(No Model.) 2 Sheets—Sheet 1.

B. A. FERGUSON.

BALING PRESS.

No. 455,281. Patented June 30, 1891.

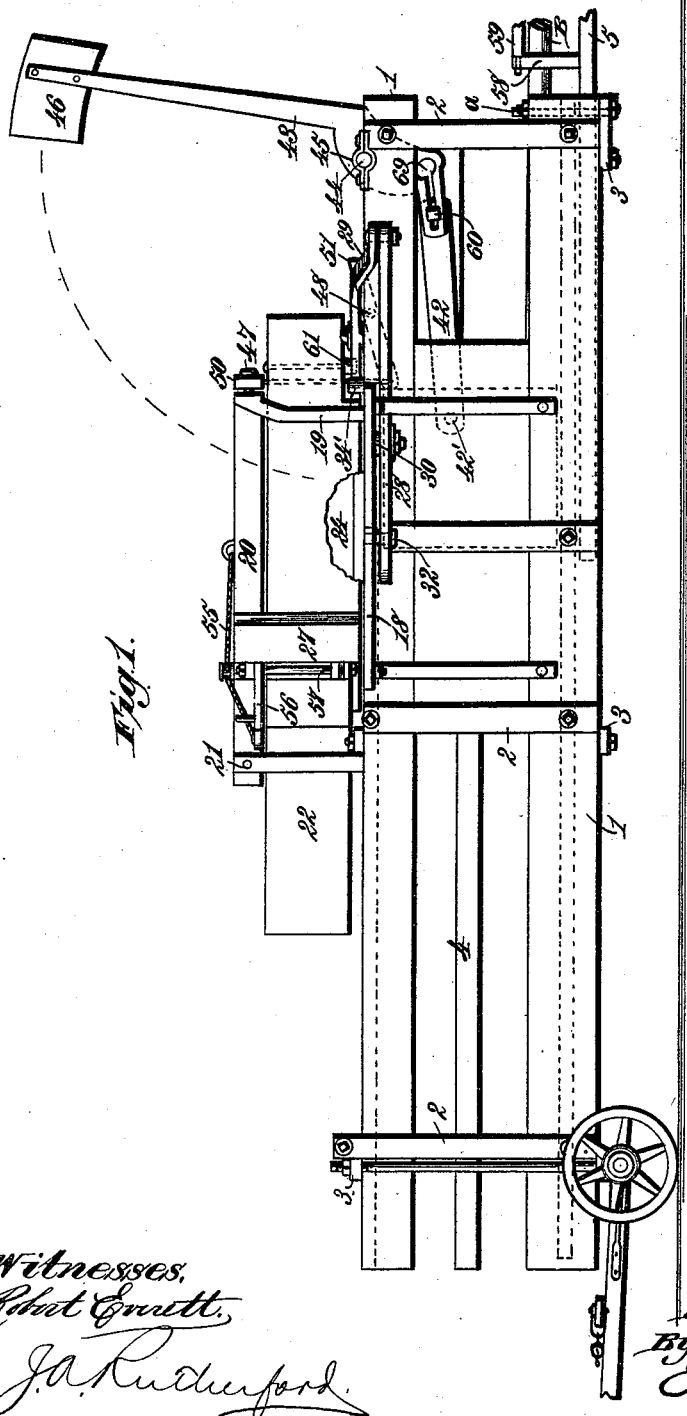

Fig. 1.

