No. 846,735. PATENTED MAR. 12, 1907.

H. L. DUNCAN.

BALING PRESS.

APPLICATION FILED AUG. 13, 1901.

3 SHEETS—SHEET 1.

Fig. 1.

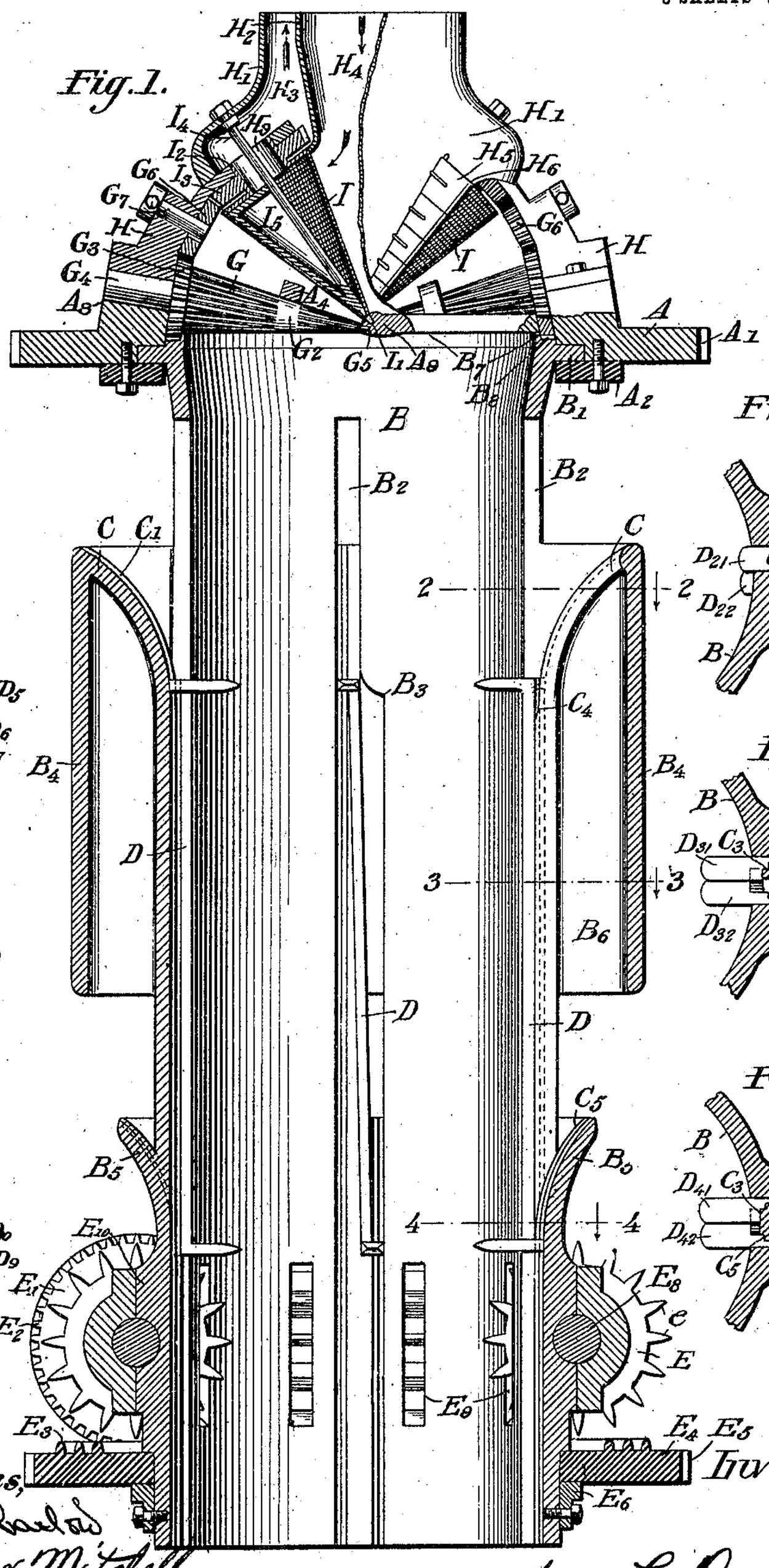


Fig. 2.

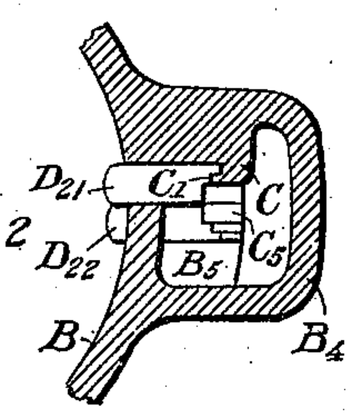


Fig. 3.

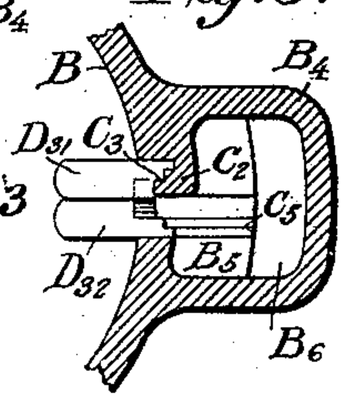
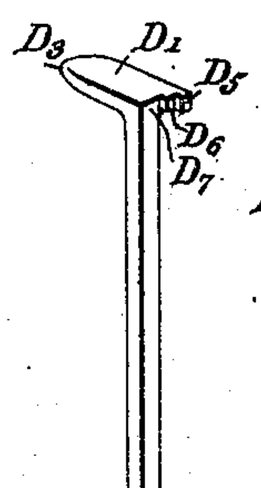


Fig. 4.

Fig. 5.



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No. 846,735. PATENTED MAR. 12, 1907.

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3 SHEETS—SHEET 2.

