No. 650,133. Patented May 22, 1900.

R. R. PACE.

COTTON PRESS.

(Application filed Aug. 11, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

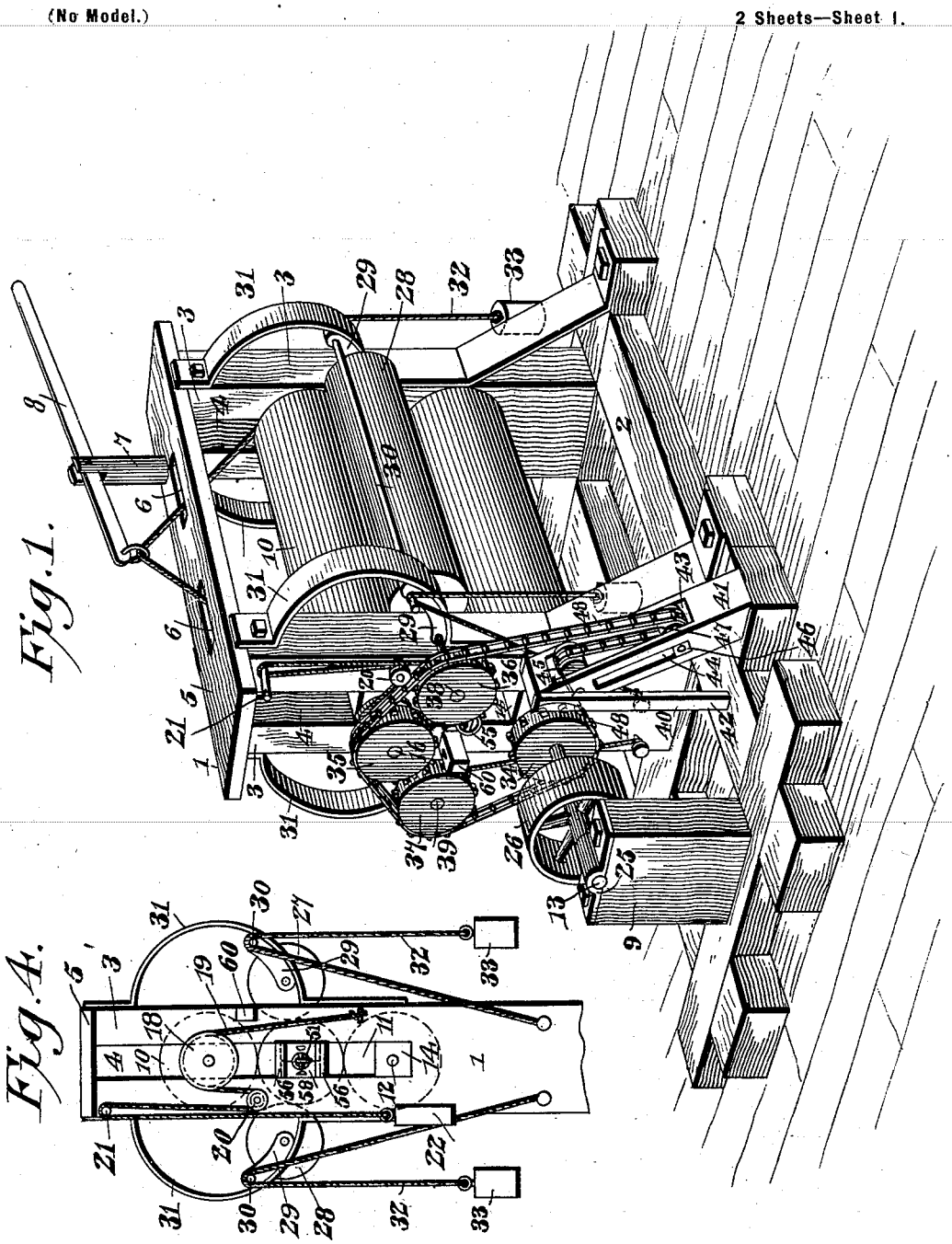


Fig. 4.

