

(No Model.)

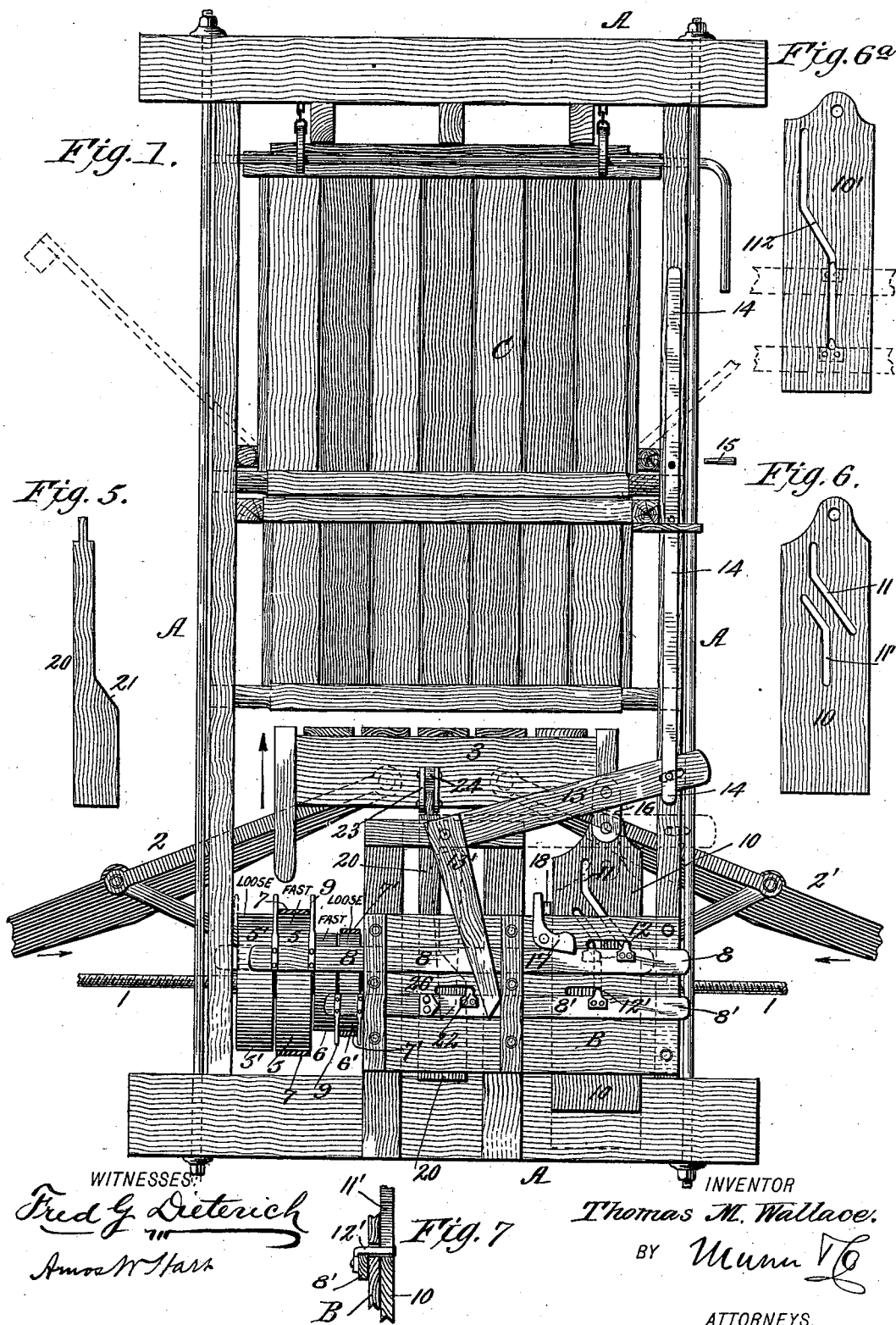
2 Sheets—Sheet 1.

T. M. WALLACE.

COMBINED BELT SHIFTER AND BRAKE FOR COTTON PRESSES.

No. 530,978.

Patented Dec. 18, 1894.



