

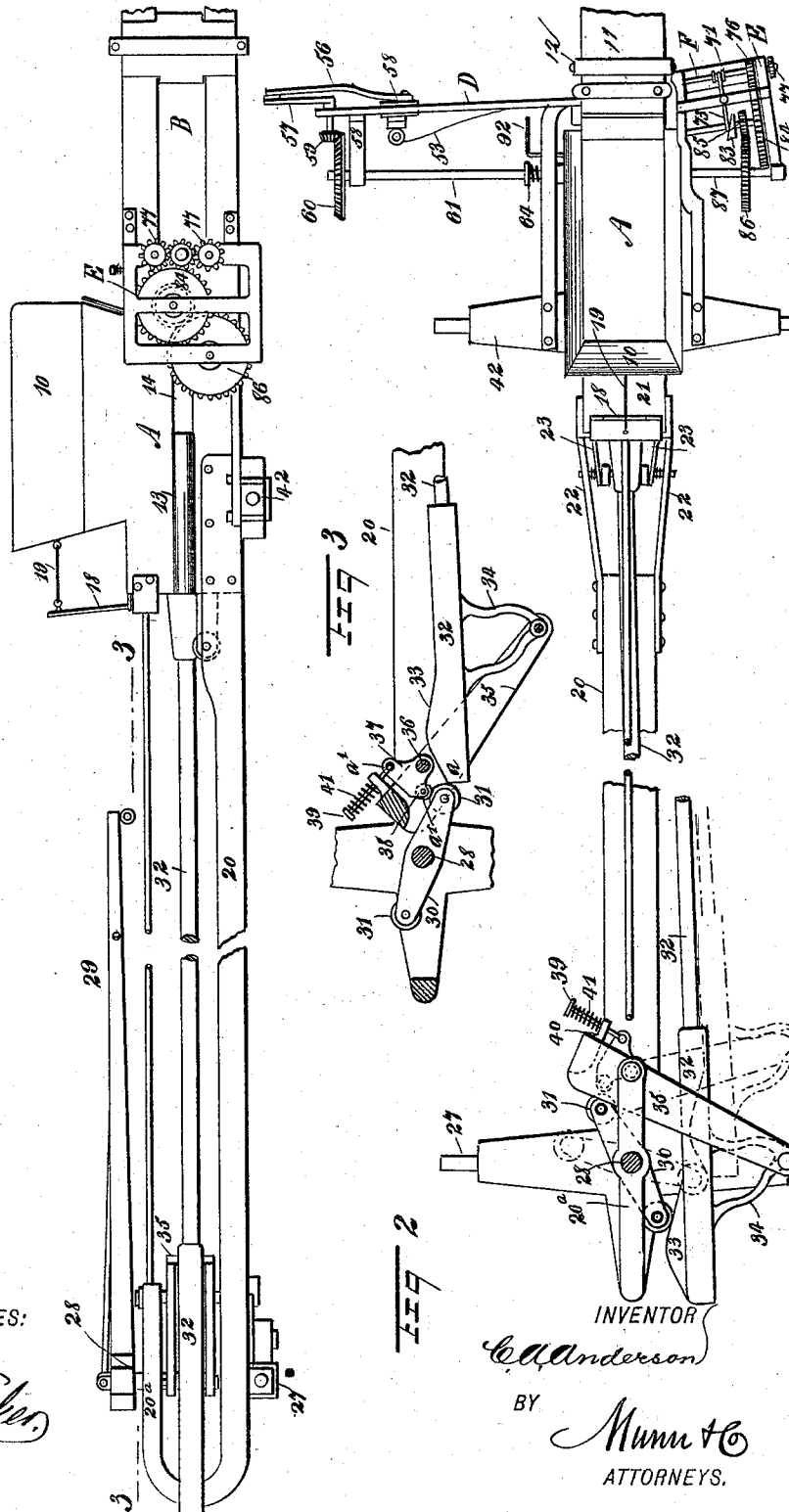
(No Model.)

3 Sheets—Sheet 1.

C. A. ANDERSON.
HAY PRESS.

No. 558,754.

Patented Apr. 21, 1896.



