No. 825,653. PATENTED JULY 10, 1906.

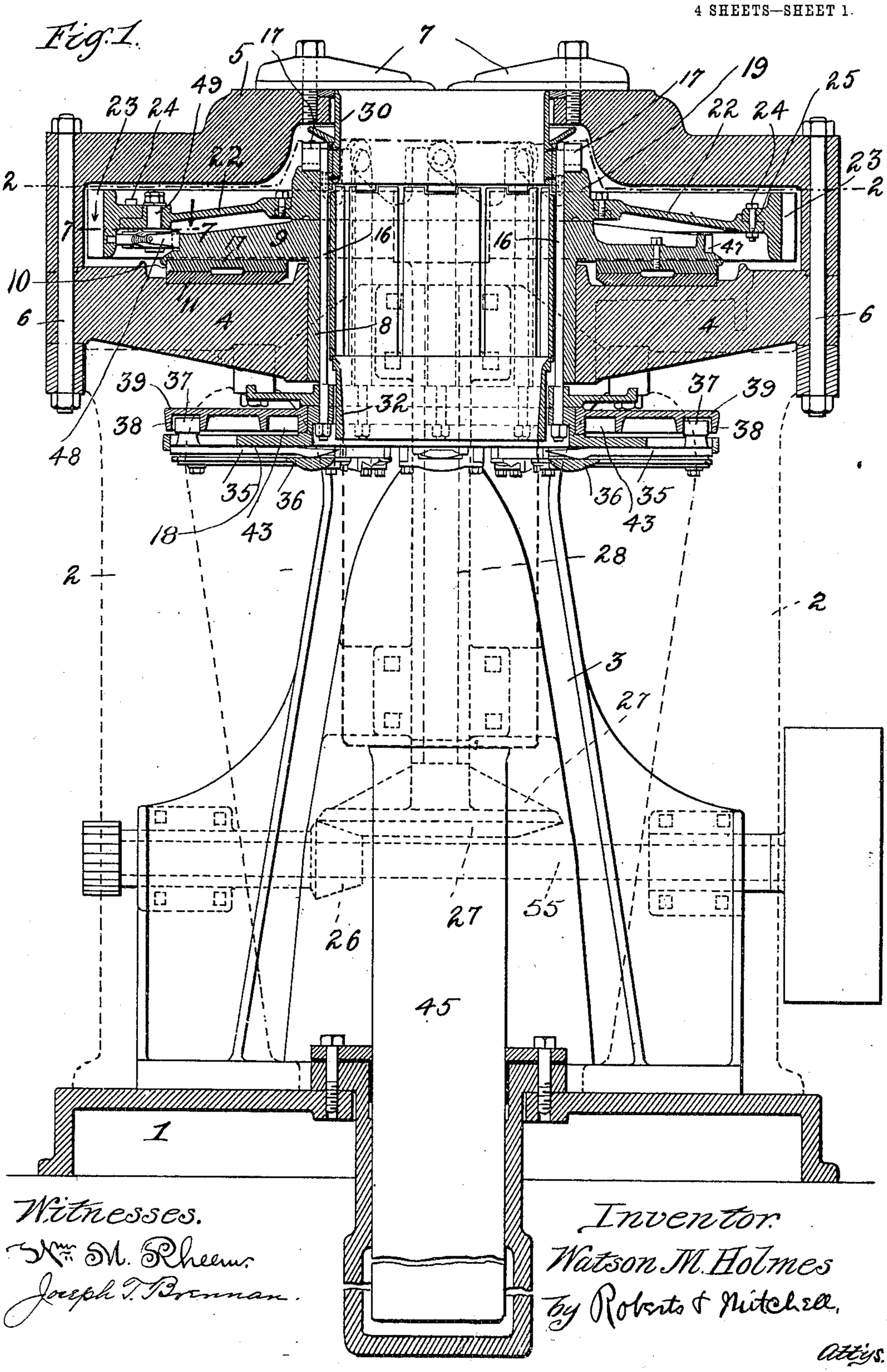
W. M. HOLMES.

APPARATUS FOR COMPRESSING COTTON.

APPLICATION FILED JULY 28, 1902.

4 SHEETS—SHEET 1.

Fig. 1.



