M. C. KENNERLY.

PACKING MECHANISM FOR COTTON PRESSES.

APPLICATION FILED MAY 17, 1919.

1,321,105.

Patented Nov. 11, 1919.

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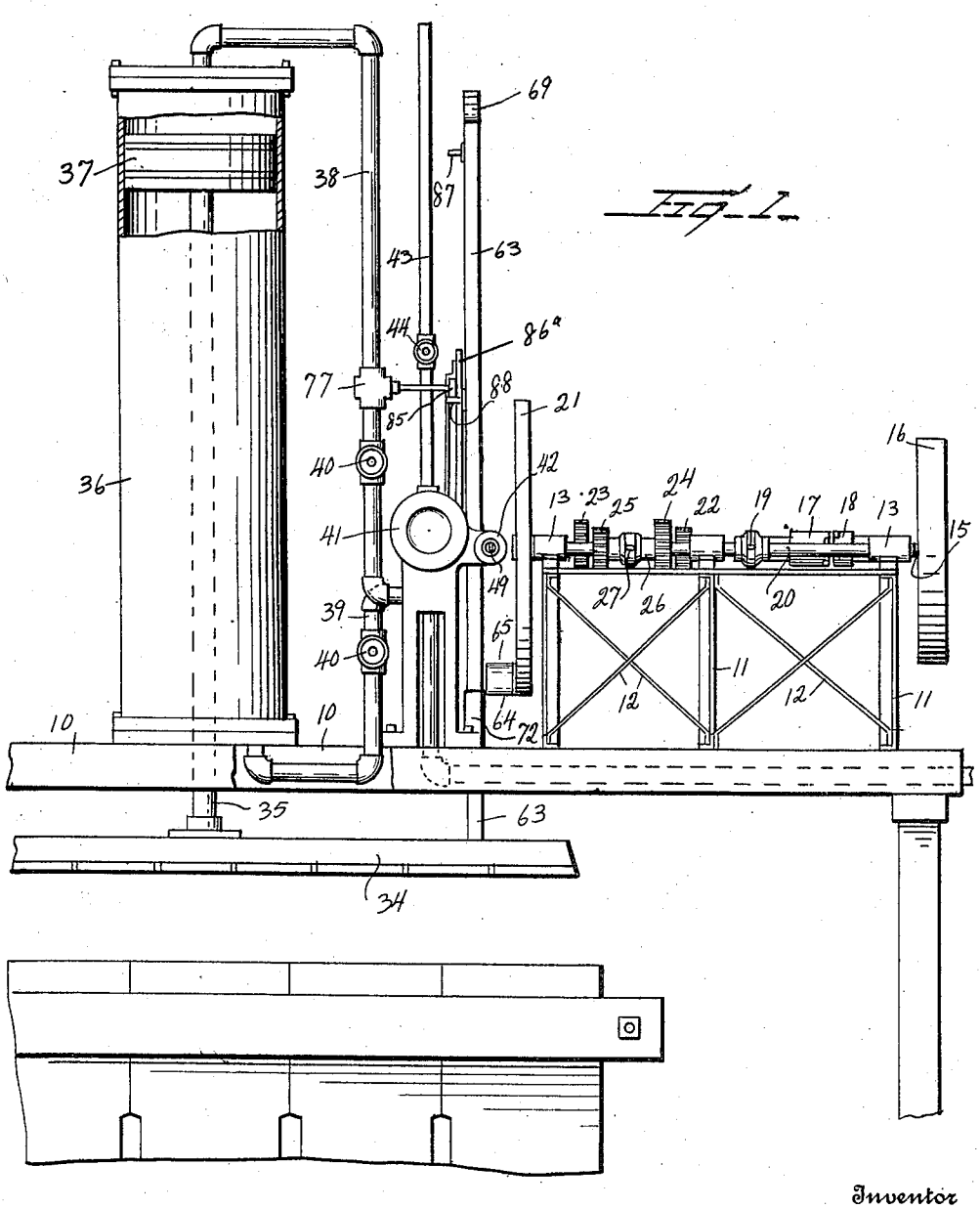


Fig. 1.

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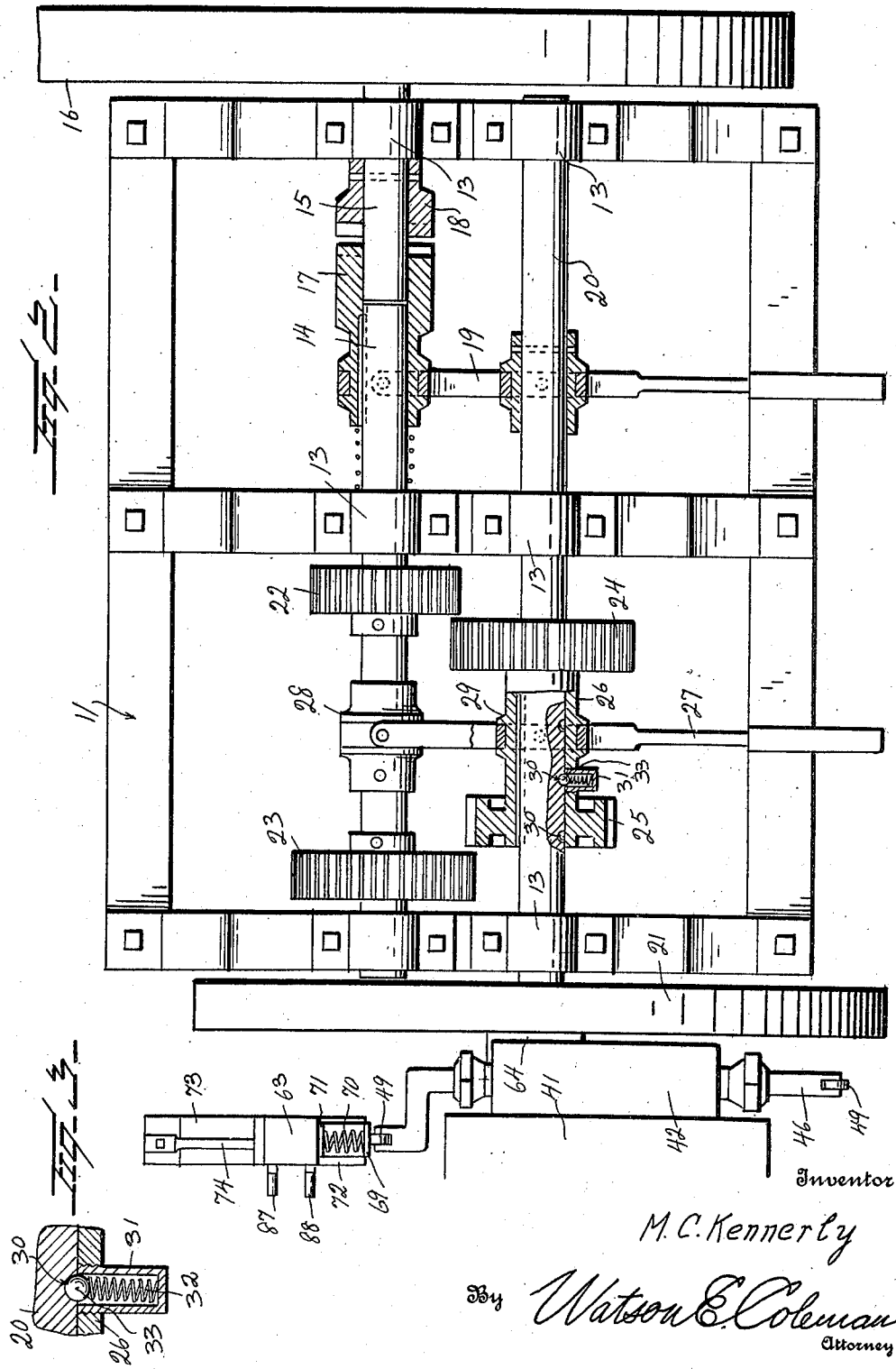
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Fig. 4.