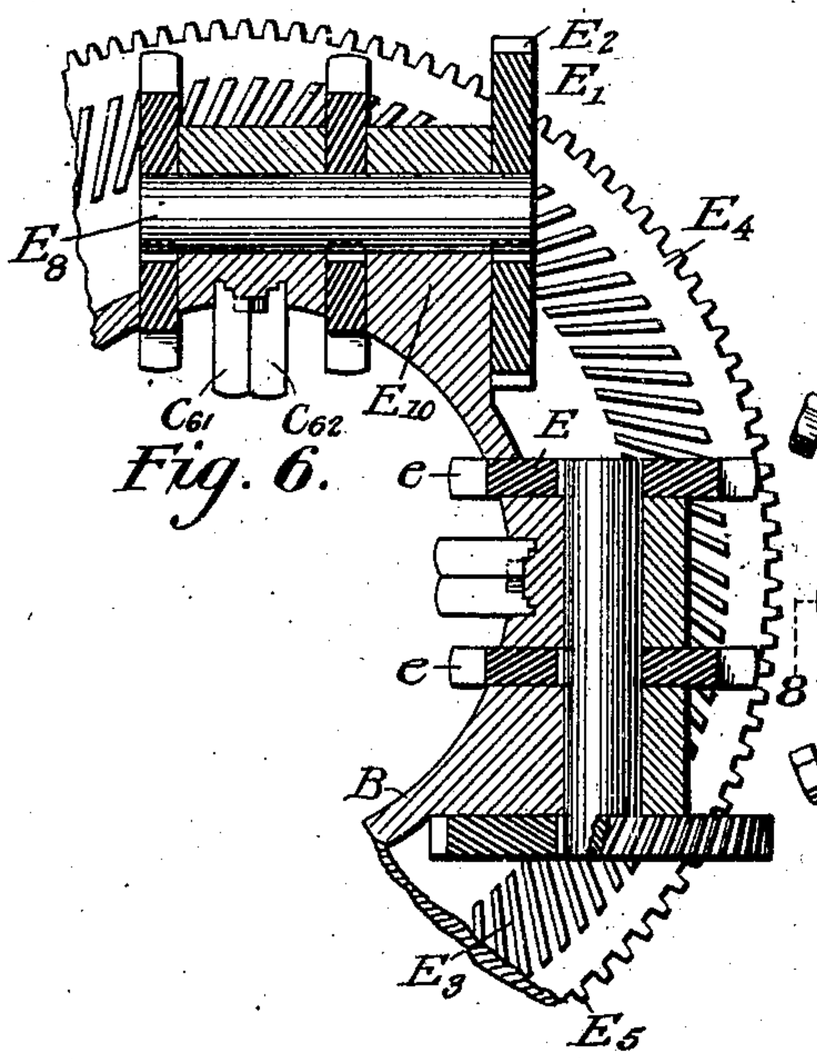
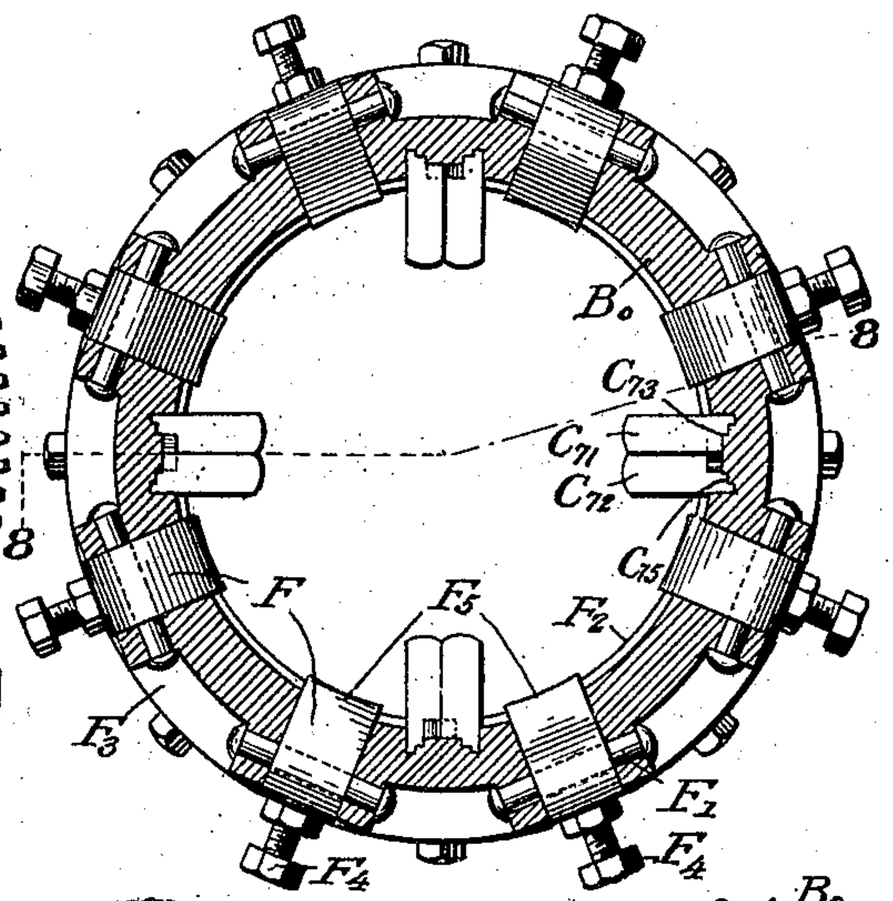


Fig. 6.

Fig. 7.



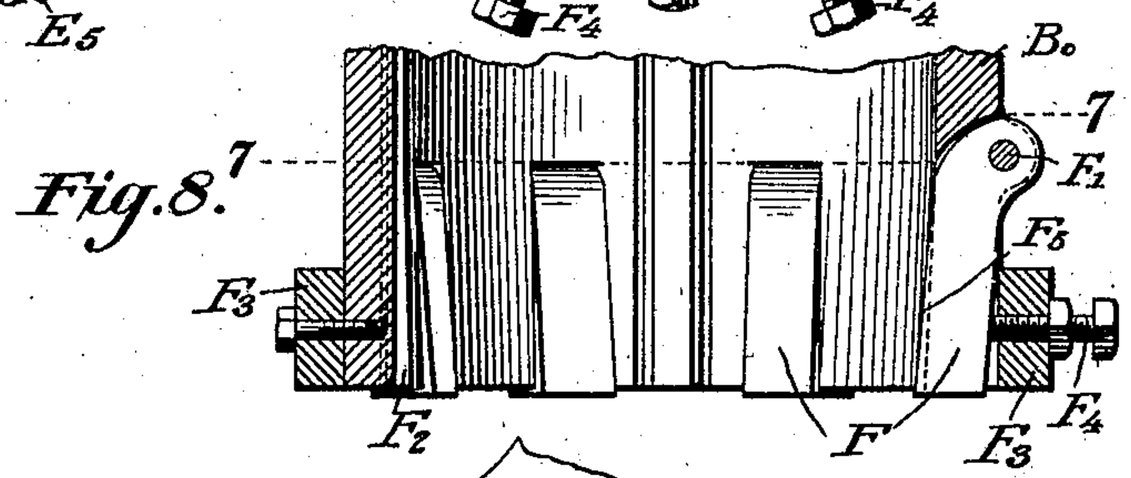


Fig. 8.

Fig. 9.