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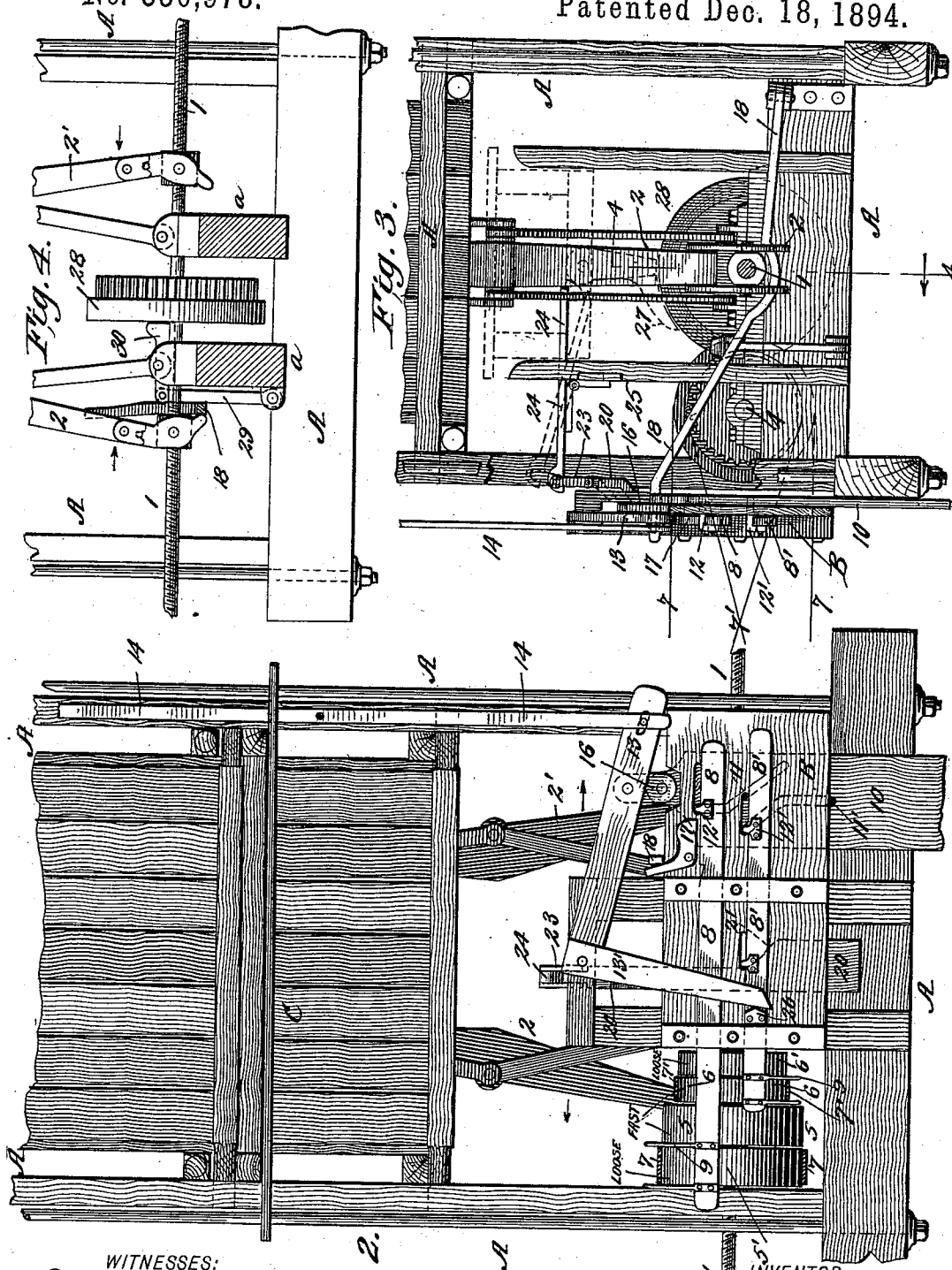
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THOMAS M. WALLACE, OF MARION, ALABAMA.

COMBINED BELT-SHIFTER AND BRAKE FOR COTTON-PRESSES.

