

No. 698,352.

Patented Apr. 22, 1902.

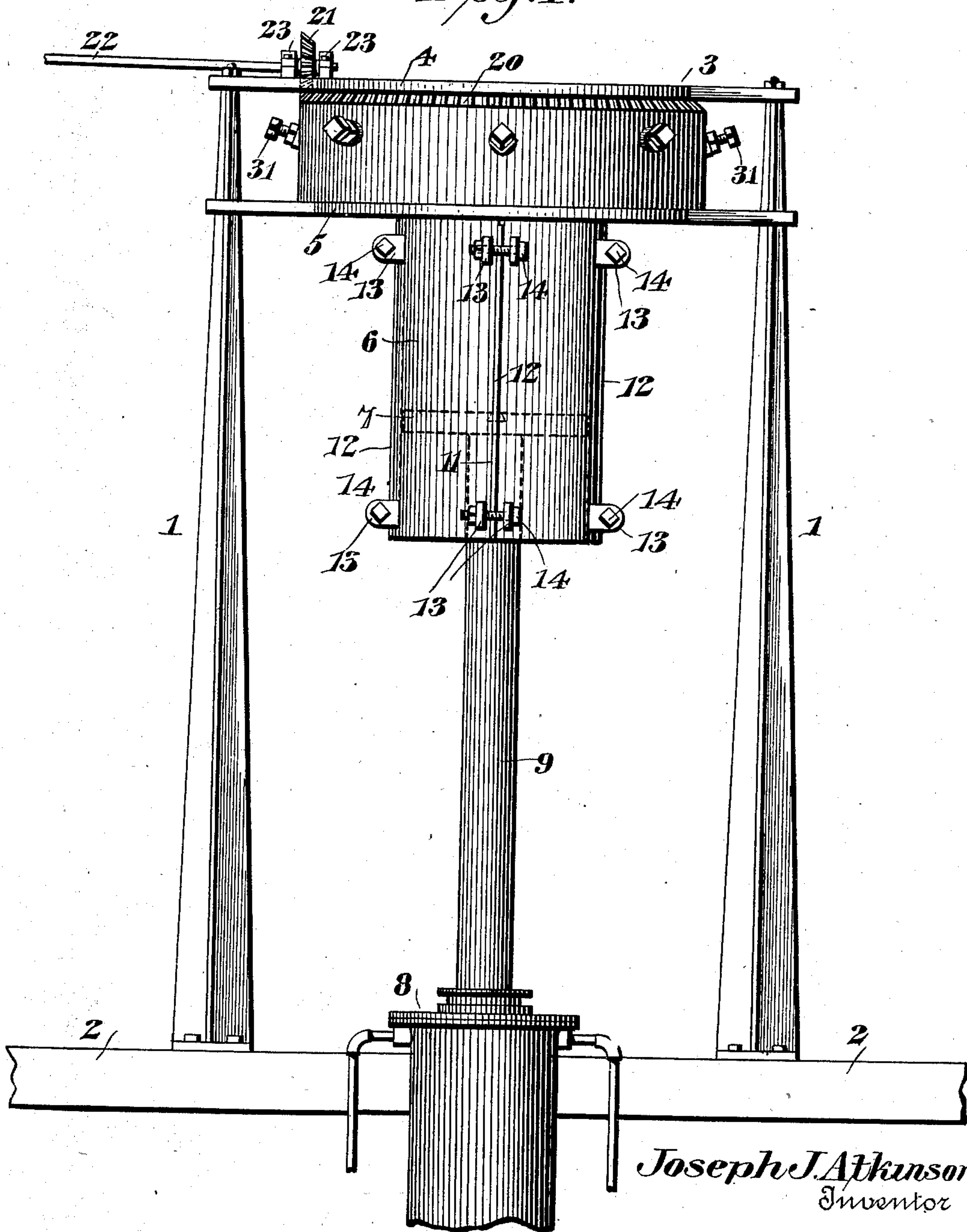
J. J. ATKINSON.
BALING PRESS.

(Application filed Aug. 4, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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2 Sheets—Sheet 2.