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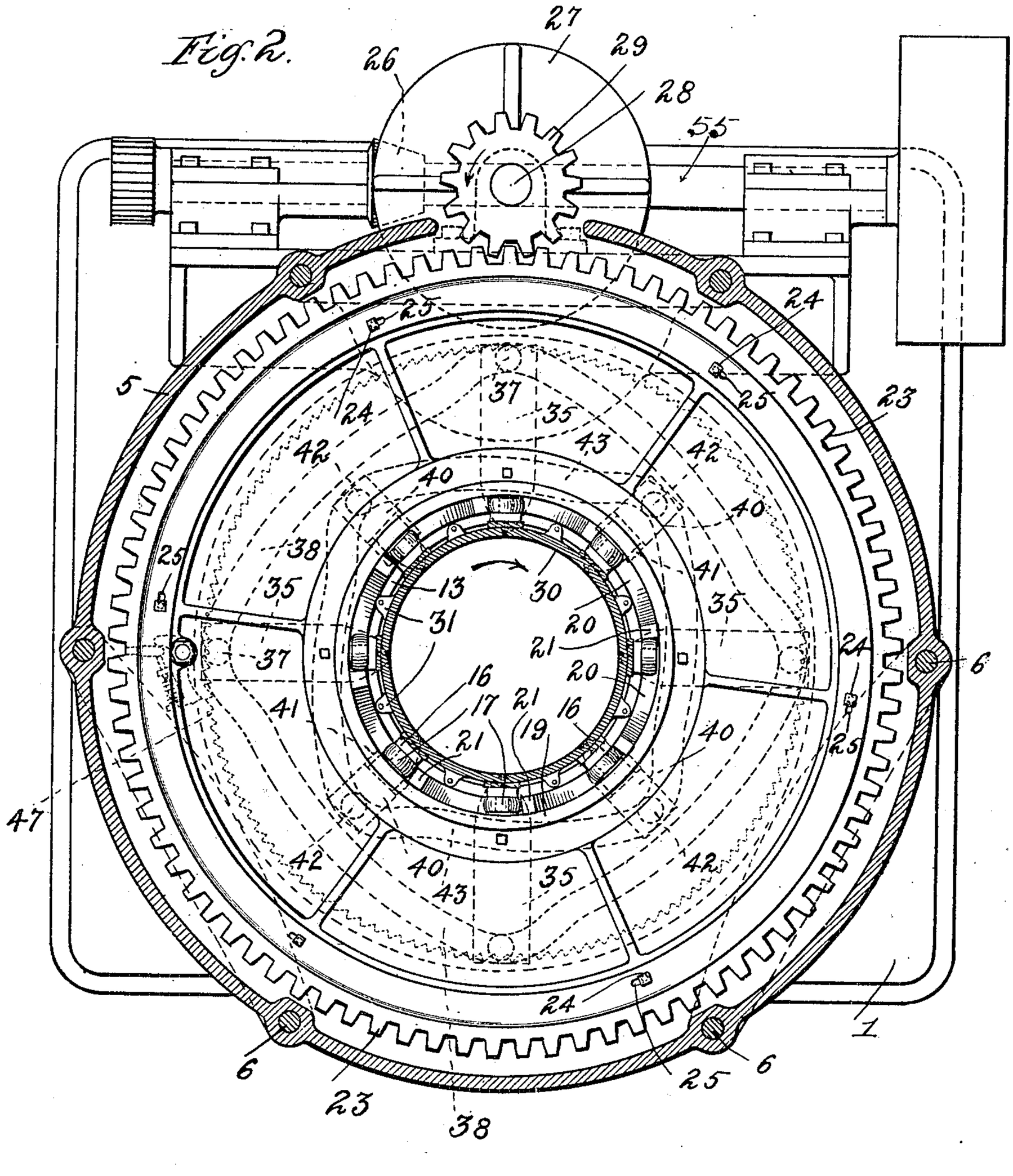
4 SHEETS—SHEET 2.

Fig. 2.



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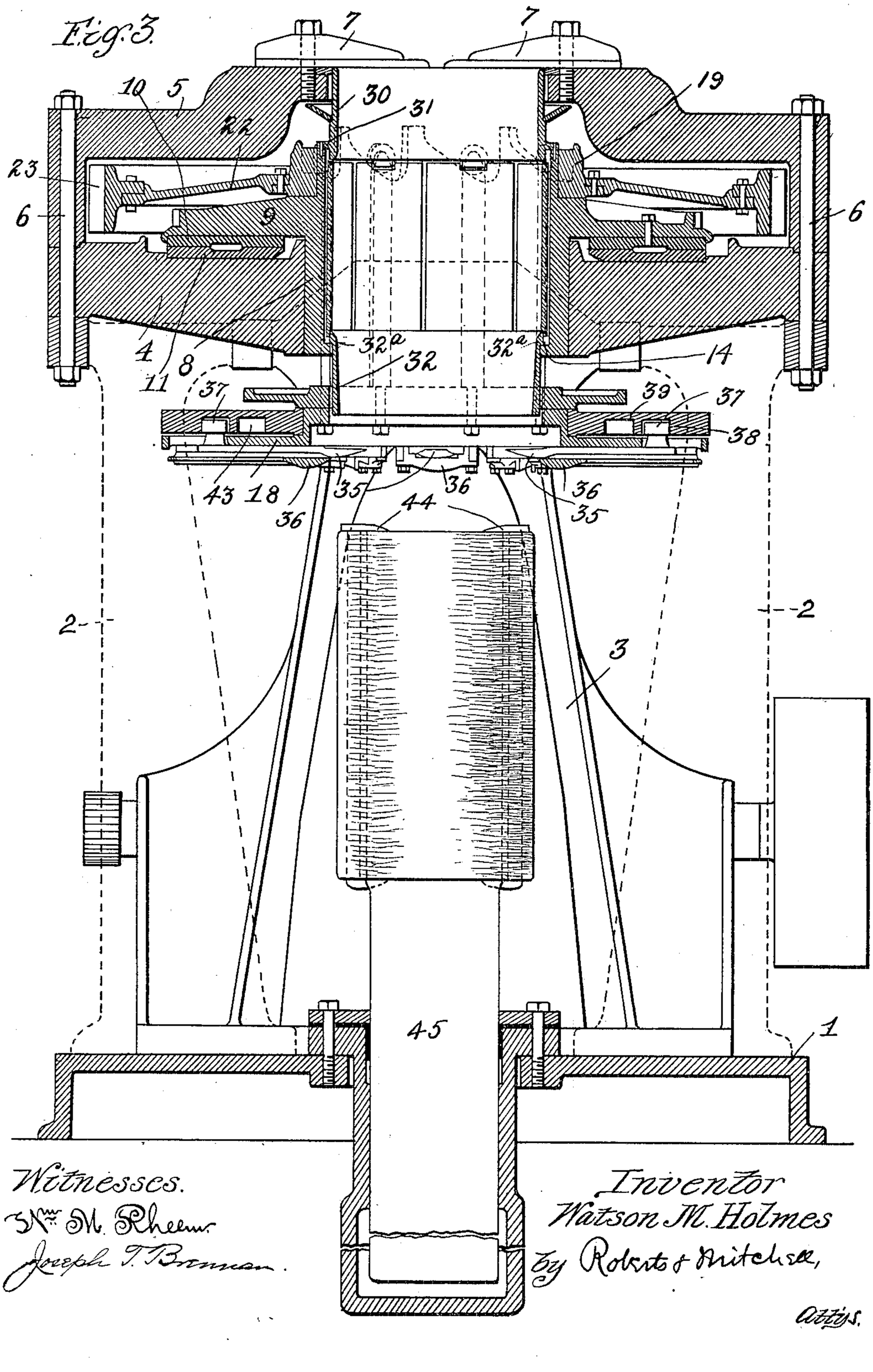
4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