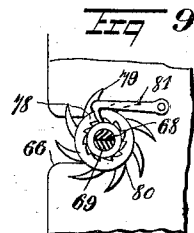
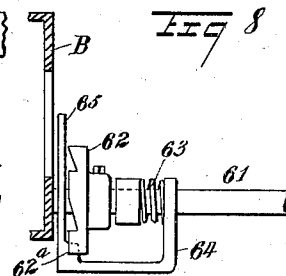
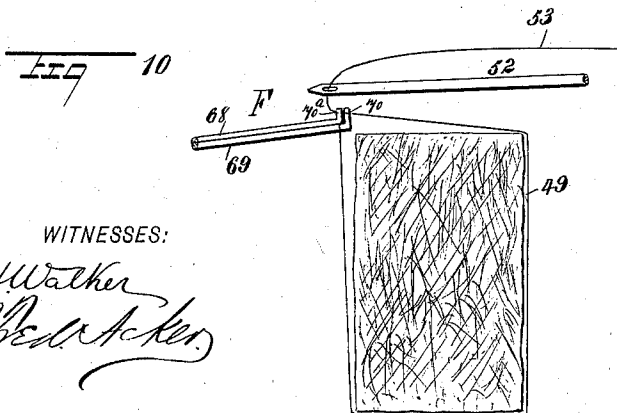
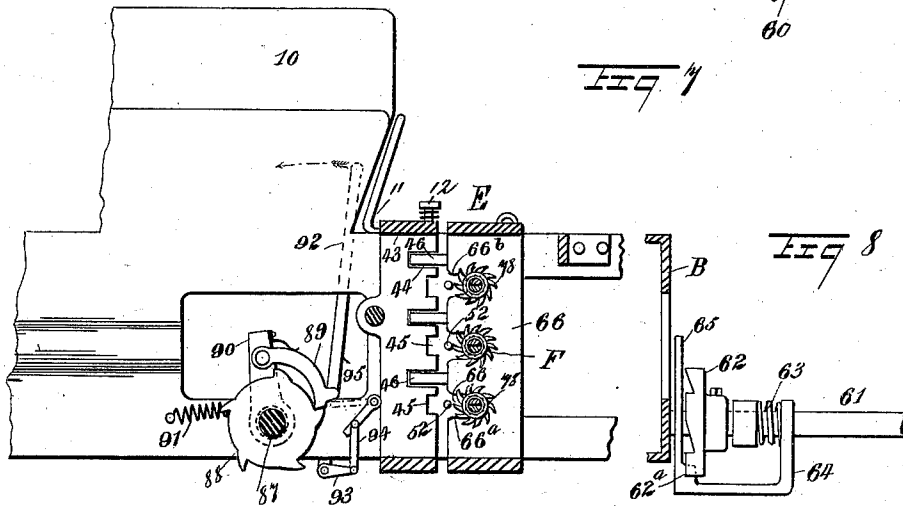
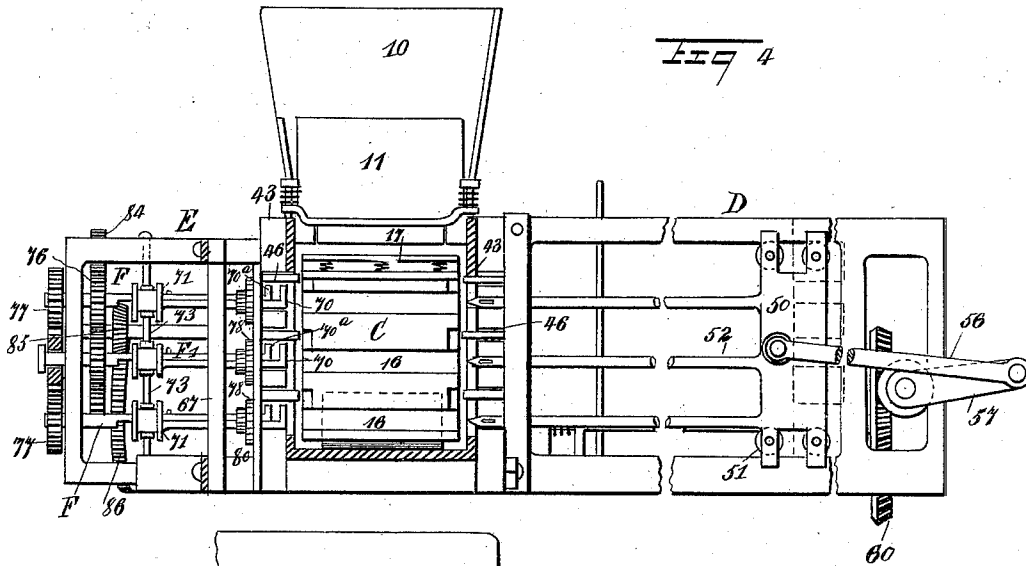
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3 Sheets—Sheet 2.

C. A. ANDERSON.
HAY PRESS.

No. 558,754.

Patented Apr. 21, 1896.