Witnesses
Jas. K. McCathran
Chas. S. Hoyer

Richard R. Pace, Inventor
By his Attorneys,
C. A. Snow & Co.

No. 650,133. Patented May 22, 1900.

R. R. PACE.

COTTON PRESS.

(Application filed Aug. 11, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

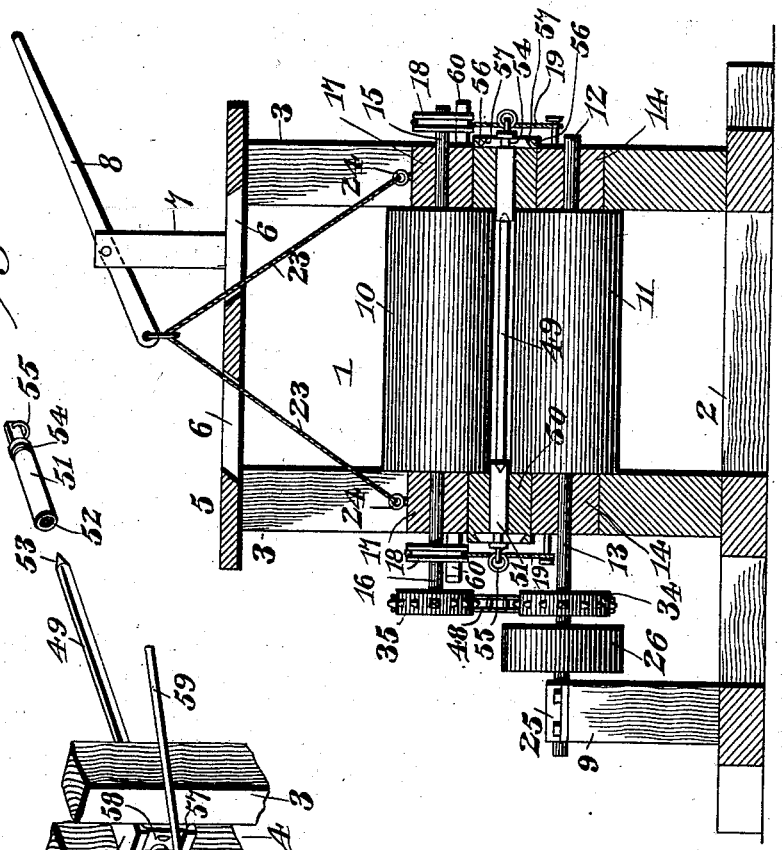


Fig. 5.

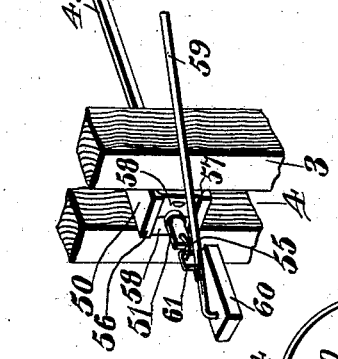
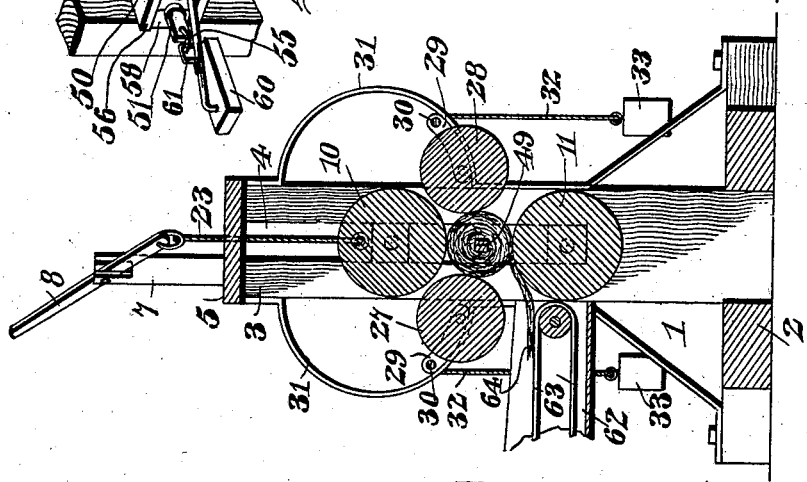


Fig. 2



Witnesses
Jas. K. McCutchan
Chas. S. Hoyer.

