

No. 874,306.

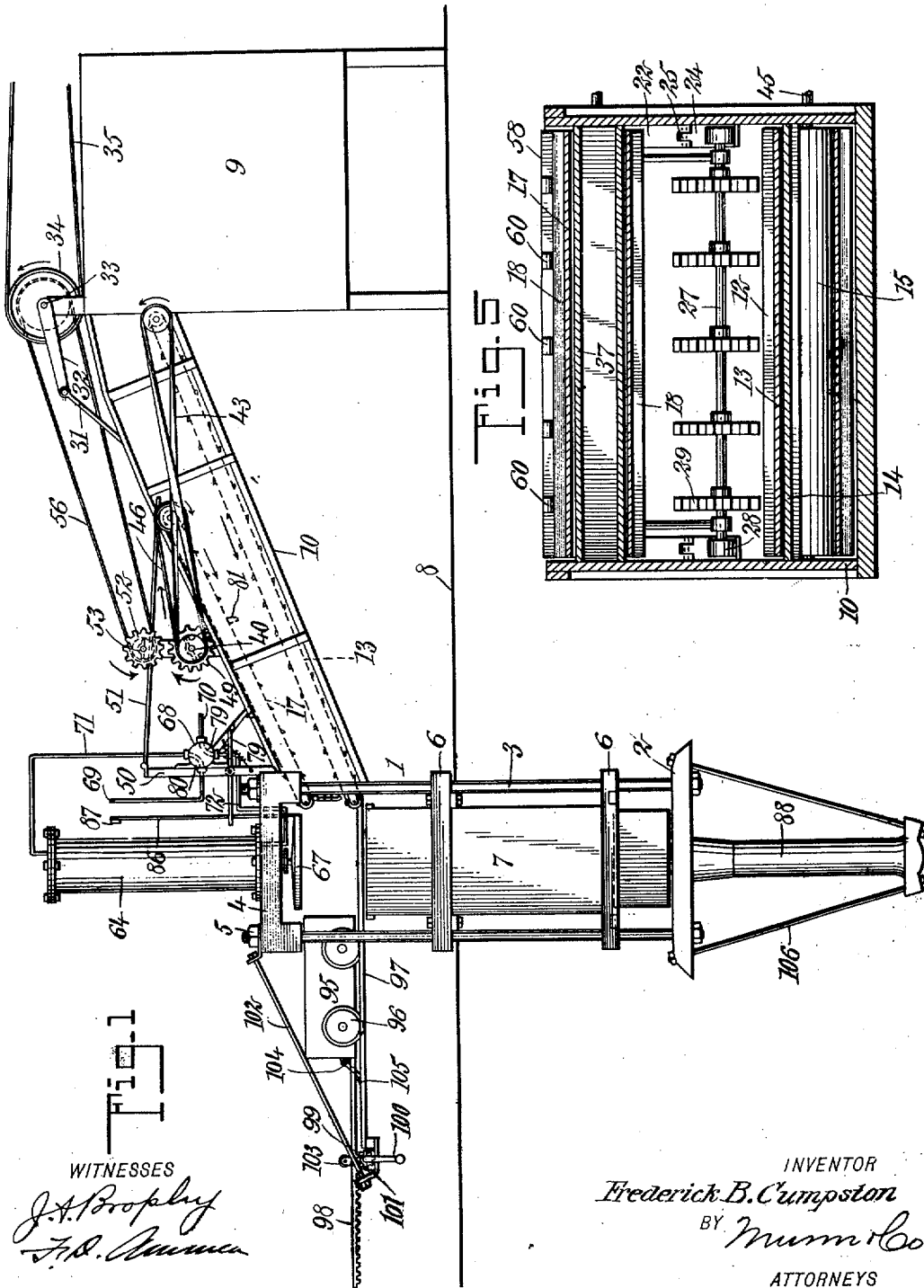
PATENTED DEC. 17, 1907.

F. B. CUMPSTON.

BALING PRESS.

APPLICATION FILED APR. 1, 1907.