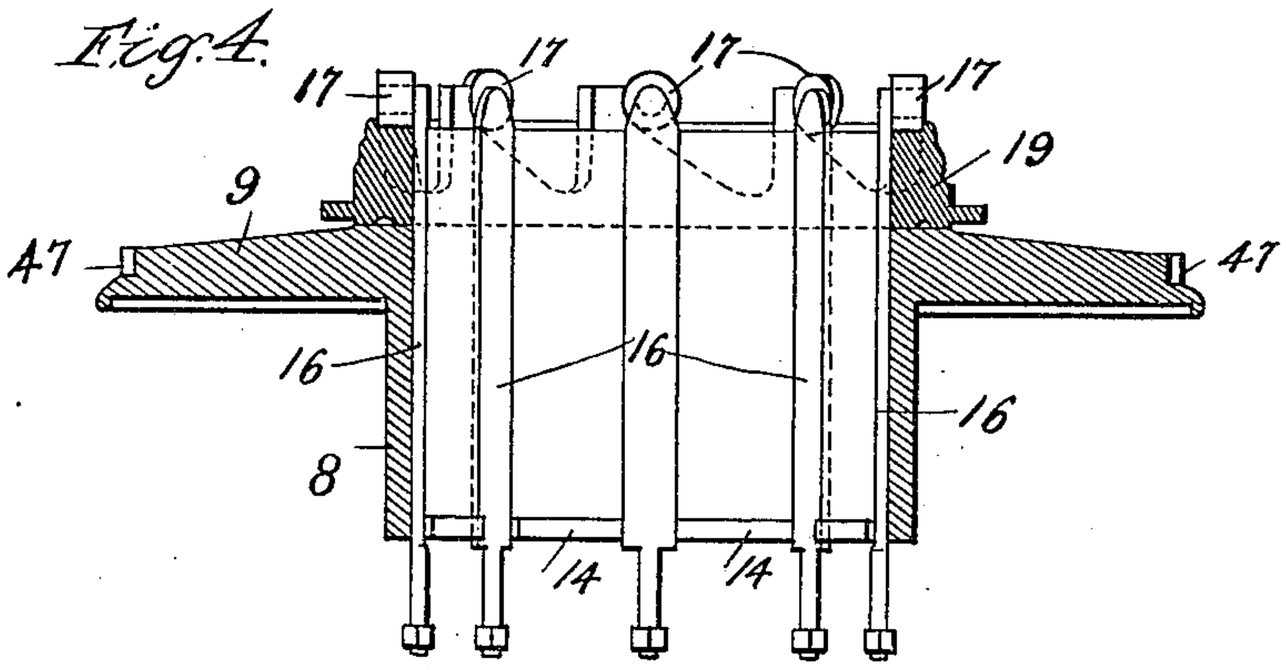


Fig. 5.

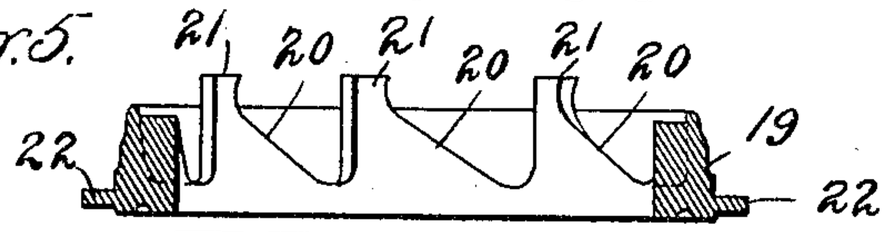


Fig. 6.

