

No. 877,297.

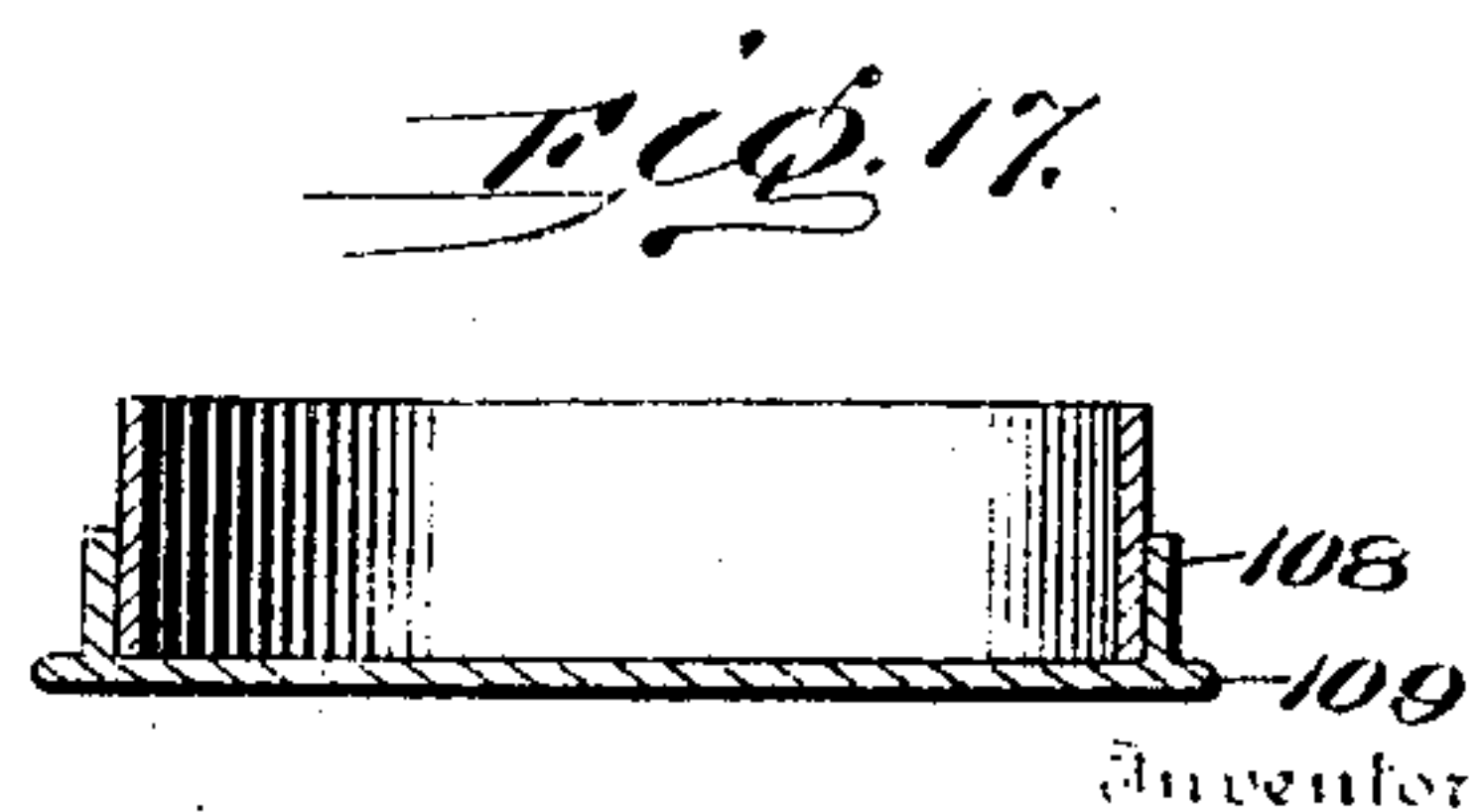
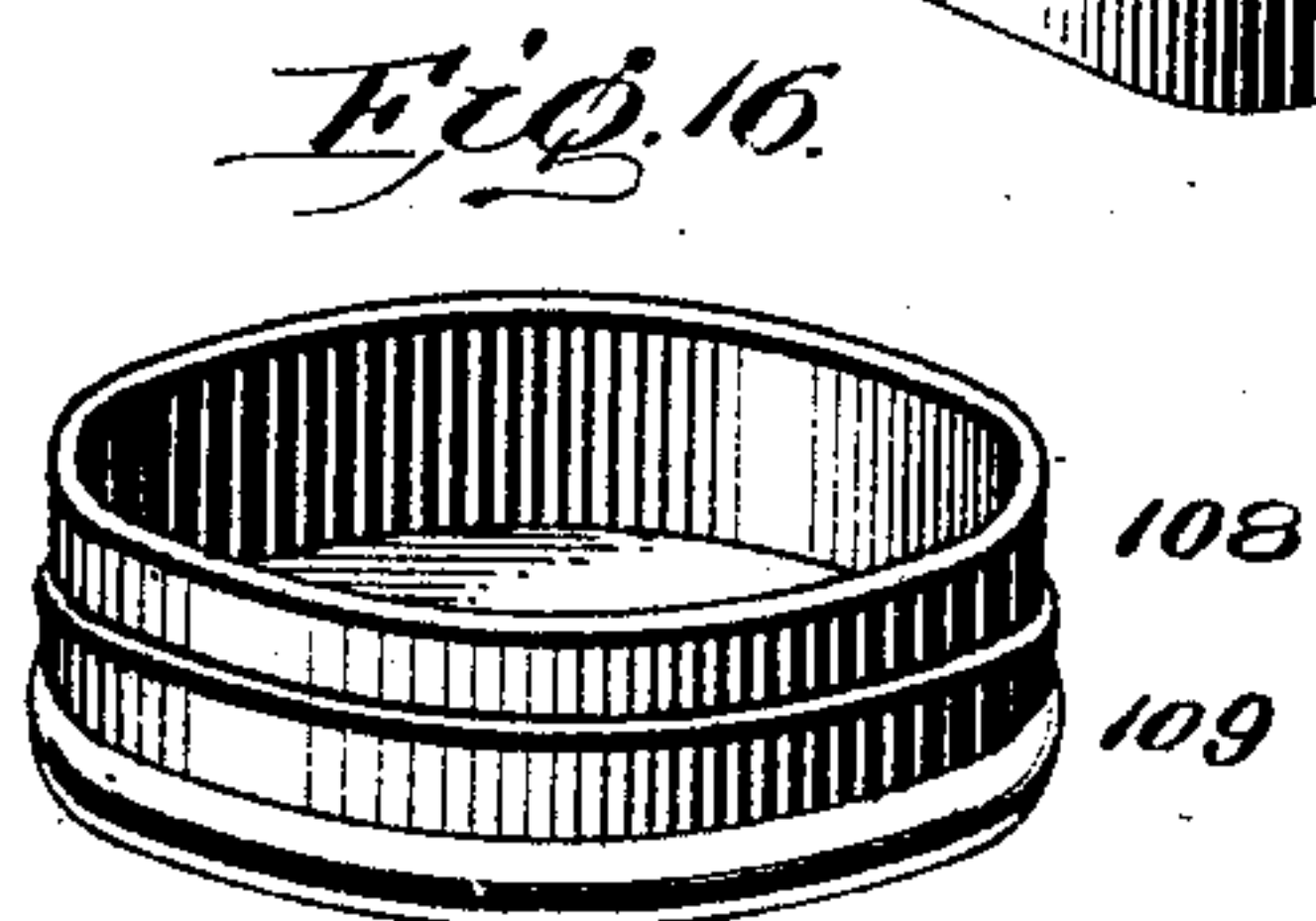
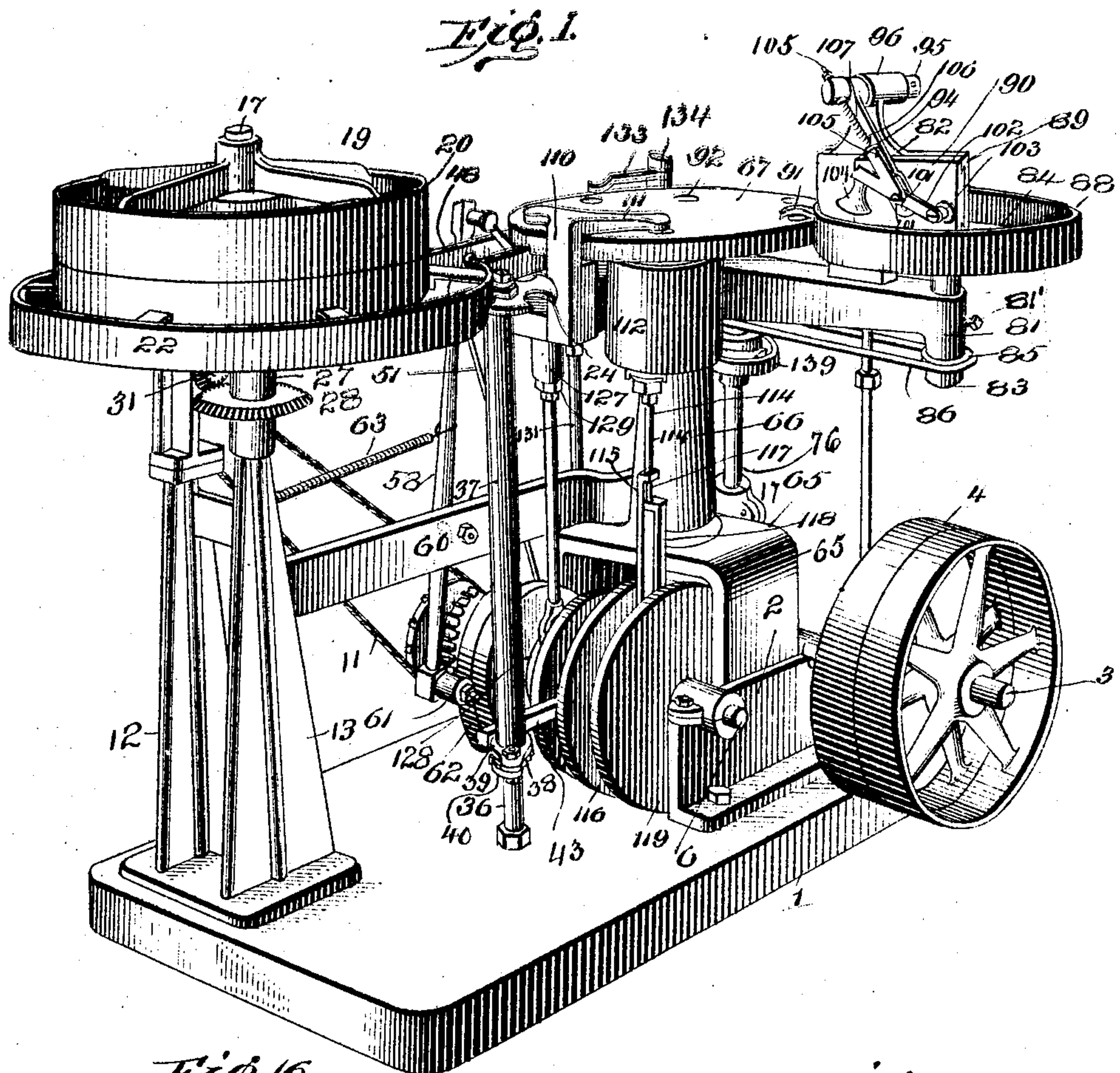
PATENTED JAN. 21, 1908.

E. E. COOK.

COLLARING MACHINE.

APPLICATION FILED FEB. 9, 1904.

9 SHEETS--SHEET 1.



## Witnesses

Edgar M. Kitchin

Elmer E. Cook.