Richard R. Pace, Inventor
By his Attorneys,
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

RICHARD R. PACE, OF LISBON, LOUISIANA.

COTTON-PRESS.

SPECIFICATION forming part of Letters Patent No. 650,133, dated May 22, 1900.

Application filed August 11, 1899. Serial No. 726,894. (No model.)

To all whom it may concern:

Be it known that I, RICHARD R. PACE, a citizen of the United States, residing at Lisbon, in the parish of Claiborne and State of Louisiana, have invented a new and useful Cotton-Compress, of which the following is a specification.

This invention relates to compresses for making cylindrical or round bales of cotton; and it has for its object to provide a new and useful and efficient machine of this character having simple and positively-operating means for forming a uniform cylindrical bale of any required density.

In carrying out the present invention a core-rod is employed, which is primarily located intermediately of a series of compression-rolls and having automatically-operating devices of a special character in connection therewith for maintaining a regularity in their pressure and also for similarly adjusting a part of the driving devices proportionately to the expansive movement of the several rolls, and thereby always hold the said rolls at an equal distance from each other and from the center of the bale, as well as continually rotate the said rolls at a regular speed and provide for evenly distributing pressure to the bale at surrounding points to produce a bale of the proper degree of density with a minimum amount of pressure.

Other objects and advantages will be disclosed in the subjoined description; and the invention consists in the novel construction, combination, and arrangement of parts hereinafter more fully described and claimed.

The fundamental features of the invention are susceptible to a wide range of modifications; but the preferred embodiment of the improvements is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a cotton-compress embodying the invention. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a transverse vertical section. Fig. 4 is an end elevation of part of the improved machine and looking toward the end opposite that shown by Fig. 1. Fig. 5 is a detail perspective view of the core-rod and attachments therefor.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates an upright press-frame having a suitable base 2 and essentially comprising a pair of oppositely-arranged parallel standards 3, which are spaced apart or have slots 4 through a portion of their length. The standards 3 are connected by a horizontally-disposed cap 5, having slots 6 therein and a post 7 rising therefrom, in which a lever 8 is fulcrumed. The frame is further provided at one side with a pillow-standard 9, which rises from the base 2, which will be more fully hereinafter referred to in connection with the parts associated therewith.

Between the standards 3 a pair of horizontal vertically-alined superposed compression-rolls 10 and 11 are disposed, the roll 10 being movable toward and away from the roll 11 to provide for the formation between the same of a cylindrical bale of cotton which increases or grows in size as the baling operation continues. In the present instance the lower compression-roll 11 is supported to rotate in a fixed plane, and the opposite spindle or shaft extremities 12 and 13 of this roll are journaled in stationary boxes 14, fitted in the slots 4 and resting against the lower terminal walls of the latter. The spindle or shaft extremities 15 and 16 of the roll 10 are journaled in slidable bearing-boxes 17, also fitted in the slots 4, and whereby the said upper compression-roll 10 while being permitted to have a free rotation can also be easily moved in a direction toward or away from the lower compression-roll 11. It is also necessary that the upward movement of the movable compression-roll 10 in a direction away from the fixed rotating roll 11 be resisted under pressure to provide for giving a proper density to the bale being formed, and while several expedients may be utilized to accomplish this result the said movable roll 10 is preferably weighted. To provide for properly weighting the said upper compression-roll, the shaft extremities 15 and 16 have thereon grooved wheels or analogous devices 18, over each of which is applied a weight rope or cable 19, as clearly shown by Fig. 4, which is made fast to one of the standards 3 at a point below the plane of lowest depression of the said movable

compress-roll and also under a direction sheave or pulley 20, also attached on the opposite adjacent standard 3 at a higher elevation, and then over an upper pin 21, from which it depends to a suitable degree and has on the free end a weight 22, which will be proportionate to the pressure required. At intervals it will also be necessary to elevate the compression-roll 10 a greater distance than the rise thereof caused by the increase in size or growth of the bale in order to liberate the latter when completed and provide for removal from the press. To accomplish this operation, the terminals of a lifting rope or cable 23 are each attached to an eye 24, secured in the journal-box 17, the said rope or cable being movable through the slots 6 in the horizontal cap 5 and loosely attached to the inner end of the lever 8. By exerting a downward pressure on the outer end of said lever the compression-roll 10 can be elevated to any height required and will sufficiently clear the completed bale for convenience in removal of the latter.

