No. 787,008. PATENTED APR. 11, 1905.

E. H. TAYLOR.

BALING PRESS.

APPLICATION FILED FEB. 11, 1904.

6 SHEETS—SHEET 1.

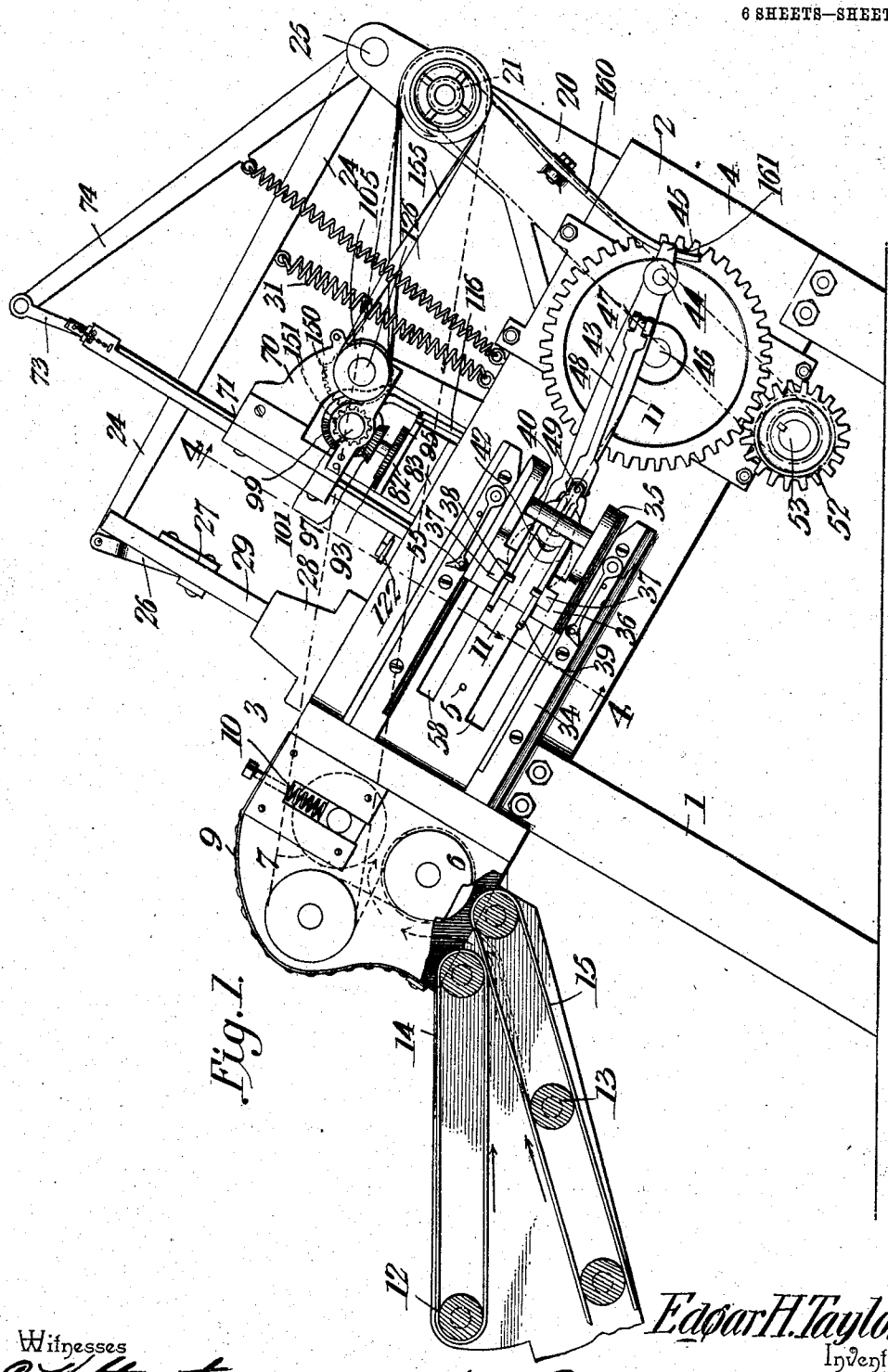

Fig. 1.

