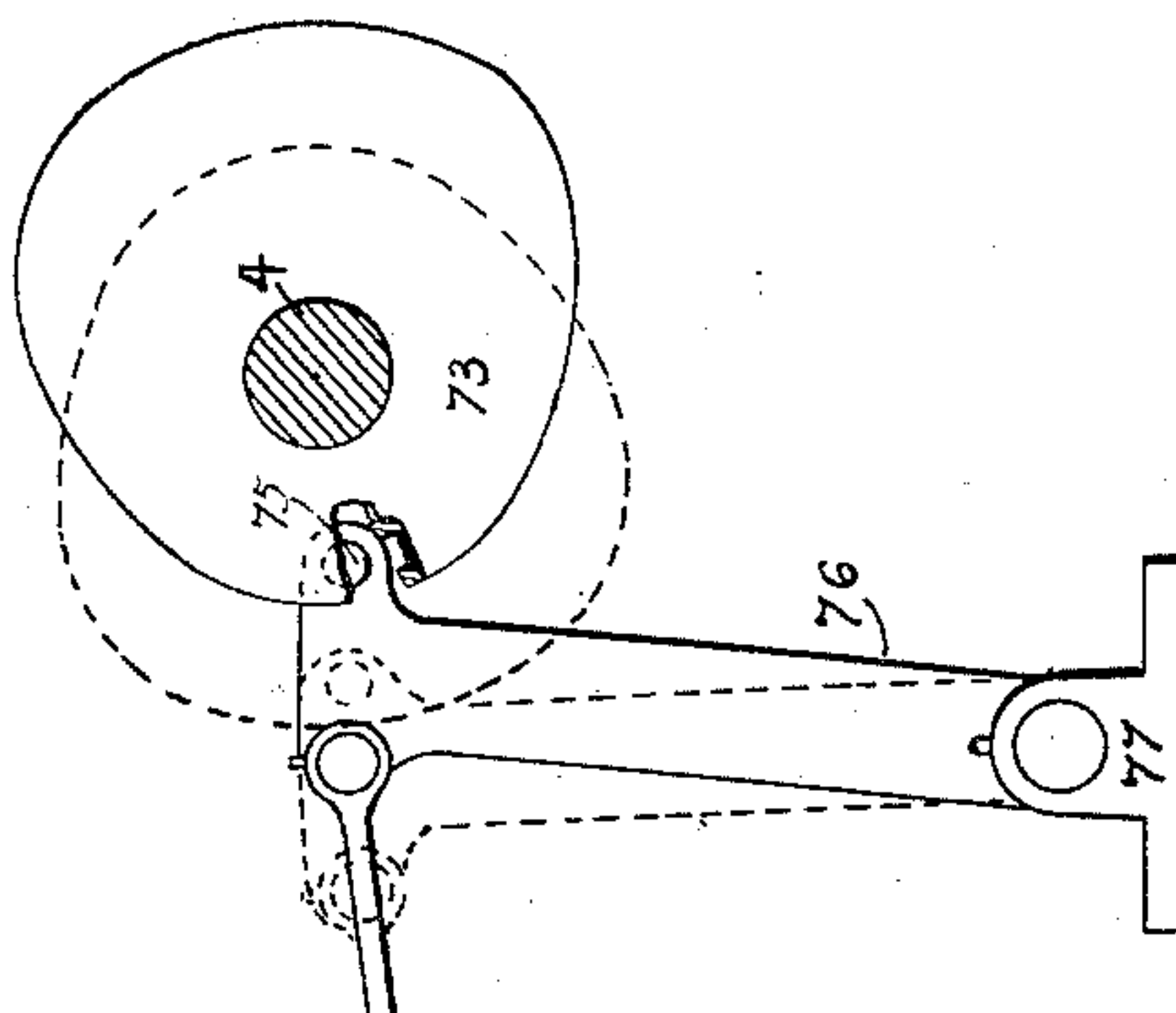


Fig. 16

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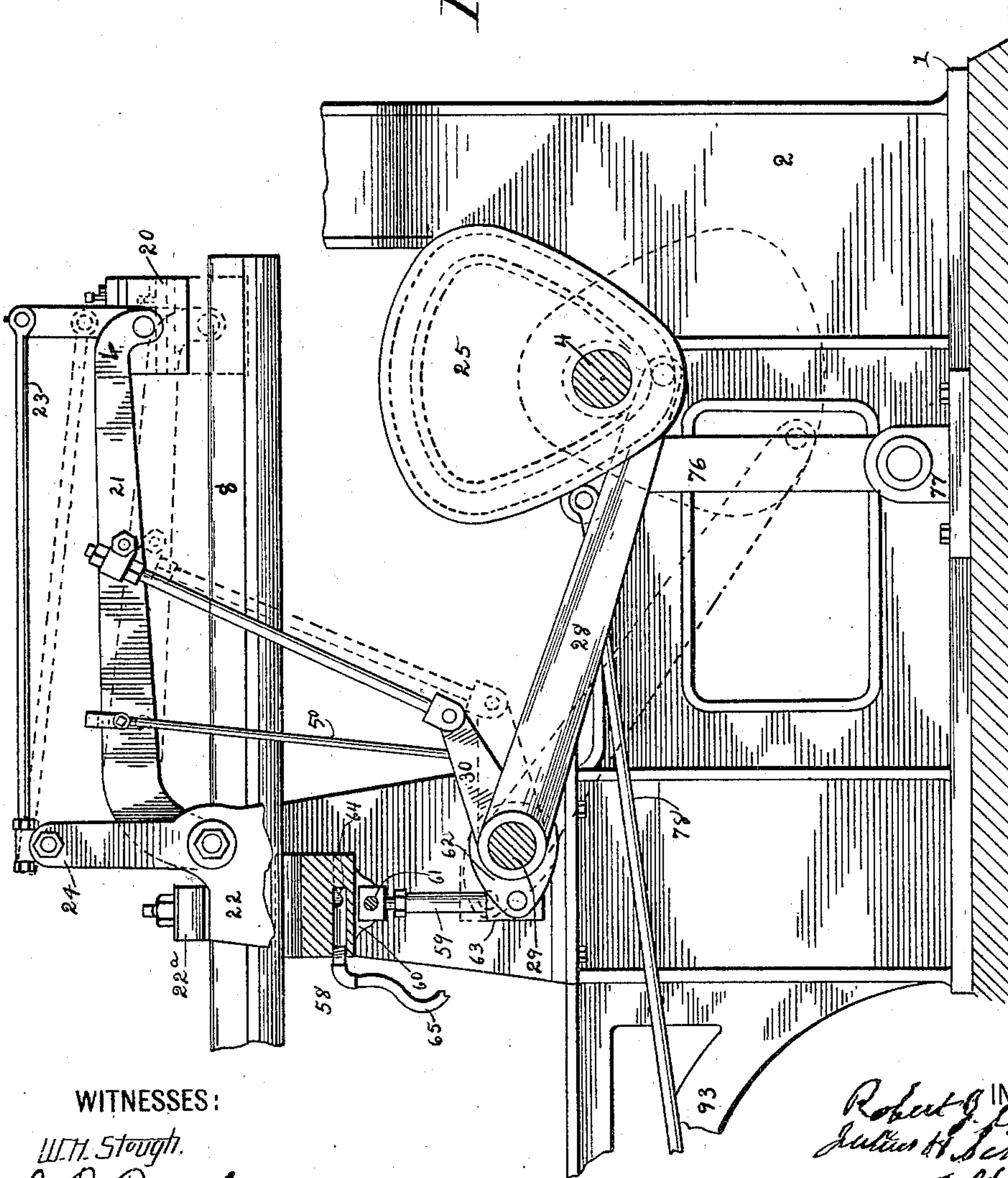
CAN FORMING MACHINE.

APPLICATION FILED OCT. 27, 1902.

NO MODEL.

7 SHEETS—SHEET 7.

FIG. 18



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UNITED STATES PATENT OFFICE.

ROBERT J. GOOD AND JULIUS H. SCHLAFLY, OF CANTON, OHIO, ASSIGNORS
TO THE BERGER MANUFACTURING COMPANY, OF CANTON, OHIO.

CAN-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 725,070, dated April 14, 1903.

Application filed October 27, 1902. Serial No: 129,012. (No model.)

To all whom it may concern:

Be it known that we, ROBERT J. GOOD and JULIUS H. SCHLAFLY, citizens of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Can-Forming Machines; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the figures of reference marked thereon, in which—