4 SHEETS—SHEET 1.



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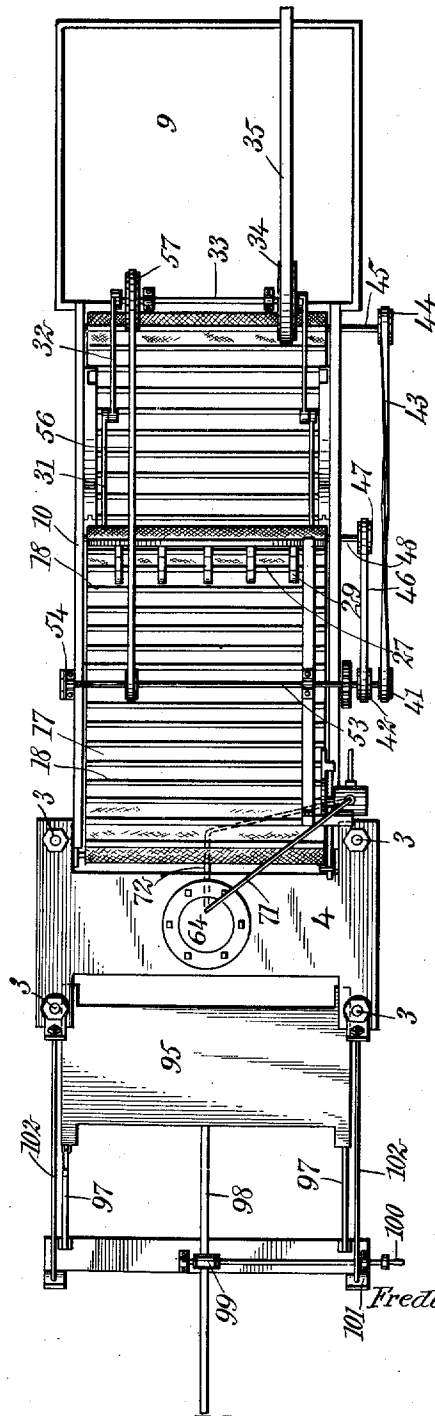
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4 SHEETS—SHEET 2.