The shaft or spindle extremity 13 of the compression-roll 11 is longer than the shaft or spindle extremity 12 of said roll and has bearing in a cap-journal 25, fixed on the pillow-standard 9. On this extended extremity 13 a driving-pulley or band-wheel 26 is also made fast and adapted to receive a belt from a suitable power-generating medium. By this means driving power is applied to the entire press or the coacting bale-forming devices thereof through the medium of transmitting mechanism, which will be hereinafter more particularly referred to. Coöperating with the upper and lower compression-rolls 10 and 11 is a pair of oppositely-located side-pressure rolls 27 and 28, disposed on reverse sides of the press-frame and at one side of the vertical plane of the said rolls 10 and 11. Each of the side-pressure rolls is rotatably connected at opposite ends to the inner extremities of segmental bearing-shoes 29, which have their outer extremities united by a tie-rod 30, with the ends projecting beyond the outer edges of the said shoes, the latter having free movement in and held in operative relation by outstanding semicircular guide-yokes 31, which are secured to the opposite standards 3 at the front and rear of the frame. The shoes 29 are not connected in any way to the said yokes, and the latter prevent the side-pressure rolls 27 and 28 from having endwise movement, though the latter are free to swing outwardly from and inwardly toward the rolls 10 and 11. The shoes 29 and yokes 31 have considerable breadth to provide a firm bearing for the loose rolls 27 and 28. It is also required that the side-pressure rolls 27 and 28 move against a resistance in order to preserve the regularity and density of the bale, and over the extended ends of the tie-rods 30 weight ropes or cables 32 are placed and are connected at one end in each instance to the lower portion of the adjacent standard, while the free end has a weight 33 secured thereto. The rolls 27 and 28 are smaller than the rolls 10 and 11, and to equalize the pressure at all points on the bale being formed between the said rolls two weights are applied to and exert their influence on each of the rolls 27 and 30, which are proportioned to compensate for the difference in the dimension of the rolls and without impairing the necessary sensitive action of the said side-pressure rolls, which must be had to form a truly-cylindrical bale of a compact equally-dense character.

The use of the semicircular guide-yokes with the segmental shoes 29 bearing thereon permits each of the side-pressure rolls to move outwardly in a regular curved line relatively to the center of the bale being formed in a horizontal direction and proportionately to the increase in size of the bale, and thereby always maintain a similar position relatively to the bale being formed and the movable compression-roll 10. By this means the pressure of the side rolls is applied to diametrically-opposite points of the bale, being formed at substantially-invariable locations, and thereby assist in producing a regularly-formed cylindrical bale.

The shoes 29 by providing a bearing for the journal devices of the side-pressure rolls 27 and 28 cause the said rolls to have a more gradual movement in conforming to the enlargement of the bale, and which could not be acquired if the journals of the said rolls had loose bearing on the said yokes. The tie-rods 30 also materially assist in causing a regular outward movement of the rolls 27 and 28 by causing the shoes to act in unison, and the action of the said rolls in their outward movement would be clearly more sensitive or quickly responsive to the gradual enlargement of the bale by reason of the shoes moving loosely over the yokes, and by applying the ropes or cables 32, having the weights 33, to the shoes and removing direct application from the journals of the rolls 27 and 28 a direct drag on the rolls is prevented and the weight influence desired acting on the rolls, as stated, is of considerably more benefit.