SPECIFICATION forming part of Letters Patent No. 530,978, dated December 18, 1894.

Application filed June 21, 1894. Serial No. 515,256. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. WALLACE, of Marion, in the county of Perry and State of Alabama, have invented a new and useful Improvement in a Combined Belt-Shifter and Brake for Cotton-Presses, of which the following is a specification.

My invention is applicable to various forms of presses in which a reciprocating follower is employed, but is especially adapted for use in connection with so-called "self-tramper" presses, in which the follower is actuated by toggle levers and a rotating screw-shaft.

The principal feature of my invention is the means for automatically shifting the two belts used on such presses, from tight to loose pulleys, and the reverse, for the purpose of running the follow-block or follower up or down. In self-tramping cotton presses, it is desirable to have the follower reciprocate rapidly, and especially to make its return movement very quickly, in order to economize time in compressing the several charges of cotton required to form the standard five-hundred-pound bale. It is, therefore, expedient to employ a brake in addition to the belt-shifting mechanism, in order that the speed of the follower may be maintained up to the limits of its movement in either direction, without danger of strain or other injury to the press, which would be likely to result if the shifting of belts were alone relied on to arrest the movement of the follower. I have therefore combined a friction-brake mechanism with the belt-shifter, but in such manner that it coacts with and virtually forms a part of the latter, as hereinafter described.

In accompanying drawings—two sheets—Figure 1 is a side view of a toggle-lever press to which my invention is applied, the parts of the latter being represented in the position they occupy when the follower is about beginning its ascent. Fig. 2 is a side view of the same, the parts being shown in the position they occupy when the follower is descending. Fig. 3 is an end elevation of the press, some parts being broken away or in section. Fig. 4 is a section on line 4—4 of Fig. 3. Figs. 5 and 6 (Sheet 1) are face views of two slides employed to operate the belt-shifters proper. Fig. 6^a shows a modification of the main slide. Fig. 7 is a transverse ver-

tical section of the guide frame of the belt-shifting mechanism.

In the drawings and following description, for sake of perspicuity, I will indicate the movable parts by numerals and the fixed ones by letters.

The stationary frame, A, of the press, has for the most part the usual construction and at the bottom is arranged the ordinary screw-shaft 1 that actuates the toggle-levers 2—2', (Fig. 1,) which are jointed to and operate the follower 3. The said screw-shaft 1 is counter to a driving shaft 4 geared therewith. On the driving shaft are keyed two sets of pulleys, to-wit, the two sets of fast and loose pulleys. The larger and smaller fast pulleys are arranged together, the larger and smaller loose ones being arranged exteriorly of the same. An open belt 7, (Fig. 3) runs on the larger pulleys 5, 5', and is used to drive the follower up; while a crossed belt 7', runs on the smaller pulleys 6, 6', and serves to reverse the driving and screw-shafts and thereby runs the follower down.

The belt-shifters proper are arranged in a guide-frame B, attached to the side of the press frame A. The belt-shifters are two slidable bars 8 and 8' arranged horizontally in suitable guide ways, one above another, and provided with the usual prongs or arms 9, for engaging the belts 7, 7'. Both of these sliding bars are operated, *i. e.* reciprocated, to shift the belts, by means of a slide 10, (Fig. 6) consisting of a slotted plate arranged to reciprocate vertically in the guide frame B. There are two obtuse-angled slots 11 and 11' (Figs. 1 and 2) in the said slide 10, their angles being reversed, or projected in opposite directions, and one slot 11 being located higher than the other 11'.

Pins or studs 12 and 12' are affixed to the respective bars and project through horizontal slots in the guide frame B into the corresponding slots 11 and 11' (see Fig. 7;) that is to say, the stud 12 of the upper bar 8, that shifts the open belt 7, in the larger pulleys 5, 5' works in the upper slot 11, and the stud 12' of the lower bar 8' which shifts the crossed belt 7', on the smaller pulleys 6, 6', works in the lower slot 11'. The slide 10 having the aforesaid slots 11, 11', *i. e.* moved up or down for the purpose of shifting the

bars 8, 8', and belts 7, 7', by means of a pivoted lever, 13, and a rod 14. (Fig. 1.) The latter, 14, extends upward, (see Fig. 1) alongside the press-box, C, through a guide-way 5 on the press, at the floor line, its upper end being provided with a cross pin, 15, that subserves a purpose hereinafter stated. The lever, 13, is right-angular, having a pendent arm, 13', its inner end being pivoted to the side of the guide frame, and its opposite or free end to the rod, 14, and at an intermediate point to a link, 16, which connects it with the slide, 10.