Fig. 2.

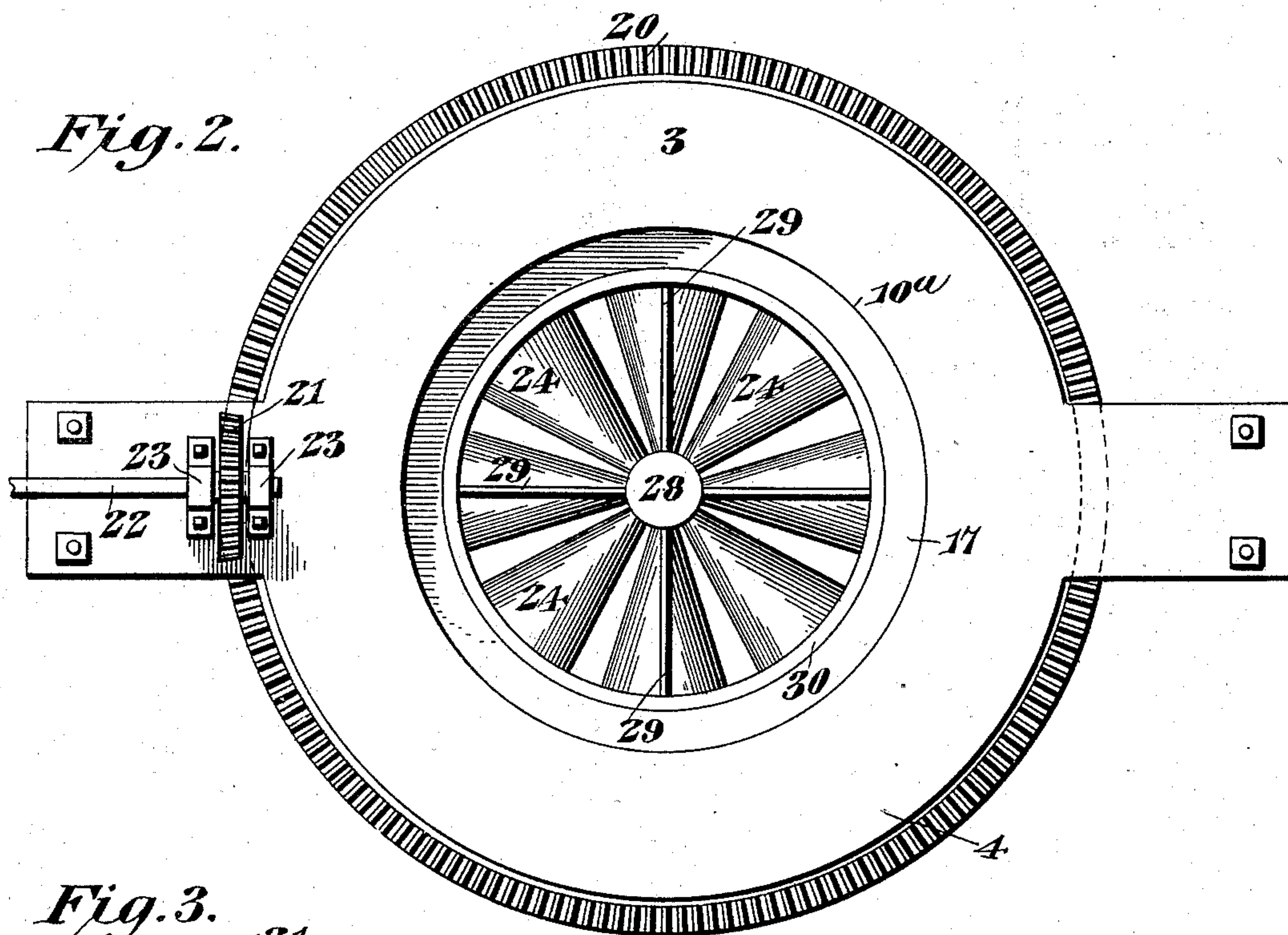