Figure 1 is a perspective view. Fig. 1^a is a transverse section of the mandrel and one of the solder-distributers and its burners. Fig. 2 is a vertical section through line *x x*, Fig. 1. Fig. 3 is a transverse section of the mandrel and illustrating the first action of the seam-locking plates. Fig. 4 is a similar view showing the second action of the seam-locking plates. Fig. 5 is a transverse section of the mandrel, showing the final action of the seam-locking plates. Fig. 6 is an end view of the blank from which the can-body is formed, showing its edges properly formed to be locked together. Fig. 7 is a view similar to Fig. 2, except the seam-locking plates are shown elevated and in contact with the hooked edges of the can-body. Fig. 8 is an end view of a can-body practically closed. Fig. 9 is an end view showing a portion of a can-body and illustrating the seam-locking plates in position to properly connect the hooked edges together. Fig. 10 is view showing a portion of the mandrel and a side elevation of the solder-receptacle, showing two cans on the mandrel, one in dotted lines and one in full, also showing mechanism for operating the seam-soldering trough. Fig. 11 is a transverse section on line 7 7, Fig. 10. Fig. 12 is similar view, except the seam-flattening head is elevated and the seam flattened. Fig. 13 is an end view of the can, showing the hooked edges locked together. Fig. 14 is a similar view showing the seam flattened. Fig. 15 is a transverse section of the mandrel, showing a can-body located thereon and illustrating the seam-flattening head in lowered position. Fig. 16 is a view showing a portion of the mandrel, also showing the can-moving rock-

bar and one of the can-moving dogs. Fig. 17 is a transverse section of the mandrel, the reciprocating rods, and the can-moving dogs located thereon, also mechanism for operating the can-moving dogs in unison. Fig. 18 is a side elevation showing a portion of the mandrel and illustrating the different devices for operating the can-body-forming die and the seam-flattening head.

The present invention has relation to can-forming machines especially designed to form the cylindrical portions of the can-body; and it consists in the different parts and combination of parts hereinafter described, and particularly pointed out in the claims.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

In the accompanying drawings, 1 represents the base, which is formed of sufficient size to properly support the various parts of the machine, from which base extends the vertical part or web 2. The front or forward portion of the web 2 is provided with a suitable bearing 3, which is formed of sufficient length to support the power-shaft 4, said power-shaft being properly journaled at one or both of its extreme ends by suitable pillars 5, having suitable bearings 6. Upon the power-shaft 4 is securely attached in any convenient and well-known manner the power-wheel 7, which may be either a belt-wheel or gear-wheel, as desired. The mandrel 8 is securely attached in any convenient and well-known manner to the vertical part of the web 2 or its equivalent and is extended any desired length toward the rear of the machine proper, the mandrel, however, being of such a length that when the various operations have been performed upon the blanks from which the can-bodies are made they will be moved off from the end of the mandrel and allowed to drop therefrom.

To the upper portion of the center web 2 are connected the side plates or housings 9, which carry the feed-rollers 10 and 11 and the forming-rollers 12 and 13, said feed-rollers and forming-rollers being driven by means of suitable gear-wheels 14, which gear-wheels are so arranged that the upper and lower

feed-rollers will rotate in opposite directions and the forming-rollers also rotate in opposite directions, the upper rollers and the lower rollers in both instances rotated in the same direction, and in order to accomplish this an intermediate gear-wheel or idler 15 is employed.

The feed-rollers 10 and 11 are for the simple purpose of feeding the blanks from which the can-bodies are formed to the forming-rollers 12 and 13. The forming-rollers 12 and 13 are provided with the beads 16 and the grooves 17, the beads 16 being located upon the upper roller at one end and the lower roller at the opposite end and the grooves 17 located directly opposite the beads 16, so that the seam-flanges will be located upon opposite sides of the bodies from which the cans are formed, this being necessary to bring the flanges in proper position to be hooked together at the time the blank from which the can-bodies are to be formed are brought into cylindrical form.

For the purpose of feeding the blanks to the feed and forming rollers carrying-chains 18 are provided, which carrying-chains are located around the sprocket-wheels 19 at their outer ends, and at their inner ends they are located around the lower forming-roller 13, suitable grooves being formed to receive or make room for the carrying-chains between the feeding and forming rollers and at the same time bring the inner upper portions of the chains out of the way and out of contact with the can-bodies' blanks. After the can-body blanks have passed through the forming-rollers 12 and 13 they are brought directly over the mandrel, as illustrated in Fig. 2, and also directly under the forming head or die 20, which forming head or die is pivotally connected to the vibrating arm 21, said arm being supported by the standards 22.

For the purpose of causing the forming head or die 20 to move up and down in a true vertical plane said die is extended upward above the arm 21, and to the upper end thereof are attached the rods 23, which rods extend rearward and are pivotally connected at their rear ends to suitable supports 24.

For the purpose of imparting vibrating movement to the arm 21, carrying the forming head or die 20, the cam 25 is located upon the power-shaft 4, which is provided with the groove 26, formed in the side face of said cam, and in which groove is located an antifriction-roller 27 or its equivalent, which roller is mounted upon a pin secured to the rock-arm 28, said rock-arm extending rearward and is secured to the cross-shaft 29, and upon which cross-shaft 29 is also located a short rock-arm 30, to which rock-arm is connected the bottom or lower end of the connecting-rod 31, the top or upper end of which is adjustably attached to the vibrating arm 21.