Fig. 2



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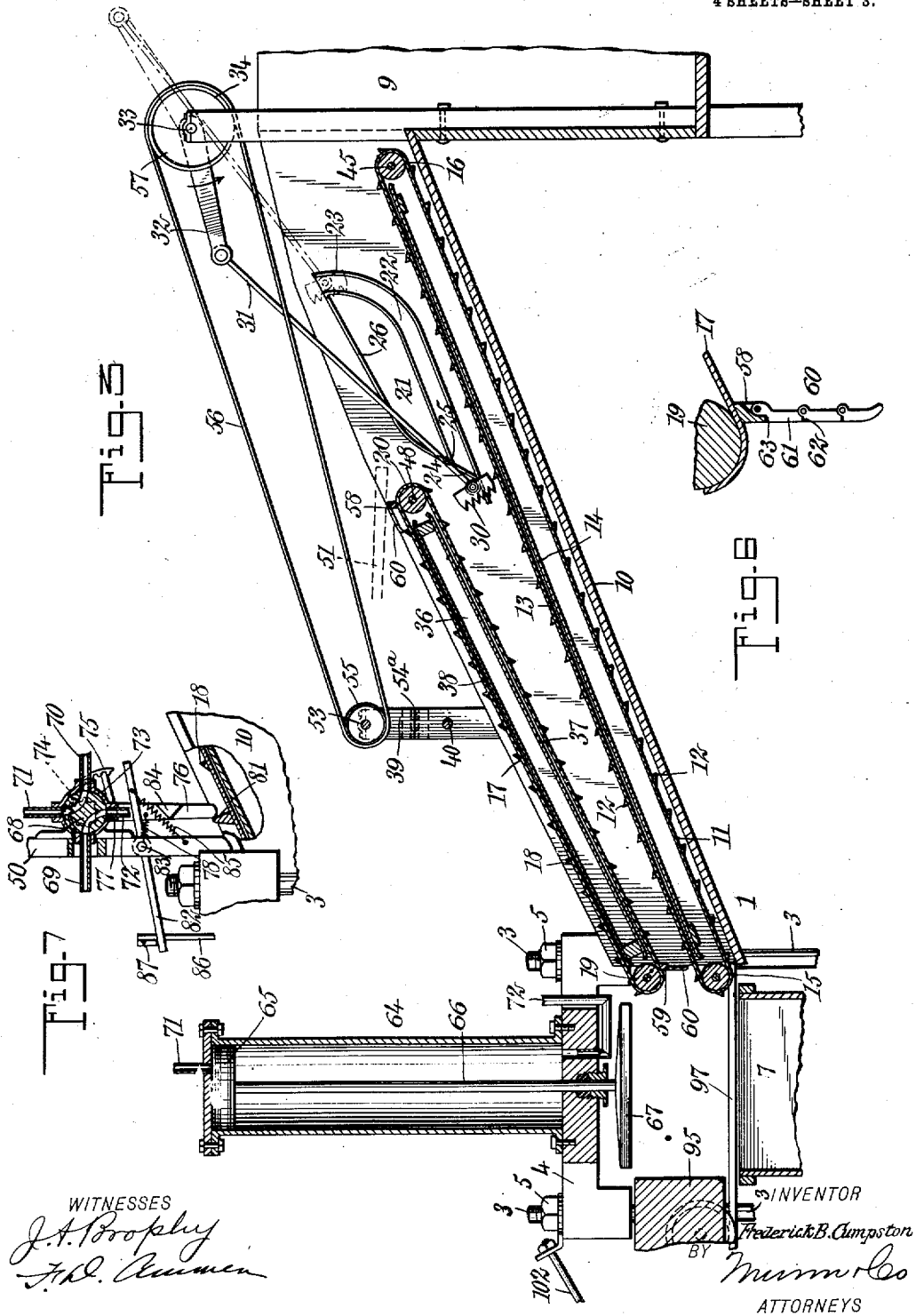
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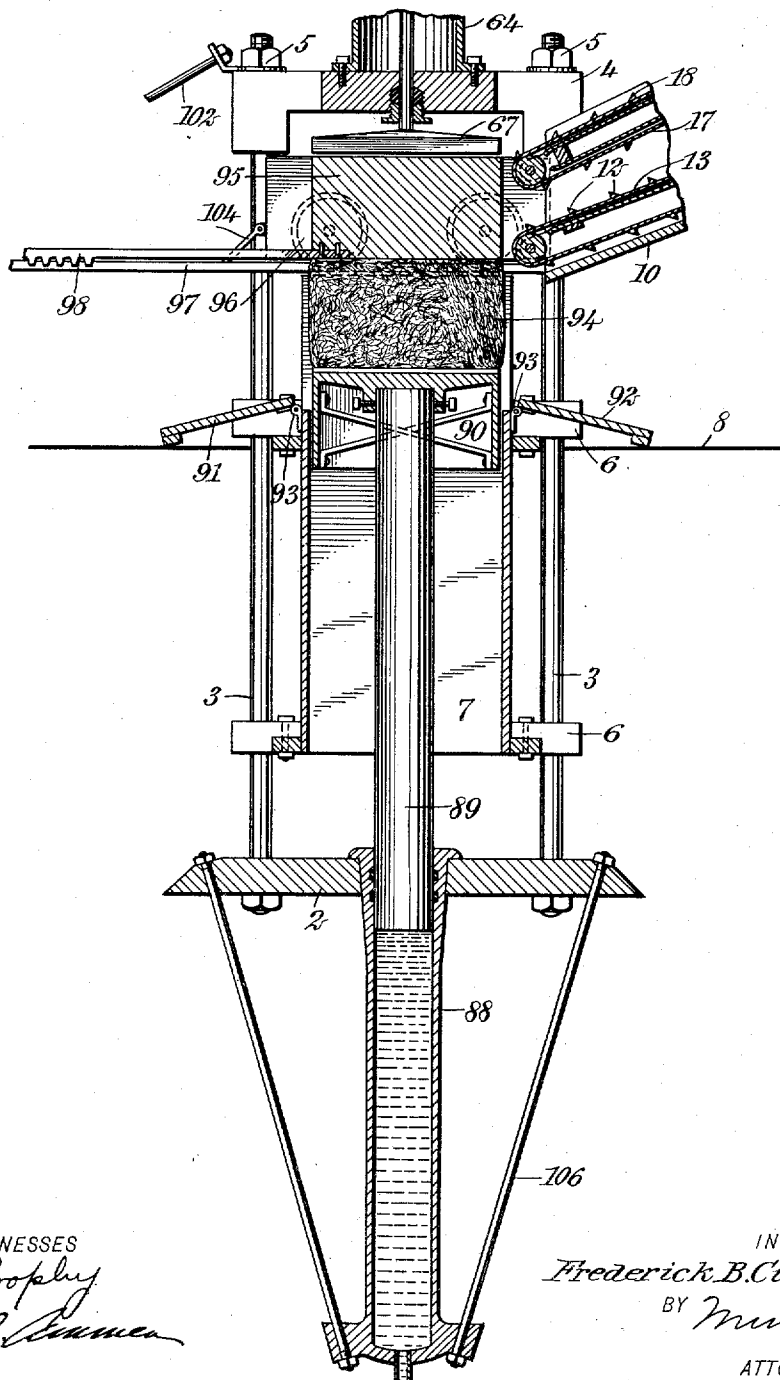
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4 SHEETS—SHEET 4.