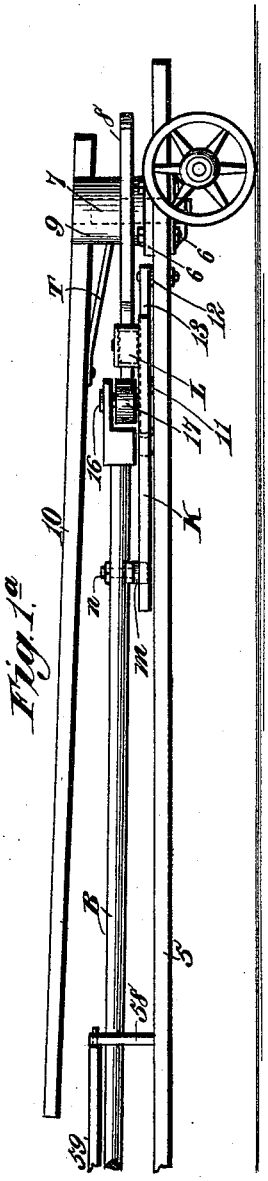

Fig. 1a.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2

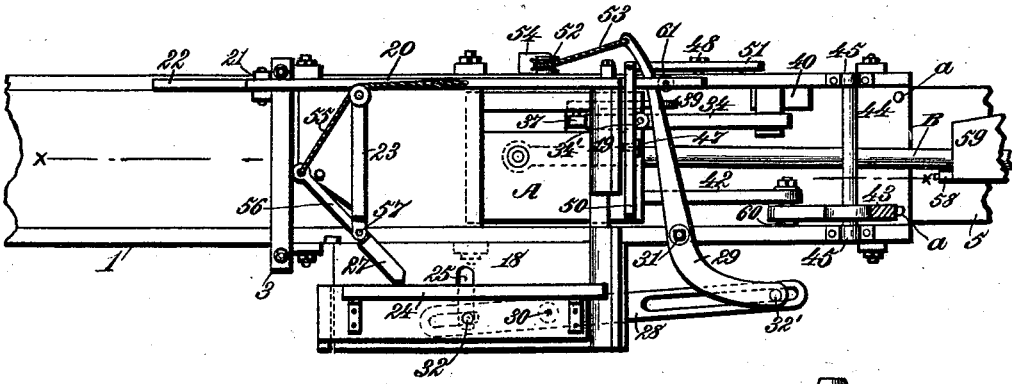


Fig. 2a

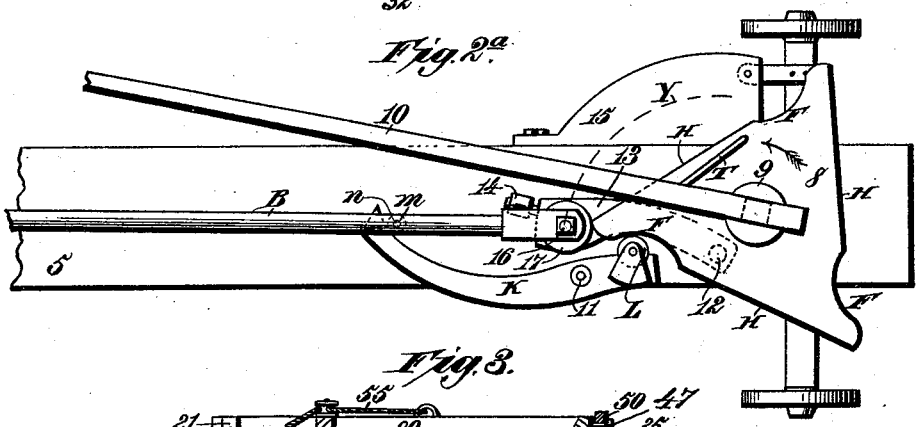
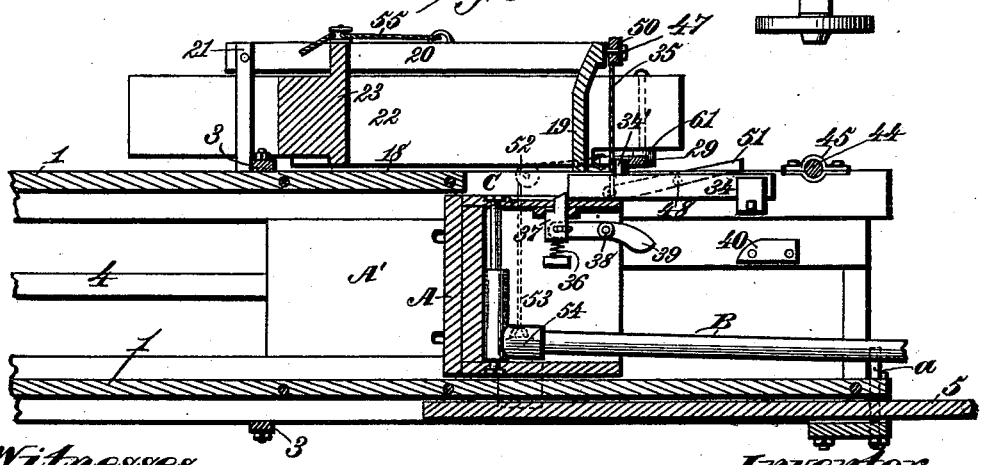


