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COTTON BALING PRESS.

No. 567,548. Patented Sept. 8, 1896.

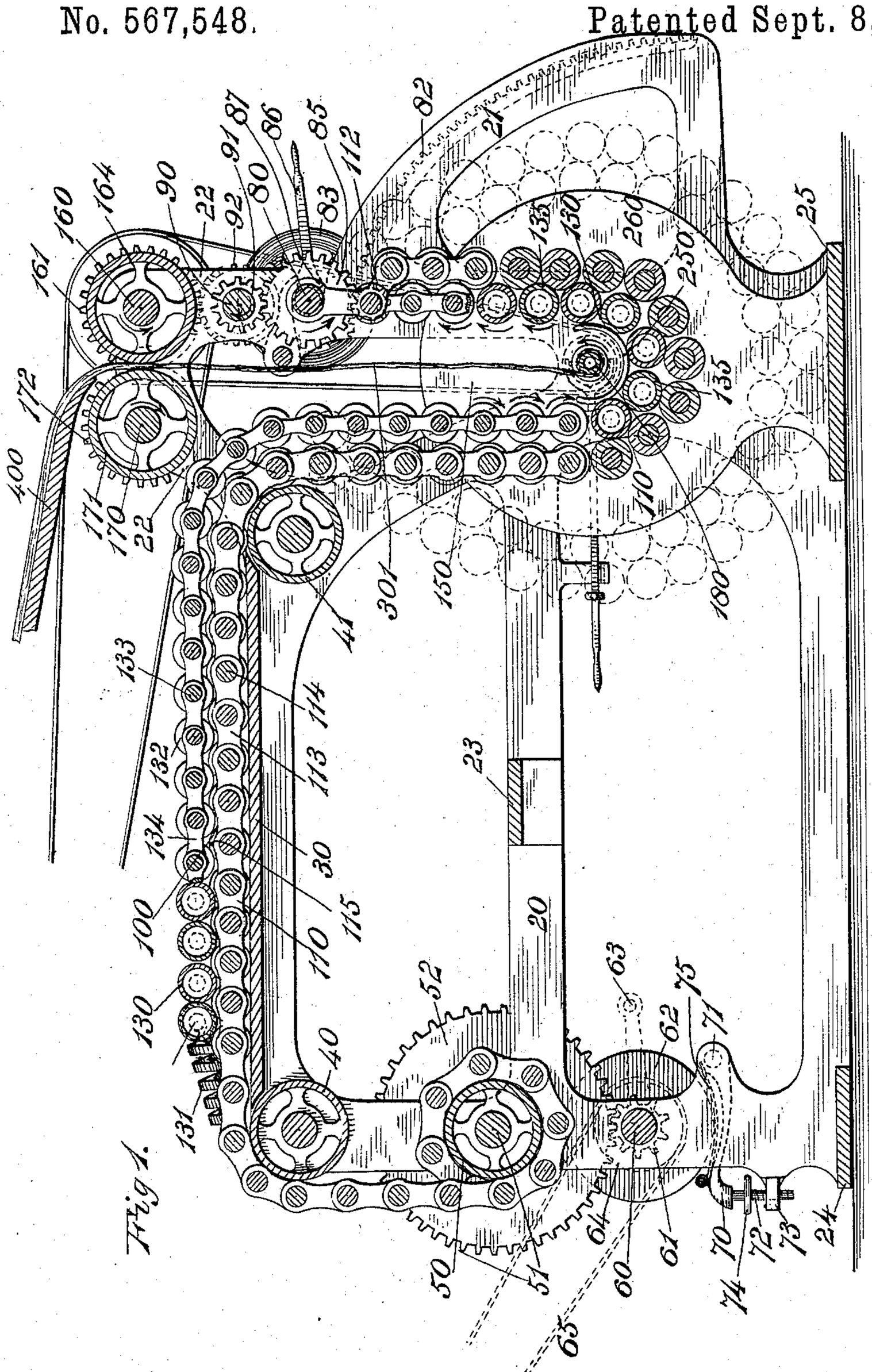

Fig 1.

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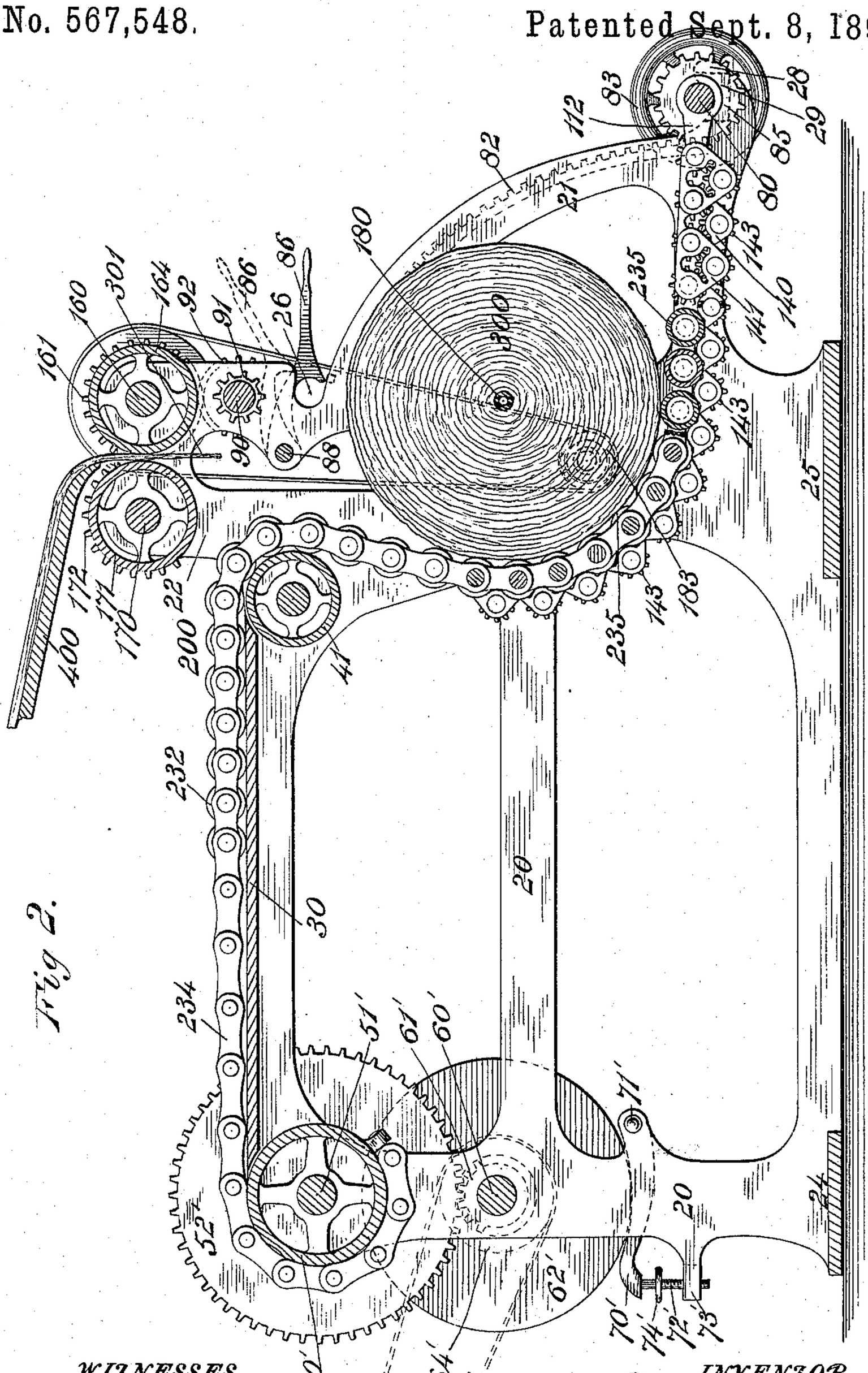

Fig 2.