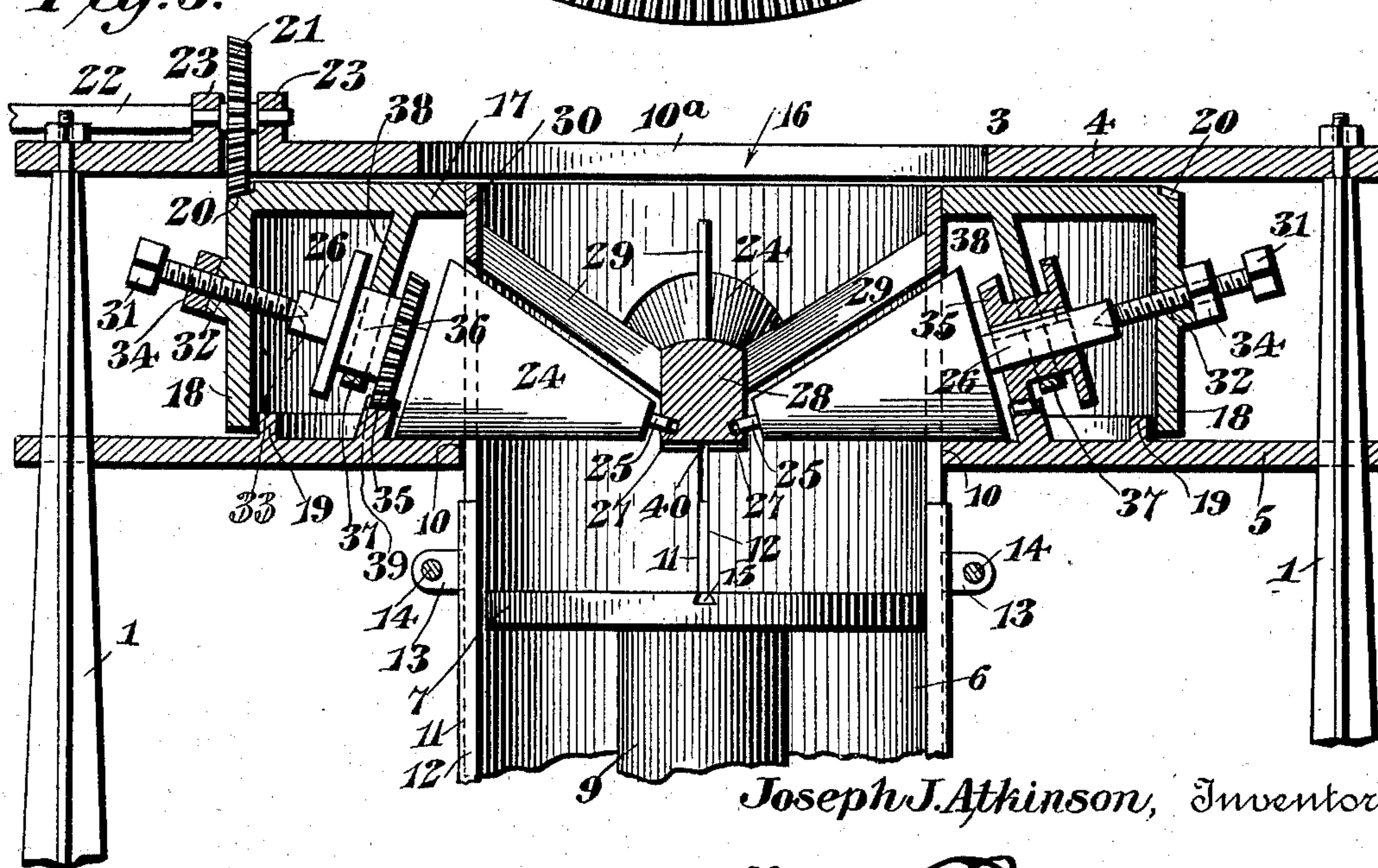


