

W. ZACHOW.
BALING PRESS.

APPLICATION FILED FEB. 1, 1915.

Patented Jan. 30, 1917.

1,213,993.

7 SHEETS—SHEET 1.

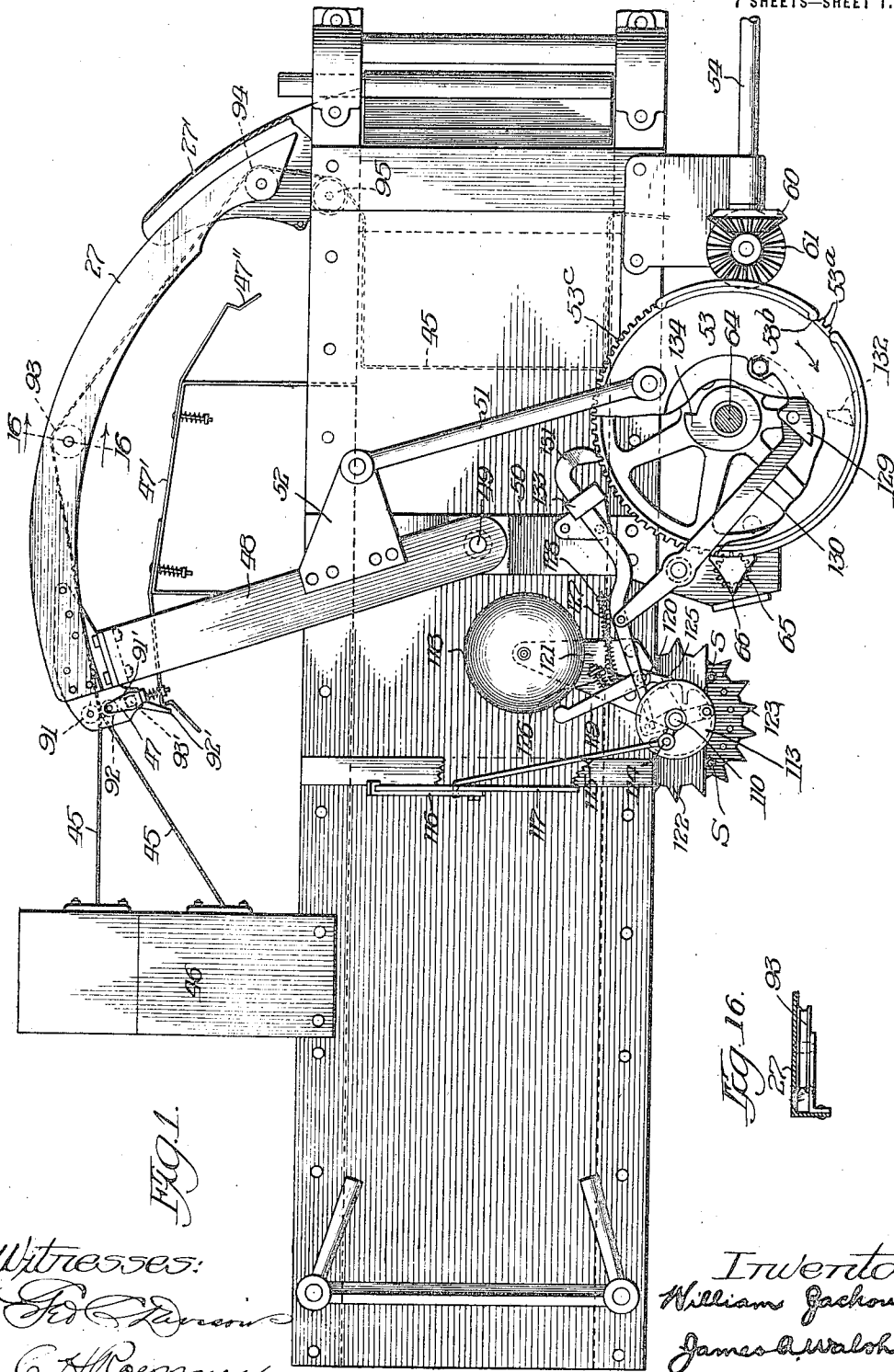


FIG. 1.

Fig. 16.

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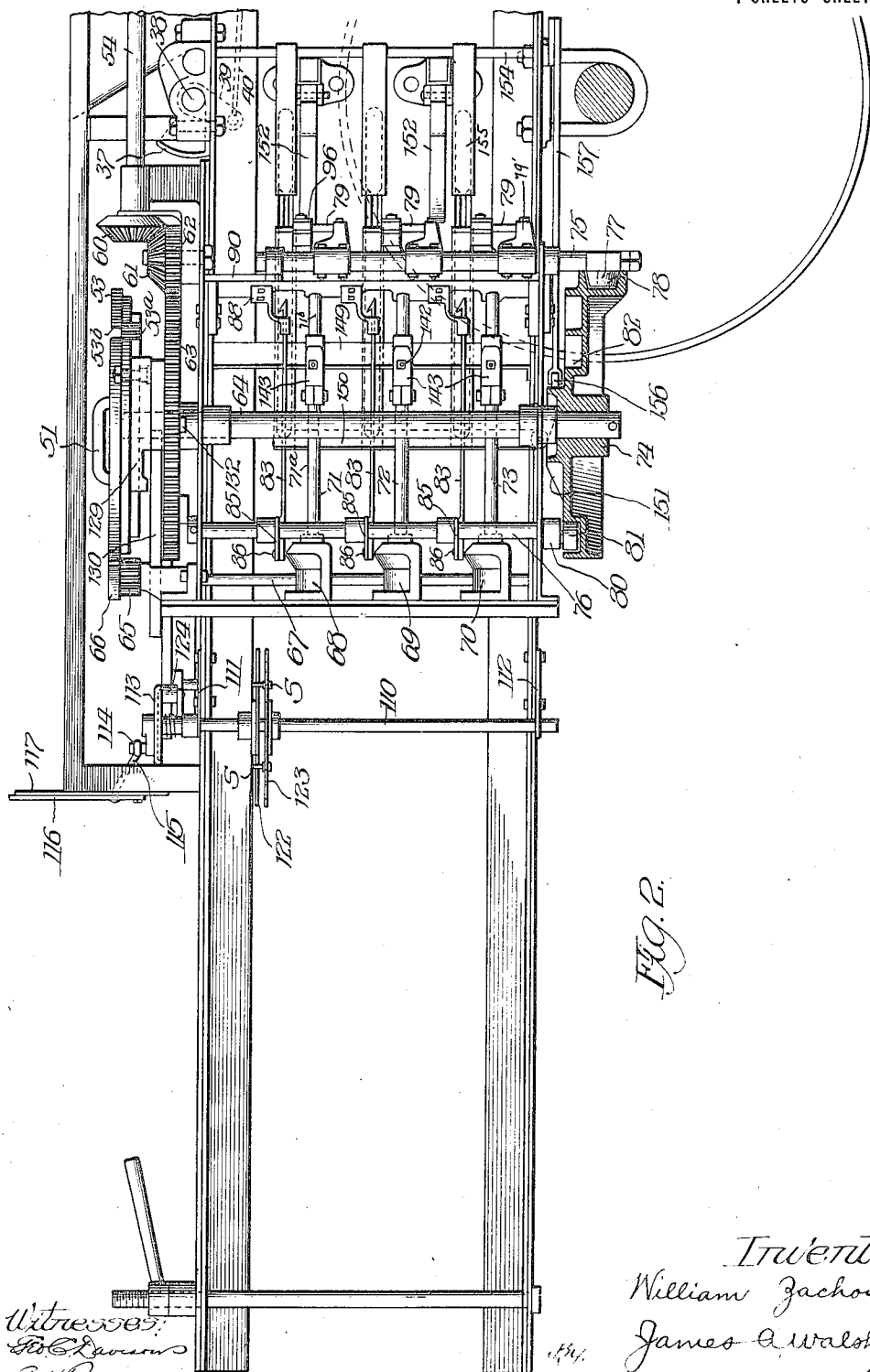