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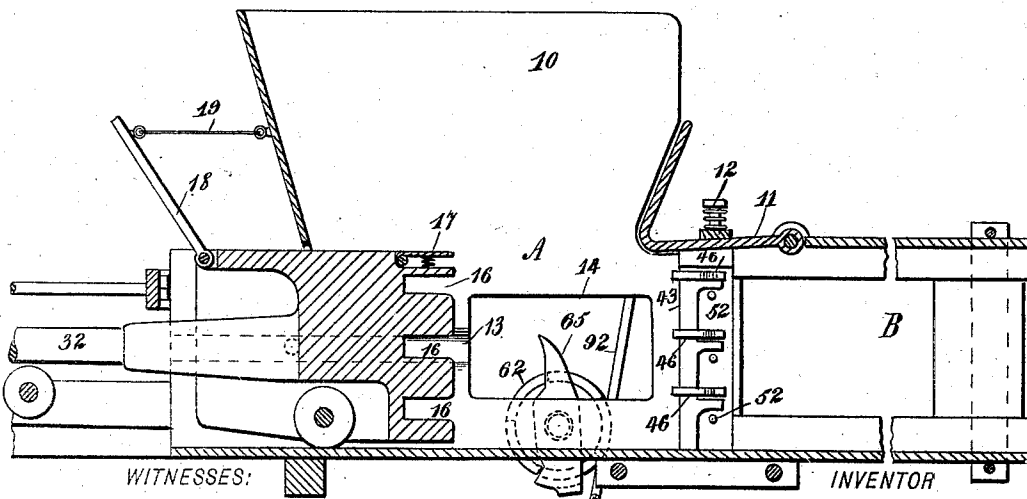
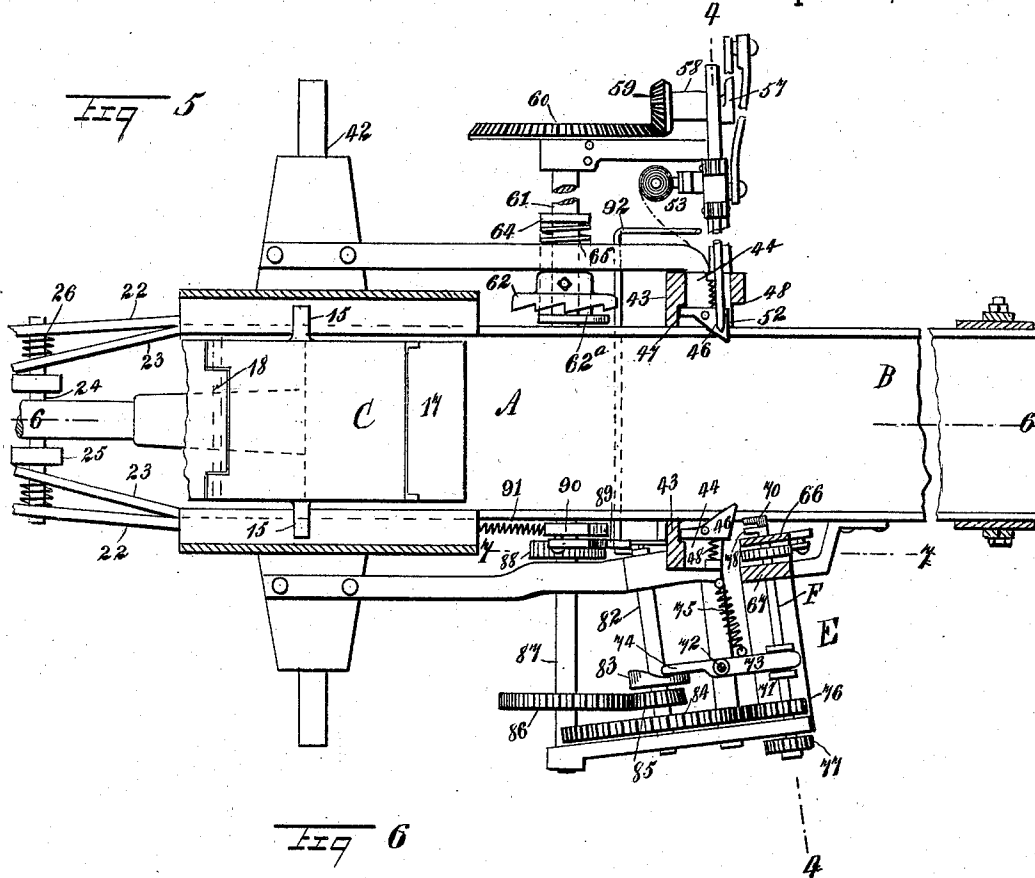
(No Model.)

3 Sheets—Sheet 3.

C. A. ANDERSON.
HAY PRESS.

No. 558,754.

Patented Apr. 21, 1896.



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UNITED STATES PATENT OFFICE.

CHARLES ADAM ANDERSON, OF CALE, INDIAN TERRITORY.

HAY-PRESS.

SPECIFICATION forming part of Letters Patent No. 558,754, dated April 21, 1896.

Application filed August 29, 1895, Serial No. 560,921. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ADAM ANDERSON, of Cale, in the Choctaw Nation, Indian Territory, have invented a new and Improved Hay-Press, of which the following is a full, clear, and exact description.

My invention relates to an improvement in hay-presses; and it has for its object to simplify the construction of such machines and to provide for a quick return of the plunger, great rapidity of baling, and a mechanism simple, durable, and economic, through the medium of which the bale while in process of formation may be tied by passing needles and wires through recesses in the plunger, and whereby also the wire bands thus formed will be twisted around the bale, holding it together and thus requiring less pressure on the part of the piston of the press than ordinarily, and whereby, further, the wire forming the tie will be caught when the tie is formed and held in position to form a second tie, the operation being entirely automatic.

Another object of this invention is to provide a horse-power for the press which will be of exceedingly light draft, and through the instrumentality of which a quick return of the plunger will be obtained and whereby also the plunger upon its return will be stopped by a spring-controlled buffer.

Another object of this invention is to assist the material in entering the receiving-chamber by placing a pivoted tucking-plate above the mouth of the said chamber, this plate not interfering in the least with the functions of the hopper, of which it likewise forms a part, or with the baling-chamber.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out 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 the improved press. Fig. 2 is a partial plan view of the same. Fig. 3 is a horizontal section taken substantially on the line 3 3 of Fig. 1. Fig. 4 is a transverse section, taken substantially on the line 4 4 of Fig. 5, illustrating the needle and the device for twisting and tying the

bands and for cutting the same. Fig. 5 is a section taken horizontally through the press at the baling-chamber. Fig. 6 is a longitudinal section taken on the line 6 6 of Fig. 5. Fig. 7 is a partial side elevation of the press and a vertical section on the line 7 7 of Fig. 5. Fig. 8 is a detail view of a portion of the mechanism adapted to impart movement to the needles. Fig. 9 is a detail view of one of the finger-wheels employed for holding an end of the wire in the formation of a loop or band; and Fig. 10 is a view of a portion of the bale, illustrating the manner in which the tie is formed thereon, showing the gripping and twisting jaws and the needle and their relation to one another.