Fig. 4



WITNESSES

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UNITED STATES PATENT OFFICE.

FREDERICK B. CUMPSTON, OF BLOOMING GROVE, TEXAS.

BALING-PRESS.

No. 874,306.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed April 1, 1907. Serial No. 365,746.

To all whom it may concern:

Be it known that I, FREDERICK BERNARD CUMPSTON, a citizen of the United States, and a resident of Blooming Grove, in the county of Navarro and State of Texas, have invented a new and Improved Baling-Press, of which the following is a full, clear, and exact description.

This invention relates to presses such as are used for making bales of cotton, straw or similar products.

The object of the invention is to produce a press of this class which will feed itself automatically, and which is provided with a packing cylinder for advancing the cotton or straw into the baling chamber; the arrangement being such that the feed takes place automatically, so that the operation of the packing plunger is also automatic.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a baling press constructed according to my invention; Fig. 2 is a plan; Fig. 3 is a vertical central section through the upper portion of the press, certain parts being shown in elevation; this view is upon a slightly enlarged scale; Fig. 4 is a vertical section through the press, taken at the baling chamber or pressing chamber, and passing through the hydraulic press; Fig. 5 is a cross section taken through the packing box along which the cotton is fed toward the baling chamber; Fig. 6 is a detail showing a portion of the carrier in cross section, and illustrating the manner of attaching controlling fingers thereto which determine the times at which the feed movement takes place; this view is upon a scale enlarged with respect to Fig. 3; and Fig. 7 is a vertical section taken through a valve which controls the operation of the packing cylinder.

Referring more particularly to the parts, and especially to Figs. 1 and 3, 1 represents the frame of the press, which comprises a base plate 2 from which tie rods 3 extend upwardly. The upper ends of these tie rods 3 pass through a fixed head 4, and are threaded to receive nuts 5 which seat against the up-

per side of the head as shown. Between the base plate 2 and the head 4 two cross heads 6 are provided, which support a baling chamber or compressing chamber 7, said chamber being of substantially square or rectangular form. The upper portion of the press is disposed above the floor line 8. At a suitable point near the press I provide a feed hopper 9, and the upper portion of this hopper is connected with the upper portion of the frame of the baling press by means of a feed chute or feed box 10, which inclines downwardly as indicated. Within this box there is located a main conveyer 11, which consists of a continuous belt or apron of canvas or similar material, the said apron being provided on its outer side with transverse slats 12. These slats are inclined on their rear faces with respect to the direction in which the belt advances, so that they operate as teeth on the upper run 13 of the belt, tending to feed the cotton toward the baling chamber. Below the upper run 13 of the belt a transverse partition or false bottom is formed in the chute, which supports this run of the apron. The ends of this apron pass around guide pulleys 15 and 16 located respectively at the lower and upper ends of the chute, as shown.

Above the longitudinal axis of the feed chute I provide an auxiliary feed belt or apron 17, and this apron is also formed of canvas or similar material, and provided with transverse slats 18, which slats are similar in form to the slats 12 described above; they project from the under run of the belt toward the baling press. These belts or aprons 13 and 17 converge toward their lower extremities as indicated. The belt or apron 17 passes around pulleys 19 and 20 arranged respectively at the lower and upper extremities thereof. The apron 17 is much shorter than the main apron 13 so that a space is left in the upper portion of the feed chute. In this space I provide a pushing device 21. This device comprises a pair of tracks 22 of channel form, which are attached to the inner sides of the side walls of the feed chute. The upper portions of these tracks are formed with upward curves 23; the lower portions are straight and provided at their rear or lower extremities with gates 24 respectively, which are attached by hinge connections 25 to the upper edges of the channels at these points. The gates 24 incline upwardly toward the