FIG. 2.

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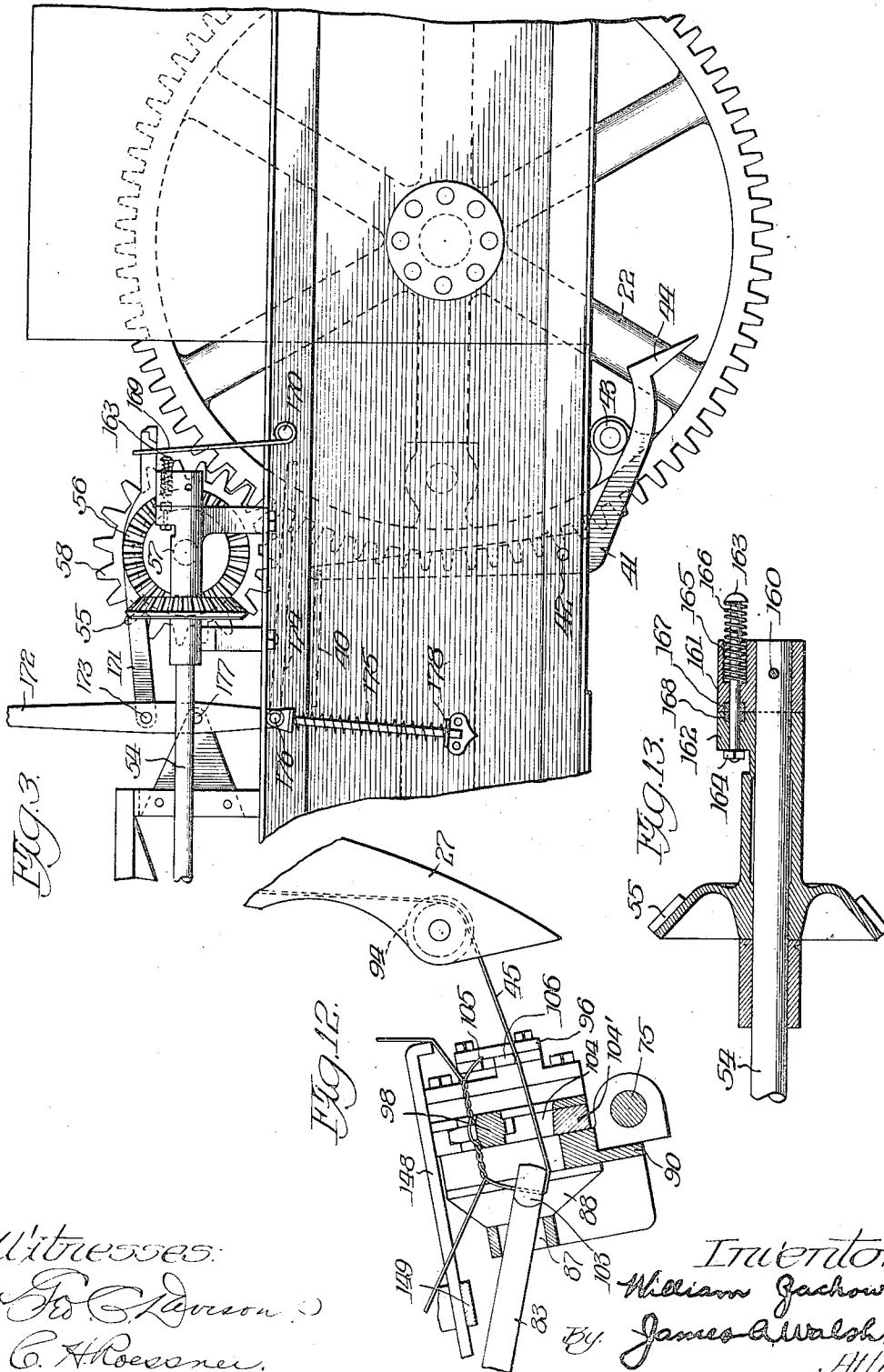
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7 SHEETS—SHEET 3.



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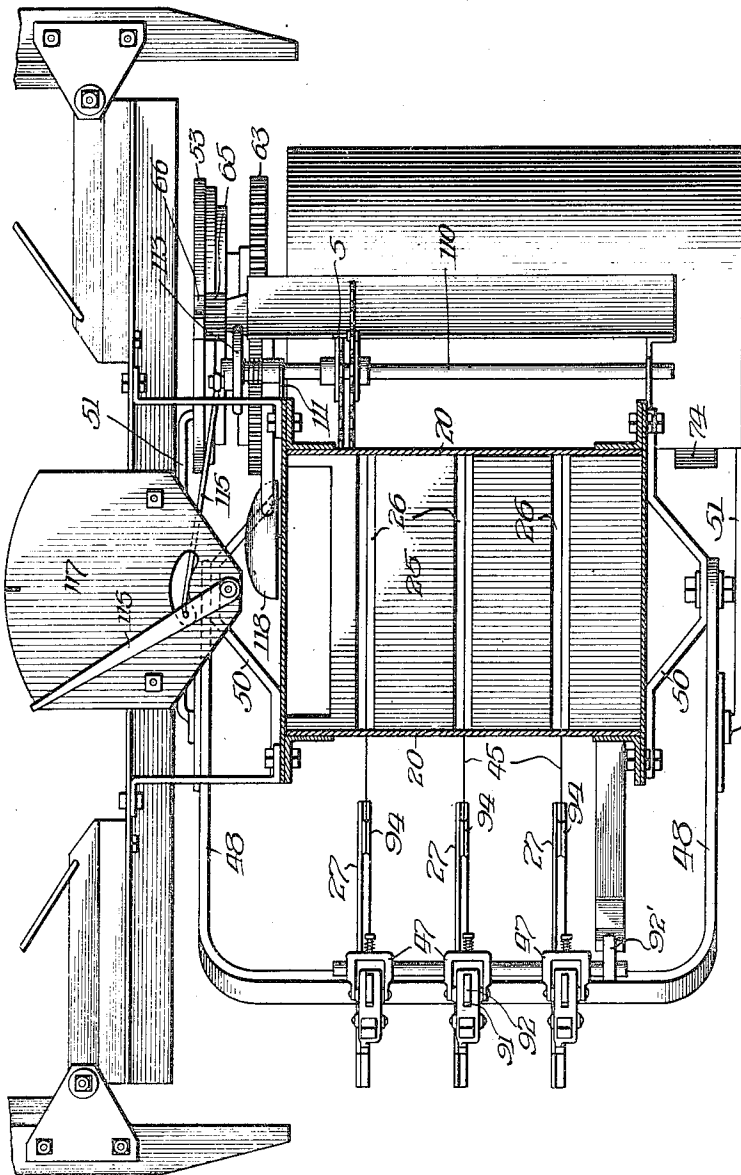