Fig. 3.



Witnesses.
Robt Ewett
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UNITED STATES PATENT OFFICE.

BYRON A. FERGUSON, OF WRIGHT, OTTAWA COUNTY, MICHIGAN, ASSIGNOR OF ONE-HALF TO RICHARD D. McNAUGHTON.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 455,281, dated June 30, 1891.

Application filed January 19, 1891. Serial No. 378,299. (No model.)

To all whom it may concern:

Be it known that I, BYRON A. FERGUSON, a citizen of the United States, residing in the township of Wright, in the county of Ottawa and State of Michigan, have invented a certain new and useful Improvement in Baling-Presses, of which the following is a specification.

The nature of my invention relates to a baling-press for baling hay and other material by means of a reciprocating plunger or follower.

The objects of my invention are to provide a novel continuous baling-press which may be operated with a comparatively small power and which can readily be transported from place to place. These objects I accomplish by means of the mechanism hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figures 1 and 1ª, when taken together, show a side elevation of my new and improved baling-press when extended in readiness for use, the dotted lines at the bottom thereof showing the position of the baling-press when telescoped or closed. Figs. 2 and 2ª, taken together, show a plan view of my invention when extended in position for use; and Fig. 3 shows a vertical sectional view on line *x x* of Fig. 2.

Similar letters and figures refer to similar parts throughout the several views.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, where it will be observed that the frame-work of the baling-chamber A′ comprises horizontal beams 1, uprights or posts 2, cross-plates 3, and planks 4. A horizontal plank or frame 5 serves to connect the power mechanism with the frame-work of the baling-chamber, and this plank extends outwardly a sufficient distance in use to permit the horse-power to be applied for operating the pitman B. The plank or frame 5 is adapted to slide beneath the frame-work of the baling-chamber, and such frame-work and plank are provided, respectively, with supporting-wheels, and when the machine is compressed as to its length it is in position to be moved from place to place. I have referred to the part 5 as a "plank;" but it will be evident that this connecting part may be constructed of any suitable material or in any suitable shape.

As shown in the drawings, the driving mechanism is supported by boxes 6 6.

7 is a post supporting the cam-wheel 8. This post may be constructed rigid with the cam-wheel, so that the wheel and post will turn together, which is the form shown in the drawings; but it is evident that the post might be stationary and the cam-wheel turn upon it.

8 represents a cam-wheel having three projections, each projection having a curved portion, which really forms the cam.

9 is a hub, preferably made integral with the cam-wheel 8. The hub is provided with means whereby a sweep 10 may be attached. This sweep may be provided with one or more braces connecting the same to the cam-wheel, which is revolved by means of the sweep. In the drawings I have shown but one brace, which is marked T.

B represents the pitman, which pitman is connected by an arm 13 to the plank, or to any suitable base by means of a pivot 12. This pivot 12 is placed eccentric to the turning-point or center of the cam-wheel 8. The connection between the pitman and arm 13 is a pivot, so that the arm may turn freely. The pitman is connected in any suitable manner to the plunger or compressor A, which compressor moves in the baling-chamber A′.