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6 SHEETS—SHEET 2.

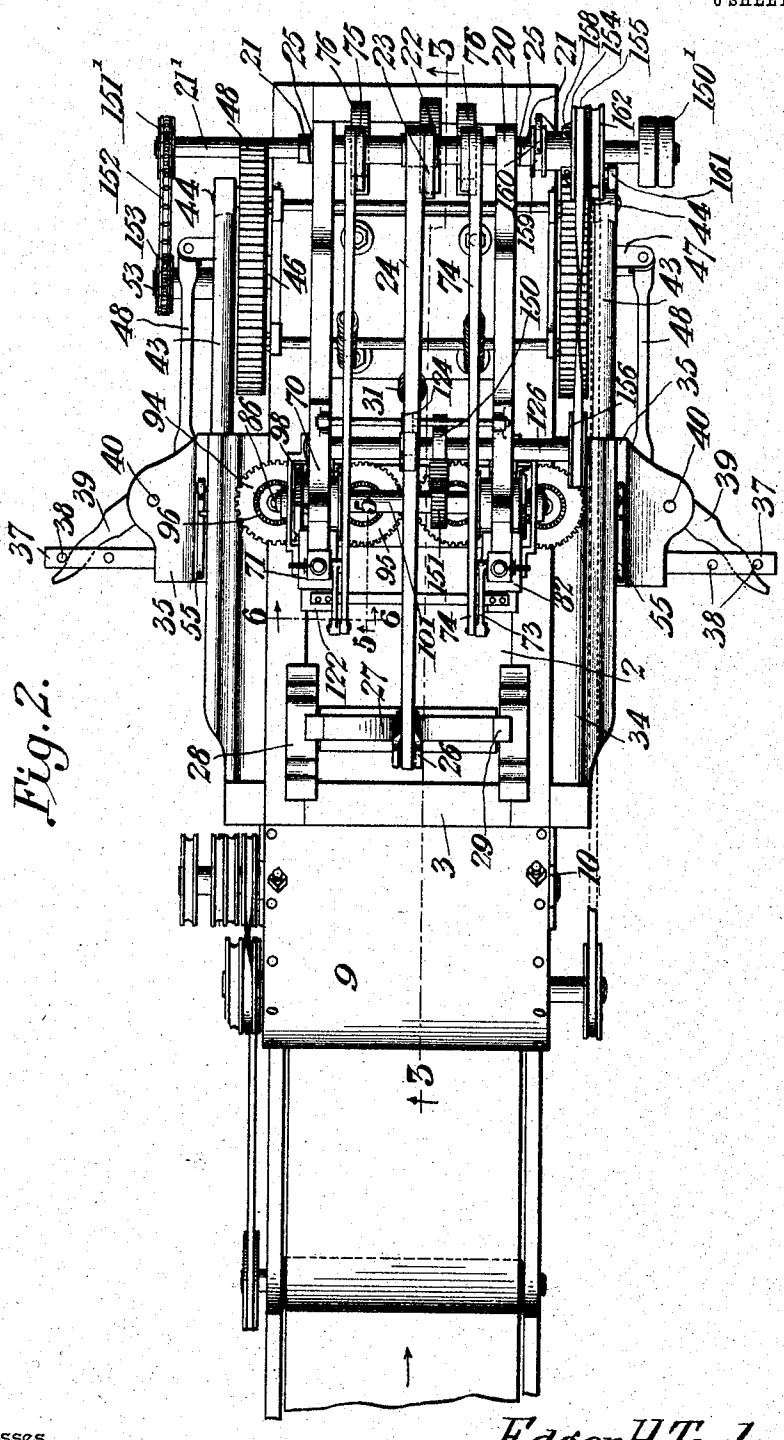

Fig. 2.