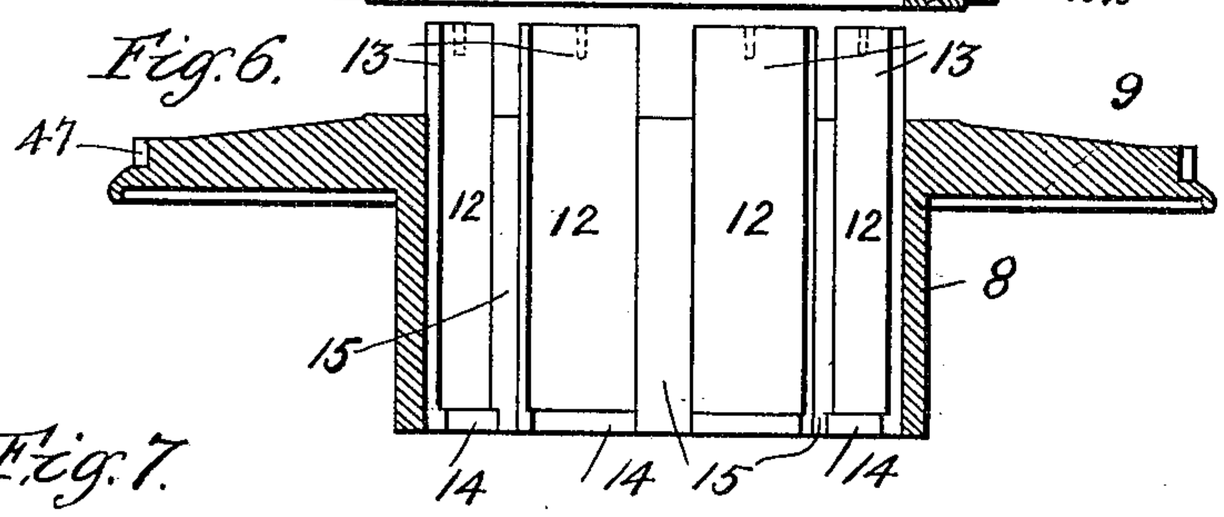


Fig. 7.

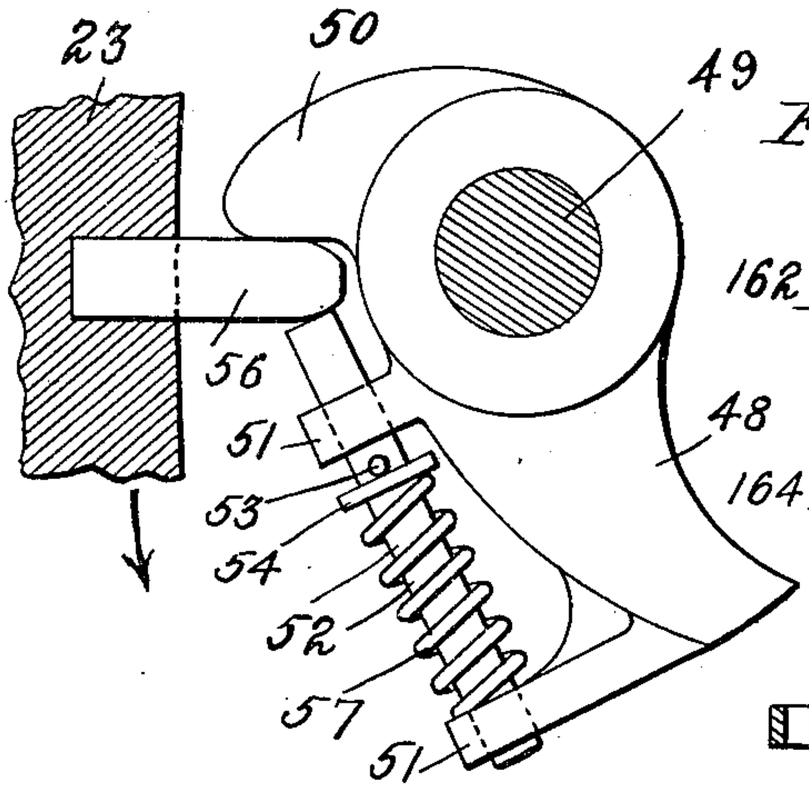


Fig. 9.