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH J. ATKINSON, OF HOUSTON, TEXAS.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 698,352, dated April 22, 1902.

Application filed August 4, 1900. Serial No. 25,938. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. ATKINSON, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented a new and useful Baling-Press, of which the following is a specification.

This invention relates to baling-presses, and has special reference to those of the roller type designed for making round or cylindrical bales of cotton, hay, and similar fibrous material and comprising means for forming the bale by building up a column of the fiber from highly-compressed layers, which are spirally laid endwise of the column. In this class of presses a compressing device or compressing-head is employed to draw in the cotton or other material from the supply in bulk and to provide for compressing the same into condensed flattened layers, which are laid endwise by the relative rotation of the compressing device and the baling cylinder or chamber. In some forms of the said type of presses the said compressing device essentially comprises a circular series or horizontally-arranged group of conical compressing-rollers; but heretofore these conical rollers have been loosely journaled in the frame or head therefor, so that the same will only be caused to revolve by a frictional contact with the material between the same and the receding follower of the press.

In carrying out the present invention one of the essential objects thereof is to provide means for imparting a positive rotation to the conical rollers of the compressing-head and also to provide means for varying the peripheral speed thereof within the vertical plane of the baling-chamber, according to the degree of density to be obtained.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts, herein-after more fully described, illustrated, and claimed.

The fundamental features of the invention providing for the positive driving of the conical compressing-rollers and the means for varying the peripheral rate of speed thereof are necessarily susceptible to a wide range of modification without departing from the

spirit or scope thereof; but the preferred embodiment of the improvements for illustrative purposes is shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a baling-press embodying the improvements contemplated by the present invention. Fig. 2 is a top plan view of the press. Fig. 3 is an enlarged vertical sectional view of the top portion of the press, exposing the construction of the compressing-head and the parts associated therewith.

Like numerals of reference designate corresponding parts in the several figures of the drawings.

In carrying out the present invention the usual parts of the press may be constructed in any approved manner and mounted in any preferred way to secure the proper operation thereof; but in order to illustrate the improvements contemplated by the present invention as applied to a form of press for making cylindrical or round bales by endwise pressure and spiral wrappings of the fiber bats or layers there is shown in the drawings an upright press-stand 1, surmounting a suitable base or platform 2 and sustaining at the upper end thereof a top supporting-frame 3, which provides a support for the main working parts of the press. As shown in the drawings, the press-stand essentially comprises oppositely-arranged uprights or standards, while the top supporting-frame 3 preferably consists of a pair of upper and lower frame-plates 4 and 5, respectively, from the lower of which frame-plates is suspended the baling cylinder or chamber 6. This baling cylinder or chamber 6 usually conforms in form and dimensions to the completed bale and is designed to accommodate therein the receding follower 7, with which follower is associated any suitable pressure mechanism of the screw or hydraulic type; but for illustrative purposes only there is shown in the drawings a portion of an ordinary hydraulic pressure mechanism 8, whose ram or piston 9 carries the receding follower 7; but it will of course be understood that any approved form of pressure mechanism may be associated with the follower in carrying out the present invention.

The baling chamber or cylinder 6, which is

suspended from the lower frame-plate 5 in the form of the invention shown in the drawings, is rigidly fitted to the said frame-plate in any suitable manner and registers with a central bale-opening 10, formed in said plate, it being noted that the upper frame-plate 4 is also provided with a central opening 10^a to receive the loose cotton or other fiber which is to be pressed into the bale. In connection with the baling cylinder or chamber 6 it may be observed at this point that in the preferable construction of the press the said cylinder or chamber is provided with a plurality of longitudinal tie-receiving slots 11, extending from end to end thereof, and which when the press is in operation are designed to be closed by removable filling-strips 12, held in place within the slots 11 by any suitable securing means. A convenient form of securing means for detachably holding the filling-strips 12 within the slots 11 is shown in the drawings and consists in providing the baling cylinder or chamber with exterior bolt ears or lugs 13, projecting therefrom at opposite sides of the slots therein and arranged in pairs, each pair of said ears or lugs being connected by securing-bolts 14, which when tightened serve to pinch the edges of the slots 11 upon the strips 12, and which when loosened relieve the strips from pressure, so that they may be readily taken out of the slots. The said slots are arranged in the vertical plane of and are designed to cooperate with tie-receiving grooves 15, formed in the upper face of the follower 7, said cooperating tie-receiving slots and grooves providing means whereby the necessary ties may be passed around the completed bale and fastened while the bale is still under pressure, as will be readily understood by those skilled in the art.