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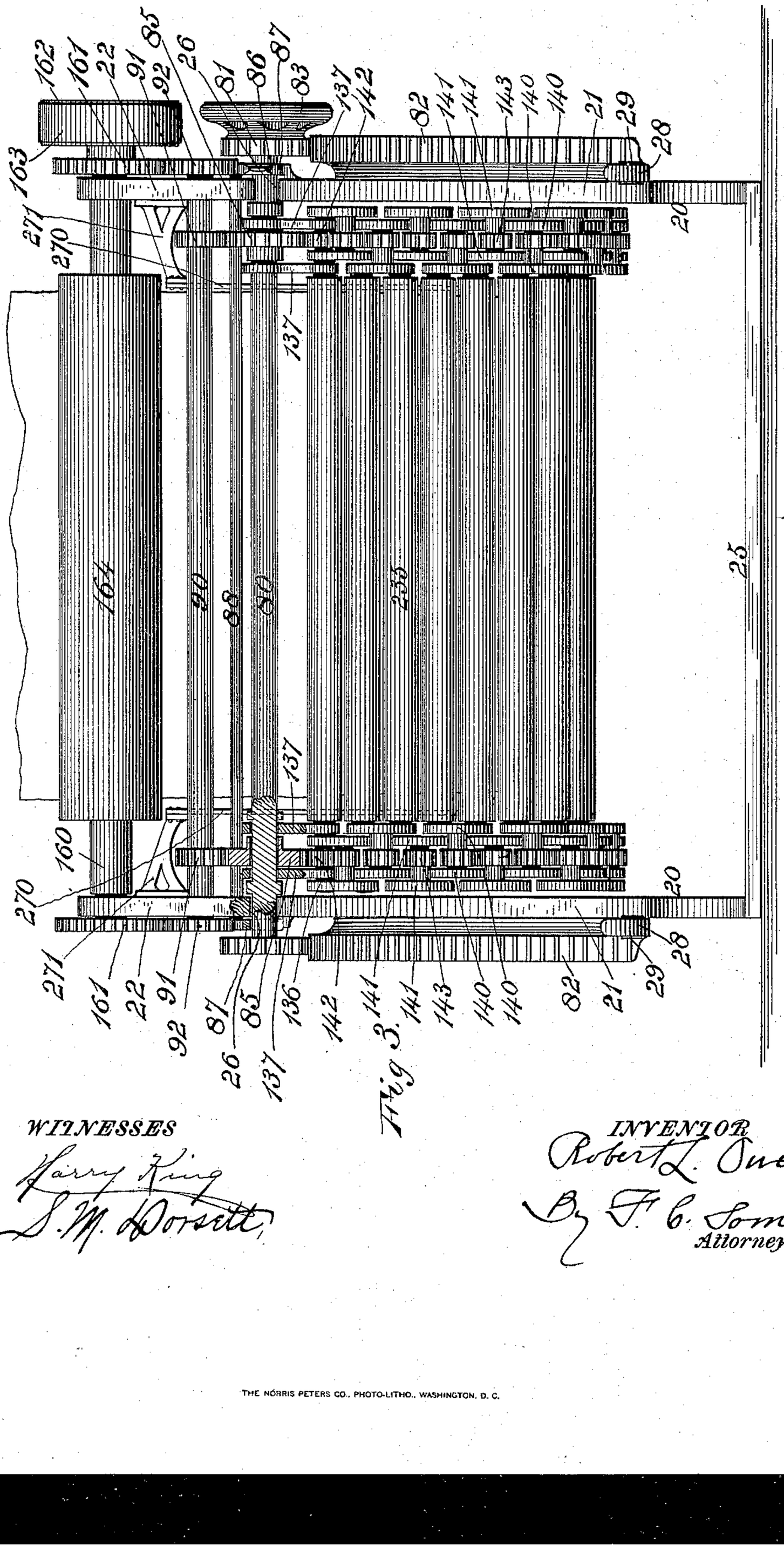

Fig. 3.

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Fig 4.