It will be understood that the downthrow of the cam 29 will carry the rock-arm 28 downward at its swinging or cam end, and thereby

rock the shaft 29, which in turn moves the free end of the rock-arm 30 downward, carrying with it the connecting-rod 31, bringing the vibrating arm downward. As the vibrating arm 21 moves downward the forming head or die 20 when brought to its lower point will be brought against the upper face of the can-body blank. The concave face of the die 20 corresponding in curvature with the curvature of the mandrel 8, or substantially so, as the forming head or die moves downward or toward the mandrel 8 the can-body will be bent around the upper portion of the mandrel, this feature being illustrated in Fig. 7, except that the can-body has been bent entirely around the mandrel.

It will be understood that the downward movement of the forming head or die simply acts upon the upper portion of the mandrel and does not complete the cylindrical formation of the body, but brings the can-body into such a position that it can be operated on to form a perfect cylinder by the devices hereinafter described.

Upon the power-shaft 4 are securely attached the cams 32 and 32^a, which cams are for the purpose of rocking the seam-locking rock-arms 33, which seam-locking rock-arms are independently mounted upon the short stud 34, which short stud is located directly below the mandrel 8, as illustrated in Figs. 2 and 7, and is securely connected or formed integral with some integral part of the frame proper. Upon the seam-locking rock-arms 33 are adjustably attached the seam-locking plates 35 and 36. After the forming head or die 20 has been brought down upon the can-body said can-body will be in a position to be acted upon by the oscillating movement of the seam-locking plates 35 and 36.

It will be understood that the upward throw of the cams 32 and 32^a will move the seam-locking plates 35 and 36 toward each other, the cams being so arranged that the movement of the seam-locking plates 35 and 36 will bring the outer hooked edge over the inner hooked edge of the can-body, this feature being best illustrated in Figs. 3, 4, and 5. After the seam-locking plates 35 and 36 have been brought to their highest point and the hooked edges of the can-body brought together, so as to be properly locked, they are permitted to recede, and for the purpose of producing a quick and positive action the springs 37 are provided, the lower ends of which are secured to some fixed object and their upper ends secured to the bottom or under sides of the seam-locking rock-arms 33.

For the purpose of reducing the friction between the faces of the cams 32 and 32^a and the ends of the seam-locking rock-arms said seam-locking rock-arms should be provided with the antifriction-rollers 38, this feature, however, being more of a matter of judgment than invention, as it will be understood that the same object can be accomplished without the antifriction-rollers 38.

The hooked edges of the can-body are simply loosely locked together, or, in other words, an open seam is produced, this being necessary in order that the hooked edges of the can-body may be properly coated with acid and solder.

After the operation just above described has been performed the can-body in its cylindrical form is moved along the mandrel by the devices hereinafter described, the seam coming in contact with the rotary acid-brush 39, (illustrated in Fig. 1,) which rotary acid-brush receives its supply from the acid-receptacle 40, the bottom or lower portion of the brush being submerged in the acid. Rotary motion is imparted to the brush in any convenient and well-known manner; but as illustrated it is imparted by means of the drive-belts 41 and 42, the drive-belt 42 leading from the power-shaft to the double pulley 43 and the belt 41 leading from the double pulley 43 to the pulley 44. It will, however, be understood that the manner of imparting rotary motion is simply mechanical and many ways may be employed to impart rotary motion to the acid-brush 39. Between the acid-brush and the delivery end of the mandrel is located the solder-receptacle 45, (best illustrated in Figs. 10 and 11,) and for the purpose of giving to each can-body seam two distinct solder baths or submersions the solder-receptacle is formed of such a length that two properly-spaced cans may be located between the ends of the solder-receptacle 45, this feature being best illustrated in Fig. 10.

It will be understood that at the time the seams of the can-bodies are submerged or dipped into the solder the hooked edges are only loosely locked together, by which arrangement the necessary amount of solder is allowed to enter between and upon the hooked edges of the can-bodies.

Within the receptacle 45 is located the reciprocating trough or solder-lifting device 46, to which are attached the bars 47, which bars are inclined upward and outward from the trough 46 and thence downward upon the outer sides of the solder-receptacle 45, this construction being best illustrated in Figs. 10 and 11. The downward ends of the bars 47 are provided with the right-angled portions 48, through which right-angled portions are located the adjustable contact-bolts 49, said contact-bolts being connected in such a manner that the arms 47, together with the trough 46, will be elevated, as hereinafter described.