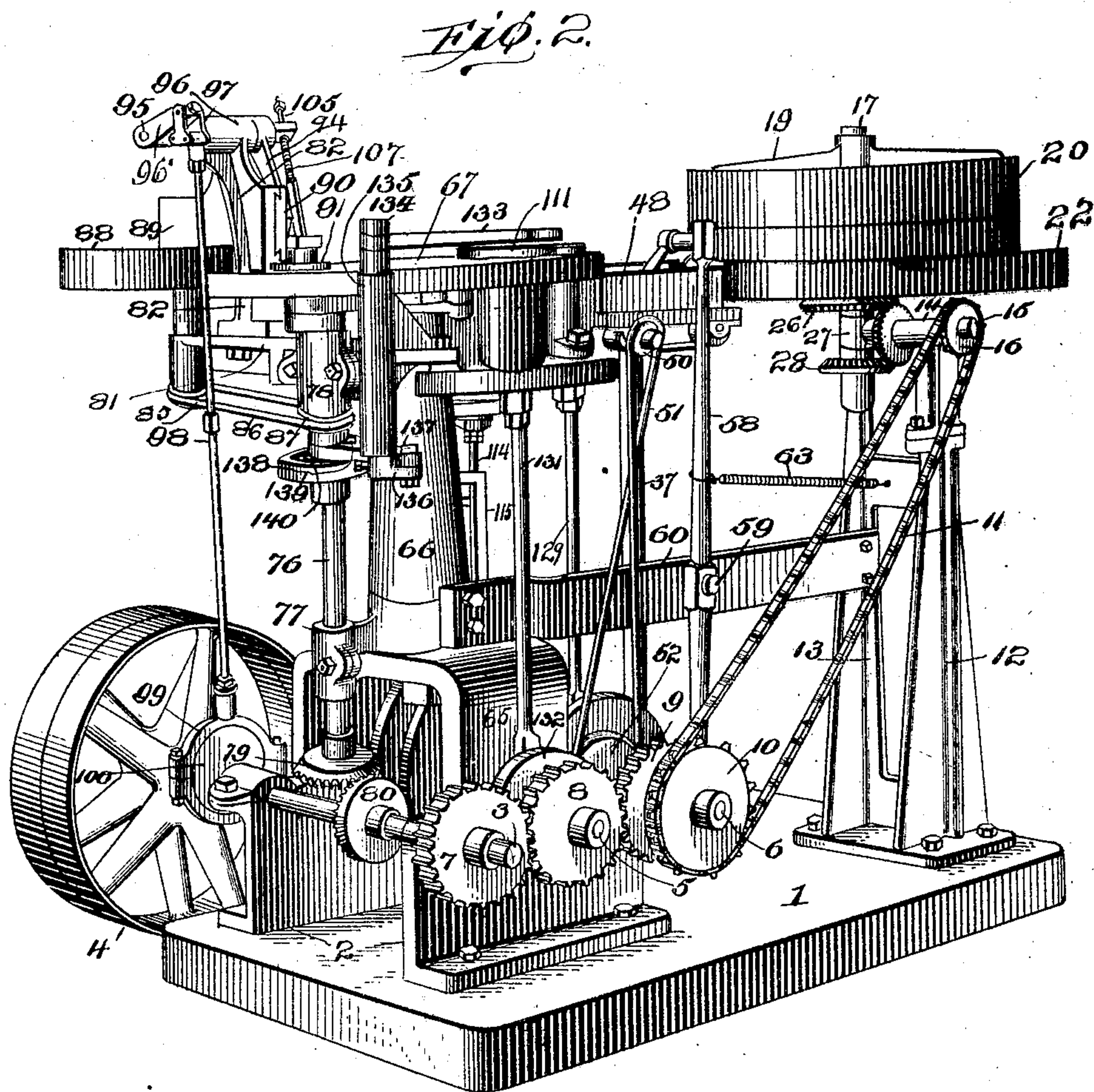
Mason, Fenwick & Lawrence  
His Attorneys.

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9 SHEETS—SHEET 2.



Inventor

Elmer E. Cook.

Witnesses

J. M. Fowler Jr.  
Edgar M. Kitchin

By Mason, Fenwick & Lawrence  
His Attorneys.

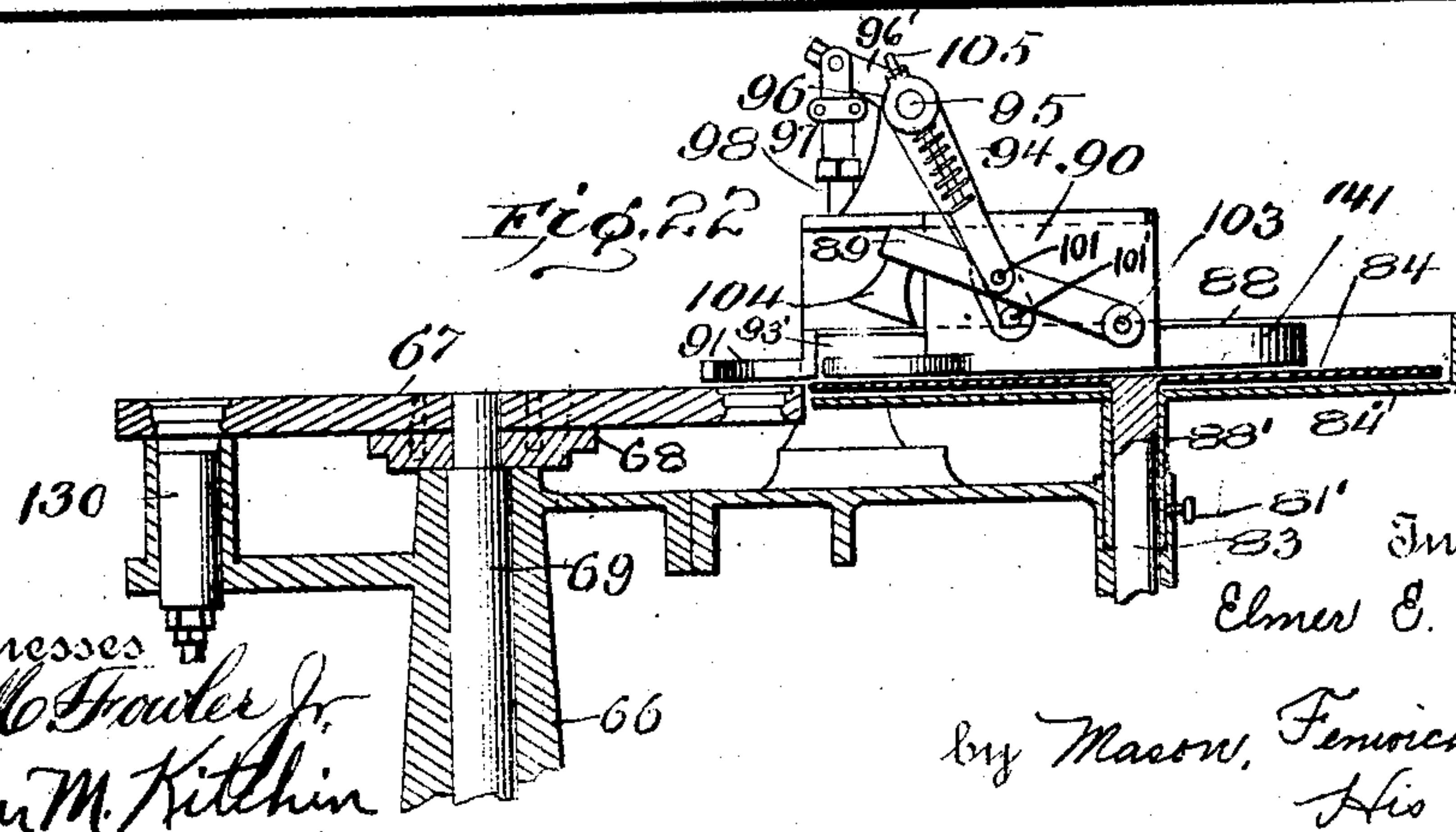
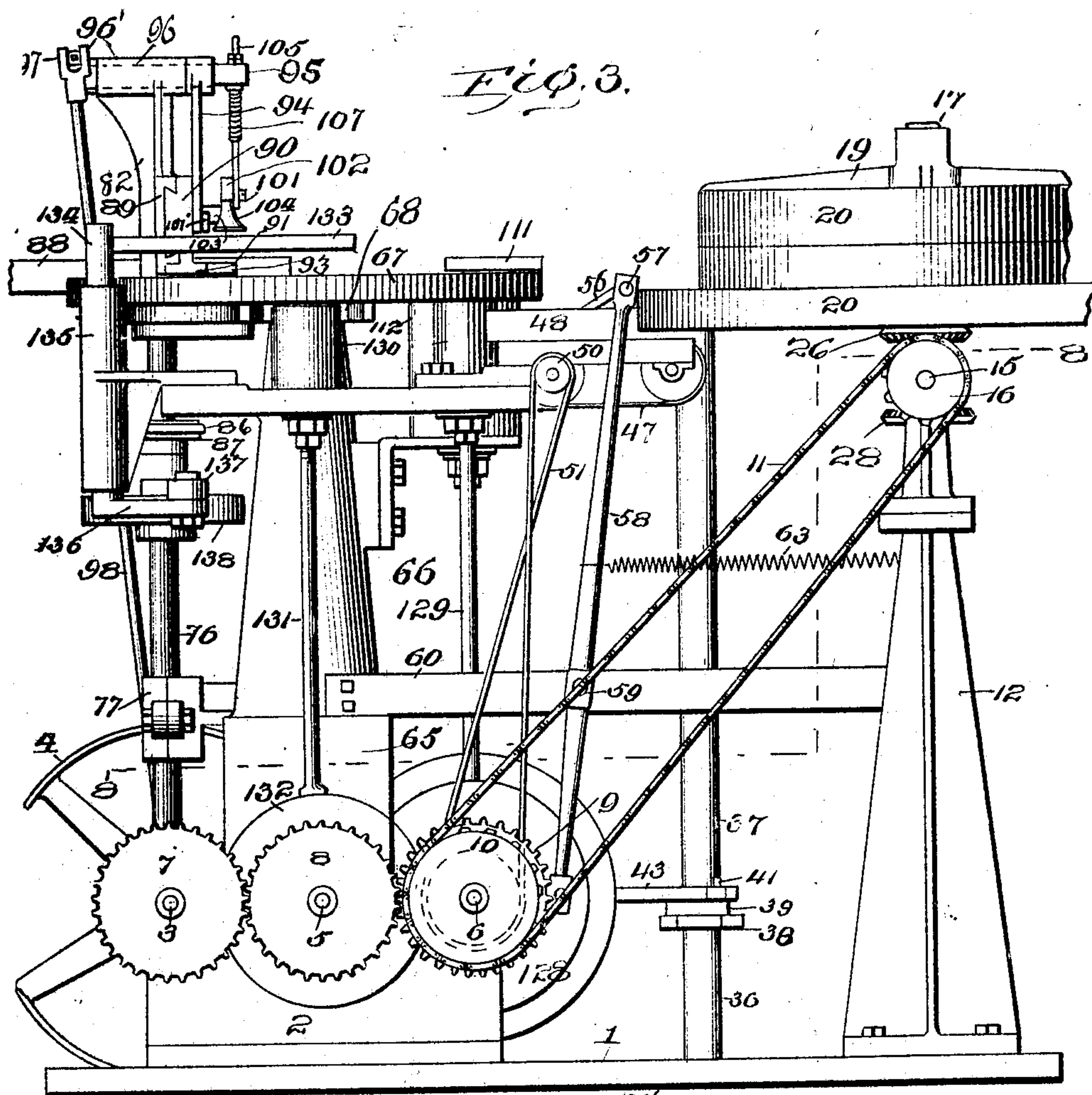


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9 SHEETS—SHEET 3.



Witnesses  
J. M. Fowler Jr.  
Edgar M. Kitchen

Inventor  
Elmer E. Cook.