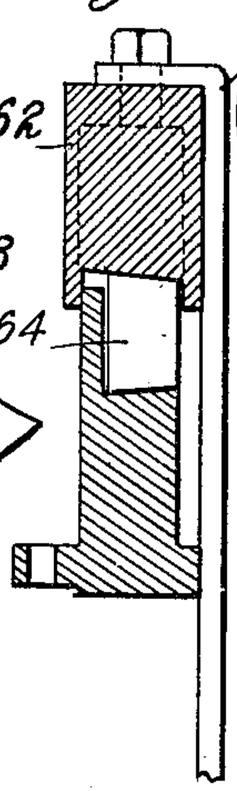
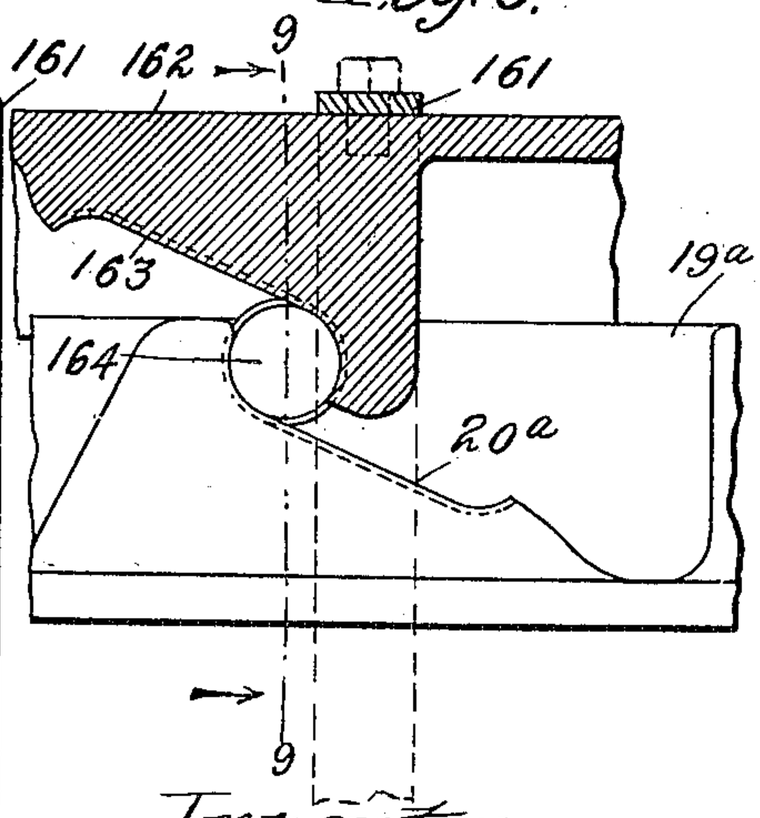


Fig. 8.



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UNITED STATES PATENT OFFICE.

WATSON M. HOLMES, OF HOOSICK FALLS, NEW YORK, ASSIGNOR TO PLANTERS COMPRESS COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

APPARATUS FOR COMPRESSING COTTON.

No. 825,653. Specification of Letters Patent. Patented July 10, 1906.

Application filed July 28, 1902. Serial No. 117,281.

To all whom it may concern:

Be it known that I, WATSON M. HOLMES, of Hoosick Falls, in the county of Rensselaer and State of New York, temporarily residing at Medford, Massachusetts, have invented an Improved Compression Apparatus for Compressing Cotton or other Fibrous Material, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a press for compressing cotton or other fibrous material, showing the application thereto of the improvement embodying one form of my invention. Fig. 2 is a view in transverse section on line 2 2 of Fig. 1. Fig. 3 is a view similar to Fig. 1, but having some of the parts in other positions. Fig. 4 is a detailed view showing one portion of the bale-detaching mechanism hereinafter described. Fig. 5 is a sectional view of the cam-ring of the bale-detaching mechanism. Fig. 6 is a sectional view of the cam-ring support hereinafter described. Fig. 7 is an enlarged detailed view in section taken on line 7 7 of Fig. 1. Fig. 8 is a fragmentary view illustrating an alternative form of yielding mechanism for the bale-detaching mechanism. Fig. 9 is a section on line 9 9 of Fig. 8.

My invention relates in general to presses for compressing cotton or other fibrous material, but particularly to that class or type of press in which a bale trunk or column is continuously formed, and this bale trunk or column as it emerges from the baling-chamber formed into individual bales by detaching suitable lengths from the growing column of compressed material.

More especially it relates to means for permitting such presses to continue in operation while the bales are being severed and removed, thus saving time and wear and loss of power incidental to stopping and starting again. In the patent to George A. Lowry and James T. Cowley, No. 751,824, dated December 16, 1902, such a press is shown and described, and one form of means is shown for accomplishing the above purpose, in which the movement of the severing-knives is controlled by springs.

My present invention is an improvement upon the machine for compressing fibrous materials shown and described in the patent above noted, and the main feature of my invention consists in providing yielding blades which are positively controlled in their yielding action without the use of springs or their equivalents. While springs and the like give a sudden recoil, my improved mechanism gives a uniform resistance without recoil.

Other features of my invention will be hereinafter pointed out.