To the vibrating arm 21 is attached the connecting-rod 50, the bottom or lower end of which is connected to the rock-arm 51, said rock-arm being connected to the shaft 52. To the shaft 52 are attached the arms 53, the upper ends of which are seated into recesses 54, formed in the reciprocating bars 55, said reciprocating bars being supported upon suitable rests 56 or their equivalents. The reciprocating bars 55 are provided with the inclines 57, said inclines being located under

the adjustable bolts 49 and in such relation to each other that when the reciprocating bars 55 are moved in one direction the bolts 49, together with the arms 47 and the trough 46, will be elevated, and when moved in the opposite direction said parts will move downward by gravitation. It will be understood that the reciprocating movement imparted to the connecting-rod 50 will impart a horizontal reciprocating movement to the bars 55 by means of the rock-arm 51 and the arm 53.

When the trough 46 is lowered or submerged in the solder contained in the solder-receptacle 45, the trough 46 will be filled with solder, which is carried upward above the solder-line in the solder-receptacle, and the loosely-hooked edges of the can-body will be submerged in the solder contained in the trough 46, by which arrangement a sufficient amount of solder is placed upon the loosely-hooked edges of the can-bodies to properly solder the seam of the can. After the seams of the can-bodies have been properly coated with solder they are moved upon the mandrel 8 until they come directly over the seam-closing head 58, which seam-closing head is given a reciprocating movement by means of the connecting-bar 59, which connecting-bar is secured at its upper end by means of the ears 60 and the cross belt or pin 61 and at its bottom or lower end by means of the ears 62 and the cross-head 63, the ears 62 being formed integral or securely attached to the rock-shaft 29, this construction being best illustrated in Figs. 12 and 15.

It will be understood that in order to properly close the seam the solder should be heated at the time the seam is closed, and in order to prevent the solder from hardening or becoming too cool for practically closing the seam the seam-closing head 28 is heated by means of suitable openings 64, in which openings gas is burned, thereby keeping the seam-closing head hot.

It will be understood that gas should be conveyed to the seam-closing head 58 by means of a flexible tube, such as 65, inasmuch as a reciprocating movement is imparted to the seam-closing head.

It will be understood that the thrust of the seam-closing head 58 will have a tendency to move or elevate the mandrel 8, and in order to prevent its upward movement the cross-bar 22^a is provided, which cross-bar is secured in any convenient and well-known manner to the standards 22. It will also be understood that the can-bodies must move under the cross-bar 22^a, and the mandrel is so adjusted that its normal position will be slightly below the cross-head, so as to provide sufficient space between the top of the mandrel and the bottom of the cross-bar to allow the can-bodies to pass unobstructed as they are moved along the mandrel.

After the seams of the cans have been properly closed they are moved along the mandrel 8 and pass over the solder-distributors 66,

which distributors place the solder in proper position and at the same time leave the seam in proper condition with reference to the solder thereof. In order to accomplish this result, it is necessary to keep the solder in a heated state, the heat being of such a degree that it will not leave the seam of the can, but be soft enough to allow the same to be properly distributed. In order to bring about this result, the gas-burners, such as 67, are provided and held in fixed position in any convenient and well-known manner. They are illustrated being supported upon the pipe 68. After the cans have been moved along the mandrel until they have fully passed the solder-distributors they are completed, and no further operation is performed upon the cylindrical can-bodies, but are moved off the mandrel properly formed into cylinders and their seams properly finished.

Adjacent to the mandrel 8 and below the horizontal center thereof are located the reciprocating rods 69 and 70, which reciprocating rods are supported in suitable bearings, such as 71 and 72; but it will be understood that other bearings may be provided, as the reciprocating rods should be held in parallelism with the mandrel 8.

For the purpose of imparting a reciprocating movement to the rods 69 and 70 the cam 73 is mounted upon the power-shaft 4, which cam is provided with the groove 74, and in which groove is located a suitable cross-pin 75, which cross-pin is connected to the vibrating arm 76, said vibrating arm being pivotally attached to the bearing 77, said bearing being held in fixed position to the base of the machine or to the floor upon which the machine proper stands. To the upper end of the vibrating arm 76 is pivotally attached the connecting-rod 78, the opposite end of said connecting-rod being pivotally attached to the bottom or lower end of the rock-arm 79, which rock-arm extends below and above the stud 80, which stud is fixed to some part of the machine-frame.