FIG. 4.

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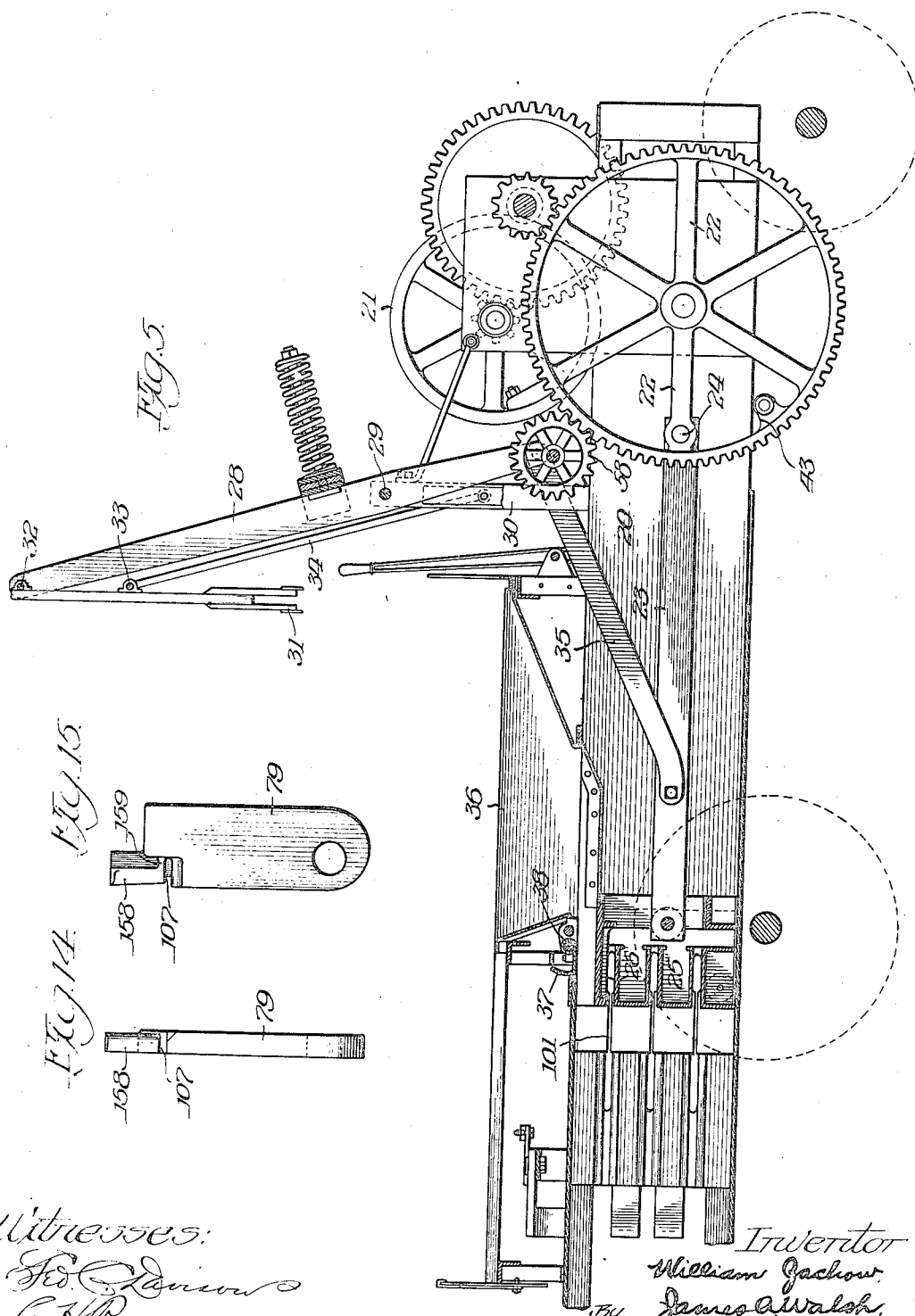
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7 SHEETS—SHEET 5.