In the accompanying drawings, which illustrate one form of my invention, 1 represents the base, upon which two front standards 2 2 and a rear standard 3 are mounted. Upon these standards is mounted a bearing-ring 4 and a head-plate ring 5, the head-plate ring 5 and the bearing-ring 4 being firmly secured together and to the standards by bolts 6. To the ring 5 is secured a head-plate made up of separated sections 7, the slots in the head-plate beng formed by spaces between the edges of adjacent sections. Through these slots the cotton or other fibrous material to be compressed passes into the compression-chamber below. Journaled in ring 4 is a sleeve 8, which forms part of the compression-chamber, said sleeve being provided with an annular flange 9, to the under side of which is fastened an annular bearing-plate 10, which rides upon an annular bearing-plate 11, mounted on ring 4. These bearings 10 and 11 take the wear and thrust occasioned by the weight of the parts and the column of compressed fiber forcing its way down through the baling or compression chamber, and in the drawings I have shown a space as formed between the two bearing-plates, into which oil under pressure may be forced in order to more perfectly lubricate the parts and reduce friction to a minimum. Sleeve 8 has formed or secured upon its interior surface a multiplicity of longitudinal slats 12, these slats extending above the upper end of the sleeve to form lugs 13 and having formed upon their lower ends inwardly-projecting shoulders 14. (See Fig. 6.) The spaces between the slats 12 form a multiplicity of grooves 15, in which slides 16 are arranged. The upper ends of these slides 16 carry rolls 17, projecting outwardly, and the lower ends of these slides are fast to the knife-support 18. Mounted upon the sleeve 8 is the cam-ring 19, provided with cam-tracks 20, which

at one end are provided with a stop-lug 21, the back of this stop-lug serving as a stop for the lower end of the adjacent cam-track. (See Fig. 5.) The rolls 17 upon the upper ends of slides 16 project outwardly and when the parts are assembled rest upon the cam-track 20, (see Fig. 4,) the lugs 21 when the press is in operation backing up the rolls 17. The ring 19 carries a flange 22, upon the periphery of which is mounted a gear-ring 23, connected to the flange by bolts 24, working in slots 25, so that the gear-ring may have a slight relative movement with respect to the flange and cam-ring. (See Fig. 2.) The purpose of this relative movement will be hereinafter explained. The gear-ring 23 is driven from the main shaft 55 through beveled gears 26 and 27, shaft 28, journaled in suitable bearings on standards 3, and pinion 29, fast on shaft 28, which pinion meshes with the teeth of gear-ring 23.

When the parts are assembled, as shown in Fig. 4, it will be seen that the slides 16 fill the grooves 15 in the inner surface of the ring 8 and that the lugs 13 project upward somewhat above the upper surface of ring 8 and within the cam-ring 19, so that the rolls which project outwardly from the upper end of the slides 16 are above cams 20. Within the parts thus organized and projecting above ring 19 and close to the under surface of the cap-plate is a sleeve 30, which forms the inner surface of the compression-chamber and which is carried by projecting shoulders 31 upon the outer surface of the sleeve 30, which shoulders rest upon the upper end of lugs 13. (See Figs. 3, 4, and 5.) A supplementary sleeve 32 is arranged at the lower end of the sleeve 8, and is supported by the shoulders 32^a around its upper outer periphery which engages the shoulders 14 at the lower end of the slats 12. (See Figs. 3 and 6.)

Supported at the lower end of the slides 16 is the knife-support ring 18, carrying several blades or fingers 35, mounted in guides 36, each blade 35 being provided with a roll 37, working in a cam-groove 38, provided in a cam-ring 39, mounted above the knife-support ring 18. It will be obvious that so long as cam-ring 39, into which the cam-rolls controlling the movement of the knives mounted in the knife-support ring 34 project, does not move relatively to the knife-supporting ring the blades 35 will not be moved, but that when the cam-ring is stopped while the knife-support continues to revolve, the blades will be thrown in and out, as may be required.

Mounted upon ring 18 and between the blades 35 are a series of sliding plates 40, mounted in ways 41, said plates carrying rollers 42, which are in engagement with a cam-groove 43 in cam-ring 39. These plates 40 are adapted to carry the ordinary bale-stay 44, well known to those familiar with the art.

The operation of the press so far as described is as follows: Assuming that the baling-chamber has been filled with a mass of cotton or the like under compression by hand or otherwise and that a supply of cotton is placed in a suitable receptacle above the head-plate 7, the main shaft is revolved and through the train of gearing above described the ring-gear 23 is rotated, carrying with it the cam-ring 19. (See Figs. 1, 4, and 5.) The movement of cam-ring 19 forces lugs 21 against rolls 17, and these rolls being mounted upon the upper end of slides 16, which slide in grooves 15 in the inner surface of ring 8, ring 8 is thereby revolved, carrying with it the sleeves 30 and 32, which are mounted at the upper and lower ends of ring 8, respectively, and which form the inner surface of the compression or baling chamber. Additional material being drawn through the slot, the column of material grows longitudinally and forces down the jack 45 until a suitable length of compressed material has been forced out of the baling-chamber to form a commercial bale. The rotation of ring 8 also carries with it the knife-supporting ring 18, which is fast to the lower end of the slides 16, and this ring 18 in its travel carries with it cam-ring 39, which is mounted thereon, and as there is no relative movement between the ring 18 and cam-ring 39 no cam action is developed, and the severing-blades and bale-stay slides remain undisturbed. When it is desired to remove a length of the column to form a bale, the upper ends of the bale-stays are hooked into the slides 40, the lower hooked ends of the stays hanging under the column and in the path of the lower end thereof. When the lower end of the column has reached the hooks on the lower ends of the stays, the cam-ring 39 is stopped by the operator, as usual, for a portion of a revolution, while the blade-supporting ring 18 continues to revolve. By this means the blades 35 are forced forward from the position shown in Fig. 1 to the position shown in Fig. 3, and at the same time the bale-stays are forced forward into the column by the plates 40. The cam-plate is then released, as usual, whereupon it resumes its movement with the knife-supporting ring. The result of this operation is that the blades 35 remain embedded in the column of material and that the upper end of the bale-stays are forced forward into the column of material and disengaged from the slides 40, the bale-stays remaining in the column. The jack 45 is now lowered and the bale divides or breaks off at the point where the blades 35 and the upper end of the stays 44 have penetrated, the compression being retained in the portion removed (see Fig. 3) by the bale-stays 44, hooked over both ends of the detached portion of the column, the blades 35 remaining under that portion which remains in the bal-