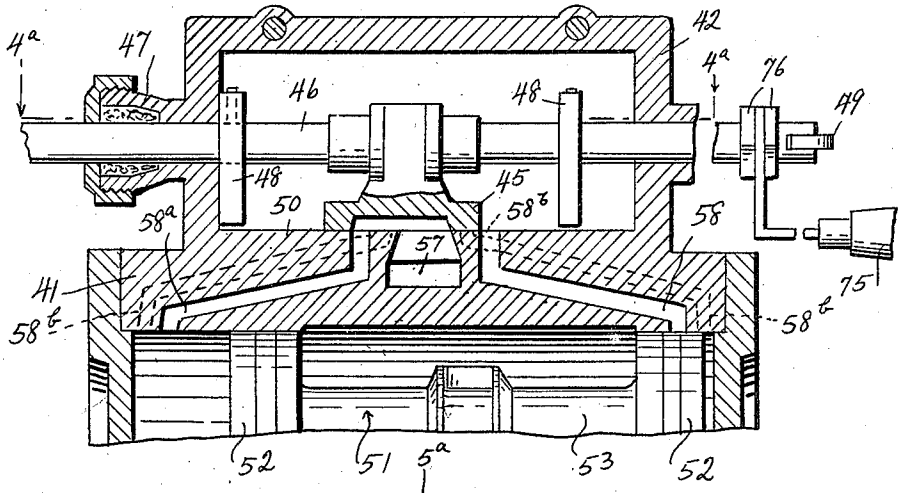
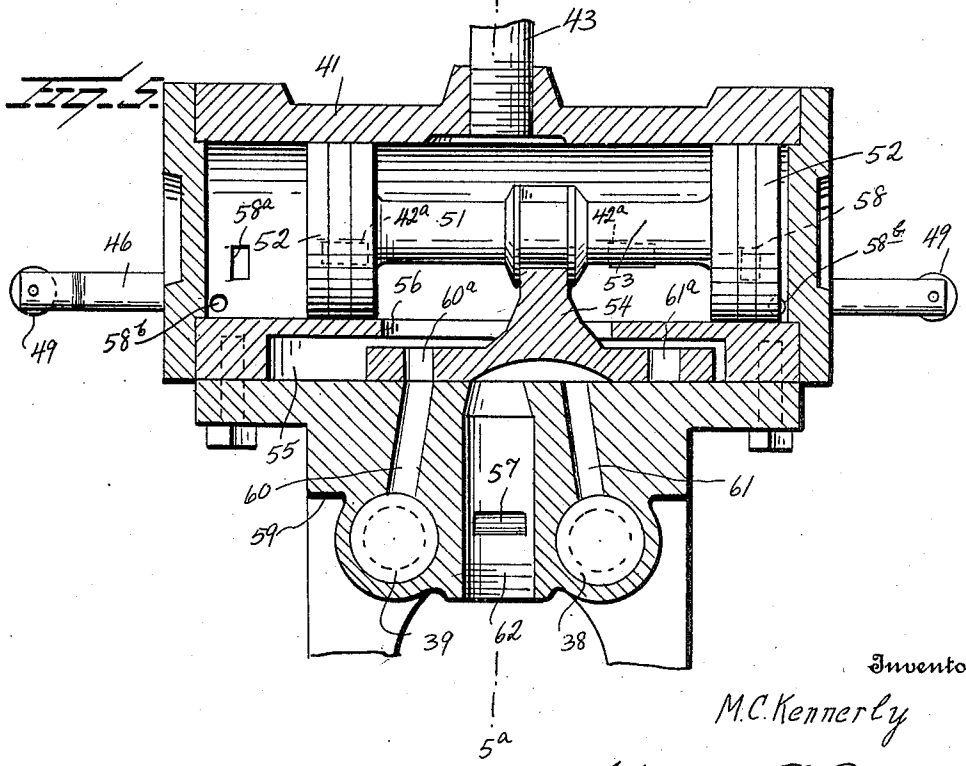


Fig. 5.



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Fig. 4a

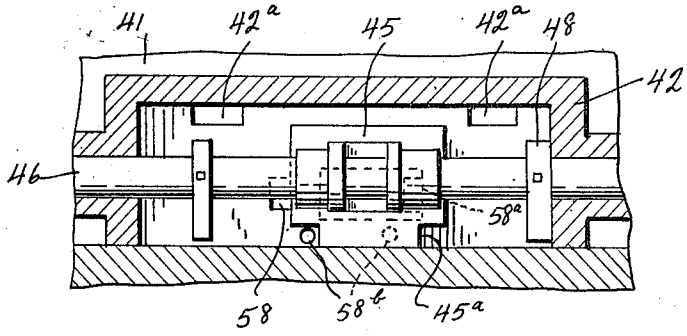
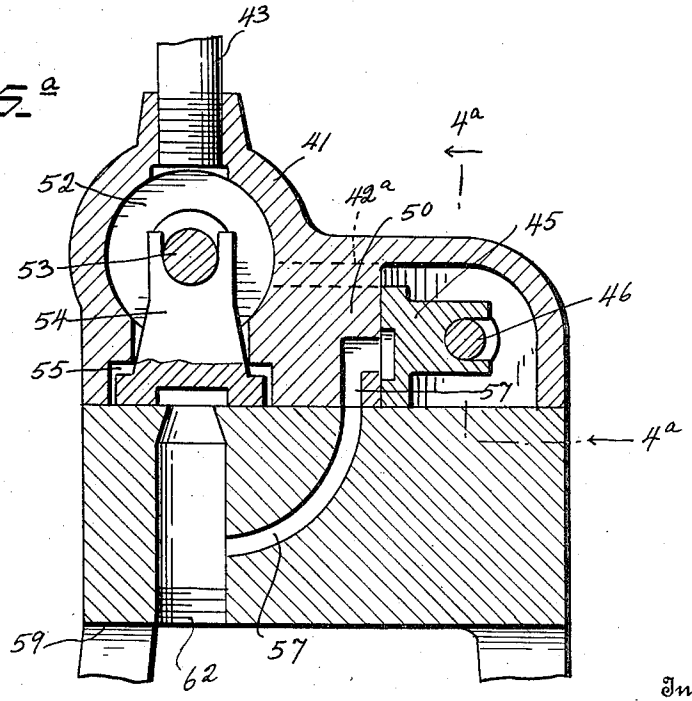


Fig. 5a



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6 SHEETS—SHEET 5.