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His Attorneys



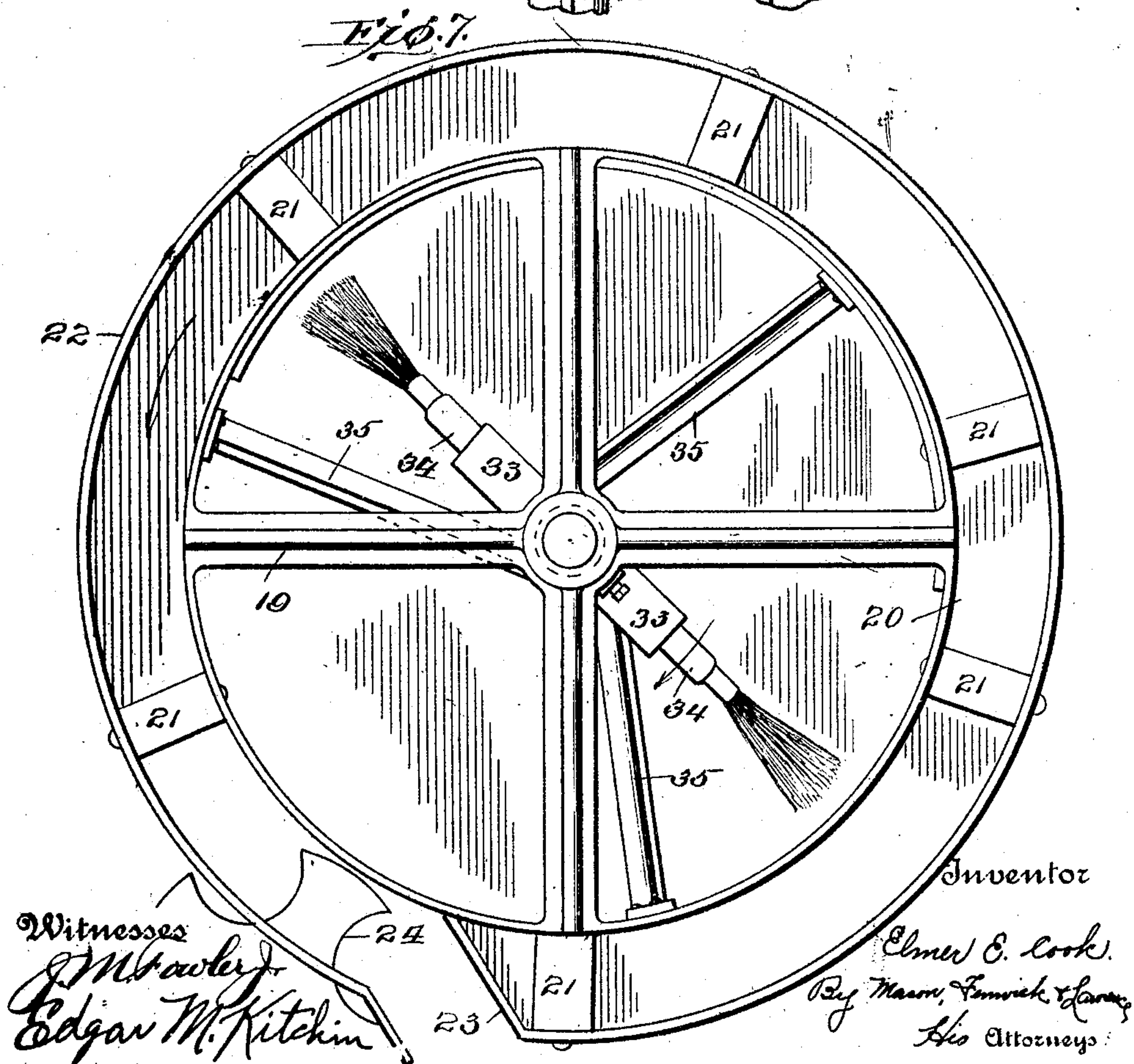
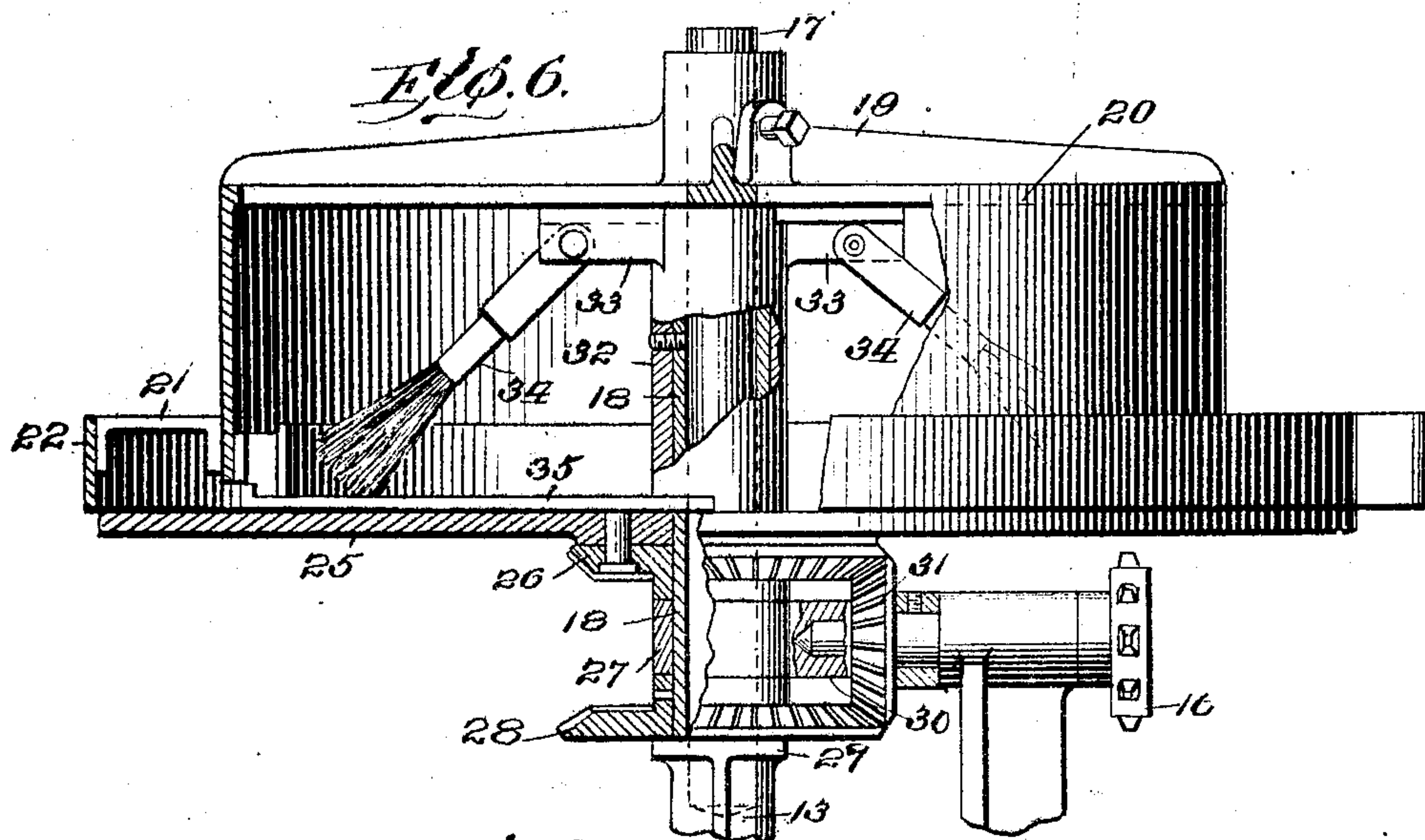


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9 SHEETS—SHEET 5.



Witnesses

*Edgar M. Kitchen*

Inventor

*Elmer E. Cook*

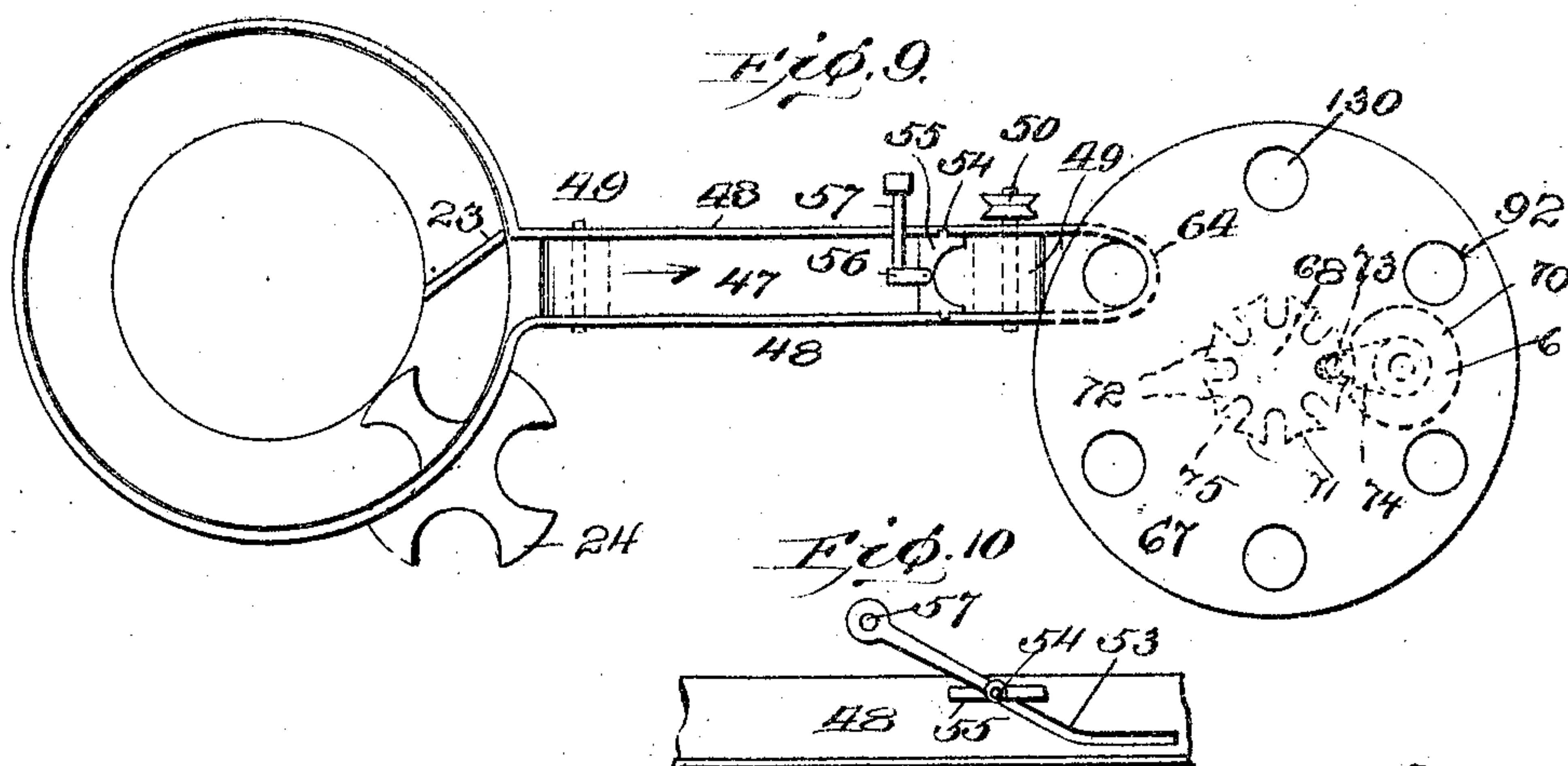
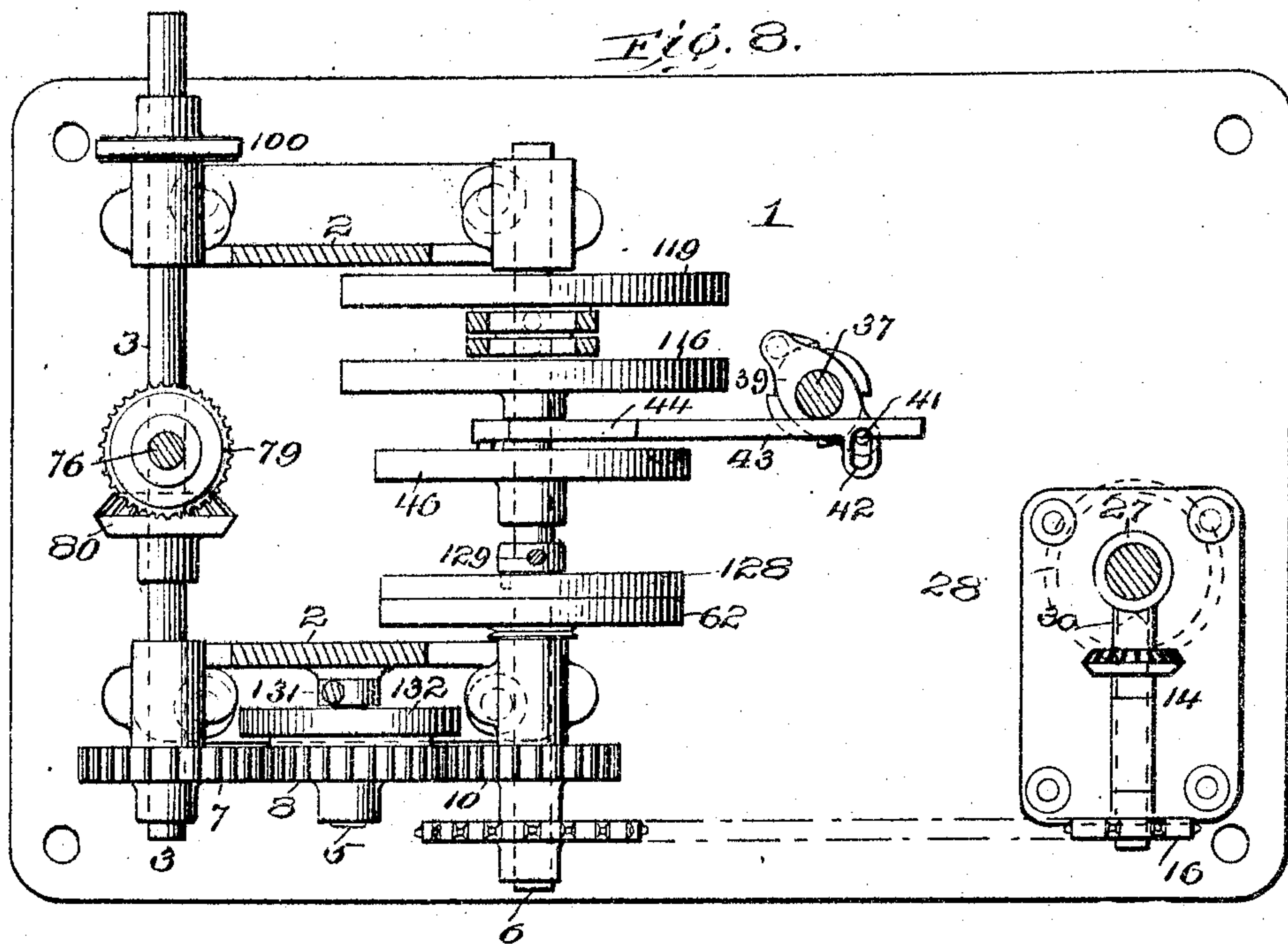
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E. E. COOK.  
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APPLICATION FILED FEB. 9, 1904.