The press is provided with a baling-chamber A, which is in direct communication with the receiving-chamber B or chamber in which the bales are received while being pressed and when pressed and through which the tying mechanism is carried. The said baling-chamber is provided with a hopper or feed-box 10 at the top and is open beneath the feed-box and immediately at the forward end thereof.

The chamber B is normally closed, especially at the top and bottom and at a portion of its sides, and where the chamber B connects with the chamber A and the said chamber A connects with the hopper 10 a door 11 is formed in the top of the said chamber B, being normally held closed by spring-controlled clamps 12 of any approved description. The door 11 is of angular construction, comprising a horizontal or straight member by means of which it is hinged in the top of the said chamber B. This horizontal member extends practically into the hopper 10 over the rear portion of the baling-chamber A, and has an upwardly and rearwardly extending member, which forms a portion of the hopper at its rear side, the surface where the two members connect being rounded off. The spring-tension door 11 thus forms the front top portion of the receiving-chamber B and the hindmost end of the hopper 10, and the front curved or rounded portion of the door acts as a folder to tuck any hay down that may be on the top rear portion of the plunger, to be hereinafter described, when the said plunger completes its compressing stroke.

When the plunger rebounds, there is nothing to support the said loose hay, and as the front or rounded end of the door 11 is made to extend somewhat below the top portion of the receiving-chamber this end will force the hay to fold down and assume position in the inside portion of the bale. If the hay were permitted to remain on the top of the bale, the bale would be very rough and ragged. The door 11 is also capable of an upward movement when any substance extends above the top portion of the plunger during the passage of the said substance from the baling to the receiving-chamber, and the door furthermore greatly assists the material in passing from the baling-chamber A into the receiving-chamber B, and consequently less pressure is required on the pitman operating the plunger. The baling-chamber has a longitudinal groove 13 made in each of its sides, extending practically from its free end to a point at or near the center, or beyond the center, the groove being made by pressing out the sides of the said chamber, and a longitudinal opening 14 is likewise made in each side, commencing at the termination of the groove and extending to the mechanism for tying the bale and to be hereinafter described.

A plunger C is held to slide in the baling-chamber, and this plunger is provided with trunnions 15 at each side adapted to travel in the grooves 13 of the baling-chamber and to pass outward through the side openings 14 thereof, as shown in Fig. 5. This plunger is provided with horizontal recesses 16 in its forward face, usually three in number, and is furthermore provided at the top portion of its inner end with a spring-pressed plate 17, whereby when the plunger approaches the rear end of the baling-chamber it may readily pass the door 11, which forms the top thereof at said end, as shown in Fig. 6, enabling the plunger to pass rearward even though material may be at the said rear end and might ordinarily interfere with its action.

The plunger has a drop-door 18 pivotally attached to its forward upper end, and this door is connected with the front end of the feed-box in a pivotal manner by means of a link 19, and the said drop-door 18, upon the inward movement of the plunger, will fall down horizontally and cover the forward open upper portion of the baling-chamber and will continue practically within that portion covered by the feed-box. This press is particularly adapted to form a bale in a series of operations—that is to say, the bale is not formed at one inward stroke of the plunger, but by two, three, or more, as may be found desirable. Therefore when this drop-door is attached to the plunger the person attending to the feeding of the machine while the plunger is on its compressing stroke may feed material on the top thereof, so that as the plunger is drawn outward on its return movement this material will drop into the baling-chamber and form a nucleus for the

second instalment to the bale. By adding this door to the press a large bale may be made without the necessity of having the press of very great length.

A beam 20 is projected forwardly and horizontally from what may be termed the "base" portion 21 of the baling-chamber, being ordinarily attached to the said chamber by arms 22, and plates 23 are secured at their inner ends to the baling-chamber between the arms 22. The forward ends of the plates converge and are loosely mounted upon a rod 24 secured in the arms 22. Nuts 25 limit the forward movement of the plates and springs 26 coiled upon the rod 24 cushion the outer faces of the plates and maintain them in their angular position relative to each other. These plates constitute buffers for the plunger C on its return stroke, the forward end of the plunger being preferably made somewhat tapering, so as to engage with the aforesaid plates. The beam 20 carries an axle 27 at its forward end upon which wheels may be mounted, and this axle is preferably pivotally connected with the said beam and the forward end of the beam is bent upon itself to form an upper return-arm 20^a. A vertical shaft 28 is journaled in the beam and its return-arm and a pole or shafts 29 is or are attached to the upper end of this shaft in order that a team may be harnessed thereto. A cross-head 30 is secured to the shaft 28 between its bearings, and the said cross-head is provided at each end with a friction-roller 31. A pitman-rod 32 is secured to the forward end of the plunger and extends forwardly along the beam 20, and this pitman-rod at its forward extremity has an inclined plane or cam surface 33 upon the inner side of its head, while a bracket-arm 34 is projected outwardly from the outer side of the head portion.