Fig. 7.

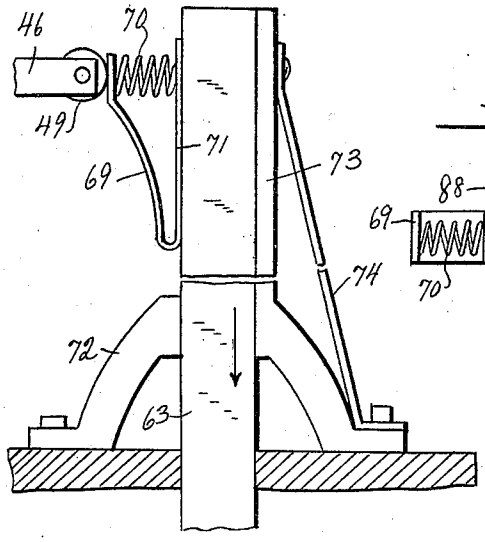


Fig. 8.

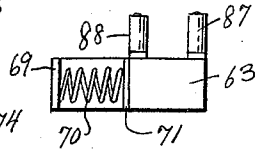


Fig. 6.

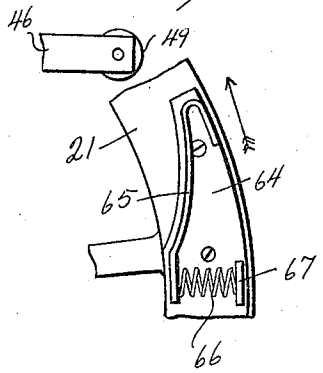


Fig. 10.

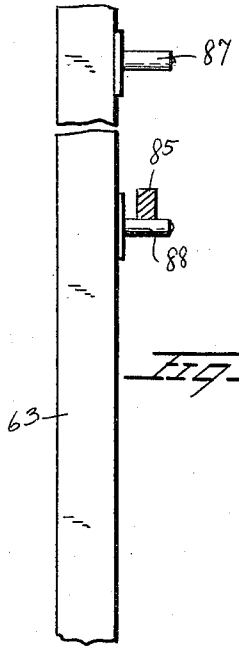
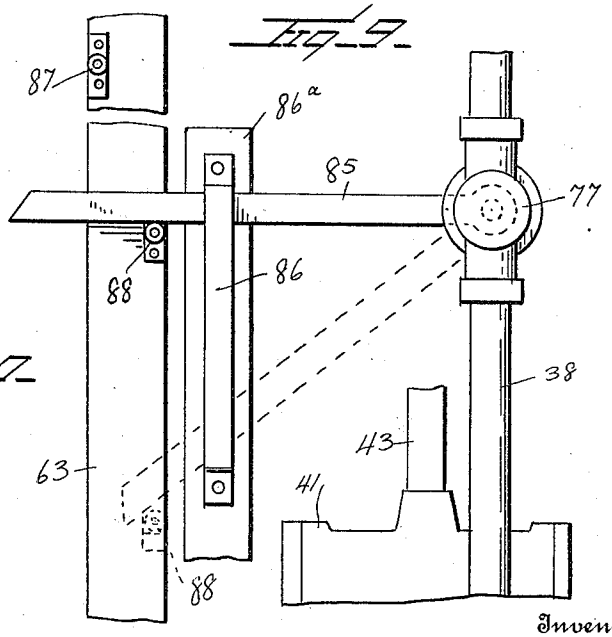


Fig. 9.



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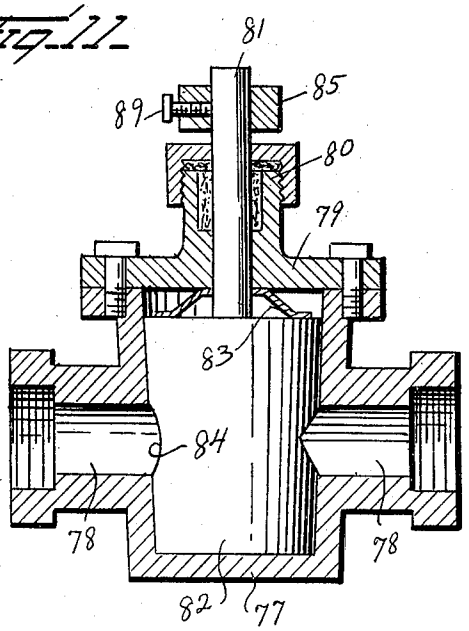
APPLICATION FILED MAY 17, 1919.

1,321,105.

Patented Nov. 11, 1919.

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Fig. 11.



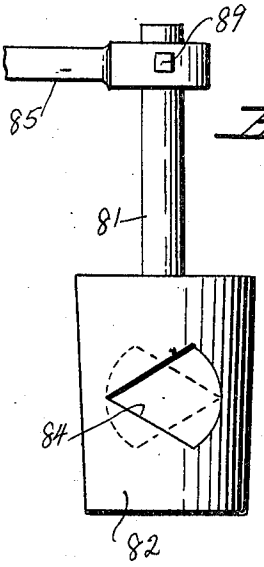


Fig. 12.

Fig. 13.

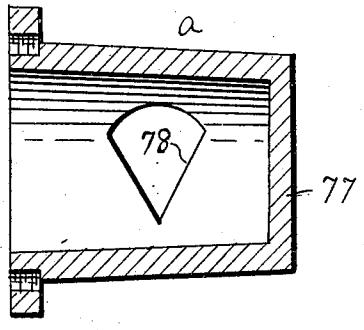


Fig. 14.

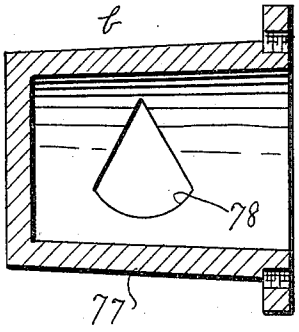
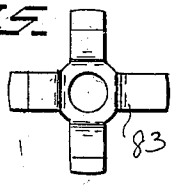


Fig. 15.



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UNITED STATES PATENT OFFICE.

MILTON C. KENNERLY, OF STUART, OKLAHOMA.

PACKING MECHANISM FOR COTTON-PRESSES.

1,321,105. Specification of Letters Patent. Patented Nov. 11, 1919.