14 is a supporting-roller supported on a pivot near the outer or free end of the arm 13, adapted to move upon a way or part 15. The cam-wheel 8 has three curved portions. (Shown by F F F.)

16 is a bolt or pivot, which connects the pitman to the arm 13.

17 is a roller upon the pitman, which is adapted to bear against the cam-surface F on the cam-wheel 8. When the roller 17 reaches the outer point of the cam, it escapes from the cam-wheel and swings in the direction of the dotted line Y until it strikes one of the curved portions F.

K is a lever turning upon a pivot 11, and is provided at its shorter end with an anti-friction roller L, which anti-friction roller also moves along the curved cam-surface F. The lever K is curved, as shown in the drawings, and bears against the stud or anti-fric-

tion roller *m*, which stud or anti-friction roller *m* turns upon a pivot *n*, which pivot is supported by the pitman B.

The cam 8 revolves in the direction shown by the arrow, and the operation of this part of my invention is as follows: The roller 17 moves along the concave cam-surface F and presses forward the pitman and with it the plunger, Fig. 2ª showing the position of the pitman when it has reached the extreme point of its forward stroke. As the roller 17 passes over the point of the cam, then the roller L is brought into contact with the concave surface F, forcing the short end of the lever K outwardly, and its longer end, which presses against the stud or roller *m* in the opposite direction, thereby moving the end of the pitman rapidly in the direction shown by the dotted lines Y until the roller 17 is brought into contact with the following curved cam-surface F. It will be seen that when the roller 17 reaches the point of the cam it passes on a circle of which the arm 13 is the radius, until the friction-roller 17 is brought in contact with the cam at the point designated. The arm 13 being pivoted at 12, eccentric to the center of the cam, the roller 17 is brought near to the center of the cam 8 as it passes or is swung around until it is brought in contact with the cam-surface F.

H merely shows the side of the cam-wheel which is not used as a bearing-surface. It may be straight or of any other suitable form. By continuing the revolution the pitman, and consequently the plunger, has a continuous reciprocating movement, the plunger making three forward and three backward strokes at each revolution of the cam-wheel.

In the form of my invention shown in the drawings I have shown the hopper with two stationary and two movable sides, the object of the construction being to compress the hopper so that it will be of smaller diameter in two directions, and I find that this can be done more readily by having two of the sides stationary and the other two sides movable.

18 shows the bottom of the hopper, and 19 the front stationary side of the hopper. I shall refer to that side of the machine nearest the power as the "front" side as a matter of convenience, and the side most remote from the power as the "rear" side or "farther" side.

20 shows the stationary side of the hopper, and 21 cleats for holding the stationary side 20 to the frame, which cleats also form ways in which the longitudinally-moving side 22 moves. The end of the movable side 22 nearest the power is attached to a roller 61, and is operated by a system of levers and mechanism hereinafter more fully described.

23 is the rear end of the hopper, and is attached to 22 and moves with it. 27 is also a movable section of the rear end of the hopper and is hinged to the rear end of the hopper 23 and has one end bearing against the laterally-movable side 24, so that 27 and 23 may be said to form the rear end of the hopper, although the part 27 forms a part of one side of the hopper when the same is partially closed.

25 is a slot in the bottom of the hopper, which forms a guide for the movement of the side 24. A pin 32 connects 24 to an actuating-lever 28, which actuating-lever 28 turns on a fulcrum or pivot 30. The lever 28 is connected by a pivot 32′ to the lever 29, which pivot 32′ passes through the shorter end of the lever 29 and through the slot in the front end of the lever 28. Said pivot 32′ is adapted to move in said slot and to give a reciprocating motion to the lever 28, as well as to the side 24 of the hopper.

31 is a pivot forming a fulcrum for the lever 29, attaching the lever 29 to the frame of the machine.

34 is a bar supported in suitable ways and operated by the plunger, as hereinafter described. 34′ is a roller upon the bar 34 and forms a bearing for the point of contact between 34 and the lever 29.