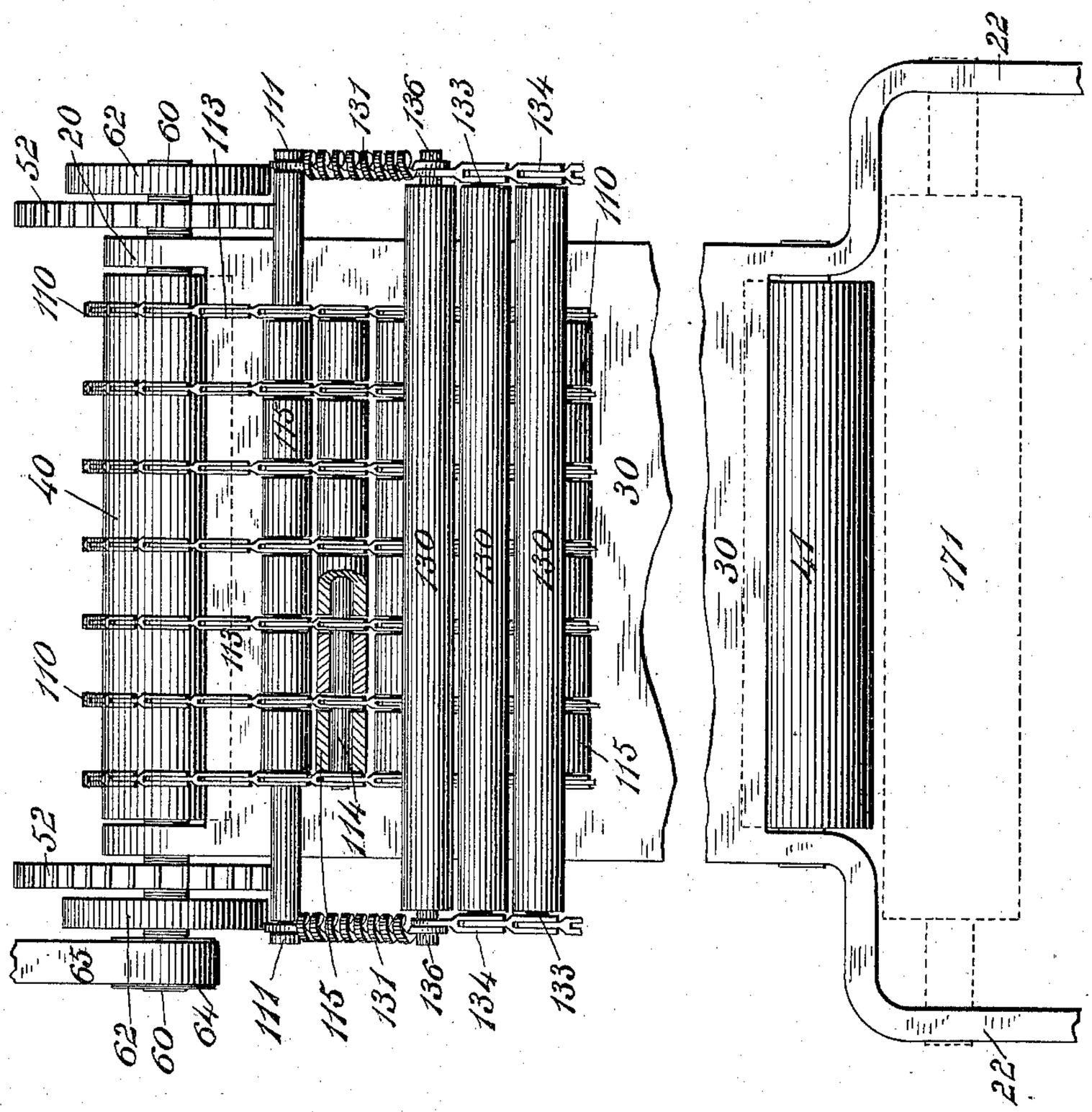

Fig 9.

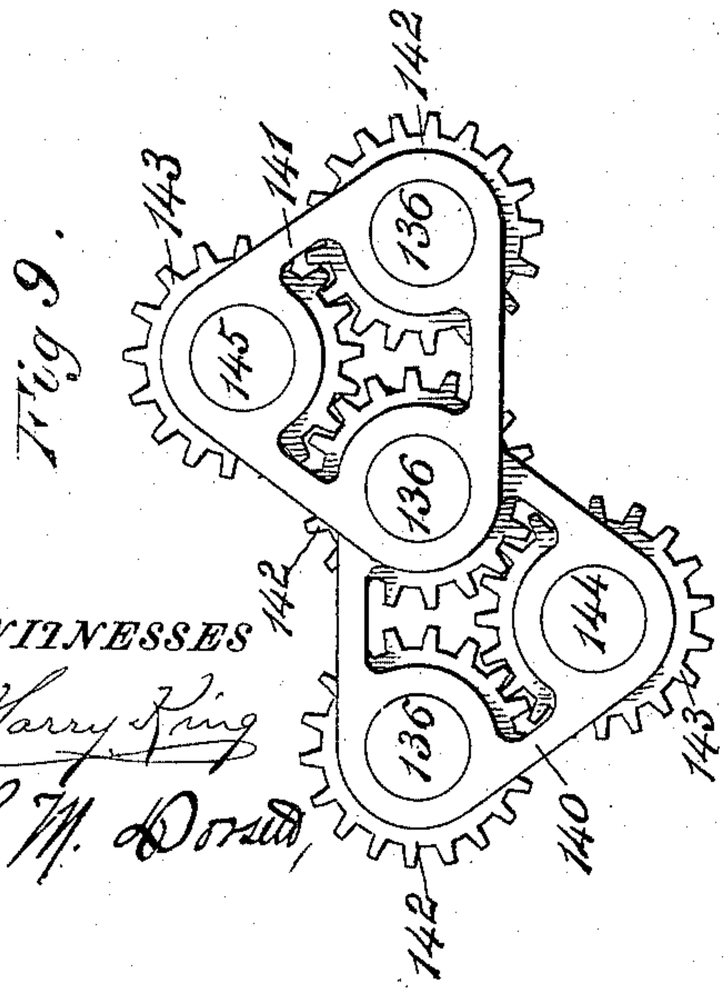

Fig 10.

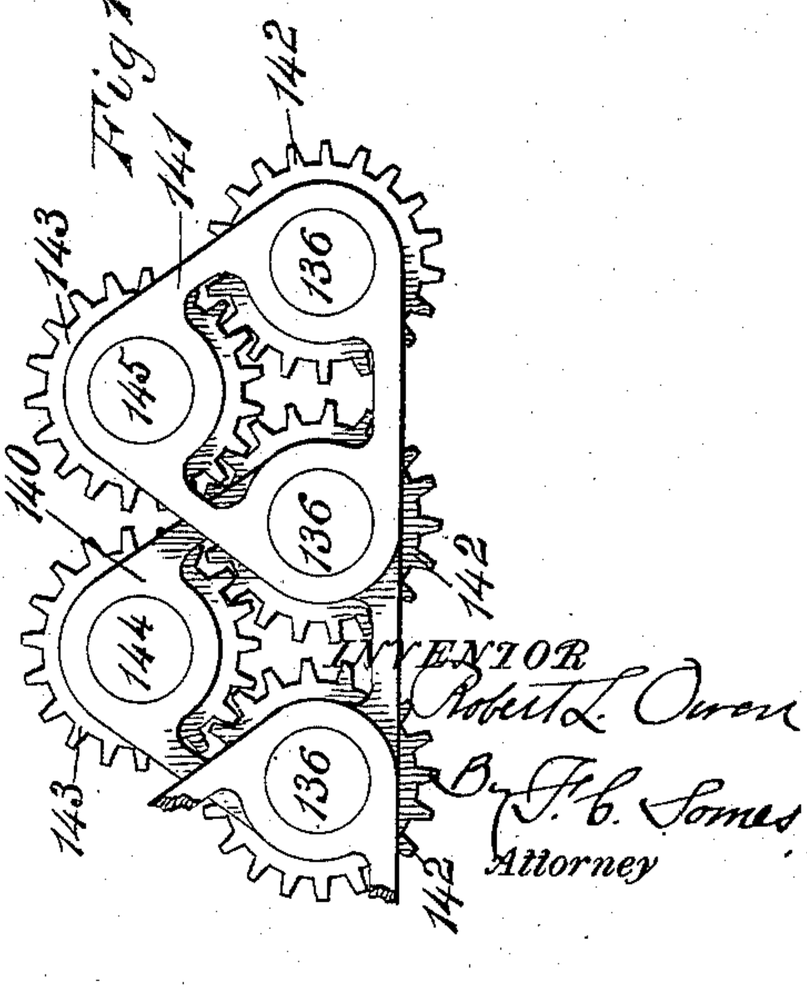

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Fig 7.