A link-lever 35 is pivoted at its outer end to the outer extremity of the pitman-bracket 34, and near its opposite end the said link-lever is fulcrumed between the return-arm 20^a of the beam and the beam itself in such position that as the cross-head 30 revolves its friction-rollers may pass between the members of the lever, and on the pivot 36 forming the fulcrum of this lever a trip or return wheel 37 is pivoted, the said wheel being substantially of lantern construction, comprising a top and a bottom plate *a*, as shown in Fig. 3, and bars *a'* connecting the said plates at opposite sides. The plates being of triangular construction they are pivoted at or near their apices, and upon the forward bar connecting the plates one or more friction-rollers 38 may be mounted, while a rod 39 is attached to the rear bar of the wheel and is carried loosely through a bracket-arm 40 on the rear side of the fulcrum end of the lever beyond its fulcrum, a spring 41 being made to press against this arm and the head of the rod.

In the operation of the pitman-driving

mechanism as the shaft 28 revolves under the influence of motion applied by the sweep 29 the cross-head 31 will move in unison with the shaft, and, as shown in Fig. 2, one of its rollers 31 will, upon the initial operation of the apparatus, engage the cam 33 of the pitman at a point near the inner end of said cam. The engagement of the cross-head with the pitman will cause the latter to swing outwardly and rearwardly under the guidance of the lever 35, which operation will continue until the parts are in the position shown in Fig. 3, whereupon the roller engaging the pitman will be at the outer end of the cam and in engagement with the roller *a'* of the lantern-wheel 37. The continued revolution of the cross-head 30 results in a disengagement of the same with the pitman and in the swinging of the lever 35 through the medium of the lantern-wheel 37 to effect a return of the plunger, for it will be seen that the lever having its fulcrum on the shaft 36 will have its longer arm moved forwardly and will carry with such arm the pitman. This forward movement will be obviously of great rapidity, and by these means a quick return of the plunger is effected. As the cross-head engages the lantern-wheel 37, it swings the same on its axis and compresses the spring 41, which spring immediately afterward reacts to assist in throwing the long arm of the lever 35 forward. After the lever 35 has completed that movement which returns the plunger 32, the parts will again assume the position of Fig. 2, and shortly after this stage in the operation the next arm of the cross-head will engage the cam 32 and repeat the above-described operation. It will be understood that the rapidity of the return of the plunger is great enough to complete such movement before the cross-head has moved sufficiently to reengage the plunger. This operation leaves that interval of time necessary for the operator to insert a new charge of hay into the compression-chamber.

As the operation of the machine progresses and the hay to form the bale becomes more compressed, the point at which the cross-head engages the cam 33 will gradually become nearer the outer end thereof, and immediately before the completion of the bale this engagement will be approximately at the crest or apex of the cam, which fact causes the plunger to move into the compression-chamber with less speed, and consequently with more force, all of which is understood to be necessary to the packing of the hay when it becomes more densely arranged in the chamber. When the greatest power is required for the packing of the hay—that is, as the bale increases—the roller will have reached the crest of the cam and will then travel down the outer incline of the cam until the final pressing-stroke of the plunger is made. Hence it will be seen that the pitman moves slower and receives more force as the hay requires to be packed tighter and requires more power

to pack it, and that the draft is more regular than in ordinary presses and the rebound of the plunger materially assists the team.

The link-lever 35 is made of extra length, thereby giving the pitman-head less of a curve in moving the same distance than ordinarily. The bracket-arms 34 are also of extra length, and by reason of this will hold the cam 33 near the cross-head 30. The combination of these three parts admits of a longer stroke of the pitman without lengthening the cross-head 30 and likewise provides more space to place the material to be pressed in the baling-chamber A than ordinarily without decreasing the power of the team in compressing said material.

The rear axle 42 is attached to that portion of the press at which the baling-chamber is located. The forward and rear axles are provided in order that wheels may be used for transporting the press from place to place, the wheels being removed when the press is in operation.

At the rear of the baling-chamber, upon each side thereof, opposing vertical plates 43 are secured to the body of the press, and these plates extend across the openings in the sides of both of the chambers A and B. These plates are provided with horizontal recesses or chambers 44 (three of them being shown in the drawings) and with shallow recesses 45 between the chambers, the chambers and recesses being in the inner faces of the plates at the rear sides thereof.

In each chamber 44 an angular dog 46 is pivoted at or near its center, the wider portions of the dogs facing the rear and extending within the receiving-chamber B of the press, while the narrower ends of the dogs have bearing against shoulders 47 made in the forward walls of the chambers 44, as shown in Fig. 5. A spring 48 has bearing against the outer wall of each chamber and against the back or outer side edge of the wider portion of each dog, normally holding the narrower end of the dog against the aforesaid shoulder. The inclined surfaces of the dogs are made to face the plunger, so that as the plunger moves forward to compress the hay forming a bale the dogs will be forced outward against the tension of their springs by the hay in its rearward travel; but when the plunger reaches the dogs they will register with, in fact, will enter, the horizontal openings 16 in the inner end face of the plunger, and their springs will restore the dogs to their normal position, entering the plunger-recesses 16 to a maximum extent, and in so doing they engage with the inner end of the compressed mass of hay, preventing the hay from returning to the baling-chamber when the plunger is withdrawn and holding the hay in position to be tied by a loop or strap 49, of wire, as shown in Fig. 9.