35 is a rope or cord connecting levers 50 and 51. The same is shown in Fig. 3 of the drawings.

36 is a spring adapted to force the dog 37 to its normal position after the same has been depressed.

37 is the dog operated by the spring 36 and adapted when in operating position to bear against the end of the bar 34 and move the same with the backward movement of the plunger.

38 is the pivot or fulcrum of the lever 39. The lever 39 at its rear end bears the dog 37, and its front end is provided with an inclined cam-surface adapted to engage with the incline 40, said incline 40 being rigidly secured to the inside of the frame-work of the baling-chamber and adapted to lift the front end or lever 39 and depress its rear end, together with the dog, in order to allow the bar 34 to be moved rearwardly by the movement of the plunger.

42 is a pivoted bar provided with a tongue or pin 60, which engages in a slot in the short end of the bell-crank lever 43 at its front end and at its rear end connected by a pivot 42′ with the plunger. The tongue at the front end is adapted to move up into the longitudinal opening or recess 69, for the purpose hereinafter described.

43 is the bell-crank lever, which carries the feed-weight or hammer 46. The hammer 46 is adapted to travel in the direction shown by the curved dotted line in Fig. 1. The lever 43 is preferably made rigid with the shaft 44, which shaft 44 turns in journal-boxes 45. 46 is a weight or hammer for driving the hay or other material from the hopper into the baling-chamber.

47 is a fulcrum for the lever 50, attaching the lever 50 to the side 19 of the hopper, the lever and fulcrum being shown in Fig. 2.

48 is the pivot or fulcrum of the lever 51. 51′ is a bar adapted to hold the hopper in its

compressed position until the same has been unlocked or expanded, as more fully described hereinafter.

52 is a pulley, and 53 is a cord passing over pulley 52 and connected with the weight 54 and the lever 29.

55 is a cord connecting the end 56 of the hinged section 27 to the side 20.

60 is a pin or tongue adapted to move in the slot in lever 43.

59 is a bridge or platform, which is used over the pitman when the machine is in operation. This bridge or platform is supported by two posts. (Shown by 58 58.) The platform is removable and is removed whenever the pitman and connecting-plank 5 are slid or telescoped within the main frame of the machine.

C is the opening from the hopper into the baling-chamber.

The movement of the hopper is as follows: The side 24 moves laterally to and from the feed-opening C. It is connected to the lever 28 by the pin 32′, which pin 32′ moves in a slot in one end of the lever 28, the lever 28 turning upon pin 30 as a fulcrum. The outer end of the lever 28 has a slot and pin 32′ connecting lever 28 to lever 29, which lever 29 turns on a pin 31, said pin or fulcrum 31 attaching the lever to the frame-work of the machine. The lever 29 is connected by the cord 53 passing over pulley 52 to the weight 54. The lever 29 bears against the roller 61, which roller is attached to the sliding piece 22. This lever also bears against the sliding piece 22 and moves the same with the bar in a reverse direction, giving a reciprocating motion to the side 22. The bar 34 carries a roller 34′, which bar is operated by means of the dog 37, the dog 37 being attached to lever 39 and lever 39 connected to the side of the plunger A. The bar 34 moves longitudinally in suitable ways or guides. The hinged piece 27, which forms a part of the wall of the hopper, is pivoted to the rear end wall 23 by the hinge or pivot 57, one end of the piece 27 bearing against the moving wall 24, while the other end is attached by a cord 25 to the end of the piece 20. As the space from the hopper to the baling-chamber is opened the walls of the hopper are contracted in the following manner: The dog 37, held up by the spring 36 on the lever 39, is brought in contact with the end of the bar 34, moving the bar 34 toward the power. The bar 34 carries with it a stud or roller 34′, which roller, coming in contact with the lever 29, turns the lever 29 on its fulcrum 31 and, being connected with the slotted lever 28 by the pivot 32, oscillates or turns lever 28 upon its fulcrum 30, thereby carrying the rear end of the lever inward and with it the side 24 of the hopper. This moves the hinged part 27 with it, and as the walls 24 and 27 move inward, as above described, the roller 61, which is attached to the bar 22, is moved by the lever 29, and the bar 22, being attached to the end wall 23 of the hopper, draws said wall with it, thereby compressing or closing the hopper upon two sides, so that its contents are in condition to be dropped through the opening into the baling-chamber. When the hopper has reached its most compressed form, the beveled end of 39 is raised by means of the incline 40, thereby depressing the dog 37, so that it will not prevent the opening of the hopper by means of the weight above described. When the hopper has been compressed as above described, it is held in this position a short time in manner following: The end of the lever 29 passes over the end of lever 51, which is held in the position shown in Fig. 3 by its gravity. The lever 51, turning upon the pivot 48, has attached at one end a cable or rope 35, which rope 35 is attached to the end of lever 50, which lever 50 turns upon the fulcrum 47, said fulcrum 47 being supported upon the wall 19 of the hopper. When the hopper is compressed and a free opening is caused between the hopper and the baling-chamber, the feed-hammer is loosened and brought down upon the baling material, driving the same into the baling-chamber, as hereinafter described. The hopper is opened by means of the weight reversing the mechanism above described as being used in closing the same.