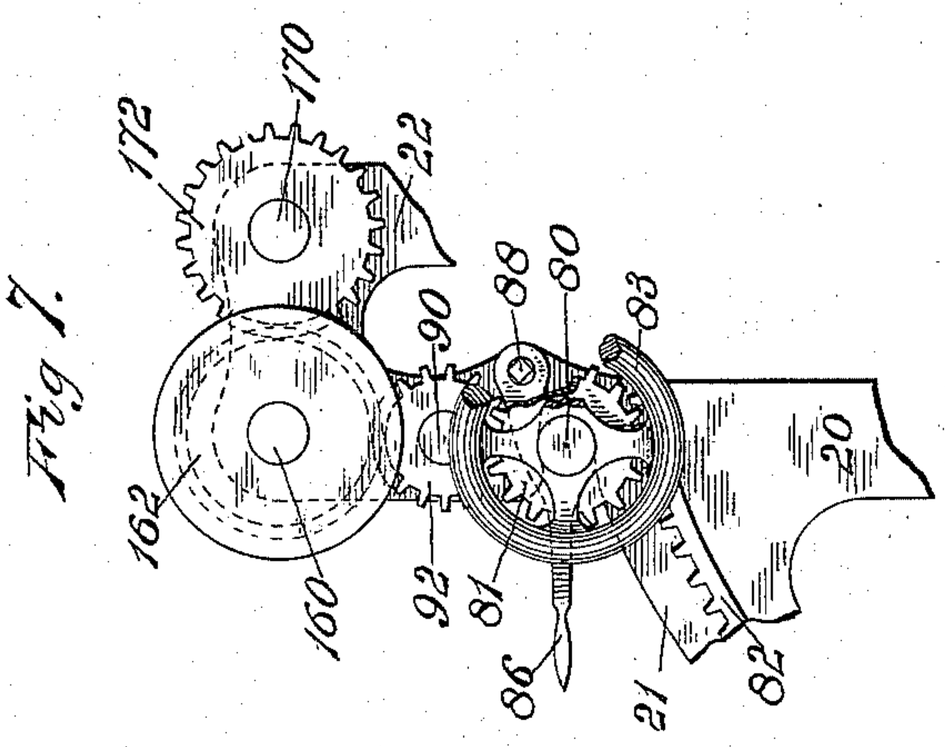

Fig 8.

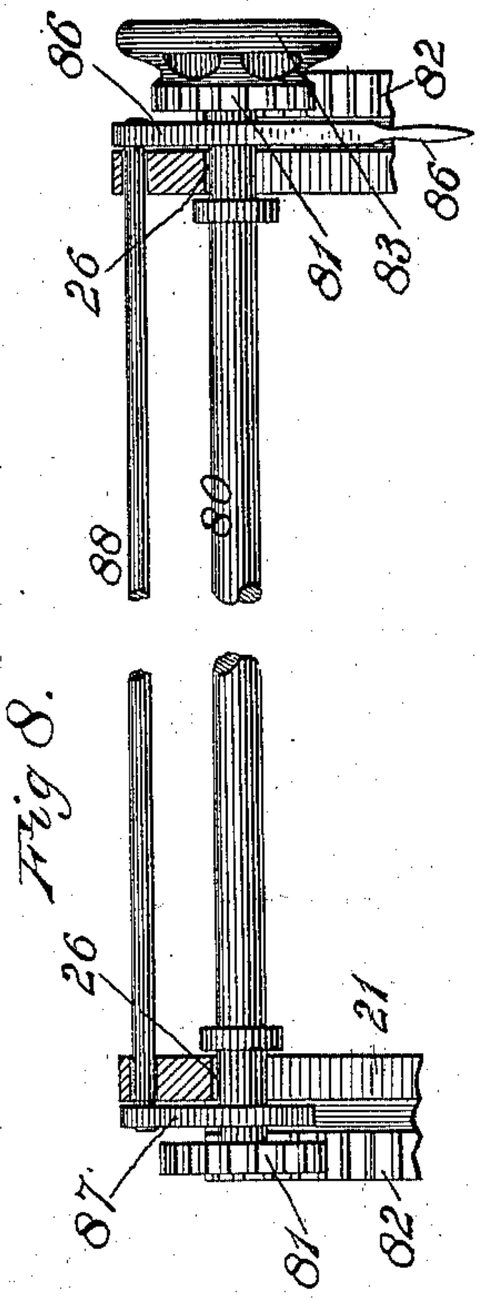

Fig 5.

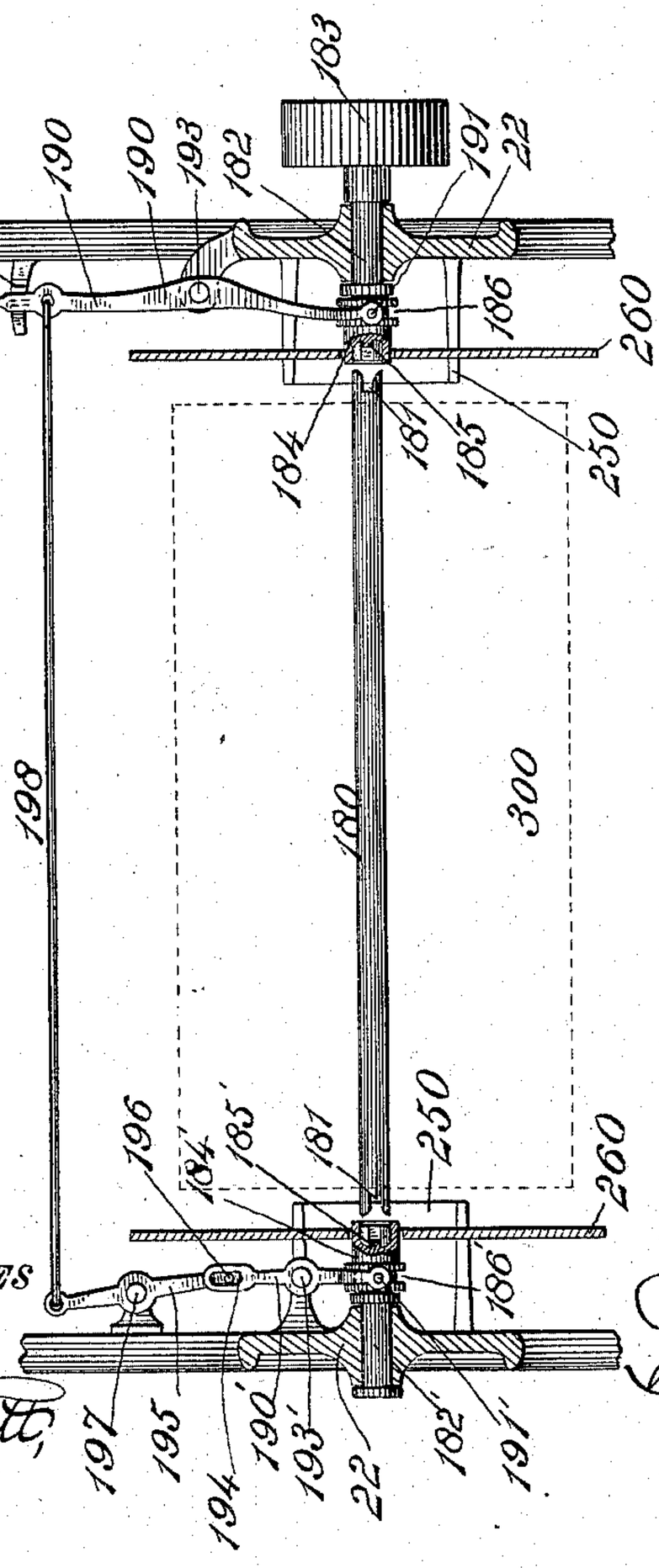

Fig 6.