9 SHEETS—SHEET 6.



Inventor

Elmer E. Cook.

Witnesses

J. M. Fowler Jr.  
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His Attorneys

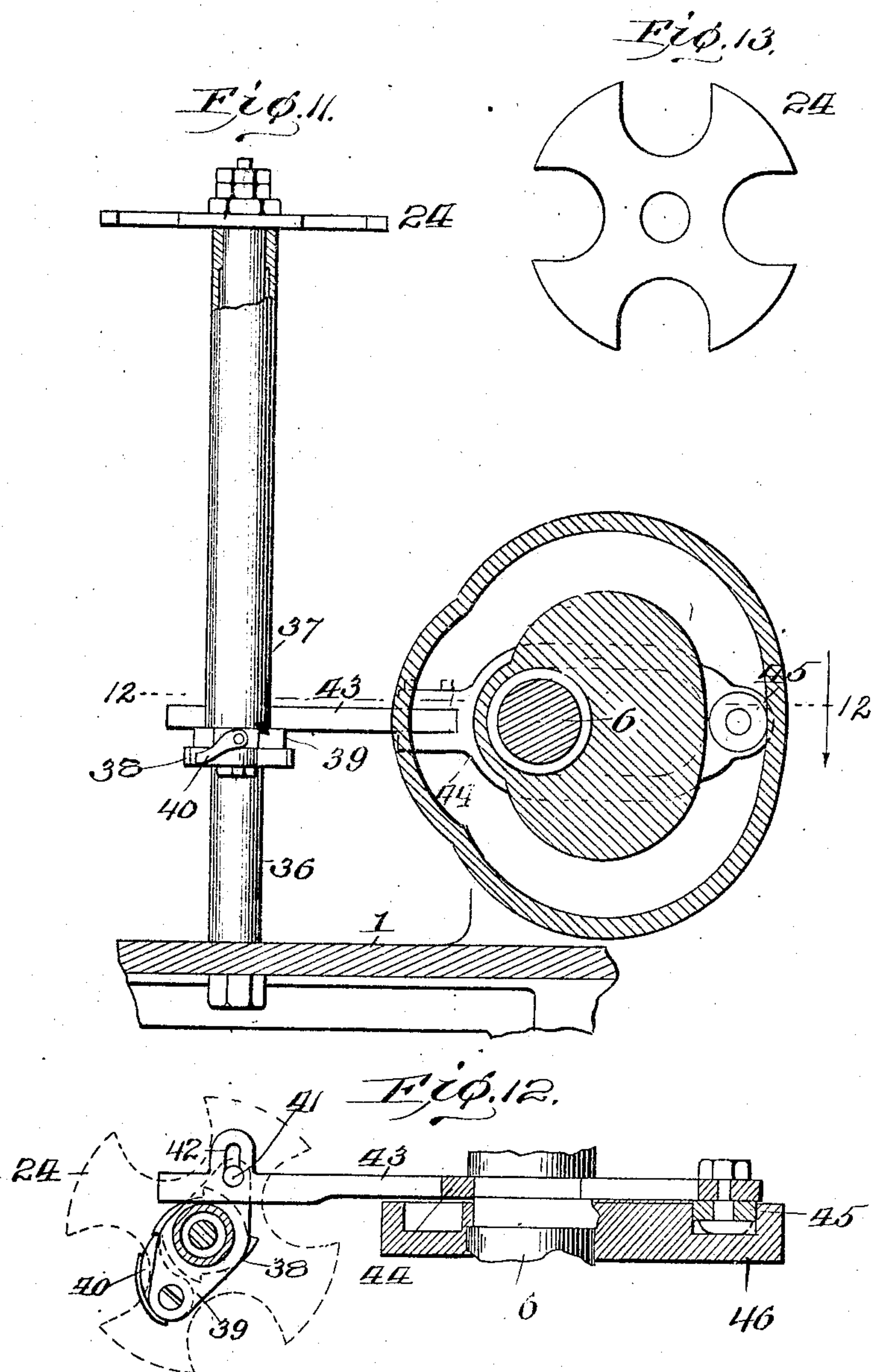


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E. E. COOK.  
COLLARING MACHINE.  
APPLICATION FILED FEB. 9, 1904.

9 SHEETS—SHEET 7



WITNESSES:

*J. M. Fowler Jr.*  
*Edgar M. Kitchen*

Inventor:

*Elmer E. Cook*  
By *Mason, Fenwick & Lawrence*

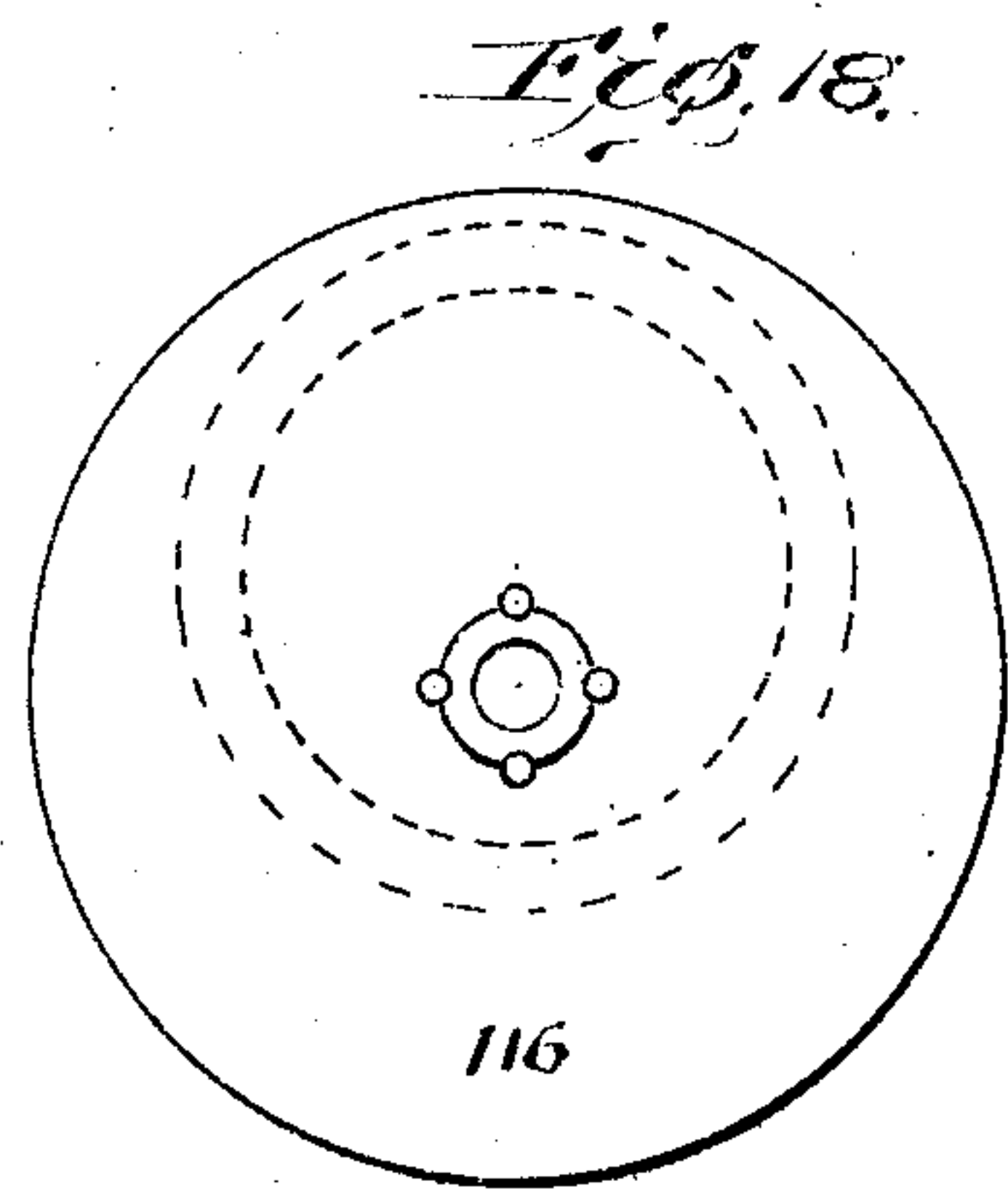
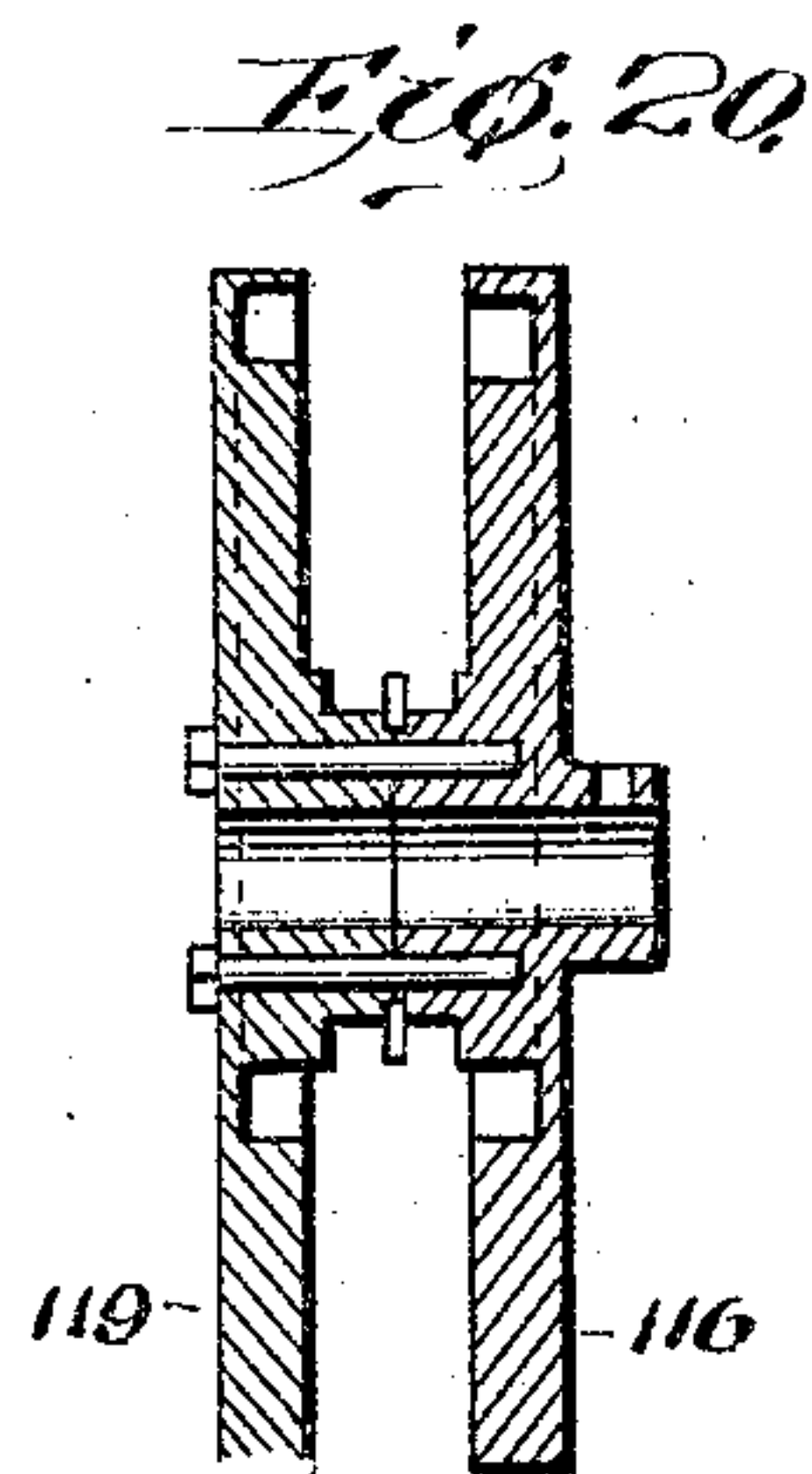
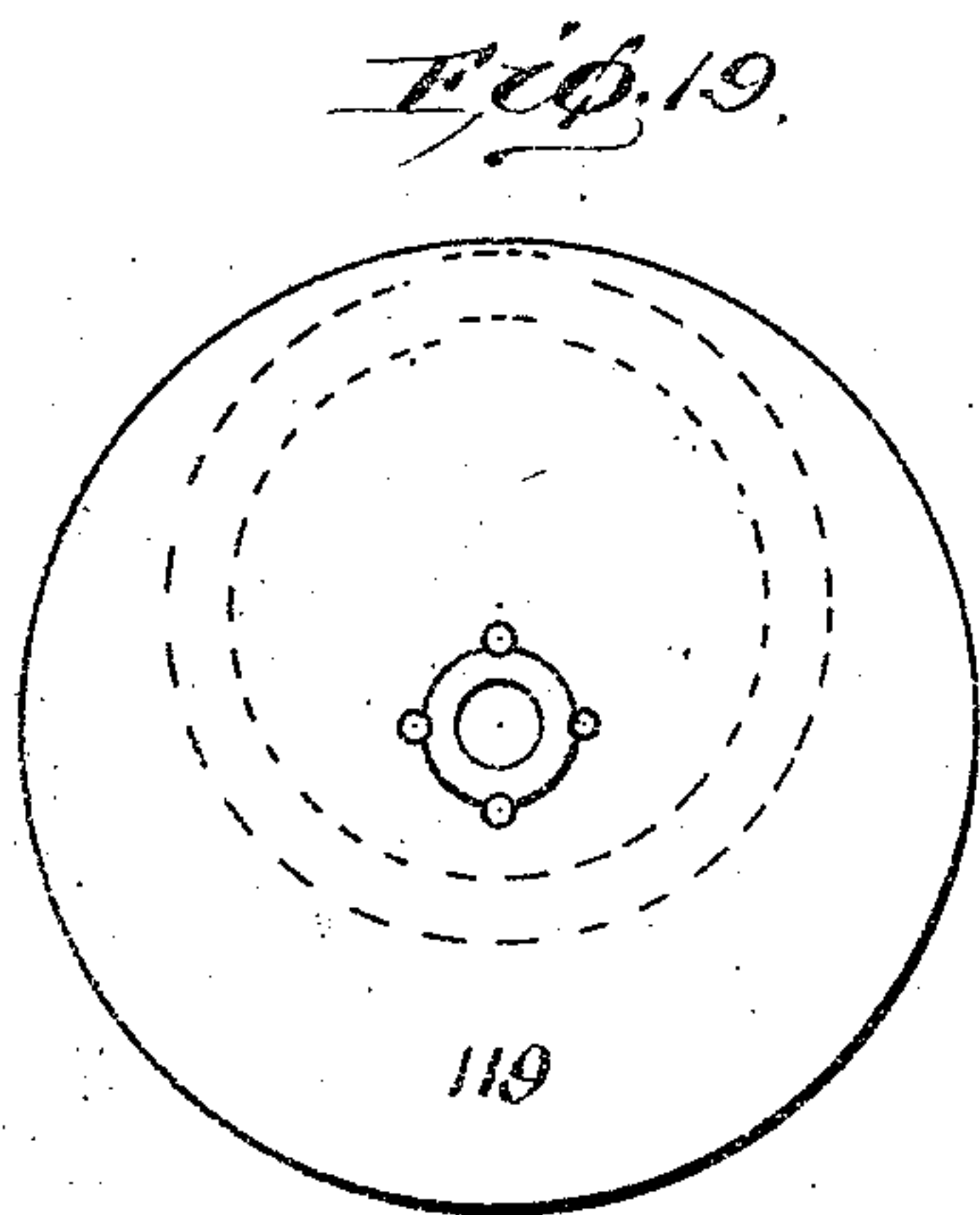
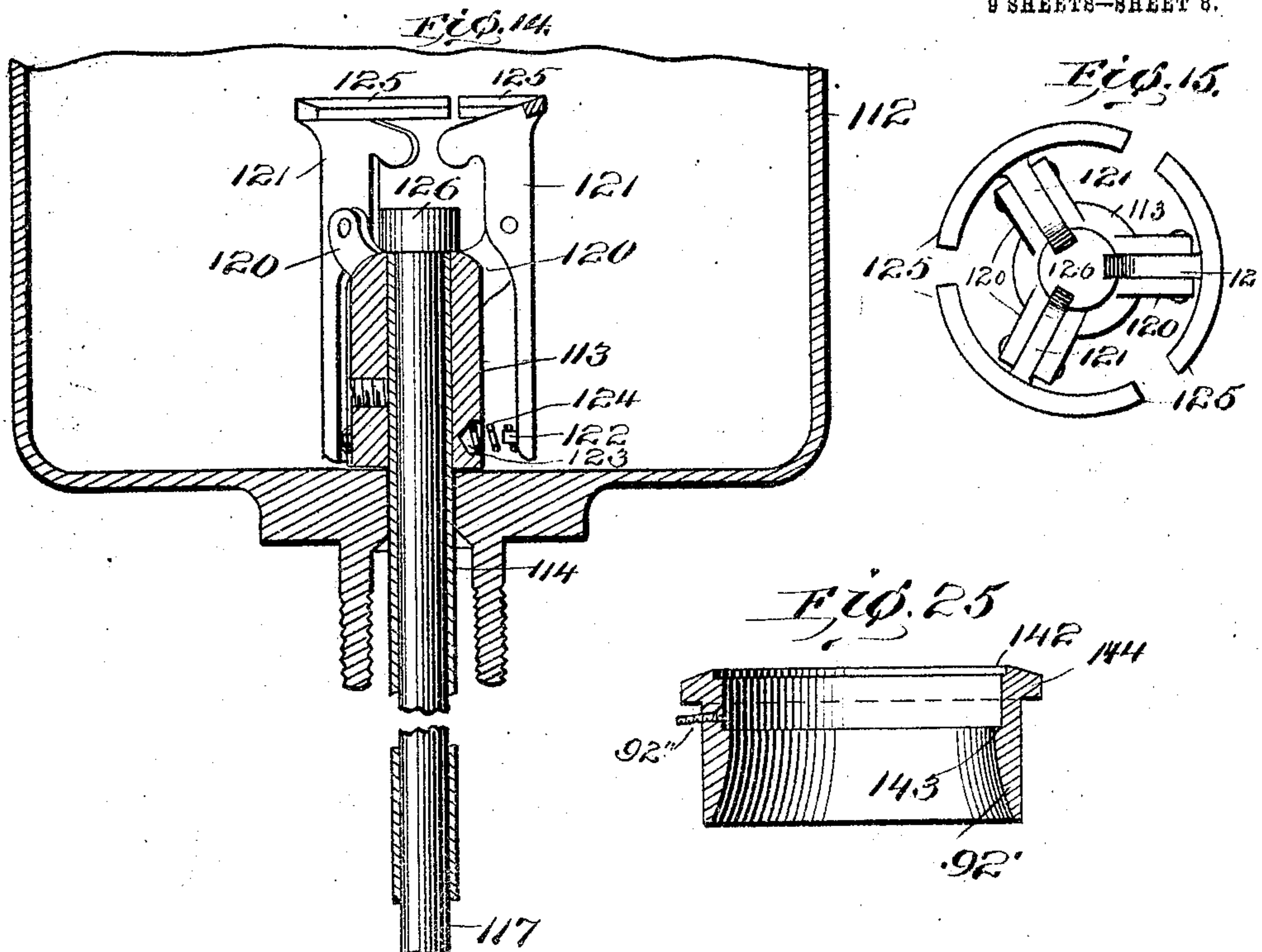
*His* ATTORNEYS.

No. 877,297.

PATENTED JAN. 21, 1908.

E. E. COOK.  
COLLARING MACHINE.  
APPLICATION FILED FEB. 9, 1904.

9 SHEETS—SHEET 8.



Witnesses  
*J. M. Fowler Jr.*  
*Edgar M. Kitchen*

Inventor  
*Elmer E. Cook.*  
*By Mason, Fenwick & Laurence*  
His Attorneys.

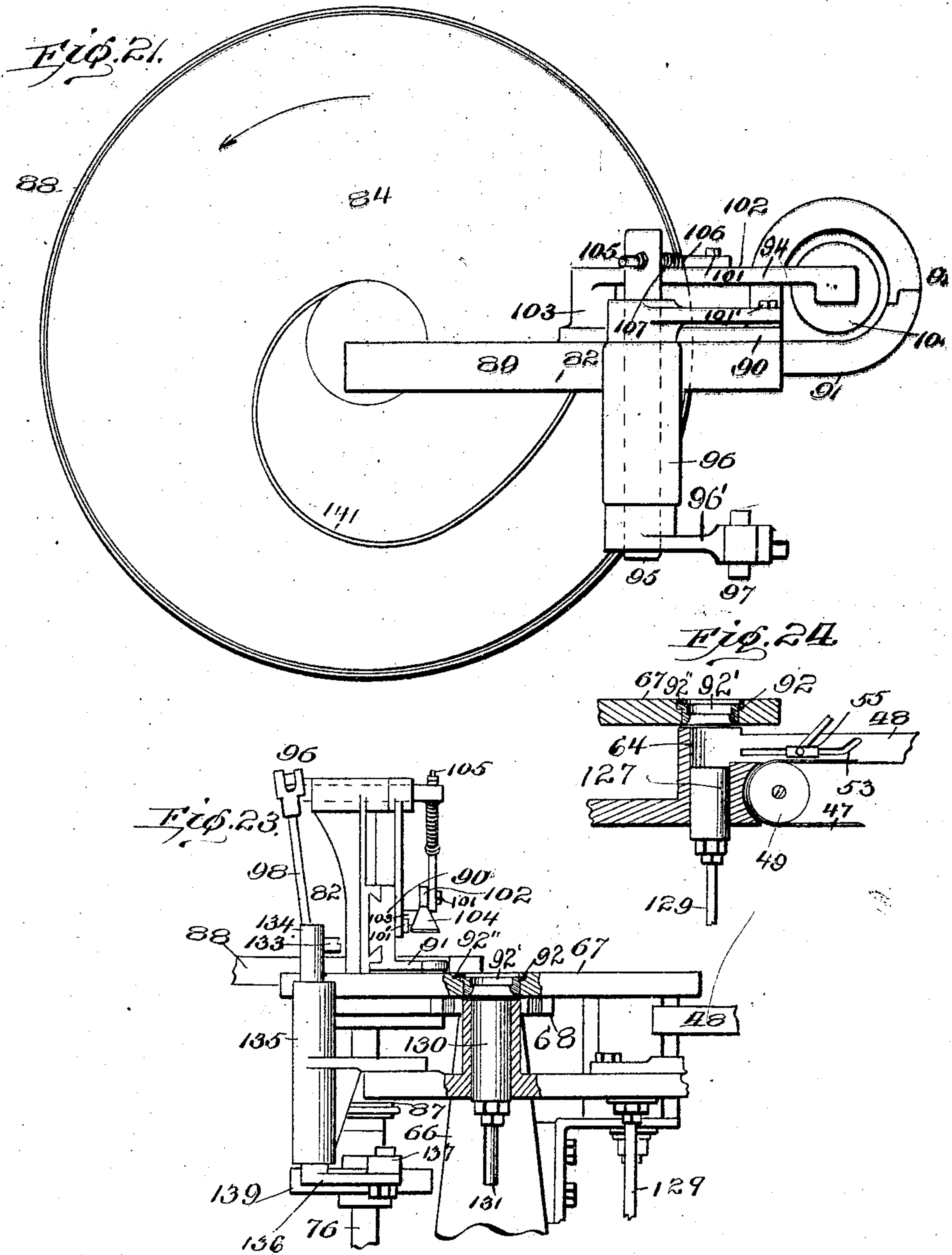


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COLLARING MACHINE.  
APPLICATION FILED FEB. 9, 1904.

9 SHEETS—SHEET 9.



Witnesses

J. M. Fowler Jr.  
Edgar M. Ritchie

Inventor

Elmer E. Cook.

By Mason, Fenwick Lawrence  
His Attorney S.



# UNITED STATES PATENT OFFICE.

ELMER E. COOK, OF RICHMOND, VIRGINIA, ASSIGNOR TO THE RANDOLPH PAPER BOX COMPANY, OF RICHMOND, VIRGINIA, A CORPORATION OF VIRGINIA.