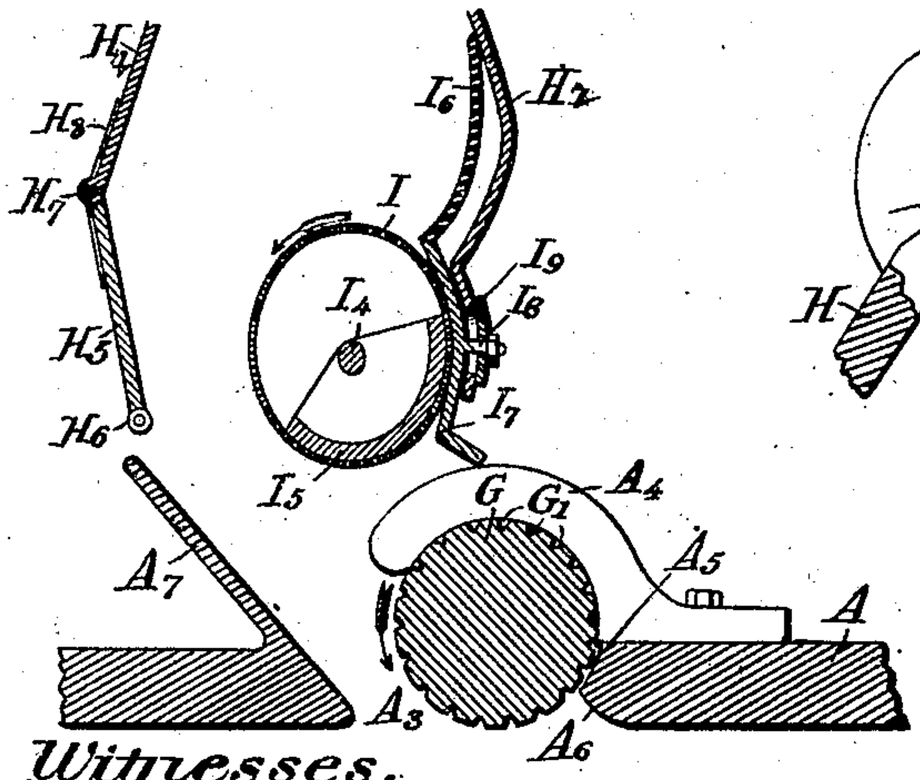
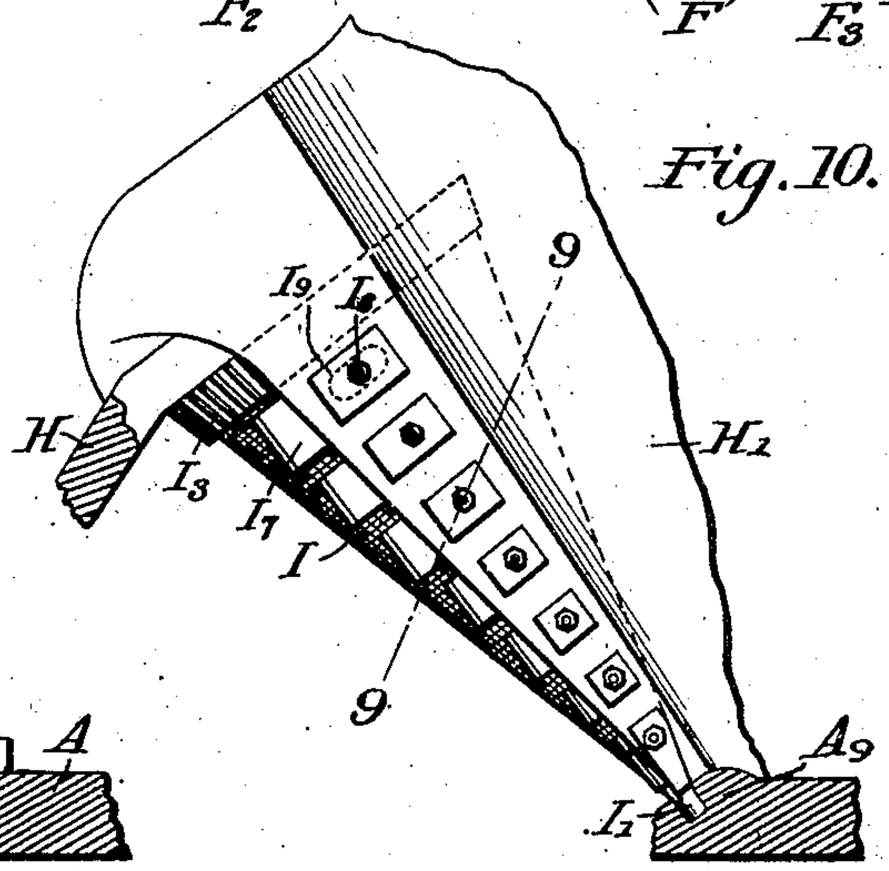


Fig. 10.



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No. 846,735. PATENTED MAR. 12, 1907.

H. L. DUNCAN.

BALING PRESS.

APPLICATION FILED AUG. 13, 1901.