upper portion of the feed chute, and constitute, when closed; (as indicated in Fig. 3) extensions of guide bars 26. These guide bars extend upwardly to the upper ends of the curves 23. In this upper portion of the feed chute there is provided a transverse pusher bar 27, the ends of which are provided with rollers 28, as indicated in Fig. 5, and these rollers are adapted to run in the channels 22 and over the guide bars 26 in a manner which will be described more fully hereinafter. The bar 27 is provided with a plurality of shoes or pushers 29, which consist simply of elongated plates having teeth 30 formed on the lower sides thereof as shown in Fig. 3. The pusher bar 27 is connected by a pair of connecting rods or pitmen 31 with cranks 32, respectively, and these cranks are rigidly attached to a shaft 33, the said shaft being mounted in a horizontal position at the edge of the feed hopper, as indicated. This shaft 33 is further provided with a belt pulley 34 over which runs a belt 35 by means of which the shaft is continuously rotated when the press is in operation. The rotation of the shaft is in a left-hand direction, as indicated by the arrow in Fig. 3. As the shaft 33 rotates, the pitmen 31 are pulled backward and forward, and the pusher rod 27, upon the advancing stroke, is guided by the channels 22. These channels are extended on their lower sides beyond the gates 24, so that as the shoes 29 reach the limit of their forward movement, they pass through the gates; then, as the shoes are drawn up by the return of the crank, the rollers 28 run up on the gates and the guide bars 26. When the pusher rod reaches the upper limit of its movement, the rollers 28 pass down into the channels again, as illustrated in dotted lines in Fig. 3. In this way the shoes 29 operate upon the cotton which is fed upon the upper portion of the conveyer belt 13, and advances the cotton downwardly, as will be readily understood. In this way the cotton is packed into the space between the main conveyer or apron 13 and the auxiliary apron 17. Inside of the auxiliary apron 17 a backing 36 is provided, which presents a lower floor 37 lying near the lower run of the apron, and an upper floor 38 which lies near the upper run.

I provide means for driving the conveyer belts 13 and 17. For this purpose, at a suitable point on the feed chute I provide stanchions 39 in which a countershaft 40 is rotatably mounted. This countershaft is provided at one end with belt pulleys 41 and 42. Over the former runs a twisted belt 43, which drives the roller 16 through the medium of a belt pulley 44, said belt pulley being mounted upon the extended shaft 45 of the pulley, as indicated most clearly in

Fig. 2. A belt 46 connects the pulley 42 with a pulley 47 mounted upon the shaft 48 which extends from the roller 20. From this arrangement it will be evident that when the shaft 40 is driven, the adjacent sides of the aprons will be advanced downwardly toward the packing chamber.

On the shaft 40 at a suitable point, I provide a gear wheel 49, and I provide means for driving this gear wheel intermittently. For this purpose, near the lower portion of the feed chute 10 I provide a standard 50, to the upper extremity whereof there is hinged a trip lever 51. The upper end of this lever is free and rests upon the upper end of the apron 17 at the roller 20, as indicated by the dotted lines in Fig. 3. Opposite the gear wheel 49 the trip lever 51 is provided with a gear wheel 52 which is adapted to mesh with the gear wheel 49 at certain times; that is, when the lever is not being tripped upwardly. The manner in which the lever is tripped will be described more fully hereinafter.

The gear wheel 52 is rigidly carried upon a shaft 53 which extends transversely above the feed chute; the opposite end of the shaft is journaled in a bracket 54 hinged at 54^a, as indicated in Fig. 3, which permits of the free end of the shaft being raised or lowered through the medium of the trip lever.

At a suitable point on the shaft 53 a belt pulley 55 is provided, and this belt pulley is adapted to be driven continuously by a belt 56. This belt 56 is driven continually by a belt pulley 57, which is rigidly carried by the shaft 33, as illustrated particularly in Figs. 2 and 3.