When the follower or follow-block, 3, reaches the limit of its ascending movement, the open belt, 7, is first shifted from the large fast pulley, 5, to the loose one, 5', and immediately, the crossed belt, 7', is shifted from the small loose pulley, 6', to the fast one, 6, so that the rotation of the screw-shaft, 1, is reversed and the follower, 3, run down. The successive or connected movements of the shifting devices required to effect this result are more specifically as follows:

As shown in Fig. 1, the lever, 13, and slide, 10, have been adjusted by pulling the rod, 14, up into the position required to run the follower, 3, up; that is to say, the open belt, 7, has been shifted onto the large fast pulley, 5, and the crossed belt, 7', onto the smaller loose pulley, 6', so that the screw-shaft, 1, rotates in the direction required to draw the lower ends of the toggle levers 2, 2', toward each other, which necessarily forces the follower, 3, up. It will be observed (Fig. 1), that a weighted, angle-shaped, pivoted pawl, or dog, 17, has engaged a notch in the upper, belt-shifting bar, 8. This is for the purpose of holding the said bar fixed in position, so that there is no possibility of the open belt, 7, being shifted accidentally while the follower is ascending. (The dog, 17, might engage a notch in the slide, 10, with the same result.) When the follower reaches the limit of its ascent, the lever, 13, is reversed, or thrown down, and all the connected movable parts then assume the position shown in Fig. 2; that is to say, the slide 10, is moved down and the bars 8 and 8', slid to the left, thus shifting the belts 7 and 7' onto the large loose pulley 5' and fast smaller pulley 6, respectively. This movement may be effected manually at any position of ascending follower, by manually disengaging the dog, 17, from the bar, 8, but it is in fact effected automatically, by means now to be described.

When the follower, 3, is at nearly its highest point, the toggle levers 2, 2', approach the vertical, as shown in Figs. 2 and 4, and at this time the lower projecting end of one of said levers (2') comes in contact with a long lever 18, (see Fig. 3,) that is pivoted to one of the cross beams, *a*, of the press frame, A, and whose free end projects over the upper belt-shifting bar, 8, between the dog, 17, and the vertical slide, 10. It will be seen, that, as the toggle lever presses against the long lever,

18, the free end of the latter is pushed laterally against the dog, 17, and thus the dog is tilted and disengaged from the bar, 8, and the bar, 14, and slide, 10, drop by gravitation, throwing lever, 13, into position, as shown in Fig. 2, which shifts the belts and reverses the motion of the screw-shaft and follower as before stated.

It is to be noted, in respect to the above described movements of the belt-shifting mechanism, that it is necessary one belt shall be shifted before the other, and that this is effected, by the arrangement of the slots 11 and 11', in slide 10. Thus, when the said slide moves down to the position shown in Fig. 2, the pin, 12, of the upper belt-shifting bar, 8, first runs in the inclined portion of the upper slot, 11, while the pin, 12', of the lower bar, 8', is in the vertical portion of the lower slot, 11'. Hence, the result is that, in the first half of the downward movement of the slide, 10, the upper bar, 8, moves to the left and shifts the open belt, 7, from the large fast pulley, 5, to the large loose pulley, 5', and that during this operation the lower bar, 8', remains stationary; but, as the pin, 12, of the upper bar 8, passes from the inclined into the vertical portion of the upper slot, 11, the pin, 12', of the lower bar, 8', passes from the vertical into the inclined portion of the lower slot, 11', so that during the remainder or second half, of the downward movement of the slide, 10, the upper bar remains at rest while the lower one shifts the crossed belt, 7', from the small loose pulley, 6', to the fast pulley, 6. This being done, the rotation of the screw-shaft, 1, is reversed and the follower, 3, descends, as before stated. It is obvious, that when the slide, 10, is moved upward, this relative movement of the belt-shifting bars 8, 8', is reversed and that 8' is first shifted to the right, and then the upper one, 8, so that the crossed belt, 7', is first thrown from the smaller fast pulley, 6, onto the loose one, 6', and then the open belt, 7', from the larger loose pulley, 5', onto the fast one, 5.