3 SHEETS—SHEET 3.

Fig. 11

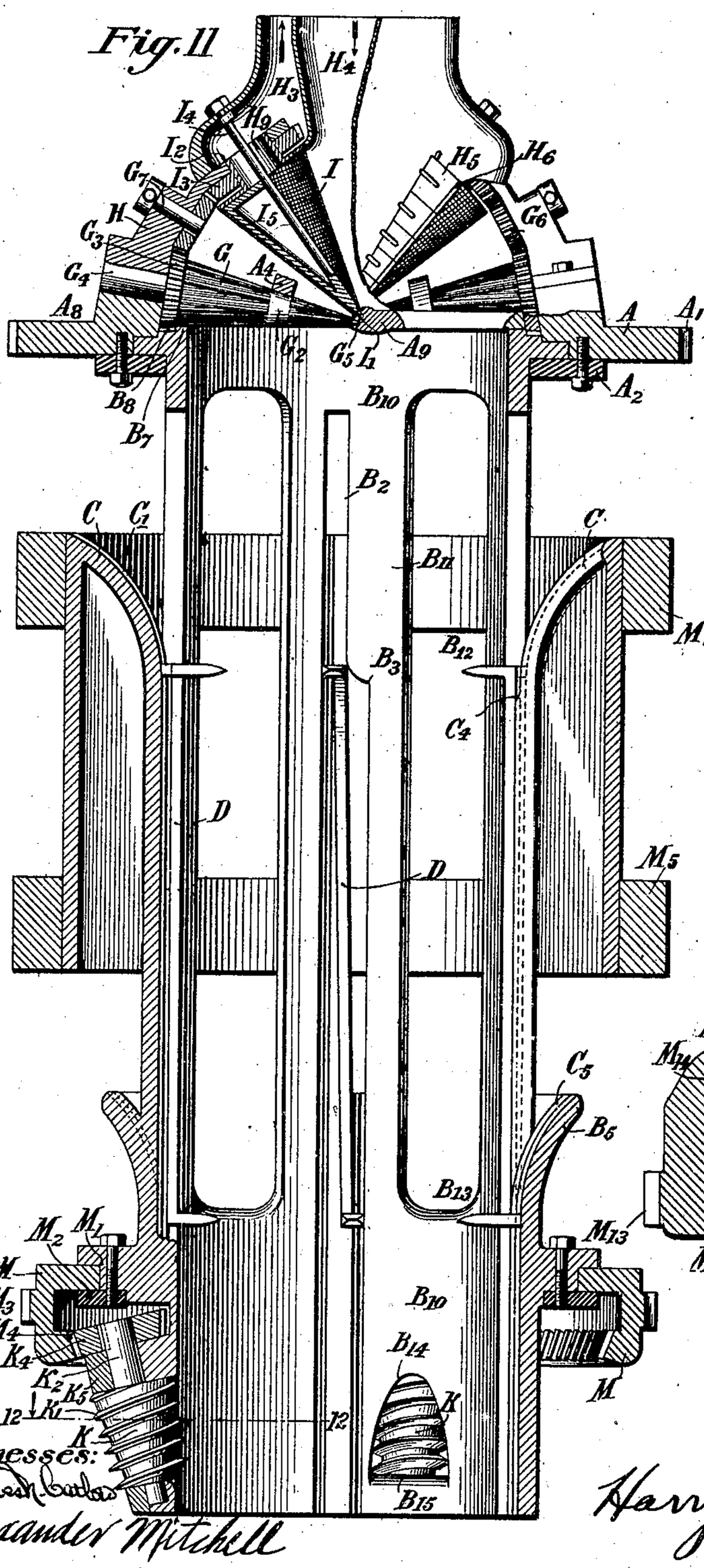


Fig. 12

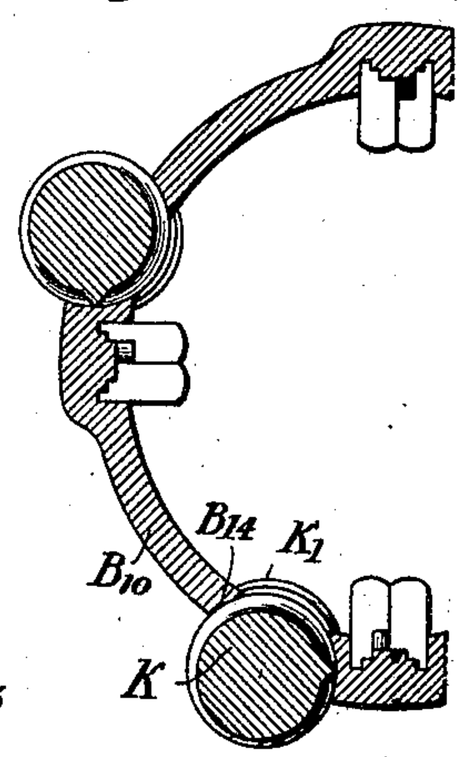
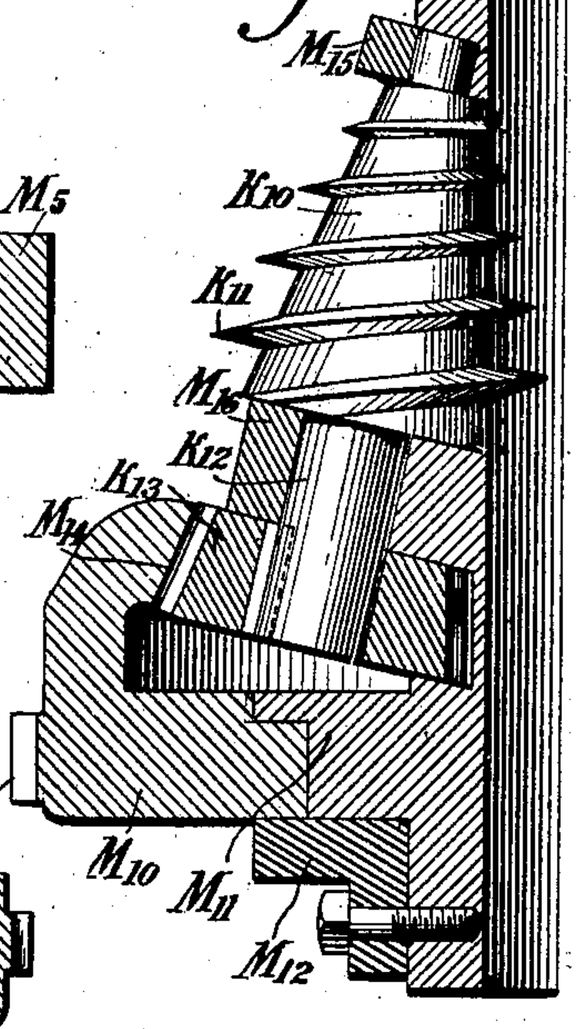


Fig. 13



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HARRY L. DUNCAN, OF NEW YORK, N. Y.

BALING-PRESS.

No. 846,735. Specification of Letters Patent. Patented March 12, 1907.

Application filed August 13, 1901. Serial No. 71,896.

To all whom it may concern:

Be it known that I, HARRY L. DUNCAN, a resident of New York, county of Kings, and State of New York, have invented a new and useful Improvement in Baling-Presses, of which the following is a specification, taken in connection with the accompanying drawings, in which the same reference character refers to similar parts in the several figures.

This invention relates to baling-presses for producing continuously a cylindrical bale of fibrous material, preferably composed of superposed helical layers; and it relates more specifically to baling-presses in which the continuous bale is separated in the baling-chamber into separate bales, and these bales are held against reëxpansion and in proper compressed condition as they are continuously fed from the baling-chamber.

In the accompanying drawings, Figure 1 shows in axial section one form of such a baling-press. Figs. 2, 3, and 4 are partial transverse sectional views taken on the lines 2 2, 3 3, and 4 4 of Fig. 1. Fig. 5 is a perspective view of a retainer. Fig. 6 is a partial transverse sectional view taken substantially through the ejectors. Fig. 7 shows in transverse section a modified form of bale-governing device as applied to the baling-chamber, taken on line 7 7 of Fig. 8. Fig. 8 is a substantially axial section of the same, taken on line 8 8 of Fig. 7. Fig. 9 is an enlarged detail showing the bat forming and feeding mechanism, taken on the line 9 9 of Fig. 10. Fig. 10 is another view of the same in elevation, taken from the right of Fig. 9. Fig. 11 is an axial section through a modified form of baling-press. Fig. 12 is a partial transverse section taken on line 12 12 of Fig. 11. Fig. 13 is a detail in substantial axial section, showing the construction of a modified form of ejector.