A frame D is projected at a right angle from one side of the press, being ordinarily attached to one of the plates 43 carrying the

dogs 46, and stands vertically at the rear portion of the plate, and this frame constitutes a slideway for a carriage 50, held to travel in the said frame, being provided with friction-rollers 51 and a series of horizontally-disposed needles 52, the needles being illustrated as three in number. The needles are adapted to pass through the recesses 16 in the plunger C and the shallower recesses 45 in the aligning dog-carrying plates 43. The eyes of these needles are at their points, and each needle is adapted to be threaded with wire from a reel 53, preferably attached to the said carriage 50, as shown in Fig. 5.

A pitman 56 is attached to the carriage 50 at or near its center and to a crank-arm 57 of a shaft 58, journaled in the aforesaid frame D, and extending in a forwardly direction. This shaft 58 carries a beveled pinion 59 on its forward end, which meshes with a beveled gear 60, secured upon a shaft 61, extending parallel with the frame and the needles, being journaled at its inner end in the side of the press, as shown in Fig. 8. A clutch or ratchet-wheel 62 is secured upon the inner end of this shaft, and a dog 63 is normally held in engagement with the teeth of the clutch or ratchet-wheel by means of a spring 63^a coiled around the shaft, the dog forming a portion of a bracket-arm 64 loosely mounted on the shaft and against which the spring has bearing, the said bracket-arm being likewise carried up in front of the ratchet-wheel 62, forming a finger 65, which may be termed a "trip-finger," since at each forward movement of the press-plunger one of its trunnions 15 will engage with the said finger 65 and move it a sufficient distance in order that the gearing just described shall cause the crank-arm of the shaft 58 to carry the needles across the baling or receiving chamber from one side to the other and return.

The tying and cutting devices are located upon the opposite side of the press to that upon which the needles are placed and slightly at the rear of the plate 43, carrying the dogs 46, as shown in Fig. 5. A frame E is secured to the body of the press, extending at a right angle therefrom, thence parallel with the side of the body, being supported by suitable braces, as is likewise shown in Fig. 5. The inner member of the said frame E, and which is opposed to the plate carrying the dogs 46, consists of an upright 66, having a series of recesses 66^a made in its forward edge opposite and corresponding in number to the recesses 45 beneath the dogs 46, as shown in Fig. 7, and the upper wall 66^b of these recesses 66^a is provided with blades of steel, so as to form a cutting edge, and parallel with the plate 66 a second plate 67 is secured in the said frame E, as shown in Fig. 5, being spaced a predetermined distance from the aforesaid inner plate 66 of the said frame. The needles 52 pass practically between the recesses 45 in the dog-carrying plates 43 and the aforesaid recesses 66^a, as shown in Fig. 7.

The twisting devices F, which receive the wire from the needles and secure the wire loop formed by the aid of the needles around the bale, are journaled horizontally in the rear portion of the said frame E, being passed through the aforesaid recesses 66^a in the inner plate of this frame. These twisting devices consist of two bars 68 and 69, placed one upon the other, each being semicircular, so that combinedly they are circular in cross-section, as shown in Fig. 9. The upper member or bar 68 is carried through to the outer side of the frame and journaled in the frame at that point, and both bars are adapted to be revolved together. An under bar 69 is provided with a lip 70 at an angle thereto, and the upper bar with a corresponding lip 70^a, having a cutting-surface formed upon its outer face to engage with the cutting-surface 66^b in the inner bar 66 of the frame E. The lower bar 69 is capable of end movement, and to that end each of said bars is attached to a sleeve 71, (shown in Fig. 4,) and a shaft 72 is journaled vertically in the aforesaid frame E forward of the shifting devices, as shown in Fig. 5, and on this shaft a shifting-lever 73 is fulcrumed, the said lever 73 being made to engage with the sleeves 71 of all of the twisting devices, and it is provided with a forwardly-extending arm 74 at or near the top, the arm being forced normally in an outward direction by means of a spring 75.

A pinion 76 is secured upon the upper-rotating bar 68 of the twisting devices, and each of the said bars or members 68 is provided outside of the frame E with a pinion 77, these pinions being in mesh one with the other. On each of the twisting devices, between the inner plate 66 of the frame and the outer parallel plate 67, a fingered wheel 78 is secured, the under members of the aforesaid twisting devices having sliding movement in the hubs of these wheels. The fingers 79 of the aforesaid wheel 78, as shown in Fig. 9, are curved, and their concaved surfaces are directed to the path of rotation of the said wheels, and as the wheels revolve the said fingers 79 cross the recesses 66^a in the inner plate 66 of the frame E. The hub of each of these fingered wheels has a ratchet 80 attached thereto, engaged by a pawl 81, which prevents a reverse movement of the wheels.

A shaft 82 is journaled in the aforesaid frame E, forward of the twisting devices, and this shaft has secured thereto a cam 83, which engages with the handle 74 of the shifting-lever 73, and at a point in the rotation of this cam the shifting-lever is operated in such a manner as to close the lips, or more properly jaws 70 and 70^a, of the twisting devices on the wire which has been introduced between them.