The foregoing description makes it clear, that the press is automatic as to reversal of the ascending movement of the follower to a descending movement. The means for changing the descending movement of the follower to a state of rest when it reaches the bottom of box, consists of a second vertical slide, 20, shown detached in Fig. 5, which is arranged in a guide frame B, at the left (Figs. 1 and 2) of the larger slide, 10. It has an inclined shoulder, 21, that works in contact with a pin, 22, projecting inward from the lower belt-shifter, 8', and its upper end is jointed by means of a link, 23, to a lever, 24, (Fig. 3,) of the first class, which is pivoted on a cross-bar of vertical standards, 25, (only one being shown,) and whose free, inner end projects into the path of the follower. It results, that when the latter closely approaches the limit of its descent, it comes in contact with and depresses the inner end of said lever, 24, and

forces the latter into the inclined position shown in dotted lines, Fig. 3, whereby the slide, 20, is raised, and thus its inclined shoulder, 21, is made to act on the pin, 22, of the lower belt-shifter, 8', and forces the latter to the right. An abutment, 26, or other form of projection, on the shifter, 8', is thus brought into contact with the pendent arm, 13', of the main lever, 13, which latter and the horizontal bar, 8', are consequently thrown into a position which raises the slide, 10, only high enough to shift the crossed belt, 7', from the fast pulley, 6, onto the loose pulley, 6', thus stopping the movement of the follower at the bottom of the box.

The operation of the follower is hence automatic throughout, except the movement to start the follower up by raising the bar, 14; that is to say, it is reciprocated automatically four or five times, or, until by compression of successive charges of cotton in the upper portion of the press-box, C, a sufficient quantity has been accumulated to produce a bale of the required weight—usually from four hundred pounds to six hundred pounds.

When the last charge has been made, and the follower is at its highest point, it is necessary it shall remain there and hold the bale under pressure long enough to allow the bagging to be properly arranged and the ties put on, and not be permitted to return at once to the bottom of the press-box as it had previously done after compressing a charge. For this purpose, a pin 15, (Figs. 1 and 2,) before referred to, is inserted in a hole in the rod, 14, a short distance above the floor that extends around the press-box; and this is done when the rod is raised, and the follow-block has been started up to compress the last charge. The pin, 15, will, when the dog, 17, is tilted by lever, 18, and the bar, 14, falls, come in contact with the floor or guide way and thus serve as a stop to arrest the downward movement of the rod 14, and change the main lever, 13, from the upwardly-inclined position shown in Fig. 1, to the horizontal position shown by dotted lines in Fig. 1, since it allows the slide, 10, to descend but half way, that is to say, to the point where the pin, 12, of the upper bar, 8, passes from the inclined into the vertical portion of the upper slot, 11, in said slide, whereby the open belt, 7, is shifted from the fast pulley, 5, onto the loose one, 5', but without shifting the crossed belt, 7', onto the fast pulley, 6. Thus, both belts run on the respective loose pulleys, and meanwhile the follower, 3, will remain at rest until the stop pin, 15, is removed, when the slide, 10, continues its descent and moves the lower bar, 8', and thereby shifts the crossed belt, 7', onto the fast pulley, 6. Of course the pin, 15, is removed immediately after the bale has been duly wrapped, the ties applied and fastened, and the finished bale ready to be rolled out of the press.

