

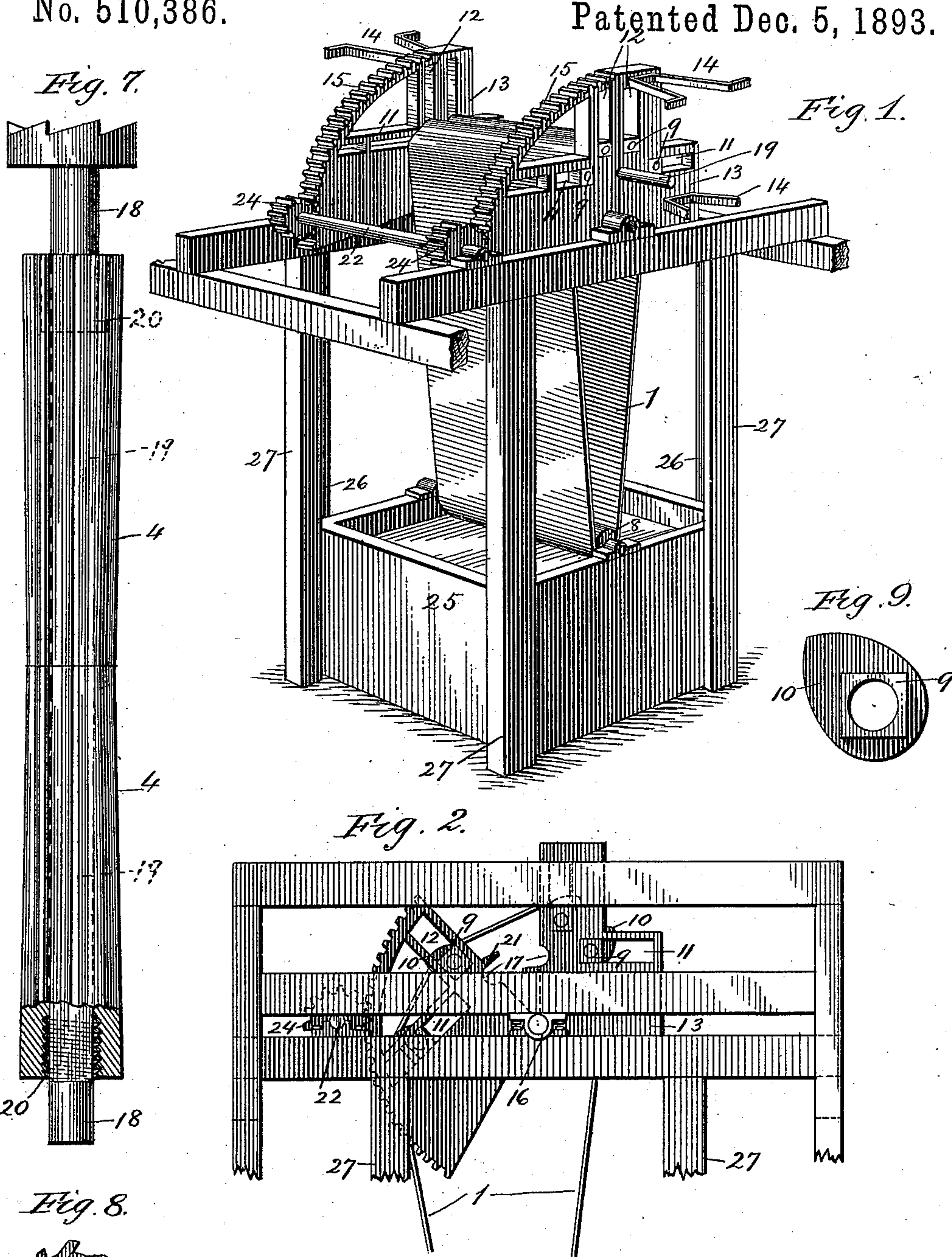
(No Model.)

3 Sheets—Sheet 1.

J. W. GRAVES.
BALING PRESS FOR COTTON, &c.

No. 510,386.

Patented Dec. 5, 1893.



Witnesses:
T. R. Stuart
Barber & Sweet Jr.

Inventor.
John W. Graves.
By Marble, Mason & Canfield,
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(No Model.)

3 Sheets—Sheet 2.

J. W. GRAVES.
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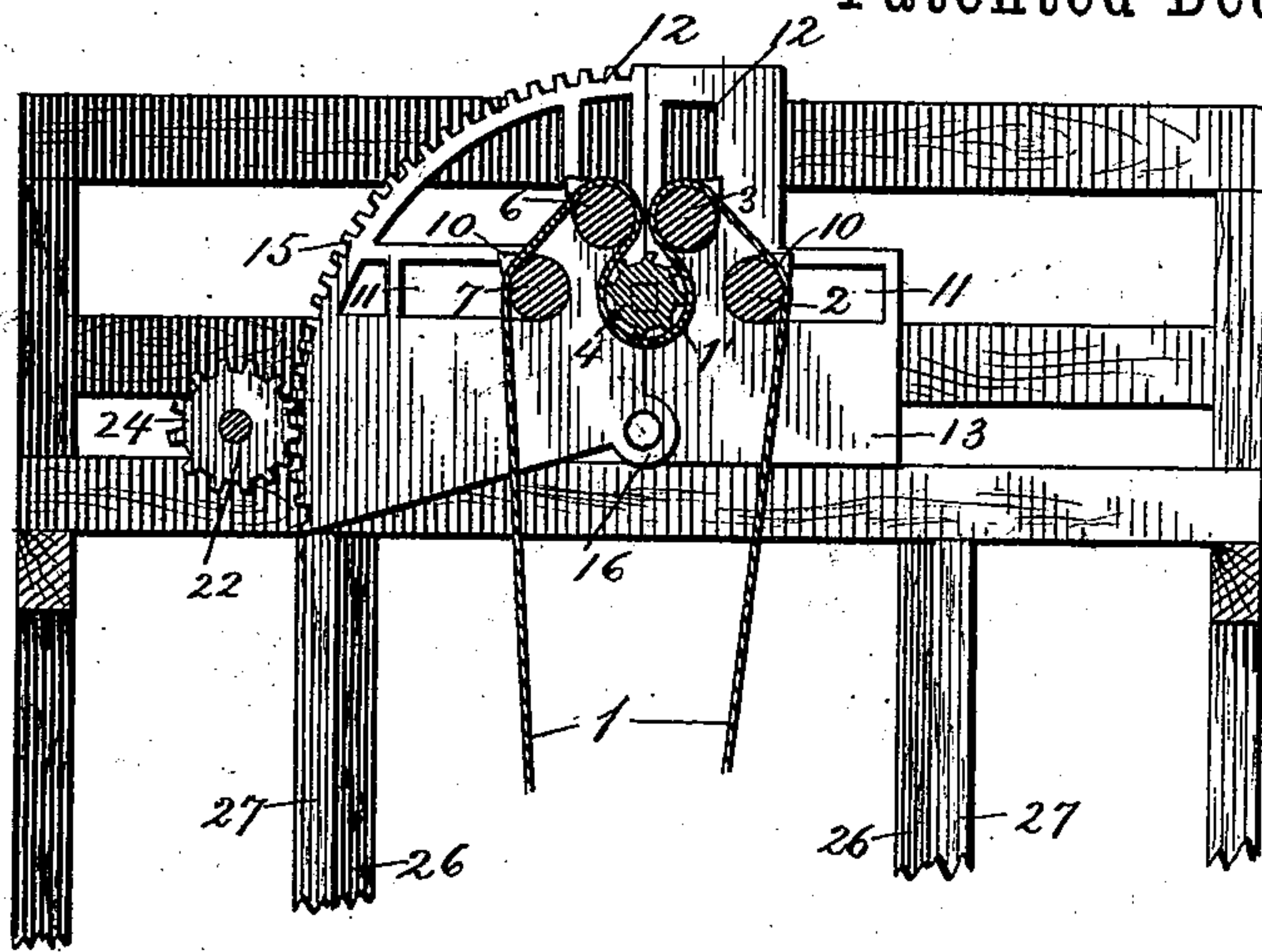


Fig. 3.

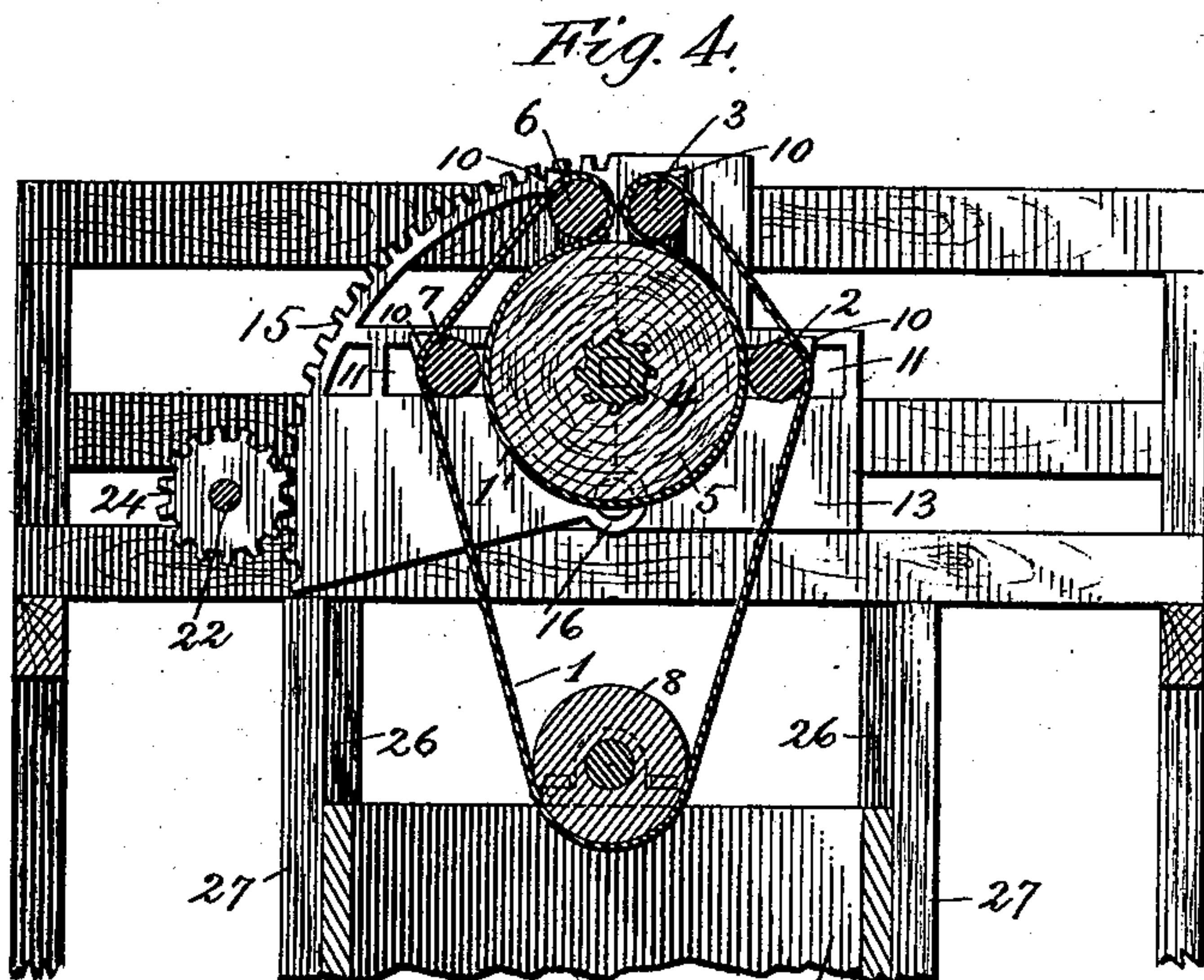


Fig. 4.

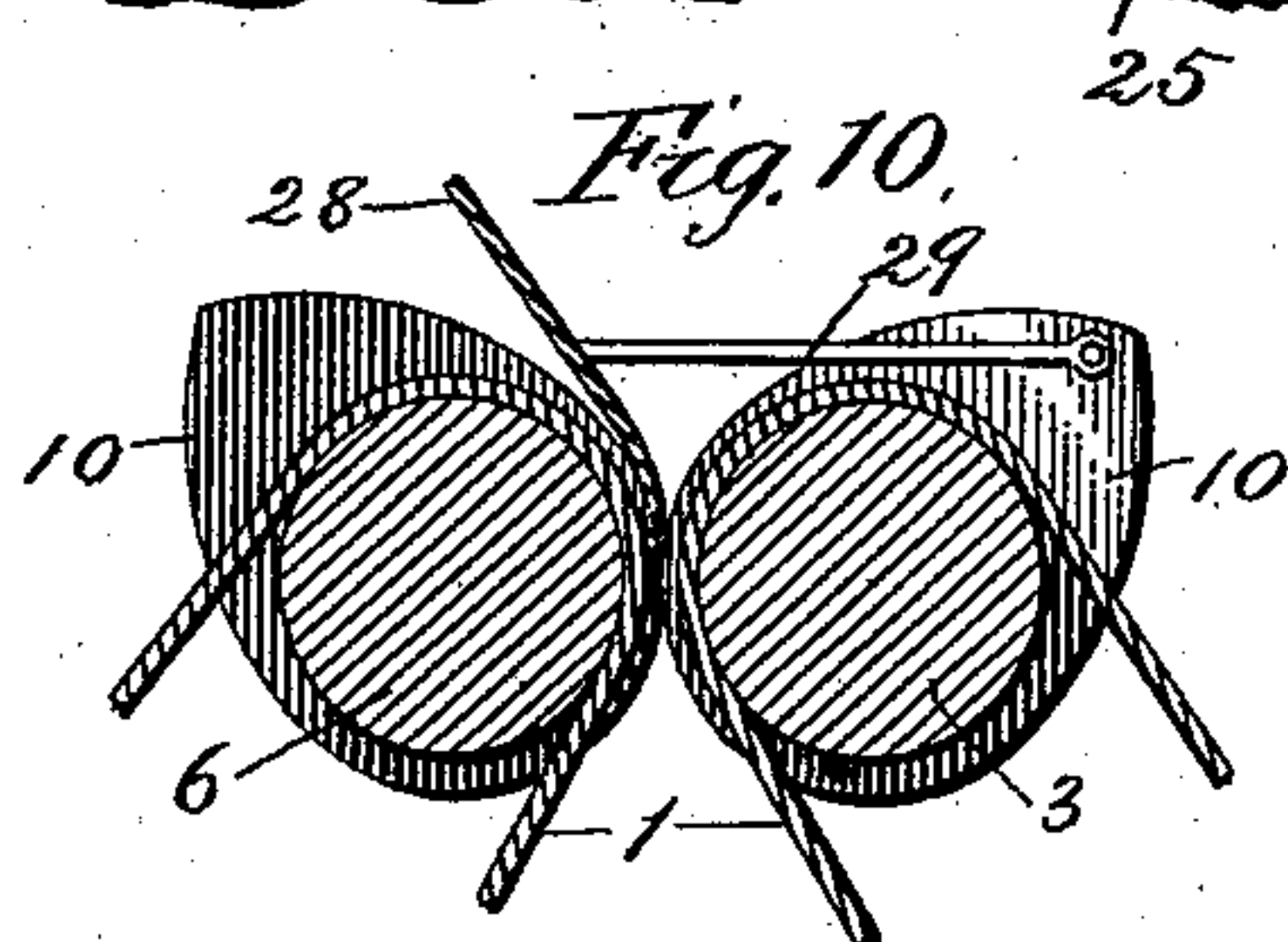


Fig. 10.

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(No Model.)

3 Sheets—Sheet 3.

J. W. GRAVES.
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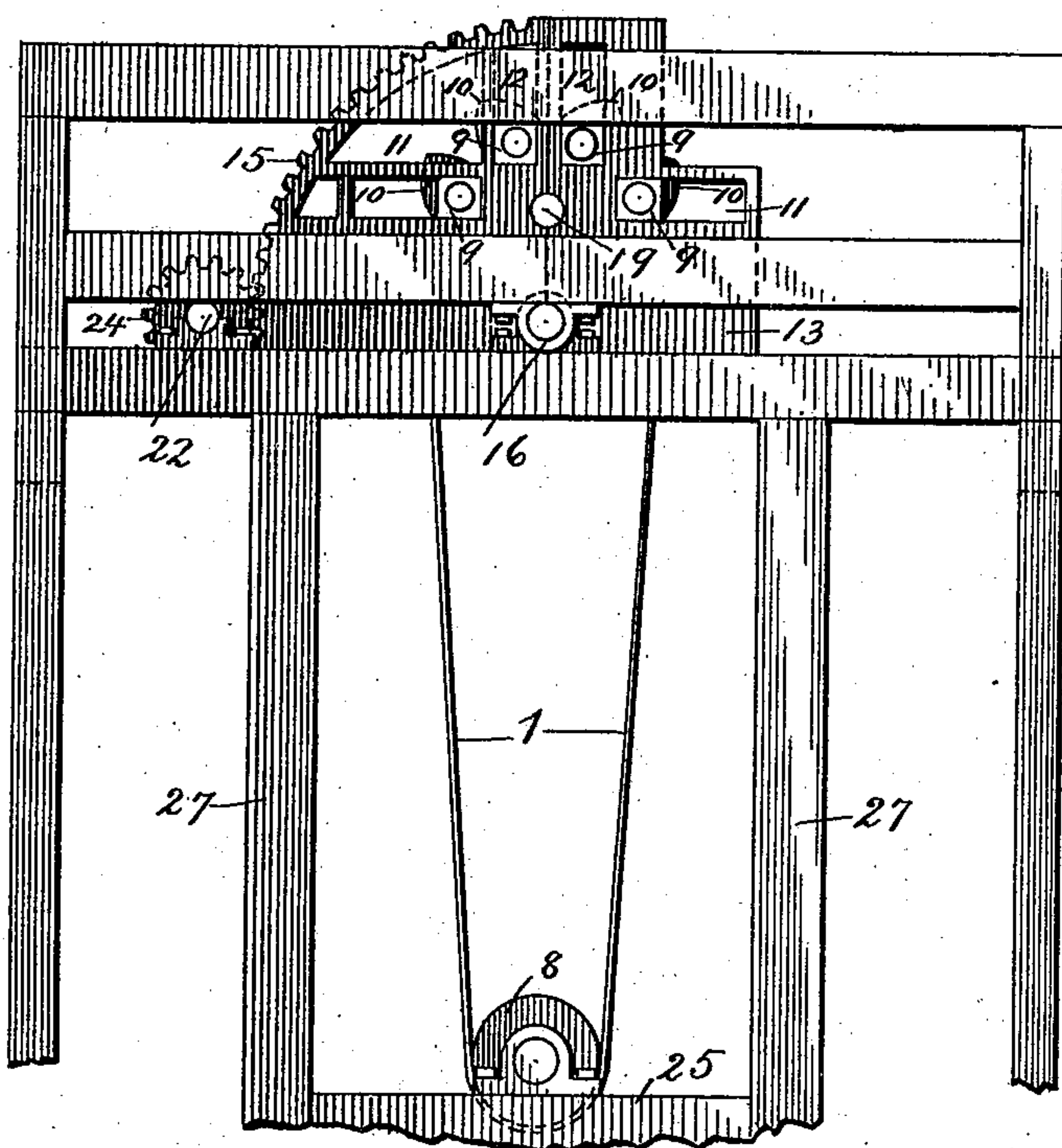


Fig. 5.

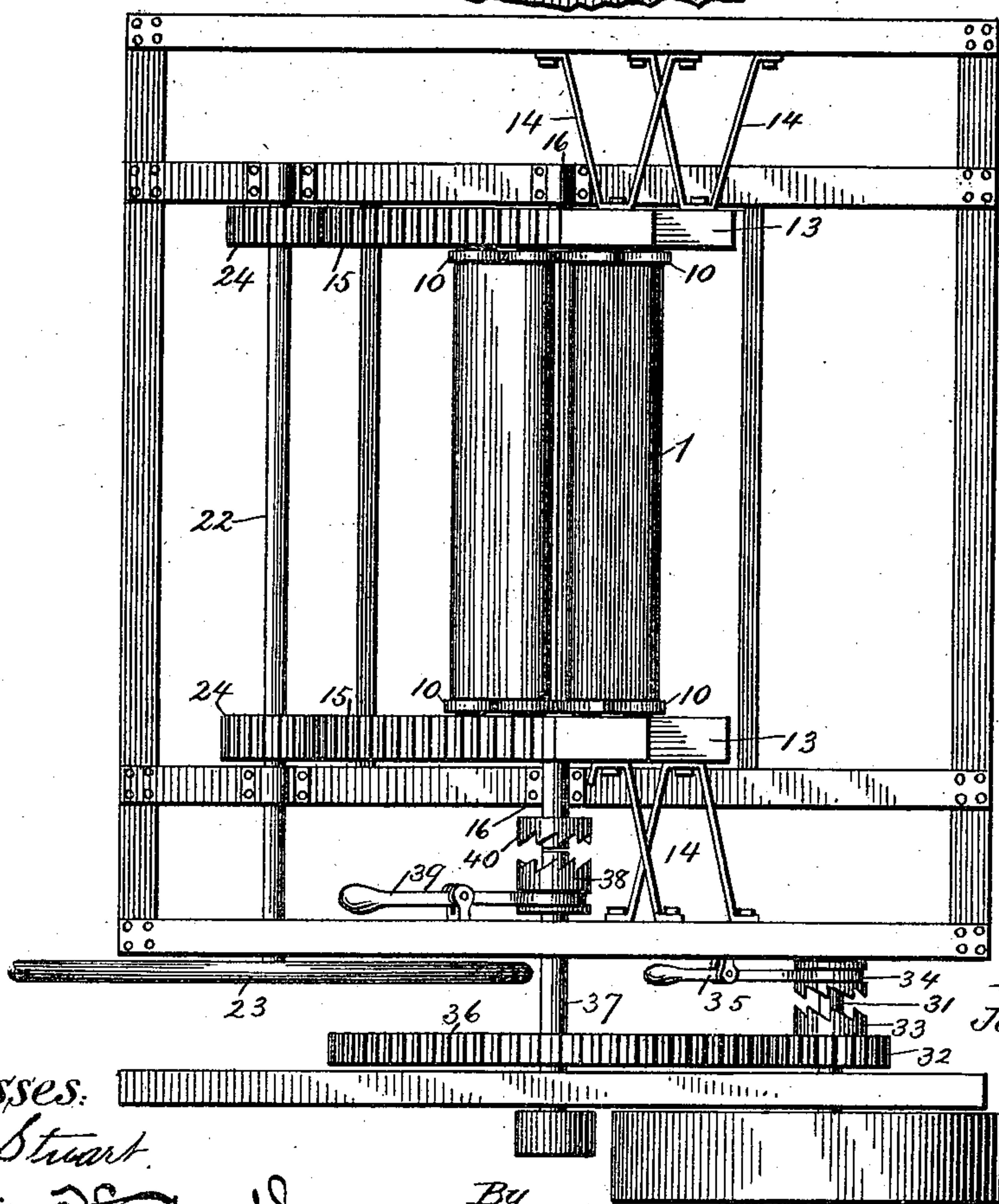


Fig. 6.

Inventor.

John W. Graves

Witnesses.

J. R. Stuart.

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UNITED STATES PATENT OFFICE.

JOHN W. GRAVES, OF LITTLE ROCK, ARKANSAS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO P. E. BRUGMAN, OF SAME PLACE, JAMES K. JONES, OF WASHINGTON, AND THOMAS LANIGAN, OF FORT SMITH, ARKANSAS.

BALING-PRESS FOR COTTON, &c.

SPECIFICATION forming part of Letters Patent No. 510,386, dated Deember 5, 1893.

Application filed February 25, 1891. Renewed May 5, 1893. Serial No. 473,142. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. GRAVES, a citizen of the United States, residing at Little Rock, in the county of Pulaski and State of Arkansas, have invented certain new and useful Improvements in Baling-Presses for Cotton, &c.; 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.

My invention relates, generally, to presses for baling cotton and other fibrous materials and, particularly, to improvements in the class thereof in which the fibers are compressed into cylindrical bales. In my improved press, this result is accomplished by feeding the fibers in the form of a bat or thin sheet into the press, winding it around and around upon itself, or layer upon layer, and simultaneously subjecting the same to friction and pressure as it is formed into a bale. The fibers will be thus closely pressed together, both from the under and upper sides of said bat or sheet, and thus acquire strength or coherence exactly in proportion to the friction and pressure applied thereto.

My invention consists, first, in improved mechanism for baling cotton and other fibrous materials, in which the fibers in the form of a bat or sheet, are simultaneously subjected to friction and pressure during the baling operation, said mechanism including a weighted, endless belt, within the loop or bight of which the bale is formed by continuous accretion and rotation of the fiber, and by effecting its compression in detail, or layer upon layer, as it is fed to the bale, which is preferably effected, when baling cotton, by delivering the sheet or bat into the press from the condenser of a gin in an unbroken condition; second, in improved mechanism for causing the bat or sheet of fiber, as it is fed into the press, to be subjected to constant friction and compression, which, never being released until the bale is finished, results in the greatest attainable density of the material and in the layers throughout the bale constituting retaining bands for those wound interiorly thereof,

which are held or bound by the layers outside; third, in improved mechanism for permitting the loop or bight of the belt to automatically accommodate itself to the increasing size of the bale; fourth, in improved mechanism for sustaining the increasing size and weight of the bale in the same plane while permitting it to move freely within the bight of the belt; and, fifth, in the special contrivances employed, which are accessorial and essential to said mechanisms in carrying out the objects or purposes of this invention, as hereinafter fully disclosed in the description, drawings and claims.

The objects of my invention are, first, to so press the bat or sheet, as it is delivered from the cotton-gin condenser or elsewhere, that its fibers will not be broken or subjected to any deteriorating influence, and, also, to avoid the danger that is inseparable from the use of a lint room; second, to effect such condensation of the fiber, in the first instance, as will place it in proper condition for ocean and other shipment, and thus obviate the present enormous expense of hauling it to storage warehouses and compresses, and also, of compressing plantation bales; third, to effect the compression or baling of the fiber by winding the bat smoothly or without tangling or twisting its fibers, around a removable core or shell, so that the pressure upon the fiber will constitute the main retaining element or holding means for the completed bale, and so that any light wrapping or covering which will arrest the expansion of the outer layer of the bat, will also prevent all expansion of the rest of said bale; also, the fiber will be left in such condition that, when said covering has been removed, the rotation of said bale can be reversed and the bat unwound in a continuous or unbroken sheet, but in a more compressed condition than when it was originally delivered from the condenser; fourth, to so press and wind the bat that its edges, at the bend of the bale, will be open to inspection or sampling, throughout its length, without mutilating the bale or disturbing its covering or binding, and fifth, to provide a machine or press at a moderate cost, which shall be simple in

construction and certain or reliable in operation. These objects are accomplished by the mechanism illustrated in the accompanying drawings, forming part of this specification, in which the same reference numerals indicate the same or corresponding parts, and in which—

Figure 1 represents a perspective view of my improved baling press with parts of the press-frame broken away and omitted, and the driving gearing removed; Fig. 2 a broken end or side elevation of the press showing one of the segment-gears thrown open or in the position assumed thereby when the bale has been discharged; Fig. 3 a broken, transverse section of the same, showing said segment-gear closed, or in the position it occupies when the loop or bight of the endless compression belt is in position for receiving the cotton to be baled; Fig. 4 a similar view, showing the positions of the parts when the bale is formed in the loop or bight of said belt and ready to be wrapped and removed; Fig. 5 a partly-broken side or end elevation of the press, showing the parts in the same positions as in Figs. 1 and 3; Fig. 6 a plan view of the same, showing the press-frame, the driving-gearing and its connections; Fig. 7 a plan view, partly in section, of the two-part shell or core, upon which the bale is formed, with the square shaft in place therein; Fig. 8 an end view of the same; Fig. 9 a detail, end-view of one of the journal-boxes in which the shafts of the rollers are mounted, and Fig. 10 a transverse section, near the ends, of the two upper or vertically-movable rollers, showing also the belt, the hood and one of its pivoted supporting-rods, attached to the elliptical flange of one of the journal-boxes.

In the drawings, the numeral 1 indicates the endless, retaining and compression belt, which passes over the rollers 2 and 3, around the two-part shell or core 4 and the bale 5, over the rollers 6 and 7, down and around or under the tension-roller 8 and thence upward to the starting point. This arrangement of the endless belt forms the loop or bight 1', which receives the fibrous material as it passes between the rollers 3 and 6 for undergoing the operation of baling. The shafts of the rollers 2, 3, 6 and 7 all rotate in freely-movable journal-boxes 9, which are provided at their inner ends with the elliptical flanges 10, which present smooth surfaces to the edges of the endless belt, prevent wear of the same and guide and hold said belt straight in its passage over said rollers. These journal-boxes are loosely mounted and guided in the horizontal and vertical slots or recesses 11 and 12, there being two recesses of each of these arrangements at the respective sides or ends of the press for permitting said journal-boxes and rollers to move outwardly as the bale gradually increases in size.

In the upper portion of each end of the press-frame is secured the vertical metallic support 13, which is held rigidly in place upon

said frame by the two-armed or outwardly-flared braces 14, which are fastened near the upper and lower ends thereof, as shown in Figs. 1 and 6. In each of these supports are formed one of the horizontal and one of the vertical recesses 11 and 12, while the other correspondingly-arranged recesses 11 and 12 are formed in each of the segment-gears 15, which are also arranged in the upper portions of the ends of said press-frame and pivoted in the bearings 16 located at the lower ends of the inner edges of said supports; also, about midway of the height of these supports and segment-gears, and in their adjacent edges, are formed the semi-circular recesses 17, which are adapted to receive, support and release the journals 18 of the square shaft 19, which passes longitudinally through the two-part, ribbed shell or core 4, upon which the bale is formed. The two parts of this shell or core are formed in the shape of truncated cones and so arranged upon the square shaft 19 that their inner and smaller ends will come in contact at or near the center of the length of said shaft; also, their outer ends are formed with the screw-threaded openings 20, into which, after the bale has been formed, after the shaft and core carrying said bale have been removed from the press, and after said shaft has been removed from said core, are inserted the screw-threaded ends of extracting rods, [not shown,] which are used for the purpose of removing the two parts of said core endwise from the center of the opposite ends of said bale.

In replacing the core and its shaft in the press, after the bale has been removed, the forwardly-projecting lugs 21, which are formed at the inner edges of the segment-gears 15, operate to force or replace the journals of said shaft into the semi-circular recesses 17 during the forward movement or closing of said segment-gears.

In rear of and in line with the pivot-bearings 16 of the segment-gears 15 is journaled the shaft 22, which is provided with the hand-wheel 23 at one end and with the two pinions 24, which engage said segment-gears and raise and lower the same for the purposes, respectively, of permitting the formation of a new bale within the bight or loop of the belt and of the removal therefrom of the completed bale. During the formation of said bale, or while it is increasing in size or diameter, it is necessary to produce the proper amount of pressure or friction thereon by the loop or bight of the endless belt. This is effected by means of the tension-roller 8, which is journaled in suitable bearings secured to the ends of the weight-box 25, which may be supplied with any kind and quantity of ballast, and which is guided in its upward and downward movements by its corners fitting into the triangular channels 26 formed in the legs 27 of the press-frame. Also, during the feeding of the bat or thin sheet of fiber down through the small space between the rollers 3 and 6,

and into the loop 1' of the belt, it is necessary to provide against said bat becoming kinked or bunched above said space and from being passed out over the roller 6 by frictional contact with the outer surface of said belt. This result is accomplished by the rearwardly-inclined hood 28, which is shown in section in Fig. 10, which is of the same length as the said rollers, and which is secured to the rear ends of the supporting-rods 29 [only one shown], which are pivoted at their front ends to the elliptical flanges 10 of the journal-boxes, in which the front upper roller 3 is revolved. The object of thus pivotally supporting said hood is to permit of its being moved forwardly, or in front of the roller 3, when a bale has been completed and desire exists to lower the segment-gears 15 and the rollers 6 and 7 for the removal of the angular shaft 19, the two-part shell or core 4 and the cotton bale 5 from the press.

The operating or driving mechanism of my improved baling press, as shown in Fig. 6, consists of the power receiving and transmitting pulley 30, secured to the outer end of the short shaft 31 upon which are mounted the integrally-formed small and loose gear-wheel 32 and the clutch 33, and the splined clutch 34, which is moved into and out of engagement with the clutch 33 by the hand-lever 35 for applying and removing the power, as may be necessary for continuing and stopping the revolution of the core 4 during the formation in and removal of the cotton-bale 5 from the bight or loop 1', of the endless belt 1. The small gear-wheel 32 is in mesh with the large gear-wheel 36, which is secured upon another short shaft 37, which is provided on its inner end with the movable or splined clutch 38, which, by the hand-lever 39, is moved into and out of engagement with and from the fixed clutch 40, attached to the outer end of the angular shaft 19, which, as stated, passes through the two-part core 4 and imparts revolution thereto during the formation of the bale.

In addition to what is obvious and hereinbefore described in relation to the advantages and operation of my improved baling-press, it may be further stated that the sheet or bat is uniformly fed from the condenser of a cotton-gin or other source and passed down through the small space between the upper rollers 3 and 6 and into the bight or loop 1' of the endless belt, where it is turned or wound over and over upon itself, in layers, and around the two-part core 4, until the bale is completed. During this operation, the layers of the bat forming the bale gradually become denser, as more layers are added and the friction increased, until the bale distends the loop or bight of the belt to some extent and gradually raises the tension-roller 8 and the weight-box 25, which, being continued, causes the formation of the desired size of bale within the loop of said belt. The distension or expansion of the loop, however, is very little un-

til the size and density of the bale therein become sufficient to overcome the resistance of said weight-box, but under the continuous accretion of fiber constituting the bat, the bale first merely increases in density, with only little increase in volume, and then it slowly begins to distend said loop which will result in raising said weight-box, and in increasing the friction upon said bale. The density of the bale will, at this stage of the baling operation, be proportional to the weight in said box and the extent of the frictional surface of the belt against the bale; hence, to continue to compress the cotton, the tension or frictional contact of said belt with the bale should be increased exactly in proportion to the increase in circumference of said bale, which may be accomplished by placing additional weight in said box at intervals. After the bale has reached the desired size, the bat or sheet of fiber is cut off and a wrapper or cover, of any suitable or usual material, is fed through the small space between the rollers 3 and 6 and wound around the belt about twice, after which a few wires are passed around said bale and twisted at their ends, and thus the bale is prevented from expansion and unwinding; then, after the clutches 38 and 40 have been disconnected by the hand-lever 39, and the rotation of the bale has ceased, the segment-gears 15 are lowered by turning the hand-wheel 23 and the pinions 24 upon the shaft 22; then the angular shaft 19, the two-part core 4 and the bale 5 formed thereon, are removed from the press; then said shaft is removed from said core and the latter from said bale, as above described, after which said core is placed back upon its shaft and the two returned to place in the press; then said segment-gears are raised or closed and the loop of the belt is again formed around said core, and then the press is in proper condition for repeating the operation of baling.

The action of the press can be clearly demonstrated by comparison with a map or sheet of paper first loosely rolled around a rod or cylinder and then rolled from its center into smaller and smaller compass, until it becomes perfectly solid.

Any yielding of one of the inner layers of the bale, by elongation or being wound too tightly around the core of the bale, extends through each layer to the outer one, and so continues until the bale is finished, wrapped or covered and bound by the wires.

Having thus fully described my improved baling-press for cotton and other fibrous materials, its advantages and operation, what I claim as new is—

1. In a baling press for cotton and other fibrous material, the combination, with a revoluble and removable angular shaft, of a two-part shell or core which is divided at or near the center of its length and removably secured upon said shaft, substantially as described.

2. In a baling press for cotton and other

fibrous material, the combination, with a revoluble and removable angular shaft, of a two-part shell or core removably secured upon said shaft, and provided with peripheral ribs, substantially as described.

3. In a baling-press for cotton and other fibrous material, the combination, with a revoluble and removable angular shaft, of a two-part shell or core removably secured upon said shaft and provided with peripheral ribs, the two parts of said shell or core having the shape of truncated cones, substantially as described.

4. In a baling-press for cotton and other fibrous material, the combination, with a revoluble and removable angular shaft, of a two-part shell or core removably secured upon said shaft and provided with peripheral ribs, the two parts of said shell or core having the shape of truncated cones, and being formed with screw-threaded openings in their outer ends, substantially as and for the purpose described.

5. In a baling-press for cotton and other loose fibrous materials, the combination, with a belt arranged to form a loop or bight, of a revoluble shaft and a two-part shell or core which is divided at or near the center of its length and located within said bight for subjecting said materials to simultaneous friction and pressure, substantially as described.

6. In a baling-press for cotton and other loose fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble shaft and a two-part shell or core which is divided at or near the center of its length and located within said loop or bight, the two parts of said shell or core having the shape of truncated cones, substantially as and for the purpose described.

7. In a baling-press for cotton and other loose fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble shaft and a two-part, ribbed shell or core which is divided at or near the center of its length and located within said loop or bight, the two parts of said shell or core having the shape of truncated cones, substantially as and for the purpose described.

8. In a baling-press for cotton and other loose fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble and removable shaft and a two-part shell or core which is divided at or near the center of its length and located within said loop or bight and removably secured to said shaft, and provided with peripheral ribs, substantially as and for the purpose described.

9. In a baling-press for cotton and other loose fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble and removable shaft and a two-part shell or core which is divided at or near the center of its length and located within said loop or bight and removably secured to said shaft and provided with peripheral ribs, the two parts of said shell or core having the

shape of truncated cones and being formed with screw-threaded openings in their outer ends, substantially as and for the purpose described.

10. In a baling-press for cotton and other loose fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble shaft, a shell or core removably secured upon said shaft and located within said loop or bight, and clutch mechanism for controlling the revolution of said shaft and core, substantially as described.

11. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble shaft and a core located within said bight for winding said materials from the center of the bale, layer upon layer, said core being divided at or near the center of its length, substantially as described.

12. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble shaft and core located within said bight for winding said materials from the center of the bale, layer upon layer, and a weight attached to said belt, substantially as described.

13. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble and removable shaft and a two-part core, which is divided at or near the center of its length and located within said bight for winding said materials from the center of the bale, layer upon layer, substantially as described.

14. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with an expansible loop or bight, of a revoluble and removable shaft and a two-part, removable and peripherally-ribbed core located within said bight, and clutch mechanism for controlling the revolution of said shaft and core, substantially as described.

15. In a baling-press for cotton and other fibrous materials, the combination with an endless belt formed with a loop or bight, rollers for supporting and guiding said belt, and a weighted tension-roller arranged within said belt, of a shaft and a two-part core for forming a bale within the loop or bight of said belt, said core being revoluble and divided at or near the center of its length substantially as described.

16. In a baling-press for cotton and other fibrous material, the combination, with an endless belt formed with a loop or bight, rollers for supporting and guiding said belt, and a weighted tension-roller arranged within said belt, of a shaft and a two-part core for forming a bale within the loop or bight of said belt, said shaft being revoluble and removable and said two-part core being removable from said shaft, and divided at or near the center of its length substantially as described.

17. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight vertically and horizontally-movable rollers for supporting and guiding said belt, and a weighted tension-roller arranged within said belt, of a shaft and two-part core for forming a bale within the loop or bight of said belt, said core being revoluble and divided at or near the center of its length, substantially as described.

18. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, a shaft and a two-part revoluble core arranged within said loop or bight, rollers for supporting and guiding said belt, and a weighted tension-roller arranged within said belt, of horizontally and vertically movable journal-boxes for the shafts of said rollers, substantially as described.

19. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, a shaft and a two-part core arranged within said loop or bight, of rollers for supporting and guiding said belt, and horizontally and vertically movable journal-boxes for the shafts of said rollers, said journal-boxes being provided at their inner ends with elliptical flanges, substantially as and for the purpose described.

20. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble and removable shaft and core located within said bight for winding said materials from the center of the bale, layer upon layer, and means for opening said bight for permitting the removal of said shaft, core and bale, substantially as described.

21. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, of a revoluble and removable shaft and core located within said bight for winding said materials from the center of the bale, layer upon layer, and means for opening said bight for

permitting the removal of said shaft, core and bale, said means comprising the pivoted segment-gears the rollers carried thereby and the devices for lowering the same, substantially as described.

22. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, of the revoluble and removable shaft and core located within said bight for winding said materials from the center of the bale, layer upon layer, and means for opening said bight for permitting the removal of said shaft, core and bale, said means comprising the pivoted segment-gears the rollers carried thereby and the devices for lowering the same, said devices consisting of the transverse shaft provided with pinions engaging said segment-gears, and a hand-wheel at the end thereof, substantially as described.

23. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt, formed with a loop or bight, a shaft and a two-part core arranged within said loop or bight of a series of rollers supporting and guiding said belt, a rearwardly-inclined hood arranged in proximity to the upper rollers of said series, and pivotal means for supporting and removing said hood, substantially as described.

24. In a baling-press for cotton and other fibrous materials, the combination, with an endless belt formed with a loop or bight, a shaft and a two-part core arranged within said loop or bight, of a series of rollers supporting and guiding said belt, a rearwardly-inclined hood arranged in proximity to the upper rollers of said series, and pivotal means for supporting and removing said hood, said means consisting of two supporting rods and the elliptical flanges of two of the upper journal boxes, substantially as described.

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

JOHN W. GRAVES.

Witnesses:

ROBERT MASON,
TOM R. STUART.