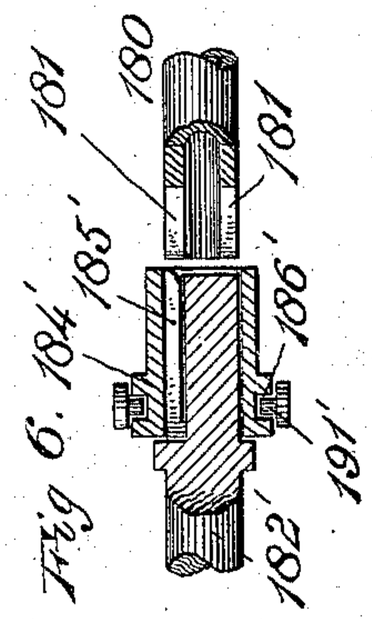

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Fig 11.

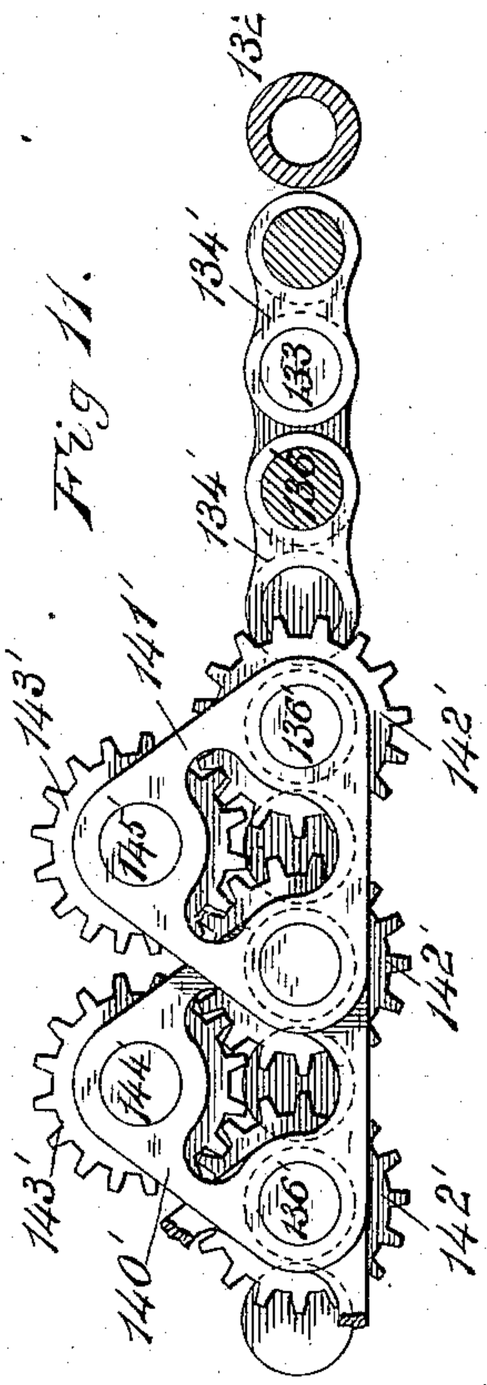


Fig 12.

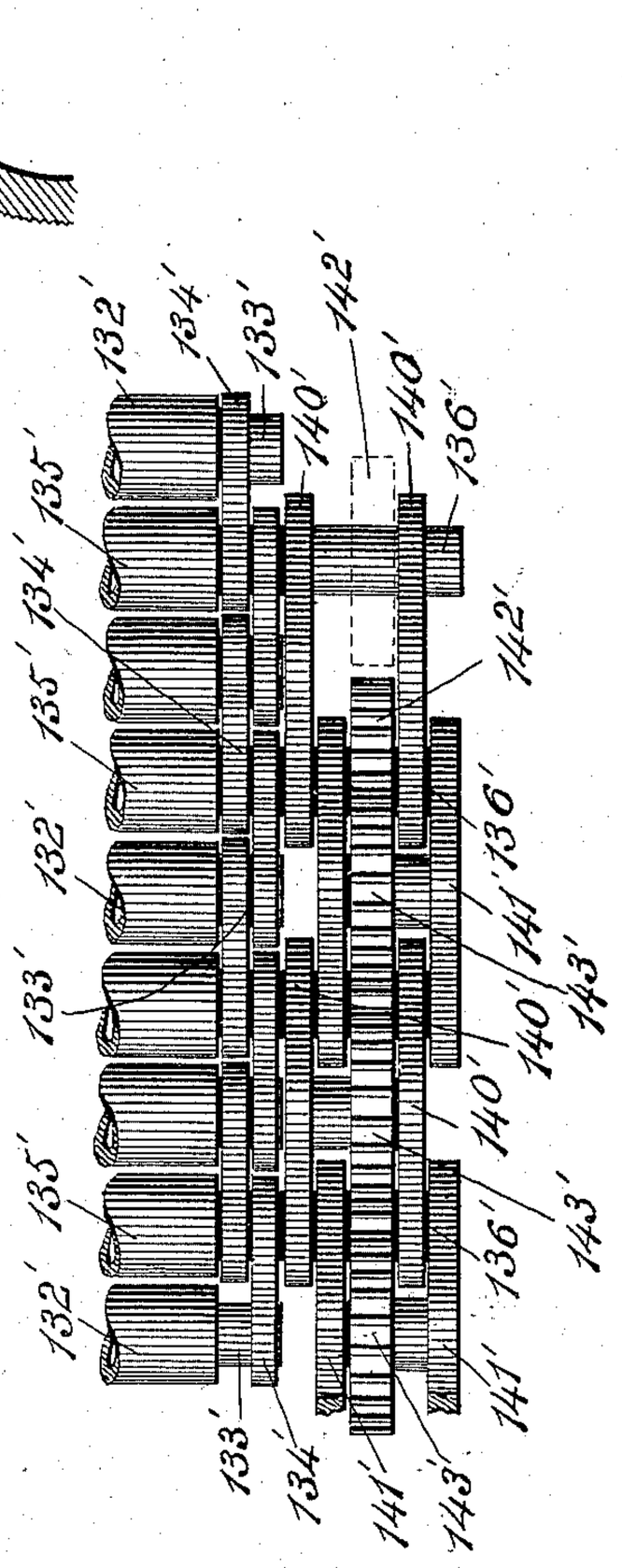


Fig 13.

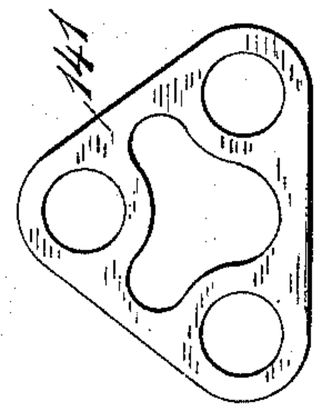
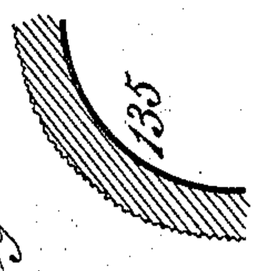


Fig 14.



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UNITED STATES PATENT OFFICE.

ROBERT LATHAM OWEN, OF MUSCOGEE, INDIAN TERRITORY.

COTTON-BALING PRESS.

SPECIFICATION forming part of Letters Patent No. 567,548, dated September 8, 1896.

Application filed February 21, 1895. Serial No. 539,264. (No model.)