This press is composed of a relatively rotating baling-chamber B and slotted cap-plate A, the baling-chamber being provided with suitable retainer-slots B^2, extending longitudinally of the same, through which bale-severing retainers D are from time to time introduced into the continuous forming-bale within the chamber and serve to divide it into separate bales. The baling-chamber is also provided with suitable ejecting or bale-regulating means, by which the movement of the continuous bale through the baling-chamber is regulated. The cap-plate is provided with suitable condensing-cones I and feeding-cones G, serving to form bats of material and feed them into the slotted cap-plate. The baling-chamber B is substantially cylindrical, as shown in Fig. 1, and is formed with a slightly-tapering upper portion. This baling-chamber is preferably stationary in this form of press, although it may be rotated, if desired. The cap-plate A is revolubly mounted with respect to the baling-chamber, the flange B′ on the baling-chamber being clamped against the cap-plate by the collar A^2, secured to the cap-plate by bolts, as shown. The cap-plate is revolved by the gear A′, which is driven by any suitable mechanism at any desired rate of speed. In the cap-plate are mounted the two feeding-cones G, rigidly secured to the stub-shafts G^4 at their outer ends and rotated by means of the beveled pinions G^3, secured to them. These pinions mesh with the driving-gear B^8, formed at the upper end of the baling-chamber, so that relative movement between the baling-chamber and the cap-plate serves to rotate these feeding-cones at substantially the same surface speed as the forming-bale with which they come in contact. The shafts G^4 are supported in heavy bearings in the cap-plate A^8, and the inner end of the feeding-cones are preferably formed with journals G^5, which have suitable bearing in the feeder-bearing A^9 at the center of the cap-plate, although this center bearing may be omitted, if desired. It is understood, of course, that the feeder-journals G^5 are slightly out of line at the center of the cap-plate, so that the two feed-openings which extend substantially along the diameter of the cap-plate substantially coincide at the center of the same. The supplemental bearing-yoke A^4, rigidly secured to the cap-plate, as is indicated in Fig. 9, serves to support the feeder-cone, since it comes in contact with the bearing portion G^2, which may be located near the center of the comb, as indicated in Fig. 1, so as to support this comb at the center and resist the upward pressure upon it. As is indicated, the feeder-cones G are formed with suitable corrugations G′, by which they more readily engage the material and feed it into the feed-slot A^3 of the cap-plate.

It will be noted by reference to Fig. 9 that the inner surface of the cap-plate is formed with a relieved portion A^6 on its under surface adjacent each feed-cone, so that the material compressed against the upper end of the forming-bale under the cap-plate is re-

leased from close contact at this point, and the material is thereby disengaged from the feeding-cone. The edge of the cap-plate A^5 at this point closely engages the feeding-cone and serves to assist in freeing the material from the feed-cone.

Instead of forming the cap-plate with a substantially flat inner surface, as is indicated, this cap-plate may be formed with a conical inner surface, as is indicated in my Patent No. 671,918, April 9, 1901, the condenser-cones and the feeding-cones being so placed that their apices still substantially coincide with the axis of the press. The two condensing-cones I are mounted by means of suitable journals I′, which have bearing in the central portion A^9 of the cap-plate, and by the bearing-collar H^9, which engages a suitable bearing I^2 in the bearing member H. This condenser-cone is formed of perforated or foraminous material, as is usual in this art, and is driven by the beveled gear I^3, secured to the collar H^9, which is driven by the idler G^6, rigidly secured to the stub-shaft G^7, mounted in suitable bearing in the bearing member H. This idler is driven in turn by the feeder-gear G^3, so that, as indicated in Fig. 9, the condenser-cone and the adjacent feeding-cone revolve in the same direction and at substantially the same surface speed, although in practice I prefer to operate the feeding-cone at a slightly-greater speed than the corresponding portion of the condenser-cone. Within the condenser is located the shield I^5, supported on a central rod I^4, bolted to the outer bearing member H′, which is rigidly secured to the bearing member H in any desired way. Each condenser cone is provided with a series of slides I^7, as is indicated in Fig. 9, these slides being mounted to move slightly about the axis of the condenser-cone and being adjustable in any desired position by the bolt and nut I^8, secured to the slide and operating in a slot in the casing H^2. The cover-plate I^9 fits over this slot and is engaged by the nut, as is indicated. To the upper end of each one of these slides is permanently secured the single flexible curtain or cover strip I^6, which is fastened at its upper end to the side of the casing H^2. In this way as the slides I^7 at various parts of the condenser-cone are moved about the axis of the cone the cover-strip serves to shield a greater or less portion of the condenser-cone at that point from the lint or blast of material which is continuously fed to the condenser-cone. In this way the active angle of the condenser-cone may be adjusted at various points along the cone to form a bat of any desired cross-section. It will of course be understood that any desired number of slides may be employed, so that any desired nicety of adjustment may be obtained in this way. The action of this adjustable bat-former is similar to that set forth in my Patent No. 672,394, April 16, 1901.

The outer casing H′ is formed substantially cylindrical near the top, and the inner casing H^2, which is also substantially cylindrical at this point, is mounted rigidly with respect to the bearing member H, so that an inner chamber H^4 is formed which communicates with the condenser-cores. This inner or feeding chamber is connected with the cylindrical feed-pipe, (not shown,) which serves to supply a blast of material—such as cotton, wool, or other fibrous material—to each of the condenser-cones, while the annular exhaust-space H^3, which communicates with the interior of the condenser-cones through the bearing-collars H^9 of the same, serves to create a suction within the cones, as will be readily understood. The outer casing H′ is of course connected with an outer pipe, (not shown,) the annular space between these two pipes being connected with a suitable exhaust-fan to maintain the desired suction within the exhaust-space H^3. The cap-plate A is formed adjacent the feed-opening with a feed-plate A^7, and the adjacent part of the casing is formed with a hinged member H^5, hinged to the casing at the point H^7 and pressed inward toward the condenser-cone by the spring H^8, so that this hinged member, which is provided with a friction-roll H^6 along its lower edge, presses against the bat of material formed on the condenser-cone I. The bat becomes disengaged from the cone at the lower portion of the same where the shield I^5 cuts off the suction, so that the bat is continuously fed down the feed-plate A^7 and into the feed-opening A^3 under the feed-cone. In this manner a bat of material of uniform thickness at all points is continuously supplied to each of the feeding-openings A^3, which extend from the axis of the press to the sizing-collar B^7 at the top of the baling-chamber; also, since the apices of the condensing-cones substantially coincide with the axis of the baling-chamber, the length of the bat of material supplied from these cones to various parts of the feeding-slot are proportionate to the distance from the center of the baling-chamber, and therefore the bat is correctly distributed throughout all parts of the resulting bale.