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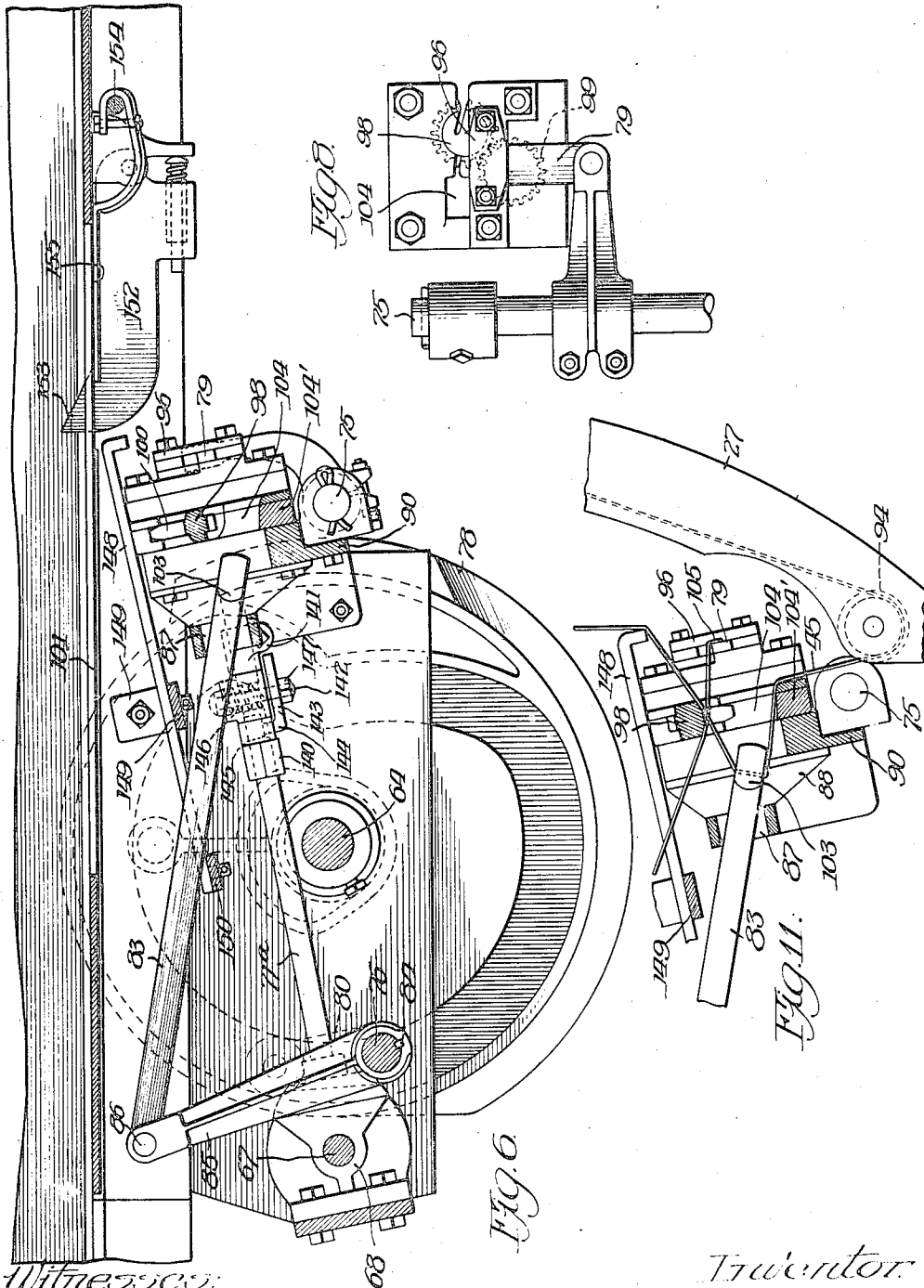
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7 SHEETS—SHEET 6.

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7 SHEETS—SHEET 7.

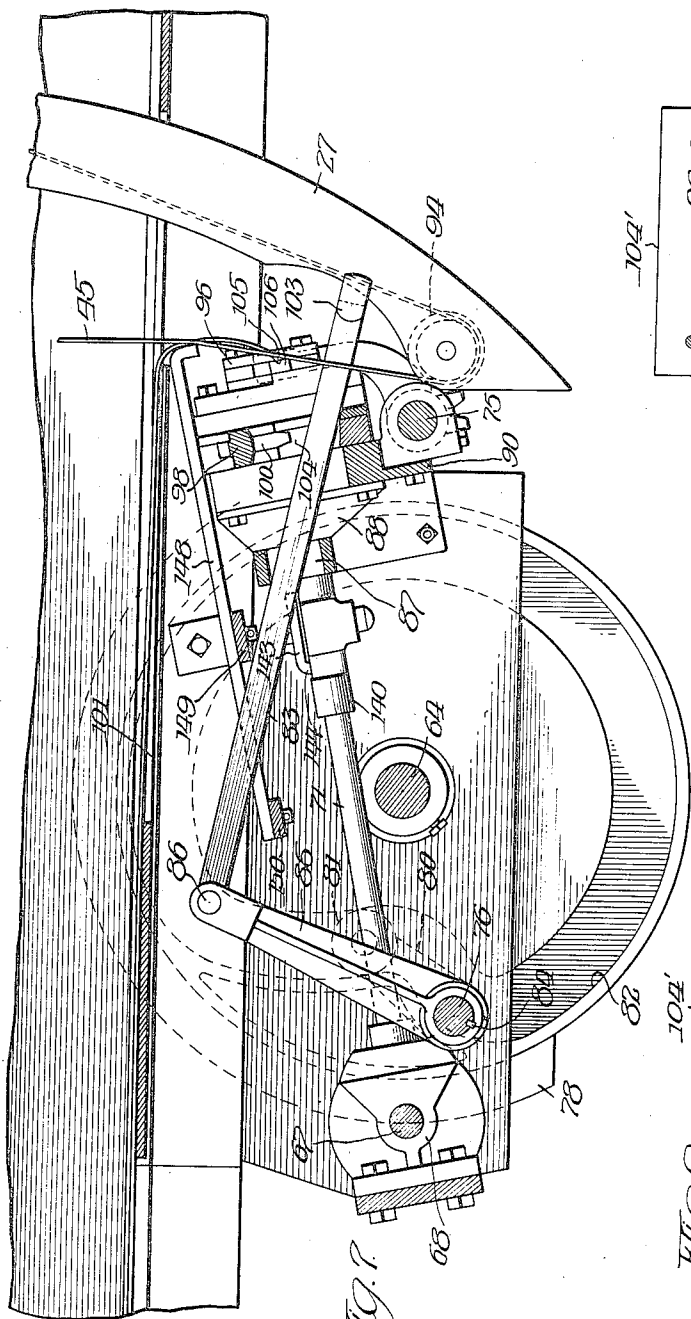


FIG. 7

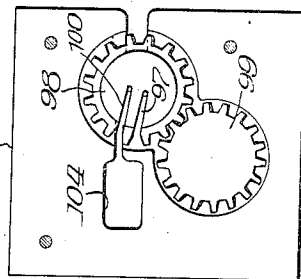


FIG. 10

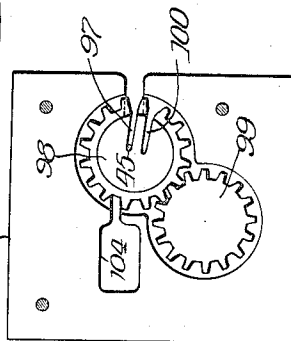


FIG. 9

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UNITED STATES PATENT OFFICE.

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BALING-PRESS.

1,213,993.

Specification of Letters Patent.

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Application filed February 1, 1915. Serial No. 5,399.

To all whom it may concern:

Be it known that I, WILLIAM ZACHOW, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Baling-Presses, of which the following is a specification.

The object of my invention is to provide a press designed for baling hay and the like in which the material being automatically compressed into bale formation will gradually move rearwardly through the machine and at the same time carry with it baling wires which, when the bale is complete, will encircle it and be automatically tied about the same, means being also provided for cutting the wires and retaining the same in position to be similarly encircled and tied about a succeeding bale, the latter in its delivery from the machine actuating signaling mechanisms to indicate the completion of a bale, all as will be hereinafter more particularly described and claimed.