It is necessary that the rolls 10, 27, and 28 have a plane of rotation inwardly toward the bale and that the roll 11 also have a similar movement for a like purpose and to attain a proper feed of the cotton between the rolls. To accomplish this, a particular arrangement of operating devices is necessary, and in the present instance a sprocket-wheel 34 is fast on the shaft or spindle extremity 13 of the roll 11, and on the shaft extremities of the rolls 10, 27, and 28 other similar sprocket-wheels 35, 36, and 37 are respectively secured. The said sprocket-wheels are normally spaced apart a distance equal to the intervals between the shaft extremities of the said rolls 10, 27, and 28 relatively considered to the fixed shaft extremity 13, and when the said rolls are inward toward each other and the roll 11 their full limit, to thereby

properly rotate the rolls in the direction stated and also leave a clear or open space at the end of the frame adjacent said sprocket-wheels for the manipulation of other mechanism. The sprocket-wheels 36 and 37 are fast on the shaft or spindle extremities 38 and 39 of the compression-rolls 27 and 28, which are projected, at one end of each of the latter, through the shoes 29 a sufficient distance to arrange said sprockets 36 and 37 in the same plane as the sprocket-wheels 34 and 35. On the base 2, adjacent the location of the sprocket-wheels 34, 35, 36, and 37, a supplemental frame 40 is located, and comprises a guide 41, disposed at an angle of inclination toward the shaft extremity 13, and so held by legs 42. This guide has a slot 43 extending entirely therethrough from front to rear, and with which opposite guide-slots 44 communicate and are located in the edge portions of the said guide. Within the slot 43, at a point above the upper limit of the slots 44, a guide-roller 45 is journaled to rotate in a fixed position, and slidingly mounted in the guide-slots 44 are boxes 46, in which is journaled an idler 47. A chain belt 48 surrounds the lower portion of the sprocket 34 on the shaft extremity 13 and then passes over a portion of each of the sprocket-wheels 37, 25, and 36 and down over and under the idler 47 and up over the roller 45. By this means the encircling dimension of the chain belt is automatically adjustable without causing a material slack or a detraction from a positive operation of the rolls, and consequently the movable rolls are permitted to work outwardly and upwardly and still have their desired speed of rotation preserved. As the movable rolls work farther apart during the growth of the bale the distance between the several sprocket-wheels necessarily increases and a tension is exerted on the belt 48 which is sufficient to automatically move the boxes 46 upwardly in the slots 44, and thereby draw the idler 47 closer to the roll 45 and gradually pay out an amount of the belt 48 proportionate to the separation of the movable rolls and the sprocket-wheels connected thereto. After the removal of a completed bale the parts are caused to assume the normal condition shown by Fig. 1 and ready for a subsequent similar operation. This arrangement of the belt 48 also maintains a regularity in the pressure of the rolls 10, 27, and 28, and if a faster or slower speed is desired the several sprocket-wheels may be increased or diminished in dimension, which is an obvious change and well understood by those skilled in the art.

A core-rod 49, which is angular in cross-section, is employed in the present machine to receive the bale. This core-rod is intended to remain in the bale when the latter is completed and must therefore be removable at the time the completed bale is withdrawn from the machine, and during the operation of baling said rod must also rotate and automatically adjust itself relatively to the growth of the bale. To accommodate these various requirements in connection with the core-rod, boxes 50 are movably mounted between the journal bearings or boxes 14 and 17, respectively, of the rolls 11 and 10, and, like the said journal bearings or boxes 17, the boxes 50 freely move in the slots 4 between the opposite pairs of standards 3. Removably mounted in the boxes 50 are core-rod stems 51, having their inner ends extended inwardly a short distance between the rolls 10 and 11 and formed with sockets 52 to detachably and rotatably receive the opposite reduced ends 53 of the said core-rod. The said stems 51 act in the capacity of centers and firmly hold the core-rod 49 in proper position between the rolls 10 and 11 and also between the side-pressure rolls 27 and 28. The outer extremities of the stems 51 have circumferential locking-grooves 54 formed therein, and a ring or other analogous device 55 is movably attached to the outer terminal of each of said stems exterior of the groove 54 therein. The outer ends of the boxes 50 have dovetailed seat grooves or slots 56 extending therethrough and formed by upper and lower guides 57. The inner reversely-beveled edges of the said guides are adapted to slidingly receive locking-plates 58, which have their upper edges correspondingly beveled and are freely movable into and withdrawable from the guides at the front and rear, the grooves or slots fully opening out through the boxes 50 at the front and rear sides to permit this operation of the locking-plates. The plates 58 are of such dimension as to each occupy about one-half of the grooves or slots 56, and their inner edges at the center are slightly recessed and fit into the circumferential grooves 54 of the stems 51 and prevent the latter from being pushed outwardly. The plates 58 may be applied and removed by any suitable means, and after they have been drawn away from the grooves 54 of the stems 51 the latter are in condition for removal or application, as the case may be and the requirements demand. For removing the stems 51 a lever 59 is used and located adjacent each end of the machine or applied when such operation of removal is necessary. Each of the levers 59 is fulcrumed on a projection 60, fixed to one of the standards 3, and on the lever is a movable hook or analogous device 61, which is inserted in the ring 55, and by exerting a pull on the lever the stem 51 can be easily drawn through its box 50, and the completed bale after both stems have thus been withdrawn can be easily removed from the machine with the core-rod therein.