It will be understood that by the rotation of the power-shaft a reciprocating movement will be imparted to the connecting-rod 78 by means of the vibrating arms 76 and the cam 75, which in turn imparts a rocking movement to the arms 79. The top or upper end of the rock-arms 79 is provided with the yoke 81, which yoke carries grippers 82; so adjusted that a true reciprocating movement can be imparted to the rods 69 and 70 by the rocking movement of the rock-arms 79.

It will be understood that the can-bodies should be moved upon the mandrel at certain intervals, and during the intervals of the movement of the can-bodies upon the mandrel the various devices perform operations, such as locking the seams, soldering the loosely-locked edges of the seams, and closing the seam of each can-body. The devices performing these various operations should be so timed that they will not be in

contact with the can-bodies or with the seams of the can-bodies at any time during the various steps of the different operations to be performed to complete the seam, and the various cans and other devices are so arranged with reference to the devices for moving the can-bodies that when the devices for moving the can-bodies are in operation the devices for performing the different steps to complete the seam are out of contact or operative engagement with the seams of the can-bodies. In order to accomplish this result, it is necessary that the blanks from which the can-bodies are formed should be spaced from each other, so as to give time for the can-carrying devices to move into position to give the can-bodies the proper movement upon the mandrel 8, as it will be understood that when the can-carrying devices move the can-bodies a given distance they must return without contact with the can-bodies, and during this return movement of the can-body carriers the can-bodies remain at rest upon the mandrel.

In order to bring the can-bodies into proper spaced relation with reference to each other to have the various operations performed upon the seams of the can-bodies and at the same time allow the can-bodies to be moved longitudinally upon the mandrel at the time the various devices employed in performing the different steps upon the seams of the cans are out of contact or have receded from the can-bodies, the carrying-chains 18 are each provided with the push-lugs 83, said push-lugs being so spaced upon the carrying-chains that proper space is provided between all of the can-bodies to allow the various devices performing operations upon the can-bodies, either in bending the can-bodies, forming the seam, and carrying the cans, to be brought into action at such times that one action will not interfere with another.

It will be understood that the solder-receptacle 45 should be heated, so as to properly melt the solder and keep it in such a condition that it can be applied to the loosely-locked edges of the can-body, and in order to bring this result a gas-burner, such as 84, is employed and is so located that it will properly heat the solder-receptacle. No detail description of the gas-burner 84 is here given, owing to the fact that various styles and kinds of gas-burners may be employed without departing from the nature of the present invention.

To the power-shaft 4 is attached the cam 85, to which cam is attached the connecting-rod 86 by means of the usual connecting-head 87. The connecting-rod 86 extends rearward, and its rear end is connected to the adjustable head 88, which adjustable head is connected to the vibrating arm 89, said arm being provided with the rocking head 90, to which rocking head is attached the arm 91, the rocking head being mounted upon the bar 92, which bar is secured in fixed position to the rearward-extending frame 93 or its equivalent.

To the arm 91 is pivotally connected the bottom or lower end of the connecting-rod 94, to the top or upper end of which is pivotally attached the oscillating head 95, said oscillating head being so attached that the reciprocating rod 70 can move the oscillating head, but at the same time cause the rod 70 to rock with the oscillations of the head 95. This result may be accomplished by means of the longitudinal groove 96, formed in the rod 70, and a lug formed in the eye of the oscillating head 95. To the rod 70 are securely attached the can-carrying dogs 97 and 98, and upon the rod 69 are also securely attached the can-carrying dogs 99, said can-carrying dogs 97 and 98 being substantially of the form shown and are practically of the same construction—that is to say, the dogs opposite each other or upon opposite sides of the mandrel 8 are alike.

It will be understood that by providing means for rocking the reciprocating bars 69 and 70 the various dogs for carrying the can-bodies can be moved to and from the mandrel 8 by means of the cam 85 and the intermediate connection between said cam 85 and the oscillating head 95.

It will be understood that the upward movement of the connecting-rod 94 will move the various can-carrying dogs toward the mandrel, all of the dogs being operated simultaneously by means of the connecting-links 100, which links are connected to the arms 101 and 102, said arms being extended from the heads 103 and 104.

In order to give a simultaneous inward movement to all of the can-carrying dogs upon both of the reciprocating rods 69 and 70, the arms 101 are located or extended upward from the reciprocating bar 70 and downward from the reciprocating bar 69.

For the purpose of insuring the proper engagement of the various can-carrying dogs with the can-bodies the mandrel 8 is provided with the grooves 105, and into which grooves the inner ends of the various dogs enter, so that they will fully pass the ends of the can-bodies, and thereby prevent any danger of the dogs from slipping or passing the end of the can-bodies as said can-bodies are moved upon the mandrel with the simultaneous movement of the can-carrying dogs.