## COLLARING-MACHINE.

No. 877,297.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed February 9, 1904, Serial No. 192,830.

*To all whom it may concern:*

Be it known that I, ELMER E. COOK, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Collaring-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in mechanism for assembling the parts of a box, and particularly to such as is adapted for introducing rings into body portions or caps of boxes, especially of the French edge type.

The object in view is the production of means for automatically introducing and securing a ring within a body portion or cap of a box in an accurate and efficient manner.

With this and further objects in view, the invention comprises the combination of means for applying an adhesive to the inner surface of the wall of a cap and means for introducing a collar into said cap in contact with said inner surface.

It further comprises the combination of a receptacle for containing box caps, a receptacle for containing collars, means for removing a single cap from the supply of caps, means for removing a single collar from the supply of collars, and means for introducing said cap into said collar.

It still further comprises certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawing: Figure 1 represents a perspective view of an assembling mechanism embodying the features of the present invention. Fig. 2 represents a similar view of the same taken from the opposite side thereof. Fig. 3 represents a view in side elevation of the entire organized mechanism. Fig. 4 represents a view in end elevation of the same, parts being omitted. Fig. 5 represents a transverse, vertical section taken centrally through the collar receptacle and surrounding parts, parts being illustrated in elevation. Fig. 6 represents an enlarged, detail, fragmentary view of the collar receptacle and surrounding parts, parts being broken away for disclosing interior structure. Fig. 7 represents a top plan view of the same. Fig. 8 represents a

horizontal section taken on the plane of line 8, 8 of Fig. 3. Fig. 9 represents a diagrammatic plan view of the feeding and assembling disks and some of the surrounding parts. Fig. 10 represents a fragmentary, side elevation of the collar feeding trough, parts being broken away. Fig. 11 represents an enlarged, detail, fragmentary view in side elevation of the collar feeding device. Fig. 12 represents a horizontal section taken on the plane of line 12, 12 of Fig. 11. Fig. 13 represents a top plan view of the feeding star-wheel detached. Fig. 14 represents an enlarged, detail, sectional view of the paste pot and contained parts. Fig. 15 represents a detail, top plan view of the paste applying head. Fig. 16 represents an enlarged, detail, perspective view of the assembled parts of a box of the particular type designed to be operated upon with the present improved mechanism. Fig. 17 represents a transverse, vertical, central section through the same. Fig. 18 represents a detail view in elevation of the paste plunger operating cam. Fig. 19 represents a similar view of the cam for operating the shaft designed for expanding the paste plunger head. Fig. 20 represents a transverse, vertical section taken centrally through the said cams in their assembled position with respect to each other. Fig. 21 represents a top plan view of the box cap receptacle and surrounding parts, parts being broken away. Fig. 22 represents a transverse, vertical section taken through the cap supplying receptacle and the carrier disk, parts being shown in elevation. Fig. 23 represents a transverse, vertical section taken through the ejecting plunger casing, the surrounding parts being illustrated in elevation. Fig. 24 represents an enlarged, detail section taken through the collar moving plunger casing and surrounding parts. Fig. 25 represents an enlarged, detail, sectional view of one of the cap aperture linings detached.

Referring to the drawing by numerals, 1 indicates any suitable base, to which are secured bearing plates 2, 2. Extending transversely of the plates 2 is a main drive shaft 3 actuated by a suitable drum 4 and any driving mechanism, not illustrated. A shaft 5 is mounted parallel to shaft 3 and finds bearing in one of plates 2, and a shaft 6 is journaled in plates 2 parallel to shafts 3 and 5, the shafts 5 and 6 carrying actuating



cams, as will hereinafter more fully appear. The shaft 3 carries a gear wheel 7 near its end opposite that carrying the driving drum 4, and a similar gear 8 is carried by shaft 5 and meshes with a gear 7, the gear 8 in turn meshing with a gear 9 carried by shaft 6, whereby the shafts 5 and 6 are actuated. Outside the gear 9 and carried by shaft 6 is a sprocket 10 actuating a driving chain 11. Vertical standards 12 and 13 rise from the base 1, and, at the upper end of standard 12, is arranged a bearing casing 14 within which is journaled a stub shaft 15 carrying a sprocket 16 engaged and actuated by a chain 11. The upper end of the standard 13 is apertured centrally, and a shaft 17 is fixed therein, said shaft 17 being surrounded by a sleeve 18. A spider 19 is fixed to shaft 17 near the upper end thereof and carries an annular casing or inclosing housing 20, projecting radially from which are suitable brackets 21, 21 engaging, at their outer ends, a ring or substantially annular wall 22, said wall forming an annular passage about the housing 20, and the passage being closed at one point by a wall 23, a discharge opening being left in the wall 22 at one side of wall 23, and a feed wheel 24 being interposed in said passage a slight distance from said discharge opening, as will be hereinafter more fully described. Spaced a distance below the housing 20 equal to or slightly greater than the width of a collar of a box is an annular base plate or disk 25 fixed to and supported by a beveled gear 26, said gear surrounding the sleeve 18 and resting upon a collar 27 also surrounding said sleeve, said collar in turn resting upon a bevel gear 28. The bevel gear 28 surrounds the sleeve 18 and rests upon a shoulder 29 at the upper end of the standard 13. The collar 27 is provided with a tubular projection 30 forming a bearing for one end of a stub shaft 15, said shaft carrying a beveled gear 31 meshing with the gear 26 above and the gear 28 below the same, whereby the actuation of the sprocket 15 by chain 11 is designed to actuate the gear 26 in one direction and the gear 28 in the other. A sleeve 32 surrounds the sleeve 18 and is fixed thereto within the housing 20, and radial arms 33, 33 project from said sleeve 32 and carry pivotally mounted brushes 34, 34 for purposes hereinafter specified. Bars 35, 35 are fixed at their outer ends to the lower edge of the housing 20 and extend inwardly on a tangent to the axes of rotation of the sleeve 18. In operating the present improved mechanism, the housing 20 is designed to contain a supply of collars which are subjected to the action of the rotating plate 25 moving in one direction and the rotating brushes 34 moving in the opposite direction, whereby in operation said collars are designed to be directed out of the housing beneath the lower edge thereof, contact of said

brushes driving the collars against the tangentially arranged bars 35 which serve to direct the collars outwardly under the action of the rotary base plate 25, the rotation of said base plate serving to further direct the collars along the channel between wall 22 and the housing 20 and into contact with wheel 24. Said wheel 24 is, as will be clearly apparent from Figs. 12 and 13, formed with a plurality of notches, each of the desired size and shape for receiving a collar, mechanism being provided for rotating said feed wheel with a step by step movement for feeding the collars out of the passage between the wall 22 and the housing 20 one at a time. By reference particularly to Figs. 11 and 12, the specific means employed for imparting a step by step movement to said wheel may be understood. A vertical standard 36 is fixed to the base 1 and is surrounded by an elongated sleeve 37 having suitable bearings on said standard at its ends and being fixed, at its upper end, to the wheel 24. A ratchet wheel 38 is fixed to the lower end of sleeve 37, and an elliptical plate 39 surrounds the sleeve 37 and is rotatably carried thereby, said plate resting upon the ratchet 38. A spring pressed pawl 40 is carried by one end of the plate 38, and the opposite end of said plate carries a pin 41 extending through a slot 42 arranged transversely of an actuating bar 43. The bar 43 is connected to a yoke 44 surrounding the shaft 6, and said yoke carries a follower wheel 45 traveling in a cam path formed in cam 46, the said cam path being shaped to impart a reciprocating movement to the bar 43, the stroke of reciprocation being sufficient for swinging the plate 39 a distance equal to one-fourth of a revolution of wheel 24, whereby, at each forward stroke, the pawl 40 will be caused to move backwardly over one tooth of ratchet 38, and, with each rearward stroke, the ratchet 38 will be turned about for one-fourth of a rotation, whereby the wheel 24 will be caused to travel forward one step, and a collar will be directed from the passage between housing 20 and wall 22 on to a feeding belt 47, as will hereinafter more fully appear.

Just beyond the wheel 24, the passage between housing 20 and wall 22 opens into a chute composed of parallel, vertical walls 48, 48 and a bottom consisting of the belt 47, said belt 47 traveling in the direction indicated by the arrow in Fig. 9 and passing about suitable drums 49, 49, the axle of one of said drums carrying a driving pulley 50 actuated by a belt 51 receiving power from pulley 52 mounted on shaft 6. Each wall 48 is formed with a guiding groove 53 into which projects lugs 54 of a forming block 55, said block being pivotally engaged and actuated by a bar 56 carried by a crank 57 pivotally engaging an actuating lever 58. The lever 58 is pivoted intermediate its



length, as at 59, to a cross beam 60, and, at its lower end, carries a suitable roller 61 engaging a cam 62 carried by shaft 6, and a spring 63 engages the lever 58 above the pivot 59 for retaining the roller 61 in contact with the cam 62, the movement of the forming block 55 being thus timed to the movement of the wheel 24, both elements being driven from the same source of power. The walls 48 unite at their end and form a curved abutment 64 struck on an arc having the same radius as the circle of the collars being operated upon, and the block 54 is cut away to a similar arc, said block, in operation, moving up to and contacting with each collar as the same is delivered into contact with the abutting wall 64, whereby a perfect circular form of each collar is insured before further operation thereon.

Rising from the bearing plates 2 is a yoke 65 converging centrally into a central, supporting standard 66, the upper end of said standard forming a bearing for a cap carrying wheel or disk 67, an operating star wheel 68 being fixed centrally beneath the wheel 67, and both of said wheels 67 and 68 being retained in position by an axially aligned shaft 69 extending through wheel 68, fixed to wheel 67, and projecting centrally through the standard 66, as best seen in Fig. 22. Any suitable means may be provided at the lower end of the shaft 69 for preventing vertical displacement thereof. The disk 67 is of a thickness somewhat greater than the width of the annular wall 108 of a box cap, and is provided with a plurality of box cap receiving apertures 92, each of the apertures, in operation, being supplied with a lining 92', seen best in Figs. 23, 24 and 25, and held removably in place by means of a suitable set screw 92". The upper end of the opening of each lining is of a diameter equal to the diameter of the disk 109 of a box cap, and an annular, inwardly extending shoulder 142 is formed in said lining and adapted to support the said disk when a cap is applied to the lining. The diameter of the opening of the lining below the shoulder 142 is equal, or slightly greater than the greatest diameter of the annular wall 108 of a box cap, and an annular, inwardly projecting shoulder 143 is formed in the lining at a distance below the shoulder 142 equal approximately to the width of the said wall 108. The thickness of the shoulder 143 is equal approximately to the thickness of the wall 108, so that the inner surface of the wall 108 of a cap will lie flush with the inner surface of the lining 92' when the cap is in position therein, and the opening in said lining preferably flares downwardly, as best seen in Fig. 25, for facilitating the introduction of a collar into a cap carried by said lining. The lining 92' is formed with an outwardly extending, annular flange 144 adapted to fit snugly within an annular

groove at the upper end of the respective aperture 92 for facilitating the retention of said lining in place. It will be observed that, by the use of the linings 92' various sizes of caps and collars may be operated upon by the simple changing of the linings 92' to small or larger, as desired, with the adjustment of the other parts to correspond.

In the operation of the disk 67 it is necessary that the same shall rotate with a step by step movement, and I, therefore, employ the wheel 68, which forms a part of the well known Geneva stop, the remaining portion thereof consisting of a disk 70 designed to rotate freely in the concaved portion 71 of each projection 72 of the wheel 68, a wrist pin 73 carried by a crank 74 being designed, at each complete rotation of the disk 70, to engage one of the radial notches 75 of the wheel 68, and cause said wheel to make a forward step. The disk 70 and crank 74 have the same axis of rotation, and are carried and actuated by a vertical shaft 76, said shaft being supported in brackets 77 and 78 carried by the standard 66. The lower end of the shaft 76 carries a suitable gear 79 meshing with the gear 80 carried by the main drive shaft 3.