As is well known in this art, the rotating cap-plate A, operating in connection with the baling-chamber B, serves to produce within the baling-chamber a continuous forming-bale composed of superposed helical ribbons of material. This continuous bale is governed in its movement longitudinally of the baling-chamber by the ejector-wheels E, whose construction and operation are substantially similar to those shown in my Patent No. 671,918, April 9, 1901. As is best shown in Fig. 6, the ejector-shafts E^8 are mounted in suitable bearings E^{10} on the lower part of the baling-chamber, and the two

ejector-wheels E, formed with the bale-gripping spikes *e*, project through suitable ejector-slots E^9 into the baling-chamber. Splined to the outer end of each of these ejector-shafts is the skew-gear E′, the teeth E^2 of which mesh with the skew-teeth E^3 upon the crown-gear E^4. This crown-gear is mounted upon the lower end of the baling-chamber by a suitable collar E^6, bolted to the same, and is rotated at any desired speed relative to the baling-chamber by the gear E^5 upon its edge. In this way, as will be evident, each one of the ejector-wheels is rotated at the same peripheral speed and engages the continuous bale within the chamber and positively feeds it through the chamber at any desired rate. In this way the density of the resulting bale may be varied, as will be manifest.

The retainer-slots B^2 extend longitudinally of the baling-chamber between the two ejector-wheels, mounted upon a single ejector-shaft. Each of these retainer-slots is provided with the shoulder B^3, so that the lower end of this slot is wider than the portion of the same above this point. The retainer-slots, as is shown, extend to a point near the upper end of the baling-chamber, as is shown in Fig. 1, to the upper end of the cylindrical portion of the baling-chamber. The upper portion of the retainer-slots are open for the convenient insertion of the retainers into the bale within the chamber, and the bridge-pieces B^4, extending around this part of the retainer-slots, serve to strengthen the upper portion of the baling-chamber. The retainer-guides C^3 are formed adjacent the retainer-slots and serve to maintain the retainers in proper position with respect to the bale. The upper retainer-guide C^3 is formed with a cam portion C′, and the lower retainer-guide at the other side of the retainer-slot is formed with a cam portion C^5. These cam-guides serve to force the retainer inward.

The retainer shown in perspective in Fig. 5 is formed with a body portion D, connecting the two feet D′ D^2, having the sharpened points D^3 and D^4, respectively. Upon the heels of the retainer-feet are formed the cam portions D^5, D^6, and D^7 upon the upper foot D′, and the cam portions D^8, D^9, and D^0 upon the lower foot D^2, as is shown in that figure. The upper retainer-cam C′, formed on the member C, projecting from the side of the bridge-piece B^4, has, as is shown in Fig. 2, only a single gripping-groove, which engages the retainer-cam D^5 and holds it in proper position in the groove, the point D^3 of the retainer having been inserted in the retainer-slot B^2, and the foot D^2 being positively guided into the bale by the edges of the slot and by the retainer-cam C′, as is shown in Fig. 2.

The upper retainer-guide, formed on the member C^2, is provided below the point C^4 in Fig. 1 with a second gripping-groove C^3, which engages the cam D^6 upon the upper retainer-foot D^{31}, as shown in Fig. 3, a section at this point, and the retainer-guide at this point also comes in contact with the cam D^7 on the retainer-foot, so that the retainer is held inward at this point throughout the whole rearward extent of the foot. It will be readily seen that since the retainers are placed in the oblique position indicated at Fig. 1, the upper foot of the retainer being at one side of the retainer-slot and the lower foot being at the other side of the slot to engage the lower retainer-guide, the upper retainer-cam must be cut away above the point C^4, since otherwise the body of the retainer near the upper foot of the same would come in contact with the gripping-ledge and the coaction of the retainer-cams with the cam-guides would not be correct.

The lower retainer-cam guides C^5 are formed on the interior of the relieved portion B^5 of the lower end of the chamber, as is shown in Fig. 1, and, as is indicated in Fig. 4, this cam-guide is formed with two gripping-grooves, which engage the cam portions of the lower foot of the retainer throughout its whole rearward extent to positively force this foot into the continuous bale. Both the upper and lower retainer-guides below the cam-guides are parallel to the axis of the press, so that the retainer once having been forced into the bale is held positively in that position by the retainer-guides as it moves, together with the bale, through the baling-chamber. The operation of these retainers in separating and holding separate bales in proper position is as follows: The baling-chamber being filled with a continuous bale, which is fed through the chamber at a definite rate by the ejectors, a set of retainers are successively inserted through the spaces B^6 within the bridge-pieces B^4, so that the upper feet of these retainers pass through the retainer-slots B^2 and are forced to a slight extent into the bale by any suitable means, so that they retain their position longitudinally of the bale. The lower feet of these retainers are placed at the other side of the retainer-slots in position to properly engage the cam-guides C^5. Then the lower points of the retainers are also forced to some slight extent into the bale to travel with the same. Then this set of retainers, which of course are forced into the bale symmetrically, as indicated in Fig. 1, engage the cam-guides, which force the upper and lower points of the retainers readily into the forming-bale, and when the retainers have been forced into the bale to the extent shown in Fig. 1 thereafter they travel with the bale through the baling-chamber. When the upper feet of this set of retainers comes into the open portion of the retainer-slots below the bridge-pieces B^4,

another set of similar retainers are inserted in like manner into the forming-bale, the lower points of this second set of retainers being inserted into the bale directly alongside of the upper feet of the first set of retainers. This second set of retainers is engaged by the cam-guides, forced into the bale, and fed forward with the bale in a similar manner. This operation is repeated, and it will be seen that a series of separate bales are ejected from the baling-chamber and that each bale will be held in proper compressed position by the set of retainers extending from end to end of the same. These retainers on each bale may of course be held temporarily in position as the bale issues from the lower end of the baling-chamber by straps or by any suitable means. As the separated bales issue from the press they may be readily separated from the continuous bale within the baling-chamber by any desired means, and it will be noted in this connection that the feet of the retainers entering the continuous bale serve to separate it into separate bales. Permanent binding means are now applied to each bale in a well-known manner, or, if desired, the retainers may be rigidly secured in position and constitute the permanent binding means.

Although I preferably form the chamber containing the retainer slots and guides integral with the chamber which coacts with the cap-plate to form the bale and also form the ejectors or other bale-governing devices on this chamber, it is not necessary that these members be formed as a single piece. The retainer-guides should, however, be formed on a slotted bale-supporting chamber through which the bale is fed.