In the accompanying drawings, forming a part hereof, Figure 1 is a plan view of the rear portion of a baling press equipped with my improved tying mechanism, showing the needle bars in their initial position, that is, withdrawn from the baling chamber; Fig. 2 is a side elevation of the mechanism shown in Fig. 1, the housings being removed to more clearly show the mechanism; Fig. 3 is a side elevation of the forward end of the machine showing the driving and safety release mechanisms; Fig. 4 is a rear view showing the signal mechanisms which notify the operator when the baling process has reached the stage to cease feeding material into the machine; Fig. 5 is a central, longitudinal, vertical section showing the plunger and the feeder lever operating mechanism; Fig. 6 is a fragmentary plan sectional view with the twister mechanism shown in its initial position; Fig. 7 is a view similar to Fig. 6 but showing the twister mechanism in the position which it assumes just previous to the final twisting operation; Fig. 8 is a fragmentary view in side elevation showing the twisting mechanism and wire cutter in their normal position; Figs. 9 and 10 are face views of the twister in different positions; Fig. 11 is a fragmentary plan section of a portion of the mechanism shown in Fig. 6, showing the

method of bringing the baling wire through the twister; Fig. 12 is a similar view showing the twisting operation at a stage where the knife has released a heretofore held end of the baling wire and also shows the wire running from the needle bar to the hook as having been drawn across one edge of the movable knife; Fig. 13 is a detail sectional view of the forward end of the drive shaft showing the safety releasing means in section; Figs. 14 and 15 are respectively an edge view and a face view of the knife, and Fig. 16 an enlarged detail sectional view on the dotted line 16, 16, in Fig. 1.

In said drawings similar reference numerals indicate similar parts, the portions marked 20 indicating a baling chamber which is built up of suitable metal plates and angle irons to form a rectangular box-like structure upon which at its forward end is mounted the drive wheel, 21, connected by a suitable gearing to the large gear, 22. A pitman, 23, is pivoted at 24 to gear 22 and carries at its opposite end a ram or plunger, 25, the face of which is slotted, as at 26, to receive the needle bars, 27, comprising a curved frame, which at a suitable time are caused to pass therethrough. A lever arm, 28, is mounted upon a shaft, 29, and is suitably supported in an A-frame member, 30. A presser-foot, 31, is pivotally mounted, at 32, to the lever 28 and, at 33, is pivotally connected with a rod, 34, also carried by the A frame 30. A drag link, 35, connects the lower end of the lever 28 and the pitman 23, so that as the plunger 25 is drawn back and forth the lever 28 is caused to oscillate about the pivot 29. Hay or other suitable material is introduced into the hopper, 36, and as the plunger or ram 25 courses back and forth in the baling chamber the presser-foot 31 is caused to rise and fall and during its fall pushes the hay which has been introduced into the hopper 36 into the baling chamber to be in turn acted upon and compressed by the next actuation of the ram. A folder, 37, is pivotally mounted upon a shaft, 38, and extends across the top of the baling chamber. Secured to said shaft 38 is a crank, 39, (Fig. 2) suitably connected by means of a rod, 40, (Figs. 2 and 3) with an L-shaped lever, 41, pivotally mounted at 42, to the side of the machine. A boss, 43, is mounted upon the gear 22, and at

each revolution causes the end, 44, of the lever 41, to be depressed. This causes a downward movement of the folder 37, which tucks in any loose ends of hay which might otherwise protrude, thus tending to maintain a smooth surface to the bale.

In Figs. 1 and 2, the mechanism is shown in its initial position, and Fig. 1 in particular shows the baling wires, 45, of which there are three, each leading from a receptacle, 46, to a tension mechanism, 47, mounted upon the rear end of the needle bars 27. A frame, 48, is pivotally mounted, at 49, to a cross strut, 50, carried upon the frame of the baling chamber, and is caused to swing thereupon by the drag link, 51, carried by the plate, 52, which is bolted to the frame 48, and the opposite end of which is pivotally connected to a mutilated gear, 53. A drive shaft, 54, is driven at its forward end by a pair of beveled gears 55, 56, Fig. 3, the gear 56 being carried on a stub shaft, 57, which carries a pinion, 58, meshing with the large gear 22. At the rear end of the shaft 54 is another pair of beveled gears, 60, 61, Fig. 2, the gear 61 being a compound gear, the spur gear portion of which, 62, meshes with a gear, 63, on a shaft, 64. The mutilated gear 53, loosely mounted upon the shaft 64, is associated with a gear, 65, and lock, 66, Figs. 1 and 2, said gear and lock being carried upon the shaft, 67. Upon the shaft 67 are also mounted three beveled gears (not shown) in housings 68, 69, 70, meshing with corresponding gears (not shown) mounted upon shafts 71, 72, 73, which will hereafter be called twister shafts, inasmuch as it is the actuation of these shafts which causes the twisting of the baling wires about the bale, the operation of which will be hereinafter described.

On the lower end of the shaft 64, is mounted a master cam, 74, which when in rotation actuates a knife-controlling shaft, 75, and a hook-controlling shaft, 76, (Figs. 2, 6 and 7). The shaft 75 has mounted at its lower end a roller, 77, Fig. 2, which engages a cam channel, 78, formed upon the edge of the cam 74, said engagement causing the raising and lowering of said shaft 75 and consequently the wire-cutting knives, 79, secured in frames 79' mounted on said shaft, the operation of which knives will be hereinafter described. The shaft 76, has a lever, 80, mounted upon its lower end which carries a roller, 81, adapted to engage a cam-channel, 82, in the upper surface of the master cam 74, said engagement causing the oscillation of the hook-bar, 83. Mounted upon the shaft 76, and keyed thereto by a key, 84, is an arm, 85, connecting the shaft 76 with the hook-bar 83, said hook-bar 83 being pivotally connected at 86, to said arm 85, the action of the cam 82 on roller 81 causing the bar 83 to be reciprocated through an

aperture, 87, in a bracket, 88, mounted upon the twister frame casting, 90, Fig. 7.

By referring to Fig. 2 it may be observed that the hook-bars 83 and the mechanisms associated therewith are three in number, and therefore the description of one set of mechanisms and the operation thereof will suffice as all are identical in construction and operation.