To all whom it may concern:

Be it known that I, ROBERT LATHAM OWEN, a citizen of the United States of America, residing in Muscogee, in the Indian Territory, have invented certain new and useful Improvements in Cotton-Baling Machines, of which the following is a specification.

This invention relates to a machine for baling cotton by winding a bat into a cylindrical bale and compressing each layer upon the accumulating bale during the winding operation, whereby the air between the fibers of each layer is thoroughly driven out and the fibers compacted into an almost solid mass by comparatively light pressure.

The object of this invention is to provide a simple, strong, durable, and powerful machine adapted for general use among planters, as well as among those who make a business of compressing cotton, for winding the fibrous bat into comparatively solid cylindrical bales.

The invention consists principally in the combination, with suitable supporting mechanism, of a practically stationary apron having an expansible bight provided with moving surfaces in which a bat of fibrous material is wound into a cylindrical bale and compressed layer upon layer during the winding operation.

The invention consists, further, in the combination of such an apron with means for regulating the tension thereof, with means for feeding the bat, and with means for opening the bight.

The invention consists, further, in the peculiar construction of the apron and of the means for driving the moving surfaces of the bight, and in other features hereinafter claimed.

Figure 1 of the accompanying drawings represents a longitudinal vertical section of this cotton-baling machine having a double stationary apron provided with a series of driven rolls, the compressing-bight of the apron being represented in full lines in the position which it has at the beginning of a bale and in dotted lines in the position which it assumes at the completion of a bale. Fig. 2 represents a longitudinal vertical section of this cotton-baling machine having a single compressing-apron, the bight being open for the discharge of a completed bale. Fig. 3 represents an elevation of the delivery end of the machine, the bight being closed. Fig. 4 represents a plan view of the machine shown in Fig. 1, portions being broken out. Fig. 5 represents a transverse vertical section of the frame on a vertical line passing through the center of the bale, showing a core therefor and means for connecting and disconnecting and rotating said core. Fig. 6 represents an enlarged detail of one end of said core and of the clutch for engaging it, parts thereof being in elevation and parts in longitudinal section. Fig. 7 represents an enlarged side elevation of fragments of the bracket and arc-shaped extension of the frame, showing the ends of the driving and feed mechanism and the mechanism for opening the compressing-bight for taking out a bale, said bight-opening mechanism being in closed position. Fig. 8 represents a horizontal section through said brackets, showing a plan of the bight-opening mechanism and the mechanism for holding the bight in closed position. Fig. 9 represents an enlarged detail of the gearing for communicating motion to the rotating rolls of the apron, the auxiliary pinions being alternately on opposite sides of the apron. Fig. 10 represents an enlarged side elevation of the gearing in which all the auxiliary pinions are on the same side of the apron. Fig. 11 represents a side elevation of a portion of the apron and of a system of enlarged gearing which operates alternate rolls of the apron. Fig. 12 represents a plan view of the parts shown in Fig. 11. Fig. 13 represents a side elevation of one of the yokes connecting the journals of adjacent rolls and auxiliary gears. Fig. 14 represents, on an enlarged scale, a segment of one of the driven rolls of the bight of the apron, the periphery thereof being provided with a roughened surface for engaging the cotton.

The same reference-numerals indicate the same or duplicate parts in all the figures.

The frame of the machine is of any suitable construction. When made as herein shown, it consists of skeleton side plates 20, approximately rectangular in form, arc-shaped extensions 21 of said plates at the right-hand end of the machine as it appears in Fig. 1, and

brackets 22, connecting the upper ends of said extensions with said side plates. These side plates are connected by suitable cross-bars, as 23, 24, and 25. The frame supports an elevated bed 30 and transverse rolls 40 and 41, the ends of the bed being tangential to the top surfaces of the rolls.

A rolling and compressing apron (designated in Fig. 1 by the reference-numeral 100) rests in part upon the bed 30 and passes over the rolls 40 and 41, being connected at one end to a winding-drum 50, journaled in the frame below the roll 40 and at the other end to a transverse shaft 80, supported on the arc-shaped extension of said apron forming a loop or bight 150, which hangs between the roll 41 and the shaft 80. This apron, which is practically stationary as distinguished from a traveling or endless apron, has movable ends to permit the enlargement of the bight to conform to the increment of the bale during its formation and to facilitate the removal of the bale after its completion. The apron is held under a tension sufficient to cause the desired degree of compression of the accumulating bale in the bight. Any suitable tension device may be employed for this purpose.

A convenient tension device by which the degree of compression of the bight of the apron may be easily regulated is shown herein. The shaft 51 of the drum 50 is provided at its opposite ends with large gears 52, which mesh with pinions 61 on a shaft 60, journaled in the frame adjacent to the drum. The shaft 60 is provided with a friction disk or disks 62, and a friction brake or brakes 70 are disposed in proximity to said disk or disks. The brake is adjustable with reference to the face of the disk to increase or decrease the area of contact or degree of pressure for ultimately regulating the tension of the drum 50, and consequently of the apron. The friction-brake may consist of an arm supported at one end on a pivot 71 and at the other end on an adjustable spindle 72, supported in a lug 73, attached to the frame. The spindle is provided with a hand-wheel 74, by means of which it is turned to raise or lower the brake for increasing or decreasing its tension on the friction-disk. The brake may have a brake-shoe of any suitable shape or material, preferably one in the form of a flexible band 75, of rawhide leather or other suitable material. By means of the large gears meshing into the small pinions and the friction-disk and brake the compressing capacity of the apron may be easily regulated to a very high pressure. The gearing between the drum and friction-disks may be increased when very high pressure is required.

The shaft 60 is provided with a crank 63 and with a pulley 64, over which a driving-belt 65 passes, whereby the shaft may be turned either by hand or power for rotating the drum 50 through the pinions and gears referred to to wind back the apron after completing a bale to readjust the bight for the formation of another bale.

The shaft 80 is adapted to roll on the arc-shaped extensions 21, which constitute a track therefor. This shaft is provided with gears 81, which mesh with toothed segments 82, supported on said arc-shaped extensions. This shaft is provided with gears 85, meshing with the toothed segments 82 and with a hand-wheel 83, whereby it is turned and made to travel when desired over the arc-shaped track and segments to open or close the bight of the apron. The brackets 22 are provided with recesses 26, which serve as bearings for the shaft 80, and latches 86 and 87 are pivoted to said brackets. These latches engage said shaft when rolled into said bearings and hold it in normal position. These latches are connected by a rod 88, and the latch 86 has a handle whereby both latches may be simultaneously lifted to disengage the shaft for opening the bight.

The rolling and compressing apron may be either double, as shown in Figs. 1 and 4, or single, as shown in Fig. 2. The double apron 100 comprises in that portion which forms the bight two layers or series of rolls, an outer layer 110 and an inner layer 130, the rolls of each layer being connected by links. The terminals of the apron are fastened by connecting one end of the outer layer to the winding-drum 50 and the opposite end of the inner layer to the shaft 80. The inner layer is smaller both in width and length than the outer layer. The outer end of the inner layer is connected by strong spiral springs 131 with the extended end of a transverse rod 111 of the inner layer, and the inner end of the outer layer is connected by links 112 with the inner layer near its point of connection with the shaft 80. The outer layer, when constructed as herein shown, is composed of a number of longitudinal chains 113, extending from the terminal, connected with the drum 50 to the links 112, transverse rods 114, disposed at close intervals in said chains, and antifriction-rolls 115, disposed on said rods between said chains. The rods and rolls are omitted from the portion of this layer which winds on the drum 50. This outer layer constitutes a flexible antifriction-bed for the rolls of the inner layer, and enables the apron to withstand an enormous degree of tension for the rolling of the cotton into bales under high pressure.