The feed weight or hammer is operated in the following manner: The weight 46 is mounted on the end of the lever 43, which lever or arm 43 is made rigid with the shaft 44, a shaft supported in the frame of the machine, the short end of the lever 43 being provided with a slot in which moves a sliding pin or tongue 60, which tongue 60 is attached to the pivoted bar 42, the bar 42 pivoted at 42′ to the plunger A, and as the plunger is withdrawn from the chamber the pin 60 moves in the slot in the short arm of the lever 43 until it reaches the front end of said slot, when it begins to act upon the short arm of the lever, moving the same with it, when the feed-weight 46 is carried in the direction shown by the curved line of Fig. 1, striking upon the hay or other baling material and driving the same into the baling-chamber. As the lever 43 comes down it strikes one end of the lever 50, raising the other end of lever 50, which lies beneath the end of the lever 51, raising the same and depressing the other end of the lever 51, thereby releasing lever 29. The weight 54, acting through the cord 53, moves the longer end of lever 29 backward, and through the connections already described opens the hopper, the lever having a suitable recess for the passage of the lever 43 in order to operate upon lever 50, as above described. During the baling operation the plank or frame 5 is held against displacement from the frame-work of the baling-chamber by any contrivance suitable for the conditions required. A simple means for accomplishing this purpose consists in a stop-pin *a*, (one or more,) adapted to be passed through an orifice in the frame-work of the baling-chamber and through an orifice in the

plank or frame 5, as in Fig. 3. When the plank or frame is to be slid beneath the framework of the baling-chamber, the pin *a* is detached, and after the plank or frame has been moved inward the required distance the pin *a* can be replaced, so as to pass through another orifice in proximity to the end of the plank or frame which carries the power mechanism for the purpose of preventing accidental displacement of the plank or frame during transportation of the machine.

Having thus described my invention, what I claim to have invented, and desire to secure by Letters Patent, is—

1. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising a stationary end wall, a lengthwise-movable side carrying a transverse rear end wall, and a laterally-movable side wall, and a movable section for closing the space between the latter and the end wall of the lengthwise-movable side, and lever mechanism actuated by the plunger for simultaneously moving one side wall lengthwise and moving the other side wall inwardly to reduce the size of the hopper, substantially as described.

2. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising a stationary end wall, a lengthwise-movable side wall carrying a transverse rear end wall, a movable section hinged to the end wall, and a laterally-movable side wall bearing against the hinged section, a connection between the hinged section and a fixed part of the frame-work for swinging such section as the lengthwise-movable side is reciprocated, and lever mechanism actuated by the plunger for simultaneously sliding one side wall lengthwise and moving the opposite side wall inwardly to reduce the size of the hopper, substantially as described.

3. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising a stationary end wall, a lengthwise-movable side wall 22, having an end wall, a laterally-movable side wall 24, and a movable section 27 for closing the space between the latter and the end wall of the lengthwise-movable side wall, a pivoted slotted lever 28, connected with the laterally-movable side wall, and a swinging lever 29, engaging a slot in the slotted lever and actuated by the reciprocating plunger for sliding one side wall lengthwise and moving the opposite side wall inwardly to reduce the size of the hopper, substantially as described.

4. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising a stationary end wall, a lengthwise-movable side wall carrying a transverse rear end wall, a laterally-movable side wall, and a hinged section pivoted to the rear end wall bearing against the laterally-movable wall and having a flexible connection with a fixed part of the frame-work, a pivoted slotted lever connected with the laterally-movable side wall, and a pivoted lever connected with a slot in the slotted lever and actuated by the reciprocating plunger for sliding one side wall lengthwise and moving the opposite side wall inwardly, substantially as described.

5. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper having a laterally-movable side wall for enlarging and reducing the size of the hopper, lever mechanism actuated by the reciprocating plunger to move the side wall inwardly, and means connected with the lever mechanism to operate the same for sliding the laterally-movable wall outwardly, substantially as described.

6. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising a stationary end wall, a lengthwise-movable side wall carrying a transverse rear end wall, a laterally-movable side wall, and a movable section for closing the space between the latter and the rear end wall, a slotted lever connected with the laterally-movable side wall, a pivoted lever connected with a slot in the slotted lever and actuated in one direction by the plunger for sliding one side wall lengthwise and moving the opposite side wall inwardly, and means connected with the lever for moving it in the opposite direction to adjust the side walls in a direction to enlarge the hopper, substantially as described.

7. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising a stationary end wall, a lengthwise-movable side wall carrying a transverse rear end wall, a hinged section pivoted to the rear end wall and having a flexible connection with a fixed part of the frame-work, and a laterally-movable side wall bearing against the hinged section, a slotted lever connected with the laterally-movable side wall, a pivoted lever connected with a slot in the slotted lever and actuated in one direction by the reciprocating plunger, and means for moving said lever in the reverse direction to adjust the side walls of the hopper in a direction to enlarge the size thereof, substantially as described.

8. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising a stationary end wall, a lengthwise-movable side wall having a rear end wall, a laterally-movable side wall, and a movable section for closing the space between the latter and the rear end wall, a slotted lever connected with one of the side walls, a pivoted lever connected with a slot in the slotted lever and engaging the opposite side wall of the hopper, a lengthwise-sliding bar engaging the pivoted lever, a dog carried by the reciprocating plunger for engaging the lengthwise-sliding bar, a lever connected with the dog, and an incline on a fixed part of the frame-work for acting on the dog-operating lever to release the dog

from engagement with the lengthwise-sliding bar, substantially as described.

9. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising a stationary end wall, a lengthwise-movable side wall having a rear end wall, a laterally-movable side wall, and a movable section for closing the space between the latter and the rear end wall, a pair of levers pivoted together and respectively connected with the movable side walls of the hopper, a cable and weight connected with one of the levers, a sliding bar engaging the lever with which the cable and weight are connected, a dog carried by the reciprocating plunger for moving the sliding bar, a lever connected with the dog to operate the same, and a cam on the fixed part of the frame-work for actuating the dog-operating lever to release it from the sliding bar, substantially as described.

10. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a hopper comprising movable side walls, one of which carries a transverse rear end wall, a hinged section mounted on the rear end wall and having a flexible connection with a fixed part of the frame-work, a pair of levers having a slotted connection at one extremity and respectively engaging the movable side walls of the hopper, a cable and weight connected with one of the levers, a sliding bar engaging the lever with which the cable and weight are connected, a dog carried by the reciprocating plunger for moving the sliding bar, and devices for releasing the dog from engagement with the sliding bar, substantially as described.