For the purpose of allowing the can-carrying dogs to be at the proper place with reference to the location of the can-bodies at the time said can-carrying dogs are moved inward, so as to engage in operative contact with the can-bodies, some of said dogs may be provided with the lateral arms 106, this feature being necessary for the purpose of allowing the reciprocating bars 69 and 70 to receive their full reciprocating movement, carrying with them the various can-carrying dogs, without interfering with any fixed object, such as the oscillating head 95 or the different bearings for said reciprocating rods 69 and 70.

For the purpose of supporting the rear ends of the reciprocating rods 69 and 70 a standard or support 107 should be provided, which is held in rigid position by suitable braces, such as 108, or their equivalents.

The working face of the cam 32^a is so formed that it will give to the seam-locking plate 35 a movement such as to bring the can-body in the position illustrated in Fig. 3. This is the first dwell of the locking-plate 35. The face of the cam 32 is so formed that the locking-plate 36 will move into action and bring the can-body having the hooked edge into position illustrated in Fig. 4, after which the cam 32^a moves the locking-plate 35 so as to hook the edge over the flange edge of the can-body, as illustrated in Fig. 5. This is the second dwell of the locking-plate 35.

For the purpose of imparting a rotary movement to the feed-rollers the power-shaft 4 is provided with a sprocket-wheel 4^a, around which extends the sprocket-chain 5^a and around the sprocket-wheel 6^a, which is fixed to one of the feed-rollers or one of the forming-rollers, as desired. We have described this manner of imparting rotary motion; but it will be understood that other forms of gear may be employed without departing from the nature of our invention.

The solder-distributors 66 are journaled to the upper ends of the pivoted arms 66^a and the distributors held in contact with the can-bodies by means of springs 67^a, said springs being secured at their bottom ends to the plate 68^a, and to which plate is connected or formed integral therewith the post 69^a, said post being for the purpose of providing means for pivotally attaching the solder-distributing arms 66^a. The burners 67 are arranged upon opposite sides of the distributors 66 and are so arranged that they will keep the distributors hot, so that they will properly act upon the solder as the can-bodies pass the distributors.

For the purpose of preventing the solder-distributors from coming in contact with the seams of the can-bodies during the time they are at rest upon the mandrel the distributors 66 are so spaced that they will be out of contact with said solder-distributors when at rest and in contact only at the time the can-bodies are moved along and upon the mandrel.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A base and a web extended upward therefrom, housings secured to the upper forward portion of the web, feed-rollers having forming-beads and grooves adapted to form in opposite directions, carrying-chains provided with spaced lugs located around sprocket-wheels and around the lower forming-roller, said chains located in grooves in the lower forming-roller and a mandrel, all arranged substantially as and for the purpose specified.

2. In a can-body-forming machine, the combination of a base and a support, a mandrel sup-

ported in horizontal position, a vibrating arm carrying can-body-forming head or die, means for imparting vibrating movement to the arm carrying the forming head or die, and mechanism for feeding can-bodies under the die in spaced relation to each other, substantially as and for the purpose specified.

3. The combination of a base and a support, a mandrel carried by the support or frame, mechanism adapted to feed can-body blanks in spaced relation over the mandrel, a can-body-forming head or die and means for imparting movement to said can-body-forming head or die, seam-locking rock-arms provided with locking-plates, and means for imparting an oscillating movement to the seam-locking rock-arms, substantially as and for the purpose specified.

4. In a can-body-forming machine, a frame or support, a mandrel secured in fixed position, hooked-edge-forming rollers and feed-rollers, feeding-chains provided with spaced carriers, a reciprocating can-body-forming head or die, and means for loosely locking the hooked edges of the can-body after said can-body has been brought into cylindrical form and around the mandrel, substantially as and for the purpose specified.

5. In a can-body-forming machine, a base and a support, a mandrel carried by the support, a can-body-forming head or die, an acid-receptacle located below the mandrel and an acid-brush, a solder-receptacle located under the mandrel and in the path of the movement of the can-bodies upon the mandrel, a reciprocating solder-trough and means for imparting a vertical reciprocating movement to the solder-trough and elevating said solder-trough above the level of the solder-line, substantially as and for the purpose specified.

6. The combination of a base and a support and a mandrel carried thereby, a solder-receptacle having located therein a reciprocating trough, said solder receptacle and trough formed of a length to correspond with the length of two or more predetermined spaced cams, substantially as and for the purpose specified.