The inner layer 130 of the double apron 100 is composed in part of a series of transverse rolls 132, having short trunnions 133, connected by a series of straight links 134, and in part of a series of transverse rolls 135, having elongated trunnions 136, connected by triangular links. The rolls 135 are the positively-driven rolls which impart a moving surface to the apron within the bight thereof to cause the cotton to roll therein. The rolls 132 and 135 are constructed of steel or other

suitable material, preferably in the form of hollow cylinders having closed ends. The peripheries of these driven rolls are preferably roughened in any suitable manner to enable them to engage the cotton. The means shown for driving the driven rolls consist of trains of pinions disposed at opposite edges of the apron and arranged in various ways, as illustrated in the drawings.

In the form shown in Figs. 3 and 10, in which successive rolls are driven, two sets of triangular links are employed at each edge of the apron to connect the trunnions of the rolls and auxiliary pinions. Each set comprises a series of links 140, disposed in the same longitudinal plane, and a series of links 141, disposed in a plane parallel with the first series, the lower corners of the links of each series being overlapped. The elongated trunnions 136 of the rolls extend through the lower overlapping corners of all the triangular links. Pinions 142 are disposed on these trunnions of the rolls between each set of triangular links, these pinions being of a size which will prevent the intermeshing of their teeth. Auxiliary pinions 143 are disposed vertically over the pinions 142 on the trunnions of the rolls and serve to communicate motion from one roll to another, so as to drive all the rolls in the same direction. These auxiliary pinions are provided with short trunnions 144 on one side and with longer trunnions 145 on the other side, these trunnions being journaled in the upper angles of the triangular links, the long trunnions engaging the outer series of links and the short trunnions the inner series thereof, the long and short trunnions being disposed in alternation on each side. This method of connecting the trunnions of the rolls and pinions enables the apron to bend without cramping the gearing.

Another arrangement for connecting the gears is shown in Fig. 9, in which the auxiliary pinions are disposed alternately above and below the pinions of the rolls, whereby the apron may be bent to any desired curve in both directions without cramping the gearing.

In the construction shown in Figs. 11 and 12 the transmitting-pinions for driving the rolls are enlarged, and in this case only alternate rolls are positively driven. The alternate driven rolls 135′ have trunnions 136′, which are still further elongated, and the alternate idle rolls 132′ have short trunnions 133′. The long and short trunnions are connected by overlapping straight links 134′, and the elongated trunnions 136′ are connected by two sets of triangular links 140′ and 141′ of larger size than the links 140 and 141. Pinions 142′ are disposed on the elongated trunnions between the two sets of triangular links, and auxiliary pinions 143′ are also supported in said triangular links. These links are composed of band-steel of suitable width and thickness to withstand the tensile strain upon the apron.

Straight links or hangers 137 connect the links at the end of the triangular series with the shaft 80. The pinions 142 on the first of the driven rolls 135 mesh with gears 85, which are loose on the shaft 80. When the shaft 80 is in normal position and the bight is closed, these gears 85 mesh with pinions 91, fixed on an intermediate shaft 90. This shaft 90 is also provided at its opposite ends with fixed gears 92, which mesh with gears 161, fixed on a driving-shaft 160, said driving-shaft being provided with a driving-pulley 162, which receives motion from a belt 163, connected with any suitable motive power. The driving-shaft 160 is also provided with a feed-roll 164. A companion feed-roll 171 is journaled in the brackets 22 in the same horizontal plane with the feed-roll 164. The shaft 170 of the feed-roll 171 is provided with gears 172, which mesh with gears 161 on the shaft 160.

A rotating core may or may not be employed in winding the bat into a bale, and this core may or may not be removable from the bale. The drawings show a core 180, which may consist of a tubular rod of gas-pipe or other suitable material provided with notches 181 at its opposite ends. A short shaft 182 is journaled in one of the side plates of the frame and another short shaft 182′ is journaled in the other side plate 22 of the frame, these shafts being in line with the axis of the bale to be formed. The shaft 182 is provided at its outer end with a driving-pulley 183 and at its inner end with a longitudinally-sliding clutch 184, having a spline or feather 185, which slides in a groove in the end of the shaft. This clutch is also provided with a peripheral groove 186, adapted to receive the pins of an actuating-yoke. The shaft 182′ is provided at its inner end with a similar clutch 184′, having a similar spline 185′, which engages a longitudinal groove in the shaft, and with a similar peripheral groove 186′, adapted to be engaged by the forked end of an actuating-lever. These splines, when the clutches are moved inward, also engage the flaring notches 181 of the core 180, so as to hold said core in position and cause it to rotate. A driving-belt from any convenient point passes over the driving-pulley 183 and turns the shaft 182, and consequently the core 180, during the winding of the cotton into a bale. A lever 190, supported on a pivot 193, is provided at one end with a yoke or fork provided with pins 191, which engage the peripheral groove 186 of the clutch 184, said lever being provided at its outer end with a handle 192, whereby it is actuated to move said clutch in or out. A lever 190′, supported on a pivot 193′, attached to an arm of the side plate 22, is provided at its lower end with a fork having pins 191′, which engage the peripheral groove 186′ of the clutch 184′. The outer end

of this lever is provided with a slot 194. Another lever 195, supported on a pivot 197, is provided with a pin 196 at its lower end, which engages the slot 194 of the lever 190′, and a rod 198 connects the outer end of the lever 190′ with the lever 190, so that one movement of the lever 190 actuates both clutches simultaneously in either direction. The lever 190 is held in adjusted position by a grooved rack 199. This core is designed to assist the formation of a bale at the beginning of the winding thereof, but it is not deemed essential to the operation of the machine, as the bat will wind upon itself within the bight and will be subjected to pressure as soon as it becomes equal in diameter to the opening in the bight at the beginning of the operation.

The plates 22 are preferably provided with curved guides 250, which project a short distance inward and engage the edges of the apron at the bottom of the bight before the expansion thereof.

Vertical guard-plates 260 are disposed opposite the ends of the bales being formed.

Guard-plates 270 are preferably hung in the bight at points near the ends of the rolls and on line with the inside of the gearing thereof, being attached to the brackets 271, secured to the side plates 20 of the frame. These plates are disposed at the edge of the bat and serve to prevent any loose particles from falling off the edge and coming in contact with the gearing. They are sufficiently narrow to hang in the bight without contact with the rolls when the bight is in its narrowest position at the beginning of the winding of a bale.