A comparatively long bracket 81 extends horizontally from the standard 66, and a standard 82 rises from the bracket 81 near the outer end thereof. A sleeve 88' is fixed adjustably in the outer end of the bracket 81 and retained in position by a suitable set screw 81', said sleeve 88' carrying a horizontal disk 84', to which is secured an annular casing 88 designed to contain a supply of box caps. A shaft 83 is journaled within the sleeve 88' and carries, at its upper end, a disk 84 positioned just above the disk 84'. The shaft 83 is driven by a pulley 85 actuated by a belt 86 extending about said pulley and passed about a pulley 87 carried by a shaft 76, the disk 84 being driven by this chain of actuating elements in the direction indicated by the arrow in Fig. 21. Formed integral with and arranged transversely of the bracket 82 is an actuating plate 89 formed with a longitudinal, undercut groove engaged by the dove-tailed portion of a sliding cross head 90, said plate 89 extending from a point approximately centrally of the disk 84 to that portion of its periphery contiguous to the periphery of the disk 67. A curved guard finger 91 extends from the end of the plate 89 above the disk 67 and is adapted to form an inner wall to each of the apertures 92 of the disk 67 as the same is brought opposite the plate 89. A bracket 93 projects laterally from the outer end of the slide 90 and extends for approximately one-half of a circle, and is adapted in its retracted position to lie across the path of movement of the box caps fed through the aperture 93' in the lower edge of the plate 89 by the movement of the disk 84. A curved guard wall 141 ex-



tends rearwardly from the inner end of the plate 89 and curves about within the casing 88 and connects with the said plate 89 at the inner end of the aperture 93', which guard wall thus forms a passage between itself and the casing 88 for causing the box caps to move in single file up to the aperture 93', said aperture 93' being of a suitable size and shape for permitting the passage of box caps, one at a time, but preventing the passage of a superposed cap or of two caps disposed laterally with respect to each other. As each cap is fed into the semi-circular bracket 93, the slide 90 is adapted to be moved forwardly for directing said cap through an opening in the casing 88 into contact with the bracket 91 above one of the apertures 92, the slide 90 being actuated by means of a crank arm 94 fixed to a rock shaft 95 journaled in a bearing 96 at the upper end of bracket 82. The end of rock shaft 95 opposite that carrying crank arm 94 carries an arm 96', to which is pivotally connected a link 97 pivotally engaged by an actuating rod 98 connected with the strap 99 of an eccentric 100 carried by the main driveshaft 3. The crank arm 94 is slotted at its lower end, and engages a pin 101' carried by the slide 90. A link 102 is pivotally connected, as at 103, to the rear end of the slide 90, and the opposite end of said link 102 carries a hammer 104. A bar 105 pivotally engages a pin 101 carried by link 102, and extends upwardly and slidably engages the rock shaft 95 preferably extending centrally through the same. The bar 105 is shouldered, as at 106, and a helical spring 107 is interposed between said shoulder and the rock shaft 95 for depressing the link 102 when the same is free to be depressed.

A bracket 110 is carried by the standard 66 and extends outwardly about the periphery of disk 67, and carries a guard plate 111 just above and on a parallel plane with the plane of the upper face of disk 67, one end of said guard plate extending to a point at a distance from bracket 91 equal to the distance traversed by one of the apertures 92 during one step of the disk 67, whereby a step in the movement of said disk is designed to carry a cap introduced into an aperture 92 from said bracket 91 beneath the end of the plate 111. Arranged just beneath the said disk 67 in the vertical plane of said end of plate 111 is a paste receptacle 112. A vertically reciprocating paste distributing plunger 113 is carried within the receptacle 112 by a tubular shaft 114, said shaft engaging a rod 115 at its lower end, said rod 115, in turn, carrying a laterally extending roller or pin riding within the cam groove of a cam 116, said groove being shaped properly for producing a desired reciprocation of the shaft 114. A shaft 117 is vertically movable within the shaft 114 and engages a rod 118 (seen in Fig.

1) carrying, at its lower end, a suitable pin or roller riding within the groove of cam 119 of proper shape for reciprocating shaft 117 in proper timed relation to the reciprocation of shaft 114. The plunger 113 is formed with a plurality of pairs of brackets 120, and between the brackets of each of said pairs is pivotally mounted a finger 121. Each finger 121 carries, at its lower end, a lug 122 extending into an aperture 123 in the head 113, said lug being surrounded by a spring 124 normally pressing said lower end outwardly, whereby the upper ends of the fingers 121 are caused to normally contact centrally above the head 113. Each finger 121 carries, at its upper end, a segment 125, all of said segments, taken together, completing a circle. The shaft 117 is provided with a suitable head 126 at its upper end designed, in operation, to contact with the upper ends of the fingers 121 for spreading their segments 125 apart. The diameter of the circle formed by the segments 125 when the same are in contact is somewhat less than the smallest diameter of the wall 108 of a cap, and, in operation, when a cap is brought into vertical alinement with the head 113 the same moves forwardly under the action of cam 116 and shaft 114 until the segments 125 lie within the cap, the cam 119 causing the shaft 117 to move synchronously with the movement of shaft 114 to this point. As soon as the segments 125 have entered the cap the shaft 114 ceases movement, and the shaft 117 continues to move, causing its head 126 to spread the upper ends of the fingers 121, whereby the segments 125 are caused to contact with the inner surface of the cylindrical wall of the cap and apply some of the adhesive material contained within the receptacle 112 to said wall. As soon as the segments 125 have contacted with the wall of the cap, the shaft 117 begins to descend under the action of its cam, and, as soon as it has permitted the fingers 121 to assume their normal position under the action of their springs 124, the shaft 114 begins to descend, and both of said shafts descend together to their lowermost position, the parts all being timed to move together, so that, by the time the cams 116 and 119 have moved sufficiently for causing the shafts 114 and 117 to rise for a second operation, the disk 67 has moved forwardly one step and presented a new cap for receiving the second charge of adhesive.

The apertures 92 are spaced apart a distance on the disk 67 equal to the distance traversed by one step of said disk, and the plate 111 is of a length equal to the distance from one side of one aperture to the opposite side of the next contiguous aperture, whereby, while one end of said plate 111 guards the cap within the aperture above the paste receptacle 112 against removal from said



aperture, the other end of said plate guards the next preceding cap from removal from its aperture, said next preceding cap lying in the vertical plane of a vertically reciprocating plunger 127, said plunger 127 being positioned for moving vertically just outside the abutting wall 64, whereby, in operation, when the block 55 presses a collar against said abutting wall, the same will be in position for being driven upwardly by the plunger 127, which plunger moves upwardly through the action of a suitable cam 128 engaged by a roller or pin carried by a shaft 129, which shaft carries said plunger 127, whereby, in operation, said plunger is designed to move upwardly with each of the collars placed thereon for forcing the same into the cap within the aperture 92, which has been moved into vertical alinement with the collar. After the collar has been thus positioned, the disk 67 makes another step forward and brings the assembled cap and collar, which elements are seen in their assembled condition in Figs. 16 and 17, to a point in vertical alinement with a discharging plunger 130 carried by a shaft 131 actuated by a cam 132 engaged by a pin or roller carried by said shaft 131, the cam 132 being carried by shaft 5. The vertical reciprocation of the plunger 130 is adapted to drive the assembled collar and cap out of the aperture 92 and into the path of movement of a discharge arm 133 carried and actuated by a rock shaft 134 journaled vertically in a suitable bearing 135 carried by the standard 66. The lower end of rock shaft 134 carries an actuating crank 136 engaged by a link 137 formed with a slot 138 surrounding shaft 76. A cam 139 is carried by the shaft 76 just beneath the link 137, and is provided with a cam path 140 into which a pin depends from the link 137, whereby said link is adapted to be reciprocated for producing the swing of the discharge arm 133.

In operation, a supply of collars is placed within the housing 20 and a supply of caps is placed within the casing 88, and the actuating pulley 4 is driven by a suitable belt, or in any other preferred manner. As the disk 25 rotates in one direction and the brushes 34 move in the opposite direction, the collars will be fed out in single file into contact with the wheel 24, the brushes 34 serving to force the collars into contact with the stationary bars 35, and the rotation of the base plate 25 causing said collars to travel outwardly along said bars beneath the lower edge of the wall of housing 20 into the space between said housing and wall 22, and the said collars are further moved by the rotation of the plate 25 until the same are brought into position for being engaged by wheel 24, which wheel, in its operation, delivers said collars, one at a time, on to the carrying belt 47, which belt directs the collar

beneath the block 55 and on to the upper end of plunger 127. As soon as the collar is passed beneath the block 55, said block begins to move downwardly and forwardly, being guided in its movement by the grooves 53, until the same strikes the collar and presses the same against the abutting wall 64. Meanwhile, the caps within the casing 88 are actuated by the rotating disk 84 and caused to pass, one at a time, through aperture 93'. Each cap, as the same passes through the aperture 93', moves in front of bracket 93 and is engaged thereby, as the slide 89 moves toward the center of the disk 67, said cap being moved by said bracket into contact with the guard 91, whereupon the hammer 104, under the action of spring 107, will strike said cap and force the same down into the aperture 92. As soon as the cap is positioned within the aperture 92, the Geneva stop, heretofore described, effects a forward step of the disk 67 and brings the cap into vertical alinement with the paste applying plunger, which operates, as above set forth, for supplying an adhesive to the inner surface of the annular wall of the cap, after which the disk 67 is caused to take a second step, which brings the cap into vertical alinement with the plunger 127, which plunger, at this moment, rises and forces the collar, which has been positioned on the upper end of said plunger, into the cap. As soon as the collar has been positioned within the cap, the disk 67 takes another step forward, and brings the cap into vertical alinement with the plunger 130, which plunger rises and ejects the cap and collar from the aperture 92 into the path of movement of the arm 133, which arm is swung in proper time for knocking off the said cap and collar as soon as the same have been forced above the plane of the upper surface of the disk 67. Thus it will be seen that, at each step of the disk 67, a cap is placed within an aperture 92, adhesive material is applied to another cap, a collar is introduced into a third cap, and the fourth cap, with its collar applied thereto, is ejected from the machine.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a mechanism of the class described, the combination with box element assembling means, of a container for supplying box elements to said assembling means, a passage extending from said container to said assembling means, of means for directing box elements along said passage, and a follower movable longitudinally of the passage and designed to engage the box elements delivered to said assembling means.

2. In a mechanism of the class described, the combination with box element assembling means, of a container for supplying box elements to said assembling means, a passage



leading from said container to said assembling means, means for directing box elements longitudinally of said passage, a follower movably mounted in said passage, and means for moving said follower into and out of the path of movement of such box element.

3. In a mechanism of the class described, the combination with a box element carrier, of pivotally mounted fingers, means for moving said fingers into the box elements carried by said carrier, means for swinging said fingers upon their pivots within the box elements, and means for supplying an adhesive to said fingers.

4. In a mechanism of the class described, the combination of a semi-circular wall, means for directing a box collar laterally into contact with said wall, and means for directing said collar into the cap of a box.

5. In a mechanism of the class described, the combination of a semi-circular abutting wall, means for directing a collar laterally against the same, a block for pressing said collar laterally against said wall into its final shape, and means for directing said collar into a box cap.

6. In a mechanism of the class described, the combination of a curved wall, means for directing a collar ring laterally into contact therewith, a block formed with a curved surface, means for directing said curved surface laterally into contact with said ring for pressing the same against said wall, and means for directing said collar laterally into a box cap.

7. In a mechanism of the class described, the combination with a box element carrying means, of movably mounted fingers, means for introducing the ends of said fingers into a box element carried by said carrying means, means movable between said fingers for spreading the same apart while within said box element, and means for supplying an adhesive to the ends of said fingers.

8. In a mechanism of the class described, the combination with a box element assembling means, of a box element supplying receptacle spaced therefrom, a rotary bottom for said receptacle means for rotating said bottom, a movably mounted slide, engaging means carried by said slide, in position for engaging the box elements actuated by said rotating bottom, and means for moving said slide from within said receptacle to a point for delivering box elements to said assembling means.

9. In a mechanism of the class described, the combination with a collar and cap assembling means, of a passage leading from said collar supply means to said assembling means, each of the walls of said passage being formed with a groove, a block, means carried by said block engaging said groove, and means for moving said block longitudinally of said grooves.

10. In a mechanism of the class described, the combination with box cap and collar assembling means, of a passage leading from said collar supply means to said assembling means, a forming block for said passage, a crank engaging said block, a lever for actuating said crank, and means for guiding said block.

11. In a mechanism of the class described, the combination with a box cap and collar assembling means, of collar supply means, a passage leading from said collar supply means to said assembling means and having grooved walls, a block removably mounted between the walls of said passage, means carried by said block engaging the grooves of said walls, a lever, and means carried thereby for moving said block longitudinally of said passage.

12. In a mechanism of the class described, the combination with a paste receptacle, of a plunger movably mounted therein, means for positioning a box cap in line with said plunger means for moving said plunger into and out of said cap, means for spreading the elements of the plunger within said box cap, and means for introducing a box collar into said cap.

13. In a mechanism of the class described, the combination with a paste receptacle, of a plunger movably mounted, means for moving the same, means for positioning an element of a box in line with said plunger, an expanding head carried by said plunger, means for expanding said head within said box element, and means for applying a second box element to the first mentioned box element.