It will of course be understood that it is not necessary to form the retainers exactly as I have disclosed. The number of cams upon the feet of these retainers might be varied, and the shape of these cams might be varied from what I have disclosed in the drawings. Readily-releasable retainers might be used in this form of press. Furthermore, it is not necessary in all cases that cam-guides be formed adjacent the retainer-slots to automatically force these retainers into the bale as they travel with the bale through the baling-chamber. Other means of forcing these retainers into the bale might be employed. The exact shape of the retainers and of the retainer-slots and the number of these retainers and retainer-slots might be varied, although the points of the retainers should project sufficiently far into the forming-bale to hold the bale in position and prevent reëxpansion of the same after the bale issues from the press, and the feet of the retainers should be made sufficiently long to accomplish this result.

Instead of the form of ejectors which I have just described any other means of regulating the movement of the forming-bale through the baling-chamber may be employed, and in Figs. 7 and 8 I show a series of bale-governing elements F F, pivotally secured to the lower end of the baling-chamber B^0 by the heavy pivots F′. The clamping-ring F^3, secured to the lower end of the baling-chamber by bolts, is provided with the clamping-screws F^4, which serve to adjust the pivoted members F in any desired position, the lock-nuts shown holding the clamping-screws in place. As is indicated, the lower end of the baling-chamber is formed with a slight taper F^2, so that the movement of the bale from the baling-chamber is resisted by this tapered portion. The bale-governing elements F serve to increase the frictional grip of the lower end of the baling-chamber upon the bale, and in this way a greater or less resistance is offered to the longitudinal movement of the bale. The speed of movement of the bale, and therefore the density of the bale, are regulated in this manner. As is shown in Fig. 7, the retainer-guides C^{73} and C^{75} are formed between the bale-governing members, and the retainer-feet D^{71} D^{72} shown in this figure are formed with cam portions and operate in connection with the retainer-guides, as has been already set forth.

In the modified form of baling-press which I have disclosed in Figs. 11 to 13 the baling-chamber B^{10} is formed with the retainer-slots B^2, as has already been described, and also with the longitudinal slots B^{12}, as indicated. These slots are formed at their lower portions with an inward taper, so that the continuous bale passes without interference past the lower end of these slots. If desired, suitable relieved portions may be formed in the lower part of the baling-chamber as a continuation of these slots, so that in this manner the continuous bale engages the baling-chamber throughout only a portion of its circumference. The heavy sleeves M^5 pass about the bridge-pieces and serve to hold the baling-chamber together and to resist the internal pressure of the bale upon it. In this way the baling-chamber below the sizing-collar at its upper end, which as is shown in this figure, is formed cylindrical and without any taper, may, if desired, be formed to engage the continuous bale only throughout the ribs B^{11}, in which the retainer-slots and retainer-guides are formed, as has already been described. The retainers in this case operate in an exactly similar manner to what has been already disclosed, and the cap-plate and the parts carried thereby also operate in a similar way. I have shown in this case a different form of ejector, consisting of a series of screw ejectors K′, having a conical body and being formed with a multiple helical ridge or screw-thread K′ of varying height throughout the body of the ejector. The

axes of these screw ejectors are inclined slightly to the axis of the press, so that the ejector-threads engage the forming bale through the ejector-openings B^{14}, inclined, as is indicated at B^{15}, to a greater and greater extent as the bale moves forward. This gradual impingement of the ejector-threads upon the forming bale is very beneficial, since in this manner less power is required to operate the ejectors. Each of these ejectors is rigidly secured to an ejector-shaft K^2, mounted, as is indicated, in suitable bearings K^5 at the lower end of the baling-chamber B^{10}. Rigidly secured to these shafts are the ejector-pinions K^4, which mesh with and are driven by the teeth M^4 of the large ejector-gear M, as is indicated. This gear is mounted in the bearing M′ in the lower end of the baling-chamber and secured in position by the sectional clamping-collar M^2, bolted to the chamber. This gear is rotated about the baling-chamber at any desired rate by the teeth M^3, with which a suitable driving-pinion engages.

In Fig. 13 I have shown a modified form of screw ejector, formed with a conical body K^{10} and with a helical ridge K^{12}, of gradually-increasing height throughout the ejector. This ejector is mounted, as indicated in the bearings M^{15} M^{16}, which engage the ejector-shaft K^{12}. The ejector-pinion K^{13} is rigidly secured to this ejector-shaft and meshes with the teeth M^{14} of the large ejector-gear M^{10}, driven by means of the teeth M^{13} on its edge. This gear is mounted in a suitable bearing M^{11} on the lower end of the baling-chamber B^{10} and is clamped in position by the collar M^{12}, bolted to the baling-chamber. It will of course be understood that this screw ejector projects through a suitable opening into the baling-chamber and engages in a manner similar to the ejector K the continuous bale within the chamber. The height of the ejector-threads or helical ridges formed on these screw ejectors must be sufficient so that the series of ejectors employed grips the forming bale within the chamber sufficiently to prevent any slip of the bale past them, and as the ejectors are rotated they serve to positively feed the forming bale through the baling-chamber at any desired rate. Since all the screw ejectors of a set operate in unison, each one tends to feed the bale forward at the same rate, as will be understood.

It will of course be understood by those familiar with this art that numerous modifications may be made in the baling-presses which I have disclosed. Furthermore, it is possible to employ these bale-separating retainers in connection with a press adapted to produce continuously a bale of rectangular cross-section. The baling-chamber in this case would of course be provided with suitable longitudinal retainer-slots and retainer-grooves. Suitable means would also be employed in this case to regulate the movement of the continuous bale through the press. Numerous other modifications might be made, and parts of my baling-press may be employed apart from the others. I do not, therefore, wish to be limited to the disclosure which I have made in this case; but what I desire to secure by Letters Patent is set forth in the appended claims.

What I claim as new is—

1. In a baling-press, a rotating slotted cap-plate, a conical feeder revolubly mounted on said cap-plate to feed material into the slot in said cap-plate, a conical condenser revolubly mounted on said cap-plate and driven by said feeder, an outer casing and an inner casing each having a cylindrical top portion secured to said cap-plate, said inner casing being connected with said condenser to supply lint thereto, and the annular space between said casings being connected with the interior of said condenser to exhaust air therefrom, a baling-chamber mounted adjacent said cap-plate and provided with a sizing-collar, a series of rotary ejectors mounted on the discharge end of said chamber to engage a bale within said chamber and to regulate the movement of said bale through said chamber, retainer-slots, cam-guides and retainer-guides formed in said chamber, longitudinal slots in said chamber, to form bale-engaging ribs in which said retainer-slots are formed and retainers to be inserted through said retainer-slots and to engage said guides.

2. In a baling-press, a rotating slotted cap-plate, a conical feeder revolubly mounted on said cap-plate, a conical condenser revolubly mounted on said cap-plate and driven from said feeder, an outer and an inner casing secured to said cap-plate, said casings having a cylindrical top portion, said inner casing being connected to said condenser to supply lint thereto, and the annular space between said casings being connected with the interior of said condenser to exhaust air therefrom.