On the auxiliary belt at the upper end thereof, as illustrated in Fig. 3, I provide a transverse trip bar 58. When this bar is passing over the roller, as shown in the figure, it raises the trip lever 51 so as to move the gear 52 out of engagement with the gear 49. At the lower end of the auxiliary belt or apron, also as illustrated in Fig. 3, I provide a similar transverse trip bar 59. These trip bars 58 and 59 are provided with a plurality of fingers 60 respectively, and these fingers are formed of links 61 which are pivotally attached together and pivotally hung from the transverse bars. The arrangement is such that when either of the bars 58 or 59 occupies the position of the bar 59, as illustrated in Fig. 3, the fingers 60 hang downwardly at the lower end of the space between the aprons. At this time the upper trip bar occupies the position of the bar 58, as shown in Fig. 3, so that the trip lever is held raised. From this arrangement it should be understood that when the shoes 29 are operating to feed the cotton into the space between the aprons, the aprons are stationary; the aprons remain stationary until the lower por-

tion of the feed chute is filled with cotton, and when this occurs, there will be a pressure upon the fingers 60 at the lower end of the chute.

As illustrated in Fig. 6, the back edges of the links 61 have abutting shoulders 62 so that the fingers operate as rigid fingers when pressed from the upper side. The uppermost of the links 61 is provided with a similar shoulder 63 which seats against the under side of the transverse trip bar, as illustrated. From this arrangement, as soon as a sufficient quantity of cotton has been brought into the chute to fill the baling press, the fingers which are disposed at the lower end of the chute will operate to advance the auxiliary apron a short distance; that is, a sufficient distance to enable the trip lever 51 to descend at its free end. When it descends, as described, the gear wheel 52 is put in mesh with the gear 49, and the feeding movement of the aprons follows immediately; the transmission movement being effected from the shaft 33 through the intermediate mechanism and belts. The fingers 60 do not offer any obstruction at the upper end of the auxiliary apron, as they lie close against the upper side thereof, in the manner illustrated at 58 in Fig. 3.

On the upper side of the head 4 I provide a packing cylinder 64 which is disposed centrally above the baling chamber 7, and it is provided with a plunger 65, the rod 66 whereof extends down through the head and is provided with a packer head 67.

I provide automatic mechanism for advancing the packing plunger 65 when the cotton has been advanced from the chute into the baling chamber. For this purpose, I provide a valve 68 to which a steam pipe 69 conducts live steam, and from the opposite side of the valve an exhaust pipe 70 leads; this valve is simply a rotary valve or cock, and on the upper side thereof, located midway between the points of attachment of the pipes 68 and 69, I provide an admission pipe 71 which leads to the upper end of the cylinder 64.

On the under side of the valve 68 a similar steam pipe 72 leads to the lower end of the packing cylinder 64. This valve is illustrated in Fig. 7; its plug 73 is provided at one side with a pinion or gear wheel 74, and this pinion is adapted to be rotated by a segment 75 rigidly attached to a lever 76, said lever being pivoted at the point 77, as will be readily understood. This valve 68 is attached adjacent to the standard 50 which has been referred to above. To the lever 76 a helical spring 78 is attached, the opposite end of the spring being attached to the standard 50 so that this spring tends to hold the lever 76 in the position in which it is shown in Fig. 7.

The plug 73 is provided with two ports 79

and 80, so that the valve constitutes a four-way-valve or cock. When the lever 76 is in the position shown in Fig. 7, the port 79 connects the steam pipe 69 with the inlet pipe 72, so that steam is admitted to the lower end of the packer cylinder 64. In this position of the plug, the port 80 connects the pipe 71 with the exhaust pipe 70. With this arrangement the packer plunger 65 will be held in an elevated position as illustrated in Fig. 3.

At suitable points on the auxiliary apron 17 I provide teeth 81 which project outwardly from the outer side of the belt or apron. The lever 76 projects into the path of these teeth so that as they come along on the upper side of the belt or apron, they will swing the lever toward the right and into the position in which it is illustrated in Fig. 1; that is, they will give the lever an eighth of a turn. On account of the segment 75 and the pinion 74 this movement is multiplied, so that the plug is given a quarter-turn, which is sufficient to change the port arrangement in the manner suggested above. When the lever 76 is moved toward the right by either of the teeth 81, it is locked in this position by a locking lever 82 which is pivoted at 83 to the standard 50. The right-hand end of this lever is disposed near the side face of the lever 76 when the lever is moved to its extreme right position, and on the face of the lever 76 a triangular block 84 is provided. This block is adapted to move into position before the end of the lever 82, as illustrated in Fig. 1, so that when the lever 76 is released from the tooth 81, the spring 78 will hold the lever 76 against the locking lever 82. The locking lever 82 is normally held in the position shown in Fig. 1 by means of a spring 85 which is attached near the right-hand end of the locking lever, the opposite end of the spring being attached to the lower portion of the standard 50. The teeth 81 are so placed upon the apron 17 that they will operate the lever 76 before either of the transverse trip bars 58 or 59 arrives at the upper position at the upper end of the belt. In this connection it should be understood that the movement of the aprons 13 and 17 is intermittent; or, whenever either of the trip bars 58 or 59 passes under the trip lever 51, the driving mechanism is disengaged. The movement of the feeding aprons is started again by the compressed cotton which is forced into the space between the aprons in the manner described above. It will now be understood that as the auxiliary apron 17 is about to come to rest, it operates the lever 76 so as to set the valve 68 in the position shown in Fig. 1. Steam will then be admitted from the pipe 69 through the valve and the pipe 71 to the upper end of the packing cylinder 64, and the plunger 65 thereof will then descend and pack the cotton into the baling press 7.