Application filed May 17, 1919. Serial No. 297,942.

To all whom it may concern:

Be it known that I, MILTON C. KENNERLY, a citizen of the United States, residing at Stuart, in the county of Hughes and State of Oklahoma, have invented certain new and useful Improvements in Packing Mechanism for Cotton-Presses, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to presses, such as are used for compressing cotton into bales, and has particularly to do with the mechanism for causing the reciprocation of the packing plunger or packing block.

The general object of this invention is to provide valve actuating means whereby steam, air or other motive fluid under pressure may be automatically directed alternately to one side or the other of a piston connected to the packing plunger to thereby cause the automatic reciprocation of the pressing plunger.

A further object is to provide a construction of this character which may be operated at a low speed or a relatively higher speed, the speed of the machine being controllable by a single operator, or wherein the parts may be shifted to a neutral position, this shifting of the parts being also controlled by the same operator.

A further object is to provide manually operable means for controlling the shifting of the controlling valves whereby steam is directed into one or the other end of the packing cylinder.

A further object is to provide a machine that will operate at such a low rate of speed and which requires such a small amount of power that it will last indefinitely, and wherein the cost of maintenance and upkeep will be extremely small.

A further object is to provide a machine of this character which may be installed in connection with cotton presses of standard character without having to tear out and scrap expensive parts of the cotton press.

A further object is to provide means whereby, upon an up stroke of the packing piston or plunger, the steam or other motive fluid in the upper end of the cylinder will be gradually throttled down as it passes out of the cylinder to thereby gradually reduce the upward movement of the plunger and cushion the last part of the stroke so as to prevent the piston smashing or cracking the cylinder head, as sometimes occurs.

And a further object is to provide a valve which will also control the admission of steam or motive fluid to the upper portion of the cylinder above the piston so as to cause a gradual increase in the amount of steam to pass into the upper end of the cylinder as the piston moves downward until the plunger is about to enter the packer box or press box so that a full pressure may be admitted behind the piston to cause the plunger to descend with force to the farthest end of its travel.

And a further object is to provide means for automatically actuating this controlling valve upon the upward and downward movement of the plunger.

A further object is to provide a machine of this character which may be operated either by compressed air, steam, or by any other elastic motive fluid.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a front elevation of a cotton press with my mechanism applied thereto;

Fig. 2 is a top plan view, partly in section, of the valve controlling means for the plunger cylinder;

Fig. 3 is a fragmentary detail sectional view of the locking means for the transmission gears;

Fig. 4 is a longitudinal section of the controlling valve casing and a portion of the main valve casing;

Fig. 4^a is a section on the line 4^a—4^a of Fig. 4;

Fig. 5 is a longitudinal section of the main valve casing, the section being taken at right angles to the section shown in Fig. 4;

Fig. 5^a is a section on the line 5^a—5^a of Fig. 5;

Fig. 6 is a fragmentary side view of the bottom of the controlling wheel showing the cam;

Fig. 7 is a side elevation of the reversing cam rod and the cam carried thereby;

Fig. 8 is a top plan view of the construction shown in Fig. 7;

Fig. 9 is a fragmentary elevation of the

pipe leading to the upper end of the cylinder and showing the pressure reducing valve therein and the means for operating it;

Fig. 10 is a fragmentary elevation of the reversing cam rod, the valve arm being in section;

Fig. 11 is a sectional view of the reducing valve casing, the valve being in elevation;

Fig. 12 is an elevation of the valve removed from the casing;

Figs. 13 and 14 are sectional views of the two sections of the valve casing; and

Fig. 15 is a top plan view of the valve spring.

Referring to the drawings, 10 designates two longitudinal beams or like parts of a cotton press, which extend parallel to the press boxes of the press. Extending upward from these beams 10 are the supporting frames 11 of the machine, these frames being connected by cross braces 12 in any suitable manner, and the upper ends of two or more of these frames support bearings 13 for a longitudinally extending shaft formed in two sections 14 and 15. The section 15 is shown as carrying upon it a drive wheel 16 which may be connected to any desired source of power as, for instance, by means of a belt passing over this band wheel 16. Mounted upon the shaft section 14 is a shiftable clutch member 17 which coacts with a clutch member 18 mounted upon the shaft section 15, this clutch being shifted by means of a lever 19. Any suitable shifting mechanism might be used for this purpose. The clutch members 17 and 18 may be of any suitable character and when they are thrown into engagement with each other, the shaft section 14 will be rotated with the shaft section 15.

Mounted in suitable bearings 13 and extending parallel to the shaft 14 is a countershaft 20 carrying at one end a wheel 21 whose purpose will be later described. Mounted upon the shaft section 14 is a relatively small gear wheel 22 and a relatively larger gear wheel 23. Longitudinally shiftable upon the countershaft 20 is a relatively large gear wheel 24 and a relatively small gear wheel 25, these gear wheels 24 and 25 being connected by a sleeve 26 and being keyed upon the shaft 20, and the gear wheels 22 and 23 being pinned or otherwise attached to the shaft section 14. The distance between the gear wheels 22 and 23 is greater than the distance between the gear wheels 24 and 25, so that when these gear wheels 24 and 25 are disposed in a neutral position, they will not mesh with the gear wheels 22 and 23, but these connected wheels 24 and 25 may be so shifted as to connect the gear wheel 24 with the gear wheel 22 and disconnect the gear wheel 25 from the gear wheel 23, or cause the gear wheels 23 and 25 to mesh while the gear wheels 22 and 24 are disconnected. When the gear wheel 24 is in engagement with the gear wheel 22, the shaft 20 will be rotated at a relatively low speed. When the gear wheel 25 is in mesh with the gear wheel 23, however, the shaft 20 will be rotated at a relatively higher speed. For the purpose of shifting the gear wheels 24 and 25, I have provided a lever 27 which is pivotally mounted in any suitable manner as, for instance, upon a loose collar 28 on the shaft section 14, this lever 27 engaging between flanges 29 on the sleeve 26. For the purpose of locking the sleeve 26 with its gear wheels 24 and 25 either in a neutral, high speed, or a low speed position, I form the shaft 20 with three sockets 30 and form in the sleeve 26 a casing 31 extending at right angles to the sleeve, having therein a coiled compression spring 32 urging a ball 33 inward toward the sleeve. This ball will form a yielding lock when engaged with any one of the sockets 30, but will not prevent the manual shifting of the sleeve 26 with its gear wheels.

It will be seen that the mechanism above described gives a two speed transmission mechanism between the power shaft and the driven shaft 20.