The shaft 82 carries a gear 84, which meshes with the pinions 76 on the twisting devices, imparting rotary movement thereto, and the said shaft 82 is likewise provided with a pin-

ion 85, meshing with a driving-gear 86 on a still farther forwardly-located shaft 87.

A ratchet-wheel 88 is secured upon the inner end of the shaft 87, as shown in Fig. 7, and the teeth of this wheel are located some distance apart, being engaged by a spring-controlled dog 89, pivoted to an arm 90, which may have rocking movement on the shaft 87, or upon a convenient support, a spring 91 serving to normally hold the dog in contact with the teeth of the said ratchet-wheel.

When the twisting devices are not needed, they may be silenced through the medium of a shifting-lever 92, the handle of which is located at that side of the machine where the needles are placed, and the said lever 92 is carried beneath the press-body to the opposite side, as shown in Figs. 5 and 7, and terminates in a crank-arm 93, which is connected by a link 94 with a lifting-arm 95, and the said arm, when elevated, will disengage the dog 89 from the ratchet-wheel 88. The wire forming the loop is received in the twisters at that side which is nearest the plunger.

In the operation of the press a finger 79 of the fingered wheel 78 will slip between the needle and the wire carried thereby when the needle is passed through the baling-chamber, and the finger that is slipped between the needle and the wire will continue to move until it has passed the edge of the plate that separates the fingered wheel and the jaws of the wire-twisters. When the needle returns, the wire will be bent around the aforesaid finger and the finger-wheel and will be held thereby, and as the twisters revolve the cutting-jaws 70^a of the twisters will pass the blades 66^b in the front plate 66 of the frame E in which the twisters revolve, and as these two points come in close contact they form shear-cutters for the wire tie, cutting the wire off between the jaws of the twisters and the fingers of the fingered wheel, leaving the fingered wheel holding the wire for the next bale of hay that is to be pressed.

When the needles carry the wires through the bale, they deposit the wires in the twisters and in position for the fingered wheel to catch said wires, and as soon as the twisters have received the wires the gearing will be actuated by one of the trunnions 15 of the plunger C striking against the arm 90, carrying the actuating dog for this mechanism, and at that time the twisters will be in action to firmly twist the wires in loop form around the bale, this action taking place prior to the needle taking its return stroke. The jaws of the twisters, or that portion which holds the wire when it is twisted, and the fingered wheels are very close together. Therefore the wires will force the fingered wheels to turn until the wire is caught, as before stated, and this turning of the fingered wheels forces them to take the wire from the needle, and when the wire has been so taken the fingered wheel ceases to turn, and the dogs 81 act upon the ratchets and the fingered wheels to prevent them from

slipping, preventing the fingered wheels from turning when the needle starts back.

It will be observed that the needles are passed through the plunger-recesses 16 and immediately over the rearmost portions of the dogs 46 while the tying mechanism is in operation, and not through the bale. By reason of the needles passing through the recesses 16 in the plunger all the hay in the front portion of the receiving-chamber is tied out, and when the bale thus tied passes out from the press it is entirely free from the following bale. If the needle should pass through the bale of hay and not through the recesses 16 in the plunger, the consequence would be that the bale to be discharged from the receiving-chamber would be connected with the following bale. Therefore passing the needles through the plunger is a very important feature in the tying mechanism.

It may here be remarked that the lever 92, which silences the tying mechanism when it is not needed, may be used to set the tying mechanism in motion instead of silencing it, as there are usually six or seven charges of hay placed in the press to form each bale, and each charge or bunch of necessity requires a compressing-stroke of the plunger. When the lever is used for setting the tying mechanism in motion, the forward movement of the lever 92 will move the fingers or bars 65 and 90 far enough for the dogs 62^a and 89 to catch in the next notches or teeth on the ratchet-wheels 62 and 88, and when the extension 15 of the plunger C is brought in contact with the fingers 65 and 90, the ratchet-wheels 62 and 88 will be moved until the plunger C rebounds. The tying mechanism is then silenced until the fingers 65 and 90 are moved forward far enough for the dogs 62^a and 89 to engage in the next teeth in the ratchet-wheels 62 and 88. Hence in using the lever 92 to actuate the tying mechanism only one movement of the lever 92 is necessary for each bale of hay; but when the lever 92 is employed to silence the tying mechanism five of these movements of the said lever will be required for each bale of hay tied.

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

1. In a hay-baling press, the combination, with the hopper, the baling-chamber and the receiving-chamber, of a spring-controlled plate forming a portion of the top of the receiving and baling chambers and likewise a portion of the hopper, the said plate comprising two members at angles to one another, the member which extends over the receiving and baling chambers being slightly inclined in direction of the baling-chamber, and provided with a rounded surface where it connects with the substantially vertical member, or member forming a portion of the hopper, as and for the purpose set forth.

2. In a hay-press, the combination, with the body of the press, and a plunger held to re-

reciprocate in the baling-chamber thereof, having extensions from its sides, of needles held to reciprocate at one side of the baling-chamber, being adapted to pass through the same, twisting devices facing the needles at the opposite side of the baling-chamber, having rotary movement and jaws to receive material carried by the needles, means, substantially as described, for moving one jaw to and from the other of each twisting device, and a driving mechanism for the twisting devices, the shifting mechanism thereof and the driving mechanism for the needles, all of the said mechanisms being controlled by the extensions from the plunger, as and for the purpose set forth.