The principal part of the present invention resides in the compressing-head 16, which is arranged in the top supporting-frame 3 over the upper end of the baling cylinder or chamber 6, said compressing-head 16 being disposed in a fixed horizontal plane and constituting a rigid abutment to resist the endwise thrust of the compressed column of material within the baling cylinder or chamber, while also providing means for feeding or drawing in the fiber and compressing the same into condensed flattened layers which are laid endwise by the relative rotation of the said compressing-head and the baling cylinder or chamber 6.

In the type of presses to which the present improvements appertain it is well understood that it is necessary to provide a relative rotation between the compressing device, which is sometimes termed a "pressure folding device," and the baling cylinder or chamber, although it is unimportant which of these elements rotates. In some forms of presses the baling cylinder or chamber 6 is rotated and in others vice versa. So it will be understood that the present invention comprehends a relative rotation of the cooperating elements

of the press, although in the preferable construction, as shown in the drawings, the baling cylinder or chamber 6 is fixed and the compressing device is revoluble. Referring particularly to the construction of the said compressing device 16, the same includes a roller-carriage 17, preferably in the form of a hollow circular frame having an outer pendant rim 18, the lower edge of which is arranged to work over the upstanding bearing-flange 19, projecting from the upper side of the lower frame-plate 5 and providing means for properly retaining the roller-carriage in position and maintaining the same for movement in a fixed circular plane. Motion may be imparted to the carriage 17 by any suitable means; but a convenient way of accomplishing this result resides in providing the carriage-frame 17, preferably at the upper corner thereof, with a gear-ring 20, with which meshes a driving-pinion 21, mounted on the inner end of a drive-shaft 22, journaled in suitable bearings 23, projecting from the upper frame-plate 4 and driven from any suitable source of power.

The hollow roller-carriage frame 17 is provided with an open center disposed in the vertical plane of the baling cylinder or chamber and within which is arranged a circular series of conical pressing-rollers 24, having the inner and outer spindle extremities 25 and 26, respectively, which are disposed in the same oblique plane, whereby the lower faces of the entire series of rollers will be arranged in a horizontal plane to constitute a roller-abutment for the upper end of the column of compressed material within the baling cylinder or chamber 6. The said circular series of conical pressing-rollers 24 radiate from the center of the roller-carriage in spaced relation and have their inner spindle extremities loosely journaled in the inner bearings 27, provided in the central bearing-hub 28, held centrally in a fixed position within the open center of the roller-carriage 17 and preferably held in place by a plurality of brace webs or bars 29, radiating from the hub 28 to the inner circular wall 30 of the roller-carriage frame 17 and made rigid therewith. The said brace webs or bars 29 incline upwardly from their connection with the central bearing-hub 28 and are arranged in spaced relation, so as to not interfere with the free drawing in of the material by the rollers 24.

The conical rollers 24 are capable of longitudinal movement or play, and the inner bearings 27 are constructed so as to permit of the necessary play of the spindle extremities 25 therein and to provide for adjusting the rollers 24 in a longitudinal direction to vary the peripheral speed thereof in the manner to be presently explained. The outer spindle extremities 26 of the rollers are associated with adjustable bearings. These adjustable bearings are conveniently in the form of adjustable screws 31, working in threaded openings 32 in the outer rim 18 of

the carriage and having inner pointed ends 33 fitting in correspondingly-shaped sockets in the terminals of the outer spindle extremities 26. The said adjustable bearing-screws 5 31 take the outward thrust of the rollers 24 due to centrifugal force and the pressure of the compressed column of material thereon; but by adjusting the said screws a longitudinal adjustment is necessarily provided for 10 the rollers 24. After having adjusted the screws as may be desired the same are held from turning by suitable jam-nuts 34, working thereon and against the outer side of the pendent rim 18 of the carriage-frame.