Connected to the plunger block 34 of the press is the piston rod 35 which extends up into a cylinder 36 and carries a piston 37. A pipe 38 conducts motive fluid into one end of the cylinder, while a pipe 39 conducts motive fluid into the other end of the cylinder. Passage through these pipes may be controlled by the cut-off valves 40, one in each pipe. Passage of steam or other motive fluid to these pipes 38 and 39 is controlled by a main valve disposed in a main valve casing 41, and this valve is shifted by means of an auxiliary or controlling valve disposed in a casing 42. Steam, air, or other motive fluid from any suitable source is conveyed to the casing 41 by means of a feed pipe 43 having therein a cut-off valve 44. It is to be understood that the auxiliary or controlling valve contained within the casing 42 is shifted in one direction by means mounted upon the wheel-like rotatable member 21 and in the other direction by a reversing device which will be hereinafter described.

The auxiliary or controlling valve casing 42, as illustrated in Figs. 4 and 4ª, has disposed within it a D-valve 45 mounted upon a stem 46 which extends in opposite directions through the valve 45, through the end walls of the valve casing, and through suitable stuffing boxes or packing glands 47 mounted upon or carried by the end walls. Adjustable stop members 48 are mounted upon the valve stem 46 and are so adjusted that they will alternately contact with the

opposite end walls of the valve casing so as to limit the movement of the valve in one direction or the other. The extremities of the stem 46 are provided with rollers 49 whose purpose will be later stated. One side wall 50 of the valve casing 42 forms a part of the side wall of the valve casing 41. In this valve casing 41 is disposed the reciprocating spindle valve 51 having the heads 52 at its opposite ends. These heads are connected by means of a stem 53 and this stem is connected, as illustrated in Fig. 5, to a slide valve 54 moving in a chamber 55 having an inlet opening 56. A feed pipe 43 discharges into the central portion of this valve casing 41.

The side wall 50 of the valve casing 42 is formed with a medially disposed exhaust port 57 and oppositely directed ports 58 and 58[a] which open adjacent the ends of the valve casing 41 and whose opposite ends are located adjacent but on each side of the exhause port 57. The D-valve 45 is of such size and so arranged that in one position the port 58[a] will be connected to the exhaust port 57 while in another position, the port 58 will be connected to the exhaust port 57. When the port 58[a] is connected to the exhaust port 57, the port 58 communicates with the interior of the valve casing 42 and vice versa. Ports 58[b] are provided connecting the ends of the casing 41 to the valve casing 42. The casing 42 is connected by a suitable supply pipe to any source of steam or air under pressure as, for instance, the pipe 43, and this steam is directed to one side or the other of the piston or spindle valve 51. One side of the valve casing 41 is formed by a wall 59 and through this wall passes the ports 60 and 61, one of these ports connecting with the pipe 39 and the other with the pipe 38 and discharging thereinto. Between the ports 60 and 61 there is provided an exhaust port 62. The valve 54 is of the D type, but is provided at its extremities with the two ports 60[a] and 61[a] adapted to respectively register with the ports 60 and 61. The chamber 55 is deeper than the D-valve 54 and then when the ports 60[a], for instance are in alinement with the port 60, motive fluid which fills the interior of the valve casing 41 between the heads 52, will pass through the ports 60[a] into the port 60 and thence to the pipe 39 and to the lower end of the cylinder 36, while when the port 61[a] is in alinement with the port 61, motive fluid will pass to the pipe 38 and then to the upper end of the cylinder.

It will be seen that the auxiliary valve 45 controls, therefore, the movement of the main controlling valve 54 through the action of motive fluid upon the heads 52. This valve 45 is reciprocated by reciprocating the stem 46. When the stem is shifted in one direction, the piston 37 will be forced downward, and when it is shifted in the other direction, it will be forced upward. To the end of automatically shifting this stem 46 and the valve 45, I provide the mechanism now to be described.

Disposed upon the periphery of the wheel-like member 21 and rotating therewith, is a tappet which has a cam face and which as the member rotates will engage with the roller 49 on one end of the stem 46. Attached to the plunger block 34 is a vertically extending rod 63 which vertically reciprocates with the plunger head and which carries at its extremity a second tappet. The tappet on the wheel 21 comprises a member 64 attached to the side face of the rim of the wheel and carrying preferably a resilient strip 65 constituting a tappet proper which is inclined in a direction from the periphery of the wheel inward and rearward relative to the direction of motion of the wheel. This strip is slightly curved in its length and the extremity of the strip is resilient and supported by means of a radially disposed compression spring 66 bearing at one end against the upper end of the strip and at its opposite end bearing against a supporting lug 67, as illustrated most clearly in Fig. 6.

It will be seen that if the stem 46 projects out in one direction, the roller on the end of the stem will be struck by the cam face of the strip 65 and will be shifted longitudinally inward, but thereafter the wheel 21 may rotate any number of times without affecting the valve until it is again shifted outward. Mounted upon the face of a vertically movable rod 63 is a tappet member, as previously stated, comprising a base plate 71 formed to provide a resilient, outwardly curved, inclined strip 69, the extremity of which is urged outward or yieldingly supported against inward movement by a coiled compression spring 70 bearing at one end against the base 71. This cam-shaped strip 69 extends upward and outward, that is toward the valve casing 42, and if the valve stem 46 be projected, this slightly curved cam face of the strip 62 will engage the wheel on the end of the stem and force the valve inward in the opposite direction in which it is forced by the tappet on the wheel 21. This reversing rod 63 passes through a guide 72 having a base and having an upwardly extending, flat guide standard 73 against which the rod 63 moves and whereby the rod is guided in its travel. This upwardly extending portion 73 is braced from the base of the guide 72 by means of a brace 74. The plunger head or block 34 may be of any suitable construction and operates in the press boxes 35. These are of any usual and suitable form and need no particular description.

Means must be provided for shifting the controlling valve 45 by hand, and to that end

I have illustrated in Fig. 4, a control handle 75 whose shank is laterally bent and operatively engaged by nuts 76 on the valve stem 46. Thus, the control valve may be shifted independently of the automatic operating means. I have referred to the parts 76 as being nuts, but it is obvious that they may be blocks or pins otherwise attached to the valve stem.

In the operation of this device, power, as before stated is applied to the shaft section 15 through the band wheel 16 which is continuously rotating. This band wheel may be driven from a driving wheel attached to the condensing mechanism located just to the rear of the press. Initially the clutch member 17 is out of engagement with the clutch member 18 so that the shaft 14 is not rotating, and in this position of the parts, the gear shifting lever 27 is shifted in Fig. 2 to the right until the ball 33 locks in the right hand notch 30 and then the hand lever is released, leaving the gears 24 and 22 in mesh so that the shaft 20 is driven at a relatively low rate of speed. If it be desired to rotate the member 21 at a relatively higher rate of speed, the gear shifting lever 27 is shifted from its right hand position or from neutral to its extreme left hand position and locked by the ball 33 with the gears 23 and 25 in mesh. By placing the gear shifting lever in the middle position, the gears are at neutral and no power is transmitted to the countershaft 20.