The machine, as viewed in Fig. 1, is in position to start a bale, there being three needle bars 27 each carrying a baling wire 45, Fig. 4, which bars course through the guide 27' the wires passing between duplicate sets of rollers, 91, 92, of the tension mechanisms 47, tension at the time being applied to the wires from such mechanisms over the idlers 93, 94, 95, idlers 93 and 94 being rotatably mounted in the needle bar 27 while idler 95 is mounted upon the frame of the baling chamber, the outer end of each of said wires being held, as shown in Fig. 11, between the face of a knife 79 and a wire holder plate, 96. Therefore, as the baling process progresses the wires 45 lying across the path of the bale, will be forced farther back with each succeeding oscillation of the pitman 23 until such time as the operator has been signaled to discontinue feeding the machine. When the bale has been formed the wires 45 have been forced backwardly in the baling chamber and the outer portion of each has been carried through a slot, 97, in a twister gear, 98, which has up to this time remained stationary. The mutilated gear 53 has been moving in a direction indicated by the arrow, Fig. 1, and the teeth, 53^a, have engaged the pinion 65, the lock 66 has fallen into the aperture, 53^b, and the shaft 67, through gears 68, 69, 70, has caused a partial rotation of the twister shafts 71, 72, 73, which carry at their opposite end gears, 99, Fig. 9, in mesh with the twisters 98, bringing the slot, 100, into the position shown in Fig. 10. The hook-bars 83 have meanwhile been advanced, as shown in Fig. 7, and the needle bars 27 have carried the wires 45 through the slots, 101, formed in the side of the baling chamber, and which register with the slots 26 in the ram 25 as seen in Fig. 5, the latter slots being sufficiently large to admit the needle bars, and the cam 82, through its engagement with the roller 81, on the lever 80, now causes a return movement of the hook bar 83, Fig. 6 and 11, the hooked end, 103, of which catches wire 45 and pulls it through opening, 104, in twister plate 104', when it slides into the slot 100 of the twister. The opposite ends of the wire bale are now threaded through the twister, Figs. 10 and 11. The mutilated gear 53 continues in its revolution and the tooth portion, 53^c, engages the pinion 65, when the twister gear 99 is caused to further rotate, which twists the

wires into the shape shown in Fig. 12, at which moment the knives 79 are raised through their engagement with the cam 78, and the end 105 of the baling wire which has heretofore been held between the knife and its holder plate is released. The needle bar has started on its return movement and has drawn the wire 45 backwardly against the raised end 106 of the knife 79, which during its raising movement has brought the notch 107 into the path of the wire 45. The knife 79 now starts down again and severs the wire, and the end thereof connected to the needle bar and lying in notch 107 is drawn down with the lowering of the knife and is clamped between the knife 79 and its holder plate 96. This clamping of the wire secures the same sufficiently to withstand the compressing action between the looped wires and the ram and the succeeding bale being formed forces the wire backwardly as hereinbefore described.

It is desirable that the wires carried by the needle-bars shall be loosely held in same upon the forward movement of the bars to permit the free running of the wires, and therefore the rollers 91, 92, are kept a considerable distance apart by means of a spring-controlled yoke 91' mounted upon a rod 93' having a flat face against which the yoke bears, and which yoke carries the roller 92. Upon the return movement of the bars, however, it is essential that the wires shall be held taut, and therefore I provide a spring-mounted frame 47' in the path of travel of the lowermost needle-bar, so that as it moves forwardly the arm 92' thereon will contact with said frame 47' and be held in one position until it reaches the offset portion 47'' thereof, whereupon, when said bar starts to return, said arm will be thrown in a reverse position by contacting with said offset portion, which operation turns the rod 93' upon which said arm is mounted, so that said yoke will be forced toward roller 91, at the same time carrying roller 92 with it, and thus grip the wire sufficiently to hold it in tension until arm 92' has traveled across frame 47' to a similar offset at the opposite end thereof, when the tension on said wire becomes released.

With reference to Figs. 1, 2 and 4, it will be noted that I have mounted upon one side of the baling chamber, a shaft 110, in plates 111 and 112. On the upper end of said shaft is secured a disk 113, carrying upon its upper surface a crank 114, to which is secured a link 115, said link being fastened at its outer end to an indicator arm 116, which is pivotally mounted upon a plate 117, said plate having a mark upon its upper edge to notify the operator when a bale has been formed sufficiently to cease feeding material to the baler, said arm 116 being caused to oscillate back and forth across the plate 117,

by the mechanism just described. An audible signal 118, is also provided, which comprises a lever 119, pivoted at 120, to a plate 121. As the shaft 110 revolves, due to the contact between the rearwardly moving bale being formed and the semi-circular toothed plates 122, 123, constituting a trip-wheel, the disk 113, carrying the roller 124, revolves, said roller engaging the end 125 of the lever 119, causing said lever to rock upon its pivot 120 and to be suddenly disengaged, thereby striking the gong or audible signal 118. The plate 123 of said trip wheel is preferably mounted upon shaft 110, and is provided with holes (Fig. 1) in which studs s may be inserted, against which plate 122 contacts, which studs may be placed any predetermined distance apart to insure that the bale being formed shall be of a certain length, it being understood that plate 122 is mounted loosely on shaft 110 and is revolved by contact with plate 123, so that if the studs are in the position shown a bale of minimum length will be announced by the signal, but if said studs are placed closer together such announcement will not take place until a greater quantity of material has been baled, and by which I am enabled to arrange for the formation of bales of varying lengths and weights as desired, and which mechanism when set for a desired size of bale insures that bales of that size shall be uniform.

A spring-actuated plunger, 126, acts as a buffer to overcome the action of a pull-spring, 127, which is connected between a lug 128 and the lever 119. The mutilated gear 53 carries upon its lower side a dog 129, which abuts one end of a pivoted lever 130, the opposite end of said lever carrying a hook bar 131. The gear 63 carries a lug 132, which engages the downturned end of the hook 131, causing said hook to slide in its bearing 133, and pull the lever 130, from its engagement with the dog 129, thereby releasing said gear, 53, so that as the hook 134, contacts with dog 129 the mutilated gear becomes actuated to make another revolution.

The twister shafts 71, 72, 73, (being identical a description of one will suffice for all) are composed of two pieces 71^a and 71^b joined as shown in Fig. 6 by a spring device, 140. The portion 71^b which carries the twister gear 99 is clamped at its opposite end to a casting 141 suitably recessed to accommodate a spring-controlled bolt 142, said bolt passing through a plate 143 having an inturned end 144 held against a flattened portion 145 of the shaft 71^a. A spring 146 surrounds the bolt 142 and is compressed between the head of said bolt and the bottom of the recess in the casting 141, tension being regulated by adjustment of the nut 147. If for any unforeseen reason the twister

should become jammed and thereby create an undue strain, the tension of the spring 146 would be overcome and the plate 143 would be sprung out of engagement with the squared end of the shaft 71^a, and said shaft 71^a would then be allowed to revolve without causing a corresponding revolution of the friction gear 99. Bars 148 are carried by a yoke 149 secured to the baler frame, said bars 148 being connected by a link 150, which is actuated by a cam 151 cast upon the top surface of the master cam 74. It is necessary that the bars 148 should lie in line with the slots 101 while the needle bars are bringing the bale wires through preliminary to the twisting operation and that they be lowered to allow the bale wire to disengage therefrom at a predetermined time. Spring-controlled fingers 152 are mounted upon opposite sides of the baling chamber and the ends 153 thereof project through suitable openings slightly into the baling chamber and are for the purpose of preventing surging of the hay as the ram is withdrawn. It is desirable that the slots 26 be closed on the side next to the twisting mechanism, except at the time when the needle bars pass there-through, and to this end I have mounted upon a shaft 154 plates or doors 155 actuated by a cam 156, (Fig. 2), which causes the reciprocation of a bar 157 mounted on the lower end of shaft 154 and communicating with said cam. These doors 155 prevent any unnecessary dust or chaff from entering the twister mechanism to clog it up.