Attached to the head 67 of the plunger 65 I provide a dog rod 86, which is guided to the fixed head 4, as illustrated. This dog rod 86 lies adjacent to the left-hand end of the locking lever 82, and at its upper end it is provided with a laterally projecting dog 87 which is adapted to engage the end of the locking lever as the plunger 65 arrives at the lower limit of its movement. In this way, when the plunger arrives at the end of the stroke, the lever 76 becomes unlocked and the spring 85 immediately throws it into the position in which it is shown in Fig. 7. This reverses the position of the valve, opens the pipe 71 to exhaust, and admits steam to the under side of the plunger 65, so that the plunger is raised again to the position in which it is shown in Fig. 3.

At the under side of the base plate 2 I provide a hydraulic cylinder 88 in which there is mounted a vertically moving plunger 89. The upper end of this plunger 89 is provided with a cap 90, which is of square form to fit the interior of the baling press, as indicated in Fig. 4. Referring, now, to this figure, it will be seen that the two opposite sides of the baling chamber are provided with doors 91 and 92 which are hinged at 93, and are adapted to swing downwardly as shown. The bale 94 is formed by the upward pressure of the plunger cap 90 while the doors 91 and 92 are closed; the upper side of the bale being pressed against a pressing block 95. This block has substantially the form shown in Fig. 2; it is mounted upon wheels 96 which run upon a track, the said track being formed of parallel rails 97 disposed at each side of the press. The upper face of the block 95 lies adjacent to the lower face of the fixed head 4, there being just a sufficient clearance to allow the block to be run in or out of position above the baling chamber. In order to enable the block to be run in and out in this manner, the block is provided with an outwardly extending rack 98, the teeth whereof are in mesh with a pinion 99; the said pinion is operated by means of a crank 100 which is mounted in a suitable bracket 101 attached to the outer ends of the rails 97. In order to support this bracket 101 and the adjacent ends of the rails, the bracket is connected with the fixed head 4 by diagonal braces 102, as shown. In order to hold the rack 98 in engagement with the pinion, I provide a roller 103 against which the upper side of the rack 98 rests, as shown in Fig. 1.

In order to limit the outward movement of the block 95, its outer end is provided with a pivoted pawl 104, the point whereof is adapted to engage a tooth or projection 105 on the upper side of one of the rails 97.

It should now be understood that after the baling chamber 7 has been packed with cot-

ton by the packing cylinder, the crank 100 will be rotated so as to advance the block 95 into position above the baling chamber, whereupon the operating fluid is admitted to the cylinder 88 so as to force the plunger 89 upwardly and press the cap 90 with great force against the block 95. Of course, as the pressure comes upon the block 95, it rises slightly so as to back up against the fixed head 4 so that the strain of the compression comes upon the tie rods 3. In order to increase the rigidity of the base plate 2 on the hydraulic cylinder 88, the lower end of the cylinder is connected with the edges of the base plate by diagonal braces 106, as shown in Figs. 1 and 4.