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6 SHEETS—SHEET 3.

Fig. 3.

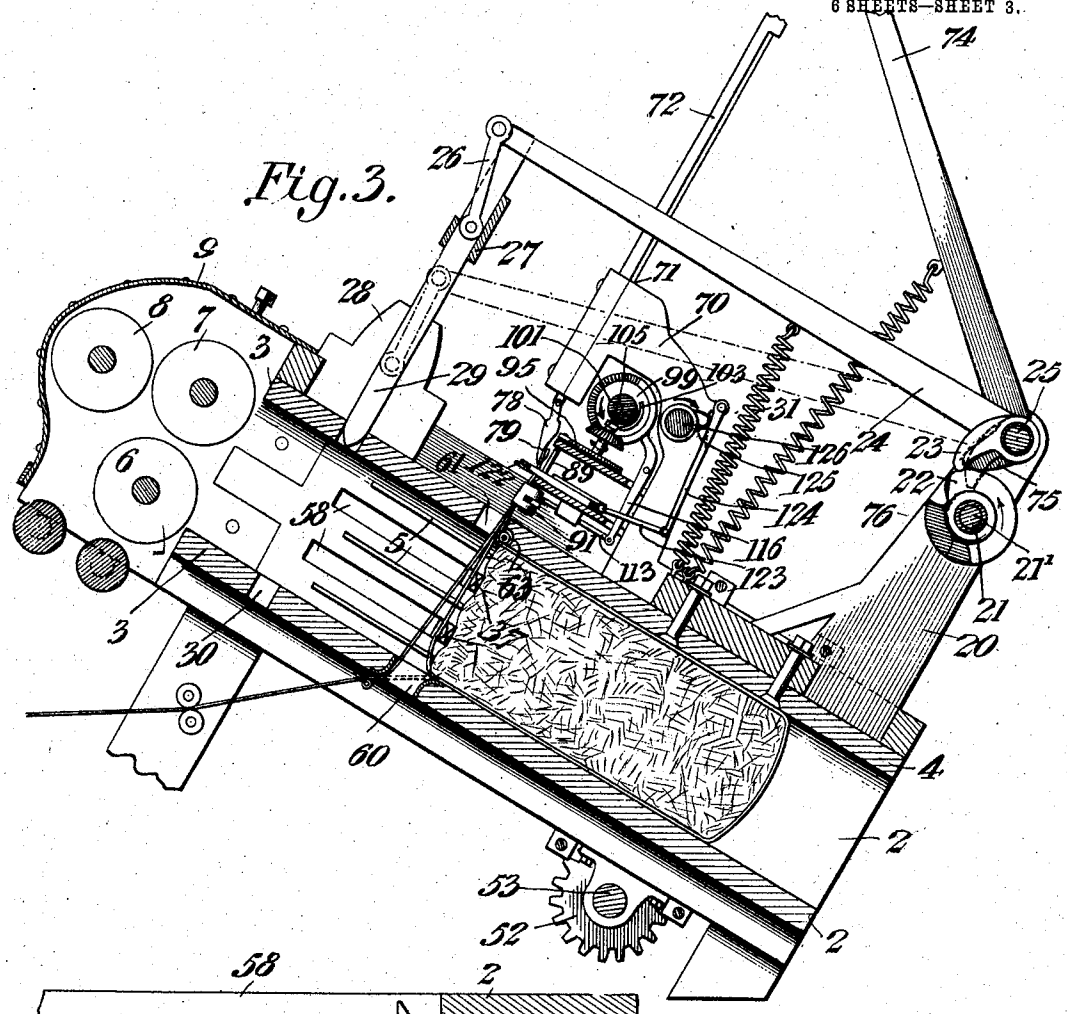