The knife 79 (Figs. 14 and 15) is preferably made of tool steel and its upper end has a projection 158 provided with a face which is slightly inclined toward the cutting edge 107, said face 158 being rounded to allow the wire to remain in position while the knife is being elevated. At the time that the wire falls into the notch 107, the end of said wire nearest the needle bar would be freed were it not for the fact that the rib 159 held the same and forced said wire between the knife 79 and its holder plate 96.

The safety device shown in Fig. 13 shows the gear 55, loosely mounted upon the drive shaft 54. At the end of the drive shaft and rigidly secured thereto by a pin 160, is a casting 161, said casting 161 and the boss 162 on the sleeve of gear 55, being correspondingly recessed to receive a bolt 163, secured by a nut 164. The casting 161 is recessed at 165 to receive a spring 166, which tends to withdraw the bolt 163. Hardened steel blocks 167, 168, are mounted in the contacting faces of 161 and 162, and act as shears in case an overload should occur on shaft 54, whereupon the bolt 163 would be severed and the driving mechanism could continue to revolve gear 55 without revolving the shaft 54, thereby obviating the liability of damage to the machine, the bolt in

use being an ordinary stove bolt. This makes a very suitable driving connection and may be readily replaced in case it becomes sheared.

If for any reason the bolt 163 becomes sheared, the spring 166 forces said bolt against the plate 169, causing said plate to be rocked upon its pivot 170, and carrying with it the bar 171, attached to the lever 172, at 173. To the lower end of the lever 172, is attached a clutch rod, 174, leading to a suitable clutch (not shown) communicating with the driving gears. Therefore, as the lever 172 is drawn forward the clutch will be released by the movement of said rod and the driving gears will be stopped. A push-spring 175 tends to maintain the lever in either its operative or disconnecting position, being in the nature of a snap-switch, that is, as the pivotal point 176 passes the line intersecting the pivotal point 177, and the point 178, it will be maintained in either position due to the pressure of the spring 175.

By the construction and arrangement of mechanisms described I produce a baling press capable of efficiently and rapidly forming and automatically binding bales, and one in which the various mechanisms for feeding and compressing the material, drawing the wires thereabout, tying and cutting the same, and announcing the completion of a bale, with safety mechanisms for positively stopping the operation of the machine in case of emergency, as well as other features, are so arranged and timed as to cooperate in entirety and either synchronously or in sequence perform the various steps necessary to the formation and binding of a bale from loose material, which I demonstrate in practice is accomplished effectively and very rapidly at a material saving in time and labor.

I claim as my invention:

1. In a baling press, a transversely swinging needle-bar adapted to carry an extensible wire, mechanism carried by said needle-bar for holding said wire under tension, means for actuating said bar to carry said wire through said press to contact with a bale being formed, means for propelling said bale so that said wire will become encircled thereabout, and means for tying the meeting portions of said wire when the formation of said bale has been completed.

2. In a baling press, a transversely swinging needle-bar adapted to carry an extensible wire, mechanism carried by said needle-bar for holding said wire under tension, means for actuating said bar to carry said wire through said press to contact with a bale being formed, means for propelling said bale so that said wire will become encircled thereabout, means for tying the meeting portions of said wire when the for-

mation of said bale has been completed, and means for cutting said wire and holding the end thereof so that said wire will be in position to be actuated by a succeeding bale under process of formation.

3. In a baling press, the combination of a driving shaft, a cam mounted thereon, a knife-controlling shaft communicating with said cam, a hook-controlling shaft communicating with said cam, a wire catching hook on said shaft, and means for driving said driving shaft to operate said cam and actuate said knife and hook controlling shafts.

4. In a baling press, the combination of a driving shaft, a cam mounted thereon, a knife-controlling shaft communicating with said cam, wire cutting knives supported on said shaft, and means for driving said driving shaft whereby said knife-controlling shaft will be actuated to carry said knives in reverse directions in relation to a wire to be cut.

5. In a baling press, the combination of a driving shaft, a cam-shaft communicating with said drive shaft, a cam mounted on said cam-shaft, a knife-controlling shaft communicating with and actuated by said cam to operate a wire-cutting knife supported on said shaft, a hook-controlling rod communicating with said cam, a wire-hooking rod connected to said shaft, a twister-controlling shaft adjacent said mechanisms and communicating with said cam-shaft, a wire twister mounted on said twister shaft, and means for rotating said drive shaft to drive said cam-shaft and cause said cam to actuate said knife, hook and twister controlling shafts.

6. The combination, in a baling press, of a cam, a knife-controlling shaft communicating with said cam, a wire cutting knife supported by said shaft, a twister-controlling shaft communicating with said cam, a wire twister mounted thereon, and means for rotating said cam to actuate said wire and twister controlling shafts.

7. The combination, in a baling press, of a cam-shaft, a cam mounted on one end thereof, a mutilated gear on the opposite end thereof, wire holders communicating with said cam, wire twisters communicating with said cam, wire cutters associated with said cam, needle-bars adapted to carry baling wires, pivotal means connecting said bars with said mutilated gear and said cam, and means for driving said cam to swing said needle-bars in the direction of said holders, twisters and cutters to carry wires thereto and for returning said bars to initial position when said wires have been so carried.

8. The combination, in a baling press, of a cam-shaft, a cam mounted on one end thereof, a mutilated gear on the opposite end thereof, wire holders communicating

with said cam, wire twisters communicating with said cam, wire cutters communicating with said cam, needle-bars adapted to carry baling wires, means for holding said wires in tension, pivotal means connecting said bars with said gear and said cam, and means for driving said cam and gear to swing said needle-bars in the direction of said holders, twisters and cutters to carry wires thereto and for returning said bars to initial position when said wires have been so carried.

9. The combination, in a baling press, of a cam-shaft, a cam mounted on one end thereof, a mutilated gear on the opposite end thereof, wire holders communicating with said cam, wire twisters communicating with said cam, wire cutters communicating with said cam, needle-bars having idlers adapted to carry baling wires, means for holding said wires in tension, pivotal means connecting said bars with said gear, and means for driving said cam and gear to swing said needle-bars in the direction of said holders, twisters and cutters to carry wires thereto and for returning said bars to initial position when said wires have been so carried.

10. In a baling press, the combination, of means for carrying wires, means forming part of said carrier means for holding said wires under tension, means for twisting said wires, means for cutting said wires when twisted, means for retaining one end of said wires, and mechanism for operating said elements consecutively.