The mode of operation of the baling press will now be recapitulated: The cotton from the hopper 9 is fed by hand into the upper end of the feed chute 10, and there it comes under the influence of the shoes 29 which are driven by the cranks 32. In this way the cotton is advanced into the lower portion of the chute between the aprons 13 and 17. When the feed chute is full, the pressure of the cotton upon the fingers 60 at the lower end of the apron 17, moves this apron so as to allow the trip lever 51 to descend at its free end. This brings about an engagement between the gear wheels 52 and 49, and a feed movement of the aprons immediately results. The cotton which is between the aprons in the lower portion of the chute is, by this means, advanced into the baling chamber. As the feeding movement of the aprons is about to cease, the automatic valve 68 is thrown so as to admit steam to the upper end of the packing cylinder 64. The plunger 65 then moves downwardly and operates automatically to unlock the lever 76, which then returns to its normal position and admits steam to the lower end of the packing cylinder. The cotton now having been packed into the baling chamber, the block 95 is advanced into the space above the baling chamber, and the plunger 89 of the press moves upwardly so as to form a bale against the pressing block. After the bale is formed, it is pushed out at the side after the doors 91 and 92 are opened.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a baling press of the class described, in combination, a baling chamber, a feed chute, means for packing cotton in the lower portion of said feed chute adjacent to said baling chamber, and means for automatically advancing said cotton into said baling chamber when said feed chute becomes full.

2. In a baling press, in combination, a baling chamber, a feed chute disposed adjacent thereto, movable aprons mounted in said chute, means for packing cotton into the

space between said aprons, and automatic means for starting said aprons when a quantity of cotton is packed into the space therebetween.

5 3. In a baling press, in combination, a baling chamber, a feed chute disposed adjacent to the upper end thereof, feeding mechanism mounted in said feed chute and comprising a continuous moving apron, fingers 10 carried by said apron and adapted to rest normally at the lower end of said feed chute, and means for packing cotton into said feed chute and against said fingers whereby said fingers afford means for starting said apron 15 when said feed chute is substantially full.

4. In a baling press, in combination, a baling chamber, a feed chute disposed adjacent thereto, feeding mechanism disposed within said feed chute and comprising a continuous apron, a movable member normally 20 resting upon said apron, means carried by said movable member for driving said apron, and a member carried by said apron and adapted to move said movable member to 25 disengage said driving means.

5. In a baling press, in combination, a baling chamber, a feed chute adapted to feed to said chamber, an apron mounted in said feed chute and adapted to advance cotton 30 into said chamber, driving mechanism for said apron, members carried by said apron and extending across said chute, means for packing cotton against said members whereby said members may move said apron when 35 said chute is full of cotton, and means for automatically connecting and disconnecting said driving means.

6. In a baling press, in combination, a baling chamber, a feed chute adapted to deliver thereto, a pair of aprons mounted in 40 said chute, means for packing cotton into the space between said aprons and within said chute, fingers carried by one of said aprons and affording means for moving that 45 apron by the pressure of the cotton when said chute is filled, and automatic means for advancing said aprons, actuated by the pressure of the cotton on said fingers.

7. In a baling press, in combination, a 50 baling chamber, a feed chute adapted to deliver thereto, a main feeding apron mounted in said chute, an auxiliary feeding apron mounted above said main apron, means for pushing cotton into the space between said

aprons and within said chute, means for giving said aprons an intermittent advancing movement, and means for operating said last means automatically when said chute is substantially full of cotton. 55

8. In a baling press, in combination, a 60 baling chamber, a packing cylinder arranged thereabove, a chute, means for feeding cotton into said chute, automatic means for emptying the contents of said chute into said chamber when said chute is full, and auto- 65 matic means for operating said packing cylinder.

9. In a baling press, in combination, a baling chamber, a feed chute delivering thereto, feeding mechanism within said 70 chute including an endless apron, driving mechanism for said apron, a trip lever supporting said mechanism, normally resting on said apron and affording means for connecting or disconnecting said driving mechanism, and a member carried by said apron 75 and adapted to displace said trip lever to disengage said driving mechanism.

10. In a baling press, in combination, a baling chamber, a packing cylinder for forcing 80 cotton into said chamber, an apron adapted to advance cotton into position over said baling chamber, automatic means for giving said apron an intermittent feed movement, and means for controlling said packing 85 cylinder from said apron.

11. In a baling press, in combination, a baling chamber, a feed chute, an endless feed apron within said chute, rollers about which said apron passes, jointed fingers attached to 90 said apron adapted to depend within said chute and obstruct the same, means for packing cotton into said chute, trip bars carried by said apron, a trip lever normally 95 resting against said apron and adapted to be displaced by said trip bars, and mechanism controlled by said trip lever for periodically advancing said apron, the pressure of the cotton on said fingers affording means for moving said apron to actuate said trip lever. 100

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK B. CUMPSTON.

Witnesses:

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JNO. A. FORD.