15 Another important feature of the present invention resides in the provision of means for imparting a positive rotation to the individual conical rollers 24. This may also be accomplished by divers mechanical expedients, 20 but preferably by associating with each conical roller a driving-gear 35, loosely keyed or splined upon the outer spindle extremity 26 of the roller and provided with an annularly-grooved journal-hub 36, which is loosely 25 journaled in a bearing 37, formed in the pendent bearing-hanger 38, located within the carriage-frame between the inner and outer walls thereof and preferably pendent from the upper side of the said frame. By reason 30 of the loose key or spline connection between the driving-gears 35 and the spindle extremities 26 of the compressing-rollers the said rollers are free to be adjusted longitudinally, while at the same time the rotation of the 35 gears serves to impart a positive rotary movement to the rollers. To provide for the rotation of the gears 35, the lower frame-plate 5 is provided upon its upper side with a circular rack 39, common to all of the gears 35 and 40 in mesh therewith. It will thus be seen that the rotation of the carriage 17 causes the gears 35 to roll upon the rack 39, and thereby be caused to rotate and transmit rotary motion to the rollers 24. In connection with the 45 rollers 24 it is to be also noted that the bases or wide ends thereof project through the inner wall 30 of the carriage, so as to have a projection outside of the vertical plane of the baling cylinder or chamber 6.

50 The central bearing-hub 28 of the revoluble roller-carriage is also provided in the sides thereof with tie-receiving grooves 40, which are arranged in the vertical plane of the slots 11 and the grooves 15 of the follower to facilitate the tying of the completed bale.

While the machine is in operation the resistance of the material being compressed causes the rollers 24 to press against their outer bearings 31. These outer bearings— 60 namely, the screws 31—are so placed as to meet and resist this pressure, and by turning the screws inward the rollers are necessarily moved longitudinally in an inward direction, thus increasing the diameters of the rollers 65 just inside of the plane of the open center of the carriage. By thus increasing the diameter of the rollers within the vertical plane

of the baling cylinder or chamber the peripheral speed is increased. In other words, while the roller-carriage is making a complete 70 revolution the pressing-rollers 24 revolve a fraction more than they would if their revolution were effected solely by frictional contact with a plane surface, the desired speed of the rollers being provided for by establishing a proper ratio between the teeth of the 75 gears and rack. The necessary play of the rollers in a longitudinal direction need be very slight, as by moving the same a quarter of an inch toward the center of the carriage a 80 sufficiently increased peripheral speed can be obtained. It will be readily perceived by those skilled in the art that in the case of conical rollers actuated as described the peripheral speed of the rollers increases in regular 85 gradation from the smaller to the larger end and that by moving the roller longitudinally toward the center of the bale I actually increase the peripheral speed at any given point and at all points within the plane 90 of the baling-chamber, because I introduce from without the plane of the baling-chamber a section of the roller having a greater peripheral speed, and this gain is necessarily 95 communicated all along the line of the roller to the hub. This is precisely what would be accomplished by taking out the roller of normal peripheral speed and substituting therefor a larger one having a greater peripheral 100 speed. In explanation of the utility of varying the peripheral speed of the rollers 24 to secure the desired density it may be stated that in forming a bale beneath the conical pressing-rollers the upper end of the compressed column of material or that portion 105 immediately under the rollers is not flat throughout, but necessarily presents an undulating surface, with the lowest point of depression directly under the rollers and the 110 crests or ridges midway between the rollers. Now if the rollers are not positively driven or if they are merely geared to revolve at the peripheral speed which would be obtained by frictional contact with a plane surface the 115 said rollers will not surmount the crests or ridges in the top layers of the material, but there will be a continual slack or loose bunch of material driven before the rollers, which will bank up between the rollers and accumulate to an extent which will ultimately cause 120 the rollers to cease to perform the drawing-in function or until the same become completely blocked. However, by taking into consideration the excess over a plane surface caused by the swell of the material under 125 pressure and providing for increasing the peripheral speed of the rollers the slack or loose bunches of material above described are overcome and there is no tendency of the material to work out between the rollers. The 130 amount of the required increase in the peripheral speed is slight, but necessarily varies according to the degree of density to be obtained.