3. In a baling-press, a revoluble conical ejector and a helical thread formed on the exterior of the same to engage a bale.

4. In a baling-press a conical ejector, a helical thread on the exterior of the same, said thread projecting a varying distance from said ejector throughout the length of said thread to gradually engage a bale.

5. In a baling-press, a bale-supporting chamber, a series of conical ejectors having bale-gripping helical threads on the exterior of the same mounted on said chamber, and means to rotate all said ejectors in unison.

6. In a baling-press, a bale-supporting chamber, a rotary ejector mounted on said chamber, a helical thread formed on the exterior of said ejector to project into said chamber to engage a bale.

7. In a baling-press, a bale-supporting

chamber, a series of rotary ejectors mounted on said chamber, helical threads formed on said ejectors to project into said chamber to engage a bale and means to rotate said ejectors in unison.

8. In a baling-press, a baling-chamber, means to form a continuous bale in said chamber, means past which said bale moves to control its movement through said chamber, said chamber being formed with retainer slots and retainers having separated projecting feet to be inserted through said slots into said bale to divide the same and to hold the separate bales in position after leaving said chamber.

9. In a baling-press, a baling-chamber, means to form a continuous bale in said chamber, means to continuously move said bale from said chamber, said chamber being formed with retainer-slots, and retainers to be inserted through said slots into said bale to divide the same into separate bales and to hold said bales in position after they move out of said chamber.

10. In a baling-press, a chamber to support a continuous forming bale, ejectors adjacent the discharge end of said chamber to govern the movement of said bale through said chamber, there being retainer-slots formed in said chamber and retainers having separated rigidly-supported feet to be inserted through said slots into said bale to divide the same into separate bales and to retain said bales in position after they move from said chamber.

11. In a baling-press, a chamber to support a bale, there being retainer-slots and upper and lower retainer-guides adjacent said slots formed in said chamber, and retainers to be inserted through said slots into said bale and to engage said guides to be held in position in said bale.

12. In a baling-press, a chamber to support a bale there being formed in said chamber retainer-slots and upper and lower retainer-guides adjacent said slots and retainers to be inserted through said slots to engage said guides to be thereby forced into said bale and held in position therein.

13. In a baling-press, a chamber to support a continuous forming bale, there being formed in said chamber slots and upper and lower retainer-guides adjacent said slots to hold retainers inserted through said slots into said bale in position in said bale.

14. In a baling-press, a chamber to support a continuous forming bale, there being formed in said chamber retainer-slots, cam-guides, and retainer-guides, adjacent said slots, to force retainers inserted through said slots into said bale and to hold said retainers in position in said bale.

15. In a baling-press, a chamber to support a continuous bale there being formed in said chamber retainer-slots, cam-guides and retainer-guides and retainers having projecting sharp points to engage said bale to be inserted through said slots to engage said guides, said retainers being carried along said chamber by said bale and said points being thereby forced into said bale.

16. In a baling-press, a chamber to support a continuous bale, there being retainer-slots and cam-guides formed in said chamber and retainers to be inserted through said slots to engage said cam-guides and to be forced into said bale by the longitudinal movement of said bale through said chamber.

17. In a baling-press, a chamber to support a bale, means to move said bale through said chamber, retainers and means actuated by the longitudinal movement of said bale through said chamber to insert said retainers into said bale.

18. In a baling-press, a chamber to support a continuous forming bale, there being retainer-slots formed in said chamber, retainers to be inserted into said slots to engage said bale and to be thereby carried longitudinally through said chamber and means engaging said retainers to force said retainers into said bale as they are moved longitudinally through said chamber.

19. In a baling-press, a chamber with longitudinal slots therein to support a bale, retainer curved cam-guides adjacent said slots, and retainers to coact with said guides to be thereby inserted in said bale.

20. In a baling-press, a baling-chamber, means to form a continuous bale in said chamber, means past which said bale moves to control its movement through said chamber, said chamber being formed with retainer-slots and retainers having projecting feet to be inserted through said slots into said bale to divide the same into separate bales.

21. In a baling-press, a chamber to support a bale, there being retainer-slots formed in said chamber, retainers to be inserted through said slots into said bale and bale-governing elements past which said bale and retainers move to govern the movements of said bale through said chamber.

22. In a baling-press, a chamber to support a continuous forming bale, means adjacent the discharge end of said chamber to hold said bale under longitudinal compression, retainers having pointed feet rigidly projecting laterally therefrom and spaced apart at substantially the length of a separate bale and means acting through the longitudinal movement of said bale through said chamber to insert said feet into said bale within said chamber.

23. In a baling-press, a chamber to support a continuous forming bale, there being retainer-slots formed in said chamber, rigid retainers of substantially the length of a bale, projecting feet at the ends of said re-

tainers and means to force said feet into said continuous bale to sever the same and to retain the separate bales in position.

24. In a baling-press, a chamber to support a continuous forming bale, there being retainer-slots formed in said chamber, rigid retainers of substantially the length of a bale, projecting feet at the ends of said retainers, retainer-guides adjacent said slots to engage both ends of said retainers to force said feet into said bale.

25. In a baling-press, a chamber to support a continuous bale, there being retainer-slots formed in said chamber, retainers substantially the length of a bale, bale-severing feet at the ends of said retainers and means to simultaneously force said feet into said continuous bale.

26. In a baling-press, a bale-severing retainer substantially the length of a bale, rigidly-projecting bale-severing feet at the ends of said retainer to be forced into a continuous bale to divide the same into separate bales and to retain said bales in compressed condition.

27. In a baling-press, a rigid bale-separating retainer substantially the length of a bale, rigidly-projecting bale-severing feet at the ends of said retainer and guiding projections at the ends of said retainer.

28. In a baling-press, a chamber to support a forming bale, means adjacent the discharge end of said chamber to hold said bale under compression, retainers having feet projecting therefrom spaced apart at substantially the length of a separate bale and means to insert said feet into said bale within said chamber to retain the separate bales on their discharge from said chamber.

29. In a baling-press, a chamber to support a continuous bale, means adjacent the discharge end of said chamber to hold said bale under compression, said chamber being provided with retainer-slots and with laterally-displaced upper and lower retainer-guides adjacent said slots, retainers having feet projecting therefrom spaced apart at substantially the length of a bale to be inserted into said slots and said feet being forced into said bale in laterally-displaced position by said guides.

30. In a baling-press, a chamber to support a continuous forming helical bale, means past which said bale moves to govern its movement through said chamber and means to divide said continuous bale and to hold the separate bales in position after leaving said chamber.

HARRY L. DUNCAN.

Witnesses:
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ALEXANDER MITCHELL.