14. In a mechanism of the class described, the combination with a paste receptacle and means for positioning a box element within the same, of a plunger in said receptacle, a plurality of fingers carried by said plunger, means for introducing said fingers into said box element, means for spreading said fingers apart, and means for introducing a second box element into contact with the first mentioned box element.

15. In a mechanism of the class described, the combination with a paste receptacle and a plunger movably mounted therein, of a plurality of fingers pivotally carried by said plunger, means normally retaining said fingers in a closed condition, means for bringing a box element into alinement with said plunger, means for moving said plunger into and out of said box element, means for spreading said fingers within said box element, and means for introducing a second box element into engagement with the first mentioned box element.

16. In a mechanism of the class described, the combination with a paste receptacle and a plunger movably mounted therein, of a plurality of fingers pivotally carried by said plunger, a segment carried by each of said



fingers, means for bringing a box element into alinement with said plunger, means for moving the plunger into and out of said box element, means for spreading said fingers within the box element for causing said segments to contact with the walls of said box element, and means for inserting a collar into said cap.

17. In a mechanism of the class described, the combination with a paste receptacle, of an expandible plunger movably mounted therein, means for bringing a box element into alinement with said plunger, means for moving the end of said plunger into said box element, and means for expanding said plunger therein.

18. In a mechanism of the class described, the combination of a plunger, means for bringing a box element into alinement with said plunger, movably mounted fingers carried by said plunger, means for supplying adhesive material to said fingers, means for moving the plunger for introducing said fingers into the box element, and means for expanding the fingers within the box element.

19. In a mechanism of the class described, the combination of a movably mounted plunger, a plurality of fingers pivotally carried thereby, a segment carried by each of said fingers, means for supplying an adhesive to said segments, means for introducing said segments into a box element, and means for moving the segments apart within said box element.

20. In a mechanism of the class described, the combination of a movably mounted plunger, a plurality of segments movably carried thereby, means for introducing said segments into a box element, means for supplying adhesive to said segments, and a shaft extending through said plunger for moving said segments apart.

21. In a mechanism of the class described, the combination of a hollow plunger head, a plurality of fingers pivotally carried thereby, a tubular shaft carrying said plunger head, means for reciprocating said shaft, means for bringing a box element into alinement with said plunger head, a shaft within said tubular shaft, and means for moving said second mentioned shaft synchronously with the movement of the tubular shaft and for moving the second mentioned shaft beyond the extreme of movement of the tubular shaft for causing said second mentioned shaft to engage said fingers.

22. In a mechanism of the class described, the combination of a hollow plunger head, a plurality of fingers pivotally carried thereby, a tubular shaft carrying said plunger head, means for reciprocating said shaft, means for bringing a box element into alinement with said plunger head, a shaft within said tubular shaft, and means for moving said inner shaft synchronously with the

movement of the tubular shaft and for moving the inner shaft beyond the limit of movement of the tubular shaft for causing said inner shaft to engage said fingers for moving the same into engagement with the alined box element.

23. In a mechanism of the class described, the combination with a rotatably mounted, apertured disk, of means for introducing a box element into the aperture of said disk, means for inserting a second box element into the first mentioned box element while within said aperture, and a fixed element for preventing removal of the first mentioned box element during said inserting operation.

24. In a mechanism of the class described, the combination with an apertured, rotatably mounted disk, of means for inserting a box element into the aperture of said disk, a fixed guard preventing dislocation of said box element, and means arranged in the path of movement of said disk for introducing a second box element into the first mentioned box element.

25. In a mechanism of the class described, the combination with a rotatably mounted disk and means for rotating the same with a step by step movement, said disk being formed with apertures spaced apart a distance equal to the distance traversed in a single step of the movement of the disk, of means for supplying box elements to said apertures, a guard plate extending parallel with the surface of said disk and normally covering a plurality of said apertures, means for applying an adhesive to the box element within one of the apertures while beneath said guard plate, and means for introducing a second box element into the first mentioned box element within the other of said apertures while beneath the guard plate.

26. In a mechanism of the class described, the combination with a rotatably mounted disk and means for rotating the same with a step by step movement, said disk being formed with apertures spaced apart a distance equal to the distance of travel of one of the apertures in a step of the movement of the disk, of means for supplying box elements to said apertures, a guard plate extending above and parallel to the upper surface of said disk and normally covering a plurality of said apertures, means arranged beneath the disk for applying an adhesive to the box element within one of the apertures while beneath said guard plate, and means beneath the disk for introducing a second box element into the first-mentioned box element within the other of said apertures while beneath the guard plate.

27. In a mechanism of the class described, the combination with a rotatably mounted disk formed with a plurality of apertures, means for rotating said disk, and means for assembling box elements within said aper-



tures, of a rock shaft, means for rocking said shaft, an arm carried by said shaft extending above said disk, and means for ejecting the assembled elements of a box from said apertures into the path of movement of said arm.

28. In a mechanism of the class described, the combination with an apertured plate, of a guard, means for directing a box element into contact with said guard for positioning the same in a given relation to an aperture in said apertured plate, means for introducing said box element into said aperture, and means for bringing a second box element into contact with the first mentioned box element.

29. In a mechanism of the class described, the combination with an apertured plate, of a guard, means for directing a box element into contact with said guard for positioning the same in a given relation to an aperture in said apertured plate, a pivoted hammer adapted to strike said box element for forcing the same into said aperture, and means for applying a second box element to the first-mentioned box element.

30. In a mechanism of the class described, the combination with box element assembling means, of a box element supply receptacle spaced therefrom, a slide for delivering box elements from the supply receptacle to a point above the assembling means and a pivotally mounted hammer carried by said slide and adapted to strike the box elements positioned above the assembling means for delivering the said elements to said assembling means.

31. In a mechanism of the class described, the combination with a box element assembling means, of a box element supply receptacle spaced therefrom, a slide arranged within said supply receptacle, means connected therewith for delivering box elements from said receptacle to a point above the assembling means, means for moving said slide for delivering such box elements, and a spring pressed, pivotally mounted hammer carried by said slide and designed to strike the box element for delivering the same to the assembling means after the box element has been delivered to the point above the assembling means.

32. In a mechanism of the class described, the combination with a box element assembling means, of a box element supply receptacle at one side thereof, a bracket, a slide carried thereby and moving within said receptacle, means for moving said slide, and means carried by said slide for engaging the box elements within said receptacle for delivering the same to said assembling means.

33. In a mechanism of the class described, the combination with an apertured disk, of a slide, means for moving the slide toward and away from said disk, a hammer carried by said slide, means for delivering a box element to the aperture in said disk, means for moving said hammer into contact with said box

element for directing the same into said aperture, and means for applying a second box element to the first mentioned box element.

34. In a mechanism of the class described, the combination with a box element assembling means, of a box element supply receptacle at one side thereof, a rotatably mounted bottom for said receptacle, means for rotating said bottom, and means for delivering box elements from said receptacle to said assembling means, the box elements being directed to the delivery means by the action of the rotating bottom.

35. In a mechanism of the class described, the combination with a rotatably mounted apertured disk, of a box element supply receptacle at one side thereof, a slide, means for moving the same between said receptacle and disk, means for delivering a box element from said receptacle to said disk, a link pivoted to the said slide, a hammer carried by said link, means for actuating said hammer for forcing said box element into the aperture of said disk, and means for applying a second box element to the first mentioned box element.

36. In a mechanism of the class described, the combination with a box element assembling means, and a box element receptacle, a slide, a rock shaft, a crank arm carried by said rock shaft, means for rocking said rock shaft, means connecting said crank arm with said slide, and means carried by the slide for delivering a box element from said receptacle to said box element assembling means.

37. In a mechanism of the class described, the combination with a box element assembling means and a box element receptacle, of a bracket, a plate carried thereby, a slide movably engaging said plate, a rock shaft journaled in said bracket, a crank arm carried by said rock shaft and engaging said slide for actuating the same, a link pivotally engaging said slide, a rod pivotally engaging said link and extending through said rock shaft, a spring engaging said rock shaft and pressing said rod away from said shaft, a hammer carried by said link, means for delivering a box element from said receptacle to said assembling means, and means for rocking said shaft for causing said hammer to engage said element for positioning said box element on said assembling means.

38. In a mechanism of the class described, the combination with a box element assembling means, and a box element supply receptacle, of a rotary disk forming the bottom of said receptacle, means for rotating said disk, a guard for limiting the movement of the box elements within said receptacle under the action of said disk, and a slide for delivering box elements from said receptacle to said assembling means.

39. In a mechanism of the class described, the combination with a box assembling

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means and a box element supply receptacle, of a bracket carrying said receptacle, a plate carried by said bracket extending into said receptacle, a slide movably carried by said plate, a rock shaft carried by said bracket, connections between said rock shaft and slide, a crank arm engaging said rock shaft, a link pivoted to said crank arm, actuating means engaging said link for rocking said shaft and throwing the slide, and means carried by said slide for delivering box elements from said receptacle to said assembling means.

40. In a mechanism of the class described, the combination with a reciprocating plunger, of a plurality of fingers pivotally carried thereby, a lug extending inwardly from each of said fingers, a spring surrounding each of said lugs, means for positioning a box element in the path of movement of said plunger, and means for swinging said fingers against the pressure of said springs.

41. In a mechanism of the class described, the combination with an inclosing casing, of a guard wall within the same forming a passage between itself and said casing, a moving plate forming a bottom for said passage, a plate extending across and restricting said passage, means for delivering box elements directed along said passage and beneath said plate from said casing, and means for applying other box elements to said delivered box elements.

42. In a mechanism of the class described, the combination with a box element retaining casing, of a guard wall spaced therefrom and forming a passage between itself and said casing, a rotating plate forming a bottom to said casing, a plate extending across and restricting said passage, a slide carried by said plate, means carried by said slide for delivering box elements directed beneath said plate from said casing, and means for applying a second box element to each of said delivered box elements.

43. In a mechanism of the class described, the combination with a box element inclosing casing, of a guard wall extending approximately parallel thereto and forming a passage between itself and said casing, a plate at the end of said wall extending transversely of and restricting said passage, means for delivering box elements beneath said plate, and means for assembling other box elements with the said delivered box elements.

44. In a mechanism of the class described, the combination with a casing, of an apertured plate extending through the same, means forming a passage leading to said aperture, means for delivering box elements through said passage and aperture, and means for assembling such box elements with other box elements.

45. In a mechanism of the class described,

the combination with an apertured plate, of means for directing box elements through the aperture of said plate, a slide moving across the front of said aperture, means for actuating said slide for closing said aperture, box element assembling means, and means for directing box elements delivered through said aperture to said assembling means.

46. In a mechanism of the class described, the combination with an apertured plate, of a slide moving across the face of said plate, means for moving said slide for closing said aperture, means for delivering box elements through said aperture when open, a bracket carried by said slide and extending into the path of movement of said box elements, and box element assembling means adapted to receive box elements engaged by said bracket.

47. In a mechanism of the class described, the combination with a guiding plate, of a sliding cross head engaging the same, said plate being formed with an aperture, means for moving said cross head in front of said aperture, a semi-circular bracket extending laterally and forwardly from said cross head and adapted to lie in front of said aperture when the cross head is retracted from in front of the same, means for directing box elements through said aperture, and box element assembling means receiving the elements engaged by said bracket.

48. In a mechanism of the class described, the combination of a segmental, fixed bracket, a semi-circular movably mounted bracket, means for moving said movably mounted bracket into contact with said fixed bracket, means for delivering a box element to said movably mounted bracket, and box element assembling means disposed beneath said fixed brackets.

49. In a mechanism of the class described, the combination with a fixed bracket, of a movably mounted bracket, means for delivering a box element into contact with said movably mounted bracket, means for moving said movably mounted bracket for delivering a box element into contact with said fixed bracket, box element assembling means disposed beneath said fixed bracket, and means for directing the box elements delivered to said fixed bracket into said assembling means.

50. In a mechanism of the class described, the combination with a movably mounted plate formed with a box element receiving aperture, of a removable lining within said aperture, and means for assembling box elements within said lining.

51. In a mechanism of the class described, the combination with a movably mounted plate formed with a box element receiving aperture, of a removable lining therein conforming to the contour of one of the ele-



ments of the box to be assembled, and means for assembling box elements within said lining.

5 52. In a mechanism of the class described, the combination with a movably mounted plate formed with a box element receiving aperture, of a lining removably mounted within the said aperture and formed with box element supporting shoulders and a

downwardly flaring open end, and means 10 for assembling box elements within said lining.

In testimony whereof I hereunto affix my signature, in presence of two witnesses.

ELMER E. COOK.

Witnesses:

PAUL G. SOWERS,  
A. J. CAVANAUGH.