7. In a can-body forming and soldering device, a base and a support mounted thereon and a mandrel carried by the support, means for feeding the can-bodies in spaced relation upon the mandrel, a forming head or die oscillating seam-locking plates, means for imparting movement to the can-body-forming die and the oscillating seam-locking plates, a solder-receptacle and a reciprocating solder-trough, a seam-closing head located in the path of the movement of the can-body upon the mandrel, means for heating the seam-closing head, and means for imparting movement to the seam-closing head, substantially as and for the purpose specified.

8. The combination of a base and a support mounted thereon, a power-shaft provided with seam-locking cams, seam-locking rock-arms actuated by the seam-locking cams, locking-

plates carried by the seam-locking rock-arms, a mandrel located in a plane above the extreme upward movement of the seam-locking plates and a can-body-forming head or die mounted upon a vibrating arm and located directly above the seam-locking plates and means for imparting movement to the can-body-forming head or die, substantially as and for the purpose specified.

9. The combination of a base and a support, a mandrel carried thereby, a soldering-receptacle located below the mandrel, a reciprocating solder-trough located therein, said reciprocating trough provided with arms extended outward and downward upon the outer sides of the solder-receptacle the bottom or lower ends of said arms provided with right-angled portions having adjustable contact-bolts, reciprocating bars supported in proper relation with the adjustable contact-bolts and said reciprocating bars provided with inclines, and means for imparting reciprocating movement to the bars provided with inclines, substantially as and for the purpose specified.

10. The combination of a base and a support, a mandrel carried thereby, said mandrel provided with grooves, reciprocating rods located upon opposite sides of the mandrel, means for imparting reciprocating movement to the rods, said rods provided with can-carrying dogs, said dogs fixed to and moving with the reciprocating rods, heads fixed to the reciprocating rods and provided, with arms or extensions, said arms or extensions extended upward from one of said reciprocating rods and downward from the other, links or bars connecting said arms and means for imparting an oscillating or rocking movement to the reciprocating bars, substantially as and for the purpose specified.

11. In a can-body-forming machine the combination of a base and a support therefor, a mandrel held in fixed position, a vibrating arm having connected to the free end thereof, a vertical moving can-body-forming die, means for imparting movement to the vibrating arm, a connecting-rod actuated by the vibrations of the arm carrying the can-body-forming die, a heated seam-closing head actuated by mechanism intermediate the connecting-rod actuated by the vibrating arm, devices for acidizing and soldering the loosely-hooked edges of the can-bodies intermediate the can-body-forming die, and the seam-closing head, and seam-locking plates located directly below the can-body-forming die, substantially as and for the purpose specified.

12. In a can-body-forming machine, a base and a support mounted thereon, a mandrel carried by the support, parallel reciprocating bars located in parallelism with the mandrel, a power-shaft provided with a cam, said cam adapted to actuate a vibrating end at its lower end in fixed position, a connecting-rod secured to the vibrating arm and a rock-arm extended above and below its pivotal point, the upper end thereof provided with a yoke,

and said yoke carrying grippers, and can-carrying dogs located upon the parallel reciprocating bars and means for imparting a rocking movement to the parallel reciprocating bars, said rocking movement being imparted simultaneously with the extreme limit of the backward-and-forward throw of the reciprocating bars, substantially as and for the purpose specified.

10 13. In a can-body-forming machine, a base and a support, and a mandrel carried thereby, a power-shaft provided with cams, seam-locking rock-arms actuated by the cams, said seam-locking rock-arms provided with locking-plates, one of the cams timed to actuate its locking-plate in advance of the other seam-locking plate and rest, the other cam timed to advance the opposing locking-plate during the first rest of the first-actuated locking-plate and the first-actuated locking-plate advanced after the full action and rest of the second-actuated seam-locking plate, substantially as and for the purpose specified.

14. In a can-body forming and soldering machine, a base and a support carried thereby, a mandrel held in fixed position, mechanism for feeding the can-bodies in spaced relation to each other, solder-distributors carried upon the pivoted arms and spaced from each other in such relation that they are put out of contact with the can-bodies when the same are at rest, and means for heating the solder-distributors, substantially as and for the purpose specified.

15. The combination of a mandrel, mechanism for feeding and moving the can-bodies in spaced relation with reference to each other to and upon the mandrel, solder-distributors carried by pivoted arms, mechanism for holding the solder-distributors in frictional contact with the can-bodies, and means for heating the solder-distributors, substantially as and for the purpose specified.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

ROBERT J. GOOD.
JULIUS H. SCHLAFELY.

Witnesses:

CHAS. A. IRWIN,
E. LANGENBACH.