In Fig. 2 a single apron 200 is represented, composed of idle-rolls 232 in its rear portion and driven rolls 235 near its front end, the rolls 232 being connected by longitudinal links 234 at their outer ends and the rolls 235 by triangular links similar to those heretofore described. In this figure the drum 40 is dispensed with and the winding-drum 50′, similar to the drum 50 in Fig. 1, is disposed in the place of the drum 40. The tension device for this drum may be similar to that shown in Fig. 1, consisting of the gears 52′, pinions 61′, friction-disks 62′, and brake 70′.

In the use or this machine the cotton, in the form of a bat 301, as it comes from the condenser of a cotton-gin or other suitable source, may pass over the inclined table 400, thence between the feed-rolls 164 and 171 into the bight of the apron. If a core be used, the end of the bat will pass in contact with the moving surfaces of the driven rolls under said core and be turned up around said core. If no core be used, it will be turned upon itself, and as it accumulates it will swell, so as to touch the rolls upon both sides of the bight, and then it will begin to receive pressure. At each rotation of the bale it will receive an addition of one layer of the bat, and after the bale has enlarged sufficiently to begin to expand the bight of the apron this bat will be compressed upon the exterior of the accumulating bale. The tension of the apron may be regulated so as to impart a high pressure upon the bale, and as each layer is compressed successively upon the roll a very compact and solid bale is formed. As the bale enlarges to its maximum the bight of the apron is expanded, as shown in dotted lines in Fig. 1. It is designed to form the cotton into bales of two feet in diameter, more or less.

When a bale is completed, the latch-lever 86 is lifted through the rod 88, also the latch 87, whereby the shaft 80 is released from its bearings. It will then roll down the tracks 21, the gears 81 engaging the rack 82. At the lower end of said track it encounters stops 28, provided with rubber cushions 29. When the shaft is at its lowermost point, the winding-drum is turned somewhat to draw back the apron and raise the bight, whereby the completed bale is rolled out of the machine. Then this end of the apron is carried back to its normal position by turning the hand-wheel 83, whereby the gears 86 engage the segments 82 and carry back the shaft 80, which rides under the latches 86 and 87 and is again held in its normal position. The winding-drum is then released and the bight assumes its normal position ready for the formation of another bale.

I claim as my invention—

1. The combination with suitable supporting mechanism, of a practically stationary apron having an expansible bight provided with moving surfaces.

2. The combination with suitable supporting mechanism, of an apron having a movable end, and an expansible bight, and moving surfaces in said bight.

3. The combination with suitable supporting mechanism, of an apron having an expansible bight, and a movable terminal which permits the expansion of the bight, a drum on which the movable terminal is wound, and means for regulating the tension of said drum.

4. The combination of a suitable supporting mechanism, an apron having an expansible bight, and a movable terminal which permits the expansion of the bight, and moving surfaces in said bight, and an adjustable terminal which permits the opening of the bight.

5. The combination of a suitable supporting mechanism, an apron having an expansible bight, movable ends which permit the expansion and opening of the bight, and moving surfaces in said bight, and a tension device for regulating the pressure of the bight.

6. The combination of suitable supporting mechanism, an apron having an expansible bight, and composed of connected layers composed of rolls and links, some of the rolls of the inner layer being provided with driving mechanism forming movable surfaces in the bight.

7. The combination of a suitable supporting mechanism, an apron having an expansible bight, movable ends which permit the expansion and opening of the bight, and moving surfaces in said bight, a tension device for regulating the pressure of the bight, and feed-rolls for compressing and feeding the bat to the bight.

8. The combination of suitable supporting mechanism, an apron having an expansible bight, and a movable end which permits the expansion of said bight, a movable shaft at the end of the bight, provided with gears, and fixed segments with which said gears engage for opening and closing the bight.

9. The combination of suitable supporting mechanism, an apron having an expansible bight, and a movable end which permits the expansion of said bight, a movable shaft at the end of the bight provided with gears, fixed segments with which said gears engage for opening and closing the bight, and latches for automatically engaging said shaft when in normal position for closing the bight.

10. The combination of suitable supporting mechanism, an apron having an expansible bight, a movable end which permits the expansion thereof, and moving surfaces in said bight, a tension device for regulating the pressure of the bight, and feed-rolls disposed over the bight of the apron for feeding a bat of cotton thereinto.

11. The combination of suitable supporting mechanism, an apron having an expansible bight, a movable end which permits the expansion thereof, a core disposed in said bight, and moving surfaces in said bight, movable clutches for engaging said core, and means for rotating said core.

12. An apron composed in part of connected idle-rolls, and in part of driven rolls provided with pinions at their ends, auxiliary intermediate pinions engaging the pinions of the rolls and overlapping triangular links connecting the trunnions of the rolls and pinions.

13. The combination of suitable side frames, an apron having a compressing-bight, and curved guides extending into said bight and engaged by said apron before the expansion of the bight.

14. An improved cotton-press for making cylindrical bales, comprising a series of rolls flexibly connected together and partially encircling the bale during its formation, and means for rotating the bale.

15. The combination with suitable supporting mechanism of an apron having a movable end and an expansible bight, and moving surfaces in said bight.

16. An improved cotton-press for making cylindrical bales, comprising a series of rolls flexibly connected together and arranged in a loop in which the bale is formed, said loop being adapted to enlarge as the bale increases in size, whereby the bale will be partially encircled by said rolls during its formation, and means for rotating the bale.

17. An improved cotton-press for making cylindrical bales, comprising a series of rolls flexibly connected together and arranged in a loop in which the bale is formed, said loop being adapted to enlarge as the bale increases in size, whereby the bale will be partially encircled by said roll during its formation, means for rotating the bale, and a device for opposing the enlargement of said loop to apply pressure to the bale.

18. An improved cotton-press for making cylindrical bales, comprising a series of rolls flexibly connected together and arranged in a loop in which the bale is formed, said loop being adapted to enlarge as the bale increases in size, whereby the bale will be partially encircled by said rolls during its formation, a device for opposing the enlargement of said loop to apply pressure to the bale, and means for rotating said rolls whereby the bale will be rotated during its formation.

19. An improved cotton-press for making cylindrical bales, comprising a series of rolls flexibly connected together and arranged in a loop in which the bale is formed, said loop being adapted to enlarge as the bale increases in size whereby the bale will be partially encircled by said rolls during its formation, means for rotating the bale, and means for opening said loop for the removal of the bale.

20. An improved cotton-press for making cylindrical bales, comprising a series of rolls flexibly connected together and arranged in a loop in which the bale is formed, said loop being adapted to enlarge as the bale increases in size, whereby the bale will be partially encircled by said rolls during its formation, said series of rolls being rigidly secured at one end, means for rotating the bale, and a tension device connected with the other end for opposing the enlargement of said loop to apply pressure to the bale.

21. In an improved cotton-press for making cylindrical bales, the combination of two swinging supporting-arms normally locked in a substantially upright position, a series of rolls flexibly connected together and to said swinging arms, said rolls being arranged in a loop in which the bale is formed and which enlarges as the bale increases in size, whereby the bale will be partially encircled by said rolls during its formation, means for rotating the bale, and a tension device for opposing the enlargement of the loop for applying pressure to the bale, whereby when the bale has reached the desired size said swinging arms may be released to allow said loop to open and permit the removal of the bale.

ROBERT LATHAM OWEN.

Witnesses:
F. C. SOMES,
S. M. DORSETT.