for Letters Patent in which I have shown a brake-shoe, 27, (Fig. 3,) hinged to the under side of the follower, so as to come in contact with the brake wheel, 28, (Figs. 3 and 4,) keyed on the screw-shaft, 1, when the follower, 3, is just reaching the limit of its descent. This action arrests, or rather assists in arresting the comparatively rapid descent of the follower at the critical moment, and thus avoids injury to the press which might otherwise result. On this device or feature, the hinged brake-shoe, I make no claim here, and refer to it thus briefly, merely in order to indicate the brake system of which it forms a part. I have also shown in the aforesaid application a brake mechanism for arresting the follower at the limit of its ascent. Such mechanism is composed of the long lever, 18, (see Figs. 3 and 4,) a pivotal vertical lever, 29, against which it acts, *i. e.* pushes, and a sliding horizontal brake-shoe or bar, 30, which is hinged to the upper end of such vertical lever and rests free on a crossbeam, *a*. Thus, when the righthand toggle lever, 2', comes in contact with the long lever, 18, it forces the latter against the shorter vertical lever, 29, which in turn pushes the shoe, 30, forcibly against the side of the wheel, 28, and hence arrests its rotation and that of the screw-shaft, 1, so that the follower 3, is instantly brought to rest. The only change made in this arrangement of brake mechanism from that described in the aforesaid application is the extension of the lever, 18, and its connection and coaction with the belt-shifting mechanism and brake at a critical juncture.

To briefly recapitulate the operation of the invention the rod, 14, being pulled upward, the main lever, 13, slide, 10, and belt-shifters 8, 8', assume the position shown in Fig. 1, and thus the belts 7, 7', are shipped onto the respective fast and loose pulleys 5, and 6', whereby the follower, 3, is caused to begin its ascent. At the proper limit of the upward movement of the follower, the right-hand toggle-lever, 2', presses against the long transverse lever, 18, and thus causes it to unlock the dog, 17, and then the bar, 14, and slide, 10, drop by gravitation, whereby the brake, 30, is applied and the main lever, 13, thrown down into the position shown in Fig. 2, which moves the main slide, 10, down, and this in turn shifts the belts 7, 7', successively, from the pulleys 5 and 6' onto the pulleys 5' and 6, which (the crossed belt then running on the small, fast pulley 6) reverses the rotation of the screw-shaft, 1, and consequently moves the lower ends of the toggle-levers 2, and 2', apart, so that the follower descends. When about to reach the limit of its downward movement, the follower strikes and tilts the normally-horizontal lever, 24, which raises the supplementary slide, 20, and this, acting on the lower belt-shifter, 8', moves the crossed belt, 7', from the fast pulley, 6, onto the loose one, 6', and then the follower comes to a stop at the bottom of the box. It will be observed,

It remains to describe the brake mechanism. I have filed an application, Serial No. 498,234,

that, in this movement of the lower belt-shifter, 8', to the right, its abutment, 26, pushes against the lower end of the pendent arm, 13', of the main lever, 13, and thus raises the latter to the horizontal position, whereby the follower is brought to a state of rest, and remains so, because the slide, 20, is not capable of having any effect on the bar, 8, which moves the open belt, 7, onto the fast pulley, 5, to start the follower up. Assuming that one charge of cotton has been made and pressed into the upper box, C, and that the follower has returned to the bottom of the box and stopped, the press is ready for another charge, after receiving which, the bar, 14, is again raised till the dog, 17, engages with the bar, 8, which holds the bar, 14, up. The follower presses this second charge as it did the first and then returns to the bottom and stops as before. When the last of the four charges has been made and compressed, the return or downward movement of the follower, 3, is prevented by previous insertion of stop pin, 15, in the trip rod, 14, when the same was raised to start the follower up. This controls the position of the main or angle lever, 13, which arrests, at the half-way point, the descent of the slide, 10, that operates the belt-shifters or slide bars 8, 8', and thereby throws the open belt, 7, on the loose pulley, 5'. The follower is thus held at rest so long as required to wrap, and tie the finished, standard-weight bale. Then the stop, 15, is displaced, and the downward movement of the slide, 10, continues and is completed, which in turn completes the belt-shifting operation required to run the follower down. The finished bale is rolled out of the press after the stop, 15, is removed, and the follower has moved down sufficiently to relieve the pressure and give room for egress of the bale.