Assuming that the gears 22 and 24, for instance, are in mesh, then the wheel 21 will be rotated and as the wheel 21 is rotated, the tappet formed by the cam face 65 will strike the stem 46 of the controlling valve and as the wheel continues its movement, will force this valve stem in, thus shifting the valve 45 in a direction to permit the exhaust of air from one end of the cylinder 41 and the inlet behind the piston head 52 at the other end of the cylinder. Thus, the spindle-shaped piston will be shifted in one direction and thus will shift the valve 54 so as to connect the casing 51 with the duct or pipe 38 leading to the upper end of the cylinder 36, thus causing the steam to enter the upper end of the cylinder and force the piston 37 downward, thus forcing the plunger block 34 down into the press boxes 35. This downward movement of the piston 37 will continue until the tappet formed by the member 69 on the upper end of rod 63 contacts with the opposite end of the valve stem 46, when the controlling valve will be reversed, and through the connections heretofore described, steam will be admitted to the cylinder 36 below the piston 37, while the pipe 38 will be connected to the exhaust port 62 so that the piston 37 and the plunger 34 will rise until they have risen to the full height, whereupon they will again be struck by the tappet on the wheel 21, the valve reversed, and the piston again forced downward. So long as the clutch members 17 and 18 are in mesh, the reciprocating movement of the pistons will continue. When a new bale of cotton has been started in the packer box, it is not necessary to operate the packing plunger for a few minutes until the packing box fills with cotton. Therefore, during this time, the gear shifting lever 27 may be disposed in its neutral position.

The transmission mechanism should first be placed in low speed and then as the bale of cotton nears completion, the transmission gearing is thrown into high speed, or if the packing box or press box fills rapidly, the transmission mechanism is thrown into high gear so that the plunger will operate more evenly and keep the cotton packed in the packing box as fast as it comes from the condenser. When the bale is finished, the transmission mechanism is thrown into neutral position or the clutch is thrown out, the press is turned, and the machine is ready for a new bale.

It will be seen that this machine may be readily installed, inasmuch as it merely requires that the mechanism be bolted to the top frame of the press on the right hand side of the cylinder, that is at the right hand side looking at the front of the press. A steam or air line is connected from the boiler or storage tank to the main valve casing, and a steam or air line is connected from the ports of the main valve casing to the cylinder 36. The auxiliary valve casing receives its steam or air from the main valve casing. The reversing rod 63 is fastened to the packer block plunger 34 and the machine is ready to be operated.

For the purpose of controlling the pressure of steam behind the piston 37 both upon the down stroke of the piston and upon its up stroke, I provide in the feed pipe 38 which extends to the upper end of the cylinder 36, a valve, the casing of which is designated 77 and which is illustrated in detail in Figs. 11 to 15. The valve casing, as illustrated in Fig. 11, has the oppositely disposed ports 78, and a cap or bonnet 79 with a packing gland 80 through which the valve stem 81 passes. The lower end of the valve stem carries a valve 82 which is slightly tapered and which is yieldingly held to its proper position by means of a four-armed spring 83. This valve has a passage 84 extending through it, which passage gradually diminishes in width from one end to the other, in other words this passage at both ends is approximately triangular but the apex of the triangular port at one end of the passage 84 is reversed relative to the triangular port forming the entrance at the other end of the passage. It will be seen, there-

fore, that the passage 84 through the valve body 82, will so coact with the ports 78 that when the valve body is in its initial position, only a very small steam passage will be left, but that as the valve is turned, this steam passage will increase in effective area until it reaches a maximum, then if the movement of the valve be reversed, this steam passage will decrease in effective area until its minimum is reached.

For the purpose of automatically rotating the valve from one position to another, I provide on the valve stem 81 an arm 85, as illustrated in Fig. 9, which passes through a guide 86, which guide is so disposed that the arm 85 cannot move upward beyond a horizontal position or other predetermined position, but which will permit the arm 85 to move downward for a predetermined distance. When the arm 85 is in its uppermost or horizontal position, the valve 82 is almost entirely closed. When the arm 85 is turned to its dotted line position in Fig. 9, the valve 82 is fully opened.

Mounted upon the reversing rod 63 are pins 87 and 88 which are spaced from each other a distance nearly equal to the stroke of the rod, and these pins are adapted to contact alternately with the arm 85 and shift the arm from its horizontal position to its downwardly inclined position, or vice versa. When the arm 85 is in its horizontal position, the valve can be so adjusted by releasing the set screw 80 and adjusting the arm 85 that there will be an opening or port for the passage of motive fluid only about $\frac{1}{8}''$ square. When the rod 63 is raised for the full extent, the piston 37 is raised to its full extent. Now when the valve casing 41 is shifted to connect the motive fluid supply pipe to the pipe 38 the steam will pass into pipe 38, but inasmuch as it passes through the very greatly reduced port opening of the valve 82, only a small amount of steam will initially enter the upper end of the cylinder 36 to force the piston 37 downward. This pressure of motive fluid gradually forced the piston 37 downward and the piston continues its gradual motion downward until the packer block or plunger 34 is about to enter the packer box. At this instant, the upper beam or roller 87 comes in contact with the arm 85 and in its downward movement shifts the valve arm from the position shown in full lines to the position shown in dotted lines in Fig. 9 so that the fluid passage through the valve 82 is gradually increased from a very small area to a "wide open" position. This position of the valve admits the full force of motive fluid which drives the piston downward with full force for the full extent of its travel. At this time, the cam 69 comes in contact with the extremity of the auxiliary valve stem 46 in the manner previously described and shifts the controlling valves so that steam is now admitted to the cylinder 36 below the piston 37 to force it upward. The full force of the fluid is used to force the piston upward until the lowermost pin 88 strikes the arm 85, whereupon the valve 82 is gradually closed, thus gradually increasing the cushioning of motive fluid behind the piston until the piston has reached the full extent of its movement. The gradual closing of the valve 82 acts to throttle down the exhaust from the upper end of the cylinder to such an extent that the piston 37 is cushioned with exhaust motive fluid and goes up gently to its former highest position and is prevented from striking the cylinder head and bursting it, as often happens.

It will be seen that I have provided by the arrangement shown in Figs. 9 to 14 an automatic valve which causes the relatively slow downward movement of the piston until the plunger has nearly reached the packer box or press box and then permits the full force of the motive fluid to be used upon the piston to force the plunger into the packer box, and that upon a reverse movement of the piston, the piston moves up rapidly from the press box until it has just passed it, when the valve 82 is gradually closed so as to reduce the speed of travel of the piston as it moves upward the piston is eventually cushioned. Here, again, I do not wish to be limited to the exact construction illustrated, as other means might be provided for accomplishing the same end without departing from the spirit of the invention.

By reference to Figs. 5 and 5^a, it will be seen that the exhaust port 57 of the auxiliary valve casing 42 is connected to the exhaust port 62 of the main valve casing 41, and it will likewise be seen from these figures that the interior of the valve casing 42 is connected by ports 42^a to the middle portion of the valve casing 41 so that the steam, compressed air, or other motive fluid discharged through the pipe 43 will also pass into the interior of the valve casing 46, and by the reciprocations of the D-valve 45 will be allowed to pass alternately to one end of the casing 41 or the other end thereof.