11. In a baling press, a movable needle-bar adapted to carry a wire, an adjustable tension device for holding said wire, and means for adjusting said tension device to maintain said wire loosely during one movement of said bar and taut during the reverse movement of said bar.

12. In a baling press, a wire twister, a twister shaft communicating with said twister, means for rotating said twister shaft, and means for preventing the end of said shaft communicating with said twister from rotating when said twister becomes accidentally inoperative.

13. In a baling press, a needle-bar adapted to carry a wire across said press ahead of a bale to be formed, a wire twister, a reciprocating hook bar for carrying said wire through said twister, means for actuating said twister to twist said wire, and means for cutting said wire and retaining the same as said needle-bar returns to initial position.

14. In a baling press, a needle-bar adapted to carry a wire across said press ahead of a bale to be formed, a wire twister, means for guiding a wire to properly enter said twister, a reciprocating hook-bar for carrying said wire through said twister, means for actuating said twister to twist said wire

and tie the same about the bale and means for cutting said wire after the same has been tied.

15. In a baling press, a cam having channels therein, a knife-controlling shaft actuated by one of said channels, a hook-controlling shaft having a hook near its end communicating with and actuated by the other of said channels, and mechanism for actuating said cam.

16. In a baling press, a main cam having channels therein, a knife-controlling shaft communicating with and actuated by one of said channels, a hook-controlling shaft having a hook near its end communicating with and actuated by the other of said channels, a cam on said main cam, a bar communicating with said cam, a shaft connected to said bar, and closures connected to said shaft adapted to be opened and closed as said bar reciprocates by the action of said cam.

17. The combination, with a baling press, of a cam-shaft, a cam on one end thereof, a gear mounted on the opposite end thereof, needle bars communicating with said cam and said gear, wire twisters communicating with said gear, wire pullers communicating with said cam, wire cutters communicating with said cam, a drive shaft communicating with said cam-shaft, and means for driving said shaft to actuate said needle bars, twisting, pulling and cutting mechanisms in sequence.

18. The combination, with a baling press, of a cam shaft, a cam on one end thereof, a gear mounted on the opposite end of said shaft, needle-bars communicating with said cam and said gear, wire twisters communicating with said gear, wire pullers communicating with said cam, wire cutters communicating with said cam, a drive shaft communicating with said cam, means for driving said shaft and actuating said mechanisms, and means interposed between said driving shaft and driving means and communicating therewith for preventing the rotation of said shaft and thus stopping the operation of said wiring mechanisms under accidental conditions.

19. In a baling press, the combination of driving mechanism, a drive shaft communicating therewith, wire carrying, twisting and cutting mechanisms communicating with said shaft, and a safety device communicating with said shaft comprising a driven gear, a sleeve associated therewith, a sleeve member secured to said shaft, means for connecting said sleeves, and means for severing said connecting means whereby said sleeves will become disengaged and the rotation of said drive shaft prevented.

20. In a baling press, the combination of driving mechanism, a ram for compressing material and communicating with said driving mechanism, a feeder cooperating with

said ram, wire carrying, twisting and cutting mechanisms, a driving shaft communicating with said driving mechanism and said wire carrying, twisting and cutting mechanisms, and a folder cooperating with said driving mechanism for retaining material within the press when said mechanisms are in operation.

21. In a baling press, the combination of driving mechanism, a ram for compressing material and communicating with said driving mechanism, a feeder cooperating with said ram, wire carrying, twisting and cutting mechanisms, a folder for retaining material within the press, a lever pivotally mounted on said press, means connecting said folder and said lever, and means communicating with said driving mechanism for intermittently actuating said lever to raise and lower said folder.

22. In a baling press having slots in its sides, the combination of driving mechanism, a ram for compressing material and communicating with said driving mechanism, a feeder cooperating with said ram, wire carrying needle-bars adapted to pass through said slots, and closures for said slots to prevent dust from entering therein.

23. In a baling press, a wire twister comprising a shaft having a gear at the end thereof, a slotted toothed member meshing with said gear, and a plate containing said gear and toothed member having an opening therein through which wires are drawn to be directed into the slots of said toothed member.

24. In a baling press, a wire cutter comprising a knife having a notch adapted to receive a wire, a holder-plate adjacent said cutter, and means for actuating said knife to draw said wire between itself and said holder to be retained thereby after said wire has been severed.

25. The combination, with a baling press, of a cam-shaft, a cam mounted on one end thereof, a driving gear mounted near the opposite end thereof, a mutilated gear on said shaft above said gear, a driving shaft communicating with said driving gear, a wire puller shaft communicating with said cam, wire pullers communicating with said shaft, a wire cutter shaft communicating with said cam, wire cutters secured thereon, a wire twister shaft communicating with said mutilated gear, wire twisters communicating therewith, and mechanism for operating said driving shaft to actuate said wire pulling, twisting and cutting mechanisms.

26. The combination, with a baling press, of a cam shaft, a cam mounted on one end thereof, a driving gear mounted near the opposite end thereof, a mutilated gear on said shaft above said gear, a driving shaft communicating with said driving gear, a wire puller shaft communicating with said cam,

5 wire pullers communicating with said shaft,
a wire-cutter shaft communicating with said
cam, wire-cutters secured thereon, a wire-
twister shaft communicating with said mu-
tilated gear, wire-twisters communicating
therewith, needle-bars communicating with
said cam and said mutilated gear, and mech-
anism for operating said driving shaft to ac-
tuate said wire pulling, cutting and twisting
mechanisms and said needle-bars.

10 27. The combination, with a baling press,
of a cam-shaft, a cam mounted at one end
thereof, a driving gear mounted near the op-
posite end thereof, a mutilated gear on said
15 shaft above said gear, a driving shaft com-
municating with said driving gear, a wire
puller shaft communicating with said cam,
wire pullers communicating with said shaft,
a wire-cutter shaft communicating with said
20 cam, wire-cutters secured thereon, a wire-
twister shaft communicating with said mu-
tilated gear, wire-twisters communicating
therewith, needle-bars communicating with
said cam and said mutilated gear, signaling

mechanism communicating with said mutilated gear, and mechanism for operating
said driving shaft to actuate said wire pull-
ing, cutting and twisting mechanisms and
said needle-bars and signaling mechanism. 25

28. In a baling press, a wire twister com- 30
prising a rotary toothed member having
wire-receiving slots therein, a twister shaft
composed of two sections communicating
with said twister, yielding means connect-
ing said sections whereby when said twister 35
becomes accidentally inoperative said sec-
tions will be disengaged so that the section
communicating with said twister will be non-
operative while the other section of said
shaft is rotating, and means for rotating 40
said shaft.

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

WILLIAM ZACHOW.

Witnesses:

LAURIS JACOBSON,
J. A. WALSH.