11. In a baling-press, the combination, with a reciprocating plunger, a baling-chamber, and a feed-hopper, of a bell-crank lever pivoted to the frame-work of the baling-chamber, a feed-hammer carried by the lever and moving in the arc of a circle, and a bar attached at one end to the plunger and at the opposite end engaging the short arm of the lever to swing the feed-hammer into the hopper as the plunger moves forward, substantially as described.

12. In a baling-press, the combination, with a reciprocating plunger and a baling-chamber, of a bell-crank lever pivoted to the frame-work of the baling-chamber and having its short arm provided with a slot, a feed-hammer carried by the lever, and a bar pivoted at one extremity to the plunger and provided at its opposite extremity with a tongue movable in the slot in the short arm of the bell-crank lever, substantially as described.

13. In a baling-press, the combination, with a reciprocating plunger, a baling-chamber, and a hopper, of a feed-hammer, a lever carrying and swinging the feed-hammer in the arc of a circle, and a bar connected to the plunger and to the lever for swinging the latter by the direct action of the plunger, substantially as described.

14. In a baling-press, the combination, with a reciprocating plunger, a baling-chamber, and a hopper comprising movable side walls, of a pair of levers pivotally connected and respectively engaging the movable side walls of the hopper, a sliding bar engaging one of the levers, a dog carried by the plunger for moving the sliding bar to operate the levers for compressing the hopper, means for releasing the dog from the sliding bar, and a pivoted lever mounted on the frame-work of the baling-chamber and adapted to engage one of the levers for temporarily holding the hopper in its compressed condition, substantially as described.

15. In a baling-press, the combination, with a reciprocating plunger, a baling-chamber, and a compressible hopper, of lever mechanism for compressing and expanding the hopper, a sliding bar engaging the lever mechanism, a dog carried by the plunger for acting on the sliding bar, devices for releasing the dog from the sliding bar as the plunger moves forward, a lever pivoted to the hopper, a lever pivoted to the frame-work of the baling-chamber, connected with the lever on the hopper and arranged to engage the lever mechanism for holding the hopper in its compressed condition, and a feed-hammer which in its descent moves the lever on the hopper, and thereby releases the lever mechanism to permit the expansion of the hopper, substantially as described.

16. In a baling-press, the combination, with a portable frame-work having a baling-chamber, and a reciprocating plunger, of a plank or frame sliding lengthwise in guides beneath the frame-work of the baling-chamber, power mechanism carried by the outer end of the sliding plank or frame, and a pitman connected with the plunger and located in a plane above the sliding plank or frame and connected with the power mechanism for reciprocating the plunger while the plank or frame stands stationary, substantially as described.

17. In a baling-press, the combination, with a portable frame-work having a baling-chamber, and a plunger, of a plank or frame sliding lengthwise in guides beneath the frame-work and having at its outer end a power mechanism and supporting-wheels, and a pitman connected with the plunger, located in a plane above the plank or frame, and actuated by the power mechanism, substantially as described.

18. In a baling-press, the combination, with a baling-chamber, a reciprocating plunger, a pitman connected with the plunger, and a plank or frame, of an arm pivotally connecting the pitman with the plank or frame, a rotating triple cam-wheel acting to move the pitman for advancing the plunger, and an oscillating lever acting at one end on the pitman to retract the latter and at its opposite end engaged by the triple cam-wheel, substantially as described.

19. In a baling-press, the combination, with

a baling-chamber, a reciprocating plunger, and a suitable plank or frame, of a rotating triple cam-wheel, a pitman having a friction-wheel acted upon by the triple cam-wheel, an arm pivoted to the pitman and eccentrically pivoted to the plank or frame relatively to the triple cam-wheel, and an oscillating lever pivoted to the plank or frame, having one end engaging a stud on the pitman and the opposite end provided with a roller acted upon by the triple cam-wheel for retracting the pitman, substantially as described.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

BYRON A. FERGUSON. [L. S.]

Witnesses:

EDWARD TAGGART,

HARRY P. VAN WAGNER.