3. In a hay or baling press, the combination, with the plunger and a pitman-rod carried thereby having a cam-surface at its head, of a link-lever through which the head of the pitman passes, the pitman-head being pivotally attached to one end of the said lever at the rear of the cam, the pivot-point being removed from the outer face of the said head, the said lever being fulcrumed near the end opposite that connected with the pitman-rod, a wheel held to revolve in the link-lever at its fulcrum and provided with a controlling-cushion, a shaft, means for rotating the shaft, and a cross-head carried by the shaft, adapted for engagement with the cam-surface of the pitman-rod and the said cushion-controlled wheel, whereby the plunger is given a slow compressing movement and a quick return, as and for the purpose specified.

4. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, needles movable through the compression-chamber, a crank-shaft, a link connected with the needles, a shaft geared with the crank-shaft, a ratchet-disk on said shaft, a pawl engaging the ratchet and engageable by the plunger, and operated tying mechanism, substantially as described.

5. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, a frame outrunning from the compression-chamber, a carriage moving in the frame and transversely with the compression-chamber, needles carried by the carriage, a crank-shaft, a link connecting the crank-shaft and frame, a shaft geared with the crank-shaft, a ratchet-wheel on said geared shaft, a pawl capable of transmitting movement to the ratchet-disk and movable from motion derived from the plunger, substantially as described.

6. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, a needle cooperating with the compression-chamber, two twisting-shafts having relative sliding movement and cooperating with the needle and having each a lip, a fingered wheel, and movement-transmitting gearing, substantially as described.

7. In a baling-press, the combination with a frame, of a compression-chamber, an oper-

ated plunger, a needle, two twisting-bars each provided with a lip and having relative sliding movement, and movement-transmitting gearing, substantially as described.

8. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, a needle, two twisting-bars one of which is longitudinally movable, means for rotating said bars, a lever connected with the longitudinally-movable bar, a cam engaging said lever and movement-transmitting gearing, substantially as described.

9. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, a needle, two twisting-bars each having a lip, one of said bars being longitudinally movable, means for rotating the twisting-bars, a lever connected with the longitudinally-movable bar, a cam engaging said lever, a fingered wheel, and movement-transmitting mechanism, substantially as described.

10. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, a needle, two twisting-shafts each having a lip thereon, one of said shafts being longitudinally movable, and movement-transmitting mechanism comprising means for rotating the twisting-bars and longitudinally moving one twisting-bar and rotating both, substantially as described.

11. In a baling-press, the combination with a frame, of a baling-chamber, an operated plunger, a needle, two twisting-bars having relative sliding movement, and each having a lip thereon, a finger-wheel axially coincident to said bars, and movement-transmitting mechanism, substantially as described.

12. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, a needle, two parallel plates, two twisting-bars rotatable in said plates, one of said bars being longitudinally movable, a fingered wheel mounted on the bars and between the plates, and movement-transmitting mechanism comprising means for longitudinally moving one of the twisting-bars, substantially as described.

13. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, a needle, tying mechanism, gearing, a shaft connected with the gearing, a ratchet-disk on said shaft, a pivoted arm, and a pawl on the arm and engaging the ratchet-disk, the arm being capable of receiving movement from the plunger and by contact therewith, substantially as described.

14. In a baling-press, the combination with a frame, of a compression-chamber, an operated plunger, a needle, twisting mechanism, gearing connected with said mechanism, a shaft connected with the gearing, a ratchet-disk on the shaft, a mounted pawl for imparting movement to the ratchet-disk, a lever, and a pivoted arm connected with the lever and capable of disengaging the pawl from the ratchet-disk, substantially as described.

15. In a baling-press, the combination with
a frame, of a compression-chamber, an oper-
ated plunger, twisting mechanism, means for
operating said mechanism, a needle, gearing
5 connected with the needle for driving the
same, a shaft connected with the gearing, a
ratchet-disk on the shaft, and a yoke pivot-
ally mounted on the shaft and comprising a
pawl spring-pressed into engagement with
10 the ratchet-disk, the said pawl being capable
of engagement with the plunger, substantially
as described.

16. In a baling-press, the combination with
a frame, of a compression-chamber, a plunger,
15 a pitman connected to the plunger, a lever
pivotally connected at one end to the pitman,
and an operated cross-head adapted to engage
the pitman and one end of the lever, the said
end being opposite to the end connected with
20 the pitman, substantially as described.

17. In a baling-press, the combination with
a frame, of a compression-chamber, a plunger,
a pitman connected with the plunger, a lever

pivotally connected at one end with the pit-
man, a spring mounted on the lever, and an 25
operated cross-head adapted to successively
engage the pitman and the lever and to com-
press the spring, substantially as described.

18. In a baling-press, the combination with
a body portion, of a compression-chamber, an 30
operated plunger, two rigid arms arranged on
the frame and one on each side of the plunger,
a transverse bar connected to said arms, an
expansive spring at each end of said bar and
35 respectively bearing against the arms, and
two pivoted plates adjacent to the bar and
respectively pressed by the springs, the said
plates being normally disposed at an angle to
each other and being adapted to be simul-
taneously engaged by the plunger and to yield 40
before the same, substantially as described.

CHARLES ADAM ANDERSON.

Witnesses:

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L. H. KIDD.