Many modifications of the structure herein described may be resorted to without affecting the objects sought to be attained, and I will therefore have it understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

10 The general operation of the press is the same as in similar presses, namely: The material to be pressed is dropped upon the rollers, which serve to draw in the material and compress the same into individual layers or
15 bats, which are wrapped spirally and endwise of the column of material, the necessary pressure being supplied through the pressure mechanism connected with the receding follower 7. This follower is forced downward
20 as the bale is formed, and when a sufficient amount of material has been compressed to form a bale the machine is stopped and the removable filling-strips 12 removed from the slots of the baling cylinder or chamber, where-
25 upon the wire tie can be passed about the bale and the same completely tied before it is dropped from the baling cylinder or chamber.

In conclusion, attention is directed to the fact that in certain of the claims I have referred to the positive rotation of the conical
30 compressing-rollers as being slightly more than normal, and by this expression I desire to be understood as meaning that the speed imparted to the rollers is slightly greater than
35 that which will be obtained by the frictional contact of the rollers with a plain surface. It will be understood that one of the primary objects of the invention is to overcome the bulging or banking up of the cotton in ad-
40 vance of the rollers, which is an objectionable accompaniment of the operation of presses of that type characterized by a number of loosely-mounted rollers which are rotated merely by contact with the surface of the cotton. I
45 therefore regard such rotation by frictional contact as normal, and consequently designate the speed at which my positively-driven rollers rotate as slightly more than normal, and it may be pointed out that by imparting
50 this comparatively high speed to the rollers through the movement of the movable member of the press the excess of speed above the normal is maintained regardless of the speed at which the press is operated, the result being
55 that no matter how fast or slow the movable member of the press is driven the excess of speed of the rollers above the normal will be constantly maintained.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a press of the character described, the combination with the follower and a compressing-head arranged directly over said follower,
65 of a circular series of conical rollers supported by said head, means for causing a relative rotation between said follower and said com-

pressing-head, and means actuated by the rotatable element for imparting an independent positive rotation to the individual conical rollers at slightly more than normal speed, substantially as set forth. 70

2. In a press of the class described, the combination with the follower, of a series of compressing-rollers arranged over said follower, and driving means for imparting an independent positive rotation to said roller at slightly more than normal speed, substantially as set forth. 75

3. In a press of the class described, the combination with the follower, of a series of compressing-rollers coöperating with said follower, and means for imparting a positive rotation to said rollers at slightly more than normal speed, substantially as set forth. 80 85

4. In a press of the class described, the combination with the baling-chamber, of a series of conical compressing-rollers coöperating with said chamber, and means for causing an independent positive rotation of said rollers at slightly more than normal speed. 90

5. In a press of the class described, the combination with the baling-chamber, of a series of compressing-rollers arranged over said chamber, driving means for imparting an independent positive rotation to said rollers, and separate means for varying the peripheral speed of said rollers, substantially as set forth. 95

6. In a press of the class described, the combination with the baling-chamber, of a circular series of conical pressing-rollers coöperating with the chamber, means for imparting a positive rotation to said rollers, and means for causing a variation of the peripheral speed of said rollers within the plane of the baling-chamber, substantially as set forth. 100 105

7. In a press of the class described, the combination with the baling-chamber, of a roller-carriage, a series of conical rollers supported by said carriage, means for maintaining a relative rotation between the chamber and said carriage, means for imparting an independent positive rotation to the individual rollers, and separate means for causing a variation in the peripheral speed of the rollers within the plane of the baling-chamber, substantially as set forth. 110 115

8. In a press of the class described, the combination of the baling-chamber, a series of pressing-rollers, coöperating with said chamber, and means for varying the peripheral speed of said rollers, substantially as set forth. 120

9. In a press of the class described, the combination of the baling-chamber, a series of conical pressing-rollers coöperating with said chamber, and means for causing a variation in the peripheral speed of the conical rollers within the plane of the baling-chamber, substantially as set forth. 125 130

10. In a press of the class described, the combination of the baling-chamber, a horizontal circular series of conical pressing-rollers grouped at the head of the baling-chamber,

and having a projection outside of the plane thereof, and means for varying the extent of the peripheral surface of the rollers within the plane of the baling-chamber to provide for varying the peripheral speed thereof, substantially as set forth.