After the core-rod 49 has been positioned between the rolls, as shown by Fig. 3, and the parts otherwise arranged, as shown by Fig. 1, the machine is ready to have the cotton fed thereto and form the bale. It is intended that this machine operate with any

improved or suitable feeder 62, as shown by Fig. 2 in part, and be a portion of a condenser for forming and feeding the cotton by a belt or apron 63 in bat form, as at 64. The bat is started over the core-rod 49 and is gradually wound thereon through the medium of the operation of the roll 11, with the assistance of the rolls 10, 27, and 28. As the bale increases or grows, as shown by Fig. 2, the roll 10 is gradually elevated and the rolls 27 and 28 move outward in a lateral direction, owing to the interposed bulk. The weight of the rolls 10, 27, and 28 themselves, in addition to the weight attachments, as heretofore described, acting against the fixed rotating roll 11, provides for the formation of a cylindrical bale with a regular density from the interior outwardly. After the bale has reached a predetermined size in accordance with the adjustment or capacity of the compress the feed of the bat is temporarily stopped, the terminating end being subsequently worked into the exterior surface of the bale as close as possible. Binding devices of any preferred or selected nature are subsequently applied to the completed bale, the removal of the bale being carried on in the manner and through the use of mechanism heretofore set forth. When the bale is removed from the machine, the roll 10 is forcibly lifted through the lever 8 and rope or cable 23 and the space above the roll 11 otherwise increased in dimension to the required extent by shifting the rolls 27 and 28, if found necessary. After the stems 51 are disconnected from the opposite ends of the core-rod 49 the opposite end portions of the laminals of the bale fall in and cover the ends of the said core-rod, the bale being longer than the core-rod a distance approximately equal to the interval between the inner opposing edges of the pairs of standards 3 and which is in excess of the length of the said rod. In tagging or otherwise indicating the weight of the bale as formed an allowance will be made for the weight of the inclosed core-rod, and by this means the form of the bale can be preserved with uniformity, and in some uses of the baled cotton it might be desirable to employ the inclosed core-rod as a spindle for unwinding purposes.

Under ordinary circumstances the inner opposing edges or faces of the standards 3 will afford sufficient bearing for properly building up the ends of the bale and prevent the cotton from working into the bearings; but at times it may be required to use interposed devices which are commonly known in the art, and those best adapted for the purpose will be selected.

One of the advantages for the herein-described machine is that the same provides simple and efficient means for forming a uniform cylindrical or round bale of cotton at a minimum expenditure of power, and thereby obviates the objections to the ordinary methods of baling cotton. Furthermore, the bale as formed by the present machine is regularly and equally packed and compressed, and the automatic adjustment of the driving mechanism without varying the speed of the rolls materially assists in producing a bale of equal density throughout.