ing-chamber. During the removal of the detached portion of the column from the press the press continues to operate at full speed, and as the column grows by the increment of material at the upper end beneath the cap-plate the blades 35 are pressed downward with uniform resistance, according to the pitch of the cam-tracks 20. The effect of this forcing down of the blades 35 and the plate or ring 18, by which the blades are carried, is to force forward or slightly increase the speed of the baling-chamber, which is normally revolved by the pressure of the lugs 21 behind the rolls 17. The longitudinal draft upon the slides 16 tends to draw the rolls down the cam-tracks 20 and away from the lug 21, and this operation cannot take place unless the sleeve 8 races forward slightly, since the slides 16 are carried in the grooves 15 in the inner surface of sleeve 8, (see Fig. 3,) and the downward movement of the slides 16 under the pressure of the material on the blades 35 causes the chamber to have a slight increment of movement, its primary movement being due to the movement of cam-ring 19, and a secondary or additional movement being given to it by the action of slides 16 as they move longitudinally in the grooves 15 and laterally, also, as the slides are hung on rolls 17 and the rolls 17 having both a longitudinal and lateral movement as they travel on cams 20. As soon as jack 45 is again returned to position to offer the necessary resistance to retain compression in that portion of the column which has emerged from the baling-chamber the cam-ring is again temporarily stopped or retarded, as usual, until the blades 35 and plates 40 are retracted to their original position. The sleeve 9 thereupon overtakes the cam-ring 19 and raises the knife-carrying ring 18 to its normal position, (shown in Fig. 1,) in which the rolls 17 are backed up by the lugs 21, the cam-surfaces forcing the rolls 17 to the upper end of the cam to effect the raising of the ring 34.

Occasionally it becomes necessary to stop and reverse the machine to a slight extent in order to remove what is known as a "choke" in the slots of the head-plate, a choke being caused sometimes by overcrowding of the material in the slots and sometimes by foreign material becoming accidentally lodged therein. This reversing operation is usually performed by hand, and the ratchet-wheel 46, secured to the main shaft 55, is provided on the main shaft 55, which is revolved by the operator in a direction to reverse the machine. It will be obvious that such reversal tends to carry the cam-surfaces 20 from under the rolls 17, and thus to permit the blade-support 18, carried by the rolls 17 through the slides 16, to yield to the pressure of the compressed material in the baling-chamber, particularly if this reversal is made during the time when a column of material is resting upon the blades 35, and it will also be clear that if at that time such relative movement between the cams and rolls were permitted the compressed mass of material confined in the baling-chamber would be permitted to expand to a certain extent, thereby losing a portion of the compression which had already been given to the mass. In order to prevent this relative movement between the rolls and cams when the machine is reversed, the flange 9 of sleeve 8 of the compression-chamber is provided with several ratchet-teeth 47 on its periphery, and a dog 48 is provided which is mounted upon a stud 49, fast to flange 22, said dog being provided with a tailpiece 50 and lugs 51. In lugs 51 is mounted a sliding bolt 52, which bolt is provided with a pin 53, against which rests a washer 54. A coil-spring 57 is interposed between washer 54 and the outer lug 51. The gear-ring 23 carries a pin 56, whose end is arranged between tail 50 of dog 48 and the inner end of bolt 52. As above explained, the gear-ring 23 is connected with the flange 22 of the cam-ring 19 by means of bolts 24 and slots 25, so that it will now be apparent that when the machine is reversed the direction of rotation of gear-ring 23 is reversed, and the gear upon reversal moves relatively to the flange 22 to the extent of the slots 25, the ends of these slots serving as stops to limit the extent of such relative movement in both directions. This relative movement in reversal causes pin 56, acting through the spring-pressed bolt 52, to move dog 48 into engagement with ratchet-teeth 47, thereby locking flange 22 to flange 9 of the compression-chamber and causing the two to reverse together, while relative movement in the opposite direction between gear 23 and flange 22 causes pin 56 to engage the tail 50 of the dog 48 and move and hold said dog out of engagement with ratchet-teeth 47 while the machine is running.