It will be noted from Figs. 4 and 4^a that the ports 58^b constitute motive fluid admission ports. These ports are disposed on one side of the valve casing 42 and that they are relatively small and that the D-valve 45 is cut away, at 45^a, (see Fig. 4^a) so as to expose one or the other of these ports 58^b coincidently with the exposure or opening of the ports 58 and 58^a. In Figs. 4 and 4^a, the port 58 and the corresponding port 58^b are opened into the casing 42 before the piston valve head 52 has closed the opposite end of the port 58. Therefore, steam, air or other motive fluid from the casing 42 can only enter into this clearance space between the

head 52 and the right hand end of the casing 41 in Fig. 4, through the port 58^b on this side. Therefore, as this port is very small, only a relatively small amount of motive fluid is allowed to enter behind the head 52 and the piston valve 51 will, therefore, move very slowly toward the left in Fig. 4 until the port 58 is uncovered by the head 52. When this is uncovered, it permits the full force of steam or air and rapidly forces the piston 51 to the opposite end of the cylinder and carries with it the main valve 54.

Now when the auxiliary valve stem 46 is shifted to its other position than that shown in Fig. 4, the port 58 will be connected to the exhaust port 57, while steam or air will be admitted to the opposite end of the piston 51 and causes this piston valve to travel rapidly to the opposite end of the cylinder or casing until the head 52 covers the port 58. Now as the corresponding port 58^b has one opening to the discharge port 57, but is covered, as in Fig. 4, by the D-valve 45, there is a compression of the motive fluid between the piston head 52 and the cylinder head which catches the piston 51 and prevents the piston valve from knocking out the cylinder head.

The reason for using two valves, that is a main valve and an auxiliary valve, is that the auxiliary valve is relatively small and only moves a short distance. Therefore, the pressure of motive fluid on this small valve causes only a slight resistance to the movement of the valve and it can shift it from one position to the other, as a matter of fact, by the touch of a finger, with ease. If I used only the main valve illustrated in Fig. 5, it would have to be of considerable size in order to care for the amount of motive fluid passing through it and there would be such a pressure on this valve that the friction on its face or seat would be considerable and it would require a great deal of force to shift it from one position to the other, and the operating cams therefor acting on the valve stem would have to be relatively large and the whole machine would have to be built much heavier and stronger in order to cause the shifting of the main valve than in order to shift the auxiliary valve.

Regarding the reciprocations of the plunger 34 into the press box, when the plunger 34 is at its lowest point, it does not enter the press box more than one-third of the depth of the box and this plunger does not begin to pack or press the cotton down to the size of a finished bale. For this reason, the plunger makes practically its full stroke each time, except when an extra large or heavy bale of very dry and spongy cotton is being formed, which is very rare. The packing mechanism to which my inprovement is applied does not finish the packing or pressing of the bale, but merely packs the cotton into the press box, and when a bale of cotton is packed into a press box, the press is turned so as to carry the box with the cotton in it directly over a ram or plunger that is forced up by hydraulic pressure from an independent pump and then the bale is pressed to its finished form.

It will be understood that the clutch 17 and its operating means is necessary in order that the gears may be shifted to control the speed of the machine into a neutral position. The clutch is thrown out of operative position when the gears are being shifted, and then again into its clutching position when the gears have been shifted.

While I have illustrated a construction which I believe to be thoroughly effective in practice and which is very simple and positive in its operation, yet it will be obvious that many modifications might be made in the details of construction and arrangement of parts without departing from the spirit of the invention.

I claim:—

1. The combination with a press and a plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve mechanism in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, means shifting the valve mechanism to a position admitting motive fluid into the upper end of the cylinder, and means attached to the plunger and moving therewith adapted to engage the valve mechanism and shift the valve mechanism to its opposite position when the plunger has descended a predetermined distance.

2. The combination with a press and a plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, means for intermittently shifting said valve to a position admitting motive fluid into the upper end of the cylinder, and a member attached to the plunger and moving therewith adapted to engage the valve to shift it to its opposite position when the plunger has shifted a predetermined degree.

3. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, and means for automatically shifting said valve alternately to one position or the other, including a power operated member

adapted to operatively shift the valve to a position admitting motive fluid into the upper end of the cylinder, and a member attached to the plunger and moving therewith adapted to engage the valve and shift it to its opposite position when the plunger has descended a predetermined degree.

4. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, means for automatically shifting said valve alternately to one position or the other, including a power operated shaft, a rotatable member mounted on the shaft and carrying a tappet operatively engaged to said valve to shift it in one direction to thereby open communication between a source of power and the upper end of the cylinder, and a member carried upon the plunger and moving therewith and adapted to operatively engage said valve and shift it to its opposite position when the plunger has moved a predetermined distance to thereby connect the lower end of the cylinder with a source of power.

5. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, means for automatically shifting said valve alternately to one position or the other, including a power operated shaft, a rotatable element mounted thereon and carrying a tappet adapted to operatively engage said valve to shift it to a position to connect the upper end of the cylinder with a source of motive fluid, a rod mounted upon the plunger and moving therewith and having a tappet mounted thereon adapted to engage said valve to reverse it and connecting the lower end of the cylinder with a source of motive fluid when the plunger has descended a predetermined distance, and manually operable means for disconnecting said shaft from its source of power.

6. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, means for automatically shifting said valve alternately to one position or the other, including a power operated shaft, a rotatable element mounted thereon and carrying a tappet adapted to operatively engage said valve to shift it to a position to connect the upper end of the cylinder with a source of motive fluid, a rod mounted upon the plunger and moving therewith and having a tappet mounted thereon adapted to engage said valve to reverse it and connecting the lower end of the cylinder with a source of motive fluid when the plunger has descended a predetermined distance, and manually controlled means for driving said shaft at different speeds.

7. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, means for automatically shifting said valve alternately to one position or the other, including a power operated shaft, a rotatable element mounted thereon and carrying a tappet adapted to operatively engage said valve to shift it to a position to connect the upper end of the cylinder with a source of motive fluid, a rod mounted upon the plunger and moving therewith and having a tappet mounted thereon adapted to engage said valve to reverse it and connecting the lower end of the cylinder with a source of motive fluid when the plunger has descended a predetermined distance, manually controlled means for driving said shaft at different speeds and including a plurality of sets of transmission gears arranged to give a plurality of speeds to the said shaft, and manually operable means for shifting said transmission gears to control the speed of the shaft.

8. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, means for automatically shifting said valve alternately to one position or the other, including a power operated shaft, a rotatable element mounted thereon and carrying a tappet adapted to operatively engage said valve to shift it to a position to connect the upper end of the cylinder with a source of motive fluid, a rod mounted upon the plunger rod moving therewith and having a tappet mounted thereon adapted to engage said valve to reverse it and connecting the lower end of the cylinder with a source of motive fluid when the plunger has descended a predetermined distance, manually controlled means for driving said shaft at different speeds and including a plurality of sets of transmission gears arranged to give a plurality of speeds to the said shaft, man-

ually operable means for shifting said transmission gears to control the speed of the shaft, and manually operable means for disconnecting the transmission gears from the source of power.

9. A packing mechanism for cotton presses including a packing plunger and cylinder, a piston moving therein and operatively connected to the packing plunger, a valve in one position connecting one end of the cylinder with an exhaust outlet and the other end of the cylinder with a source of motive fluid and in another position connecting the first named end of the cylinder with a source of motive fluid and the last named end of the cylinder with an exhaust opening, means for shifting said valve including a reciprocatable member having a stem, a wheel having a cam-shaped tappet member adapted in its rotation to engage with one end of the stem to force the valve in one direction, a rod connected to the plunger and moving therewith and having a cam-shaped tappet adapted to engage with the other end of the stem to reversely shift the said member, and power operated means for rotating said wheel and controlling the speed of its rotation.

10. A packing mechanism for cotton presses including a packing plunger and cylinder, a piston moving therein and operatively connected to the packing plunger, a valve in one position connecting one end of the cylinder with an exhaust outlet and the other end of the cylinder with a source of motive fluid and in another position connecting the first named end of the cylinder with a source of motive fluid and the last named end of the cylinder with an exhaust opening, means for shifting said valve including a reciprocatable member having a stem, a wheel having a cam-shaped tappet member adapted in its rotation to engage with one end of the stem to force the valve in one direction, a rod connected to the plunger and moving therewith and having a cam-shaped tappet adapted to engage with the other end of the stem to reversely shift the said member, power operated means for rotating said wheel and controlling the speed of its rotation, comprising a driven shaft having gear wheels thereon, a driving shaft having gear wheels thereon, the gear wheels on the driving and driven shafts having different ratios, means for shifting one set of gear wheels to thereby control the speed of the shaft, and means for connecting or disconnecting the shaft to a source of power.

11. An automatic packer for cotton presses including a plunger, a cylinder, a piston operating in the cylinder and operatively connected to the plunger, a main valve casing connected to a source of motive fluid under pressure and having an exhaust port, ports leading to opposite ends of the cylinder, a fluid operated valve in said main valve casing shiftable to connect either one of the last named ports to the exhaust port and simultaneously connect the other of said first named ports to the source of motive fluid, an auxiliary valve controlling the action of motive fluid upon the main valve, an auxiliary valve in said casing having a longitudinally extending stem projecting beyond the casing, means for alternately shifting said valve stem in opposite directions comprising a power operated, rotatable member having a cam-shaped tappet adapted to engage one end of the valve stem when the valve stem is projected in one direction and thereby force the valve stem in one direction, and a rod shiftable by the plunger and having a tappet engageable with the opposite end of the valve stem when the plunger has lowered a predetermined distance to thereby shift the valve stem to the opposite direction to the direction in which it was shifted by the tappet on the rotatable member.

12. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of means for directing motive fluid alternately into one end of the cylinder or the other, means for gradually increasing the pressure of motive fluid on the piston after the piston has traveled in the cylinder a predetermined distance, and means for gradually decreasing outward movement of the exhaust motive fluid in the same end of the cylinder upon the reverse travel of the piston.

13. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of ducts conducting motive fluid to the outer and inner ends of the cylinder respectively, a pressure controlling valve disposed in the duct connected to the outer end of the cylinder and controlling passage therethrough, said valve when the piston is raised being in a position reducing flow of motive fluid therethrough to a minimum, and means acting as the piston descends to shift said valve to its fully opened position and as the piston ascends to shift the valve to its first named position.

14. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of ducts conducting motive fluid to the outer and inner ends of the cylinder respectively, a pressure controlling valve disposed in the duct connected to the outer end of the cylinder and controlling passage therethrough, said valve when the piston is raised being in a position

reducing flow of motive fluid therethrough to a minimum, and means acting after the piston has descended a predetermined extent to gradually shift the valve to its fully opened position and after the piston has raised to a predetermined extent, acting to gradually shift said valve toward its first named position.

15. The combination with a press and plunger therefor, a cylinder and a piston operating in the cylinder and operatively connected to the plunger, of a valve in one position directing motive fluid into one end of the cylinder and in another position directing fluid into the other end of the cylinder, means for automatically shifting said valve alternately to one position or the other including a power operated member adapted to operatively shift the valve to a position admitting motive fluid into the upper end of the cylinder, a member operatively connected to the plunger and moving therewith adapted to engage the valve and shift it to its opposite position when the plunger has descended a predetermined degree, a valve disposed between said first named valve and the head of the cylinder and controlling admission to the upper end of the cylinder, said valve having an arm, and means on said last named member adapted upon a descent of said last named member to a predetermined extent to engage said arm and shift it to thereby shift the valve connected therewith from a position of minimum opening to a wide open position, and acting upon an upward movement of said member to engage said valve arm after the member has moved a predetermined distance to shift the valve from its wide open position to a position of minimum opening.

16. A packing mechanism for cotton presses including a packing plunger and a cylinder, a piston moving therein and operatively connecting the packing plunger, and means for controlling the passage of motive fluid from a source into one end of the cylinder or the other including a longitudinally reciprocatable main valve and an auxiliary valve having ports leading to opposite ends of the main valve casing and having an exhaust port, a D-valve longitudinally shiftable to connect either end of said ports with the exhaust port and permit the entrance of steam through the other port, and relatively small fluid admission ports opening to opposite ends of the cylinder outward of the first named inlet ports and opening into the auxiliary valve casing inward of the inlet ports, the D-valve being cut away to alternately expose the admission ports simultaneously with the uncovering of the corresponding inlet ports.

17. In a mechanism of the character described, a main valve casing having a reciprocating valve therein formed with opposed heads, an auxiliary valve casing connected to a source of motive fluid, a medially disposed exhaust port opening into the auxiliary valve casing, inlet ports opening into the auxiliary valve casing on each side of the exhaust port and extending to opposite ends of the main valve casing and opening thereinto, the inlet valve ports being adapted to be alternately closed by the main valve as it moves from one end of the casing to the other, and relatively small fluid admission ports having a relatively small diameter opening into opposite ends of the main valve casing outward of the inlet ports and opening into the auxiliary valve casing between the exhaust port and the inlet ports, a D-valve operating on the auxiliary valve casing and adapted to alternately connect the exhaust port with one or the other of the inlet ports and alternately close and open the adjacent ends of the admission ports whereby to cause the inlet of a relatively small amount of motive fluid initially behind the head of the main valve at the beginning of the return stroke of the main valve.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

MILTON C. KENNERLY.

Witneses:
J. L. MAINARD,
M. B. BUNYARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."