11. In a press of the class described, a fixed baling-chamber, a revoluble roller-carriage arranged at the head of said chamber, a series of conical pressing-rollers carried by said carriage, means for imparting a rotary movement to the carriage, and means actuated by the movement of the revoluble carriage for imparting an independent positive rotation to the individual rollers at slightly more than normal speed, to cause them to surmount the crests formed in advance of the rollers by the compression of the cotton, substantially as set forth.

12. In a press of the class described, the combination of a baling-chamber, a roller-carriage arranged at the head of the chamber, a series of conical pressing-rollers supported by the carriage and capable of longitudinal movement, adjustable bearing-supports for said rollers to provide for varying the projection thereof within the vertical plane of the baling-chamber, and means for causing a relative rotation between the baling-chamber and the carriage, substantially as set forth.

13. In a press of the class described, a fixed baling-chamber, a revoluble roller-carriage arranged at the head of the chamber, a circular series of conical pressing-rollers grouped within the carriage, adjustable bearing-supports for the rollers to provide for the longitudinal adjustment thereof to vary their projection within the vertical plane of the baling-chamber, means for rotating the carriage, and separate means for independently rotating the rollers, substantially as set forth.

14. In a press of the class described, the combination of a fixed supporting-frame having a stationary circular rack, a baling-chamber pendent from the supporting-frame, a revoluble roller-carriage, and a series of conical rollers supported by the carriage and carrying individual driving-gears meshing with said rack and caused to roll thereon by the movement of the carriage, but at slightly more than normal speed, substantially as set forth.

15. In a press of the class described, the combination of a supporting-frame having a stationary circular rack, a revoluble roller-carriage having an interior pendent bearing-hanger, a series of conical pressing-rollers supported by the carriage and movable therewith, said rollers being provided with inner and outerspindle extremities having bearing-supports, and driving-gears mounted on the outer spindle extremities of the rollers and having hub portions journaled in said pend-

ent bearing-hanger, said driving-gears meshing with the circular rack of the supporting-frame and caused to roll thereon by the movement of the carriage, but at slightly more than normal speed, substantially as set forth.

16. In a press of the class described, the combination of the supporting-frame having a circular rack, a baling-chamber pendent from said frame, a revoluble roller-carriage, mounted within the frame, and provided with a central bearing-hub and an outer pendent rim, a series of conical pressing-rollers grouped within the open center of the carriage and having a projection outside of the plane of the baling-chamber, said rollers having inner and outer spindle extremities, the inner of which have a loose bearing in the central bearing-hub, adjustable bearing-screws mounted in the outer rim of the carriage, and engaging with the outer spindle extremities of the rollers, driving-gears for the individual rollers loosely keyed or splined upon the outerspindle extremities thereof and supported within the carriage, and separate means for rotating the carriage, substantially as set forth.

17. In a press of the class described, the combination with the pressing mechanism and the follower having wire-receiving grooves in the face thereof, of a baling cylinder or chamber provided with a plurality of longitudinally-disposed tie-receiving slots cooperating with the grooves of the follower, removable filling-strips fitting in the slots of the baling cylinder or chamber, and fastening means for said filling-strips, substantially as set forth.

18. In a press of the character described, the combination with the baling-chamber, of a compressing-head arranged over said chamber, a circular series of conical rollers supported by said head, means for causing a relative rotation between the baling-chamber and head, means actuated by the rotatable press member for rotating the rollers at slightly more than normal speed, and means for changing the speed of the rollers.

19. In a press of the character described, the combination with a follower and a compressing-head in opposed relation, of a circular series of conical rollers supported by the head, means for effecting the relative rotation of the follower and compressing-head, and means for rotating the individual rollers at slightly more than the normal speed, whereby the tendency of the fiber to bank up in advance of the rollers is overcome.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOSEPH J. ATKINSON.

Witnesses:

R. C. GRAY,

C. R. HARMON.