The boxes 46 have sufficient frictional bearing within the slots 44 to prevent too-loose play or movement and quickly respond to the pull exerted thereon by the roller 45 and due to the chain belt 46 gradually conforming to the increase in distance between the gears 35, 36, and 37 relatively to themselves and the lower gear 34, and it will be observed that the said chain belt does not exert a pull on the roller 43 directly in line with the axis of the latter, but at an angle thereto and to the inclined face of the guide 41. By "gears" it will be understood that the sprocket-wheels are meant, and it will be seen that the sprocket-wheels 35, 36, and 37 will have a very slow and gradual feed in view of the fact that the upward and outward movement of the rolls to which said sprocket-wheels are connected are weighty and must necessarily overcome the resistance offered by specific gravity. Furthermore, the side rolls are weighted in addition, as explained, and the automatic movement of all of the upper rolls is approximately equal in proportion to the size of the bale formed in the pocket between the same and the lower roll having a fixed rotation. Therefore the resisting tension of the chain belt 48 will be added to the weight-pressure of the rolls 10, 28, and 29, and the said chain belt will be held firmly in engagement with the said sprocket-wheels 35, 36, and 37. This construction and arrangement is materially advantageous in view of compresses having the movable compressing-rolls below the fixed rotatable roll and held in radial relation to the latter by a weight-controlled belt, for the reason that the weight controlling the belt not only has to overcome the downward tendency of the said movable rolls below the roll having a fixed plane of rotation and owing to gravity, but also must overcome the tendency of the easy movement of the said lower rolls when the said bale is being formed, and the pressure will not be as effective in producing a bale of equal density throughout. Hence any compress which employs a self-adjustable driving-belt in connection with movable rolls below the plane of a fixed roll has an uncertain and variable operation, and cumbersome and heavy mechanism must be employed to make them practicable.

Changes in the form, proportions, size, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the invention, what is claimed as new is—

1. In a roller-compress, the combination of a pair of vertically-alined coacting compression-rolls, one of which has fixed bearings and the other limited to vertical movement above the fixed roll, side-pressure rolls guided to

move in arc-shaped paths relative to the compression-rolls, independent pressure devices associated individually with the movable rolls, a driving element on the fixed compression-roll, other gear elements on the movable rolls, an inclined guide, an idler mounted frictionally in the said guide, a roller in the upper part of the guide, and a compensating endless gear connection fitted to the driving element, the gear elements, the idler and roller in the upper part of the guide to exert a pressure in a downward direction on all of the automatically-movable rolls, the said guide being inclined relatively to the compensating endless gear connection.

2. In a cotton-compress, the combination of two vertically-disposed rolls, the lower one of which has a fixed rotation and the upper one automatically movable in a straight line, side-pressure rolls automatically movable in arcs of circles outward from and inward toward a central bale-forming pocket between all of the rolls, shoes in which the shafts of the side-pressure rolls are rotatably mounted, guide-yokes against which the said shoes loosely bear, weights connected to a portion of the shoes, and driving mechanism for the rolls.

3. In a cotton-compress, the combination of a series of rolls assembled around a central bale-forming pocket and all rotatable, the upper rolls being automatically movable relatively to the lower roll which has a fixed rotation, boxes between a portion of the bearings of the rolls and also automatically movable in vertical planes, individually movable and revoluble stems slidably and removably mounted in the said boxes and projected inwardly into the said pocket beyond the outer terminals of the rolls, and a core-rod of less length than the bale-forming rolls and having detachable interlocking engagement with the inner opposing ends of the said stems, the opposite terminals of the said core-rod adapted to be covered by the end portion of the completed bale.

4. In a cotton-compress, the combination of a series of rolls, all of which are rotatable and a part automatically movable in a vertical plane, boxes adjustably located between the bearings of a part of said rolls and also vertically movable, the outer ends of said boxes having dovetailed grooves or slots extending therethrough in longitudinal direction, disconnected independent stems removably mounted in the said boxes, in alined relation one to the other, a pair of locking-plates for each of the boxes adapted to have their inner opposing edges brought to bear against and hold the stems from outward movement, and a core-rod detachably held by and between the inner terminals of the stems.

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

RICHARD R. PACE.

Witnesses:
M. NALLE,
C. G. YOUNG.