I show, in Fig. 6^a, a slide, 10', having but one slot, 11², which will operate the sliding bars, 8 and 8', in the same manner as the slide 10. The dotted lines show the relative position of said bars when the slide, 10', is in the position corresponding to that of slide, 10, shown in Fig. 1, that is to say, when the belt is on the fast large pulley and the follower is therefore going up.

What I claim is—

1. The combination, with two sets of fast and loose pulleys, which are of different diameters and have the same axis, the two fast pulleys being arranged contiguously, and two slidable belt-shifters, or bars, arranged parallel horizontally and having lateral projections, of a vertically-slidable plate, having two obtuse angle slots, one arranged above another, their apexes pointing in opposite directions, their adjacent portions being inclined, and the upper portion or member of the upper slot and the lower portion of the lower slot being vertical, a pivoted angle lever which engages one of said bars, the press follower, and a bar connected with said lever and extending upward alongside the press-

box, for operating said lever, as shown and described.

2. The combination with a press-box, a reciprocating follower, and means for forcing the latter upward which include fast and loose pulleys, a sliding bar or belt-shifter having a lateral projection, a fast and loose pulley and a driving belt, of a vertical reciprocating slide having an angle slot in which the projection of the belt-shifter works, and a pivoted locking dog which automatically engages the belt-shifter when the latter has shifted the belt onto the fast pulley, as shown and described.

3. The combination with a press-box, follower, levers connected with the latter, a rotatable screw-shaft for actuating said levers, fast and loose pulleys, a shaft carrying the latter and geared with said screw-shaft, open and crossed belts, two belt-shifters, a device for locking the latter, a lever arranged transversely in the path of the follower levers, and its free end engaging such locking devices, and means for operating said lever, substantially as shown and described, whereby, when the follower reaches the limit of its upward movement, the belt-shifter is moved to shift the driving belt, as specified.

4. The combination, with a press-box follower, and means for operating the latter, of fast and loose pulleys, a sliding belt-shifter having a lateral projection, a device for locking said belt-shifter, a vertical reciprocating slide having an angle slot, and a pivoted lever 18 connected with said slide for operating it, of a lever pivoted and arranged in the path of the means for forcing the follower upward, and its free end engaging said locking device, whereby the latter is operated and allows the shifting of the driving belt, when the follower is about to reach the upward limit of its movement, substantially as shown and described.

5. The combination with a slidable bar or belt shifter, a dog for engaging the latter and means for operating the belt-shifter, of a pivoted lever whose free end engages said dog, a press-box, a follower and means for operating the latter, said means being adapted to act on the lever when the follower is at one limit of its movement, as shown and described.

6. The combination with a press box, follower, and means for operating it which include fast and loose pulleys and belts, of sliding belt-shifters having lateral projections, and two vertical slides, the main slide having two guideways and the other one guideway for the said projections, and means for raising the supplementary slide and lever connected with said main slide for raising it, and a projection or shoulder on the lower belt-shifter, which comes in contact with such lever when said belt-shifter is moved endwise by the supplementary slide, substantially as shown and described, for the purpose specified.

7. The combination with the press-box, the follower, means for operating the latter, including fast and loose pulleys, and belts run-

ning thereon, and two sliding belt-shifters having lateral projections, of the main slotted vertical slide and the parallel supplemental slide, the pivoted, main, angle-shaped, lever 5 connected with the main slide and having a pendent free arm, and a pivoted lever having a joint connection with the supplementary slide, and its free end projecting into the path of the follower, whereby, when the latter is 10 nearing the limit of its descent, it tilts such lever and thus raises the supplementary slide, and shifts the belt that runs the follower down, as set forth.

8. The combination with a press-box, a fol- 15 lower, levers for operating it, a screw-shaft for operating the levers, a brake wheel, a mov-

able brake-shoe acting on the latter, and a transverse brake lever arranged adjacent to the brake-shoe, to press the same against the wheel when the follower levers are at their 20 closest approximation, and the main, slotted, vertical slide, a horizontal sliding belt-shifter connected with said slide, a lever, connected with the latter and having a pendent member against which the brake lever acts simul- 25 taneously with its action on the brake-shoe, as shown and described.

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Witnesses:

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