In Figs. 8 and 9 of the drawings a modified construction is shown. In this construction the slides 161 are at their upper ends fast to a ring 162, which is also provided with a number of spiral cam-shoulders 163, which coöperate with the shoulder 20^a on the cam-ring 19^a, antifriction-rolls 164 being interposed between the two cam-surfaces to reduce friction, if desired. With this construction friction is eliminated. Therefore the pitch of the cams is not required to be so great as in the construction described above, and, moreover, when two cams, such as 163 and 20^a, are employed their length need be only one-half the length of cams 20 for the same amount of movement of the knife-support.

I claim—

1. In a machine for compressing fibrous or other material, the combination with a rotatable compression-chamber; means for feeding the material thereto, and bale-severing mechanism rotatable with the compression-

chamber, of a rotatable driving member and means connecting the driving member with the compression-chamber and severing mechanism for rotating said chamber and for yieldingly supporting the severing mechanism.

2. In a machine for compressing fibrous or other material, the combination with a rotatable compression-chamber; means for feeding material thereto; and bale-severing mechanism rotatable with the compression-chamber, of a power-transmitting device for rotating the compression-chamber and yieldingly holding the severing mechanism in its retracted position.

3. In a machine for compressing fibrous or other material, the combination with a rotatable compression-chamber for holding a column of compressed fiber; a knife-support rotatable with said chamber, and knives on said support arranged adjacent the open end of the chamber to engage the column, of a power-transmitting device for rotating the compression-chamber and yieldingly opposing movement of the knives and their support relatively to the compression-chamber.

4. In an apparatus for compressing fibrous and other material, the combination with compression mechanism, of bale-detaching devices supported in operative position with relation to the compressing mechanism by one or more cams, and said cams.

5. In an apparatus for compressing fibrous and other material, the combination with compressing mechanism, of bale-detaching devices supported in operative position with relation to the compressing mechanism by a multiplicity of cams arranged around the compressing mechanism, and said cams.

6. In an apparatus for compressing fibrous and other material, the combination with compressing mechanism, consisting of a slotted head-plate and means to support the mass of compressed material against the surface of the head-plate, of a multiplicity of severing-blades adapted to be forced into the compressed material; cams supporting said blades so as to yieldingly resist the expansion of the mass, and means to operate the severing-blades.

7. In an apparatus for compressing fibrous and other material, the combination with a slotted head-plate and a compression-chamber, forming a compressing mechanism, of a compression retaining and severing mechanism made up of a multiplictiy of severing-blades mounted below the open end of the compression-chamber upon an annular support; said support; means for actuating said blades to sever the compressed material; a multiplicity of cams sustaining said support, all organized and arranged to cause the blades to penetrate the compressed material and to yieldingly resist the expansion of the mass of material.

8. In an apparatus for compressing fibrous and other material, the combination with a slotted head-plate and a relatively movable compression-chamber, of an actuating-ring for the compression-chamber having a multiplicity of cam-surfaces; a multiplicity of severing-blades, and a support for the severing-blades slidingly connected with the compression-chamber and held retracted by the cam-surfaces with provision for movement relatively to the compression-chamber in opposition to the friction between the mass of material and the head-plate when said support is under pressure from the growing column.

9. In an apparatus for compressing fibrous and other material, the combination with compressing mechanism comprising a compression-chamber and an actuating-ring having a multiplicity of cam-surfaces; of a multiplicity of severing-blades; and a support for the severing-blades held yieldably retracted by the cam-surfaces.

10. In an apparatus for compressing fibrous and other material, the combination with compressing mechanism comprising a compression-chamber and a relatively movable actuating-ring having a number of cam-surfaces, of a blade-support slidably engaging the compression-chamber and yieldingly held retracted by said cam-surfaces; severing-blades on said support, and means to actuate the severing-blades.

11. In an apparatus for compressing fibrous and other material, the combination with compressing mechanism comprising a compression-chamber for holding a compressed mass, and a head-plate against which the mass bears, of severing-blades at the open end of the compression-chamber; means to operate said blades, and means to support the severing-blades and to cause the pressure of the compressed mass upon the severing-blades to accelerate the axial movement of the mass against the frictional resistance between the mass and the head-plate.

12. In an apparatus for compressing fibrous and other material, the combination with compressing mechanism comprising a compression-chamber and an actuating-ring therefor provided with a multiplicity of cam-surfaces, of a multiplicity of severing-blades; a support for the severing-blades held retracted by the cam-surfaces of the ring; means to operate the blades, and means to prevent relative movement between the compression-chamber and said support when the operation of the apparatus is reversed.

13. In a machine for compressing fibrous and other material, in combination, a compression-chamber; a knife-support mounted on the chamber and arranged to rotate therewith and which is provided with a number of cam-surfaces; knives on said support; a driving member provided with a number of cam-

surfaces opposed to the cam-surfaces of the knife-support; and rolls arranged between the two opposed sets of cam-surfaces.

14. In an apparatus for compressing fibrous and other material, a slotted head-plate; means to retain a mass of material under compression beneath the head-plate; an actuating-ring to relatively rotate the mass and head-plate and having a multiplicity of cam-surfaces; a severing-blade support having a multiplicity of cam-surfaces which are opposed to the cam-surfaces of the actuating-ring; severing-blades on said support, and means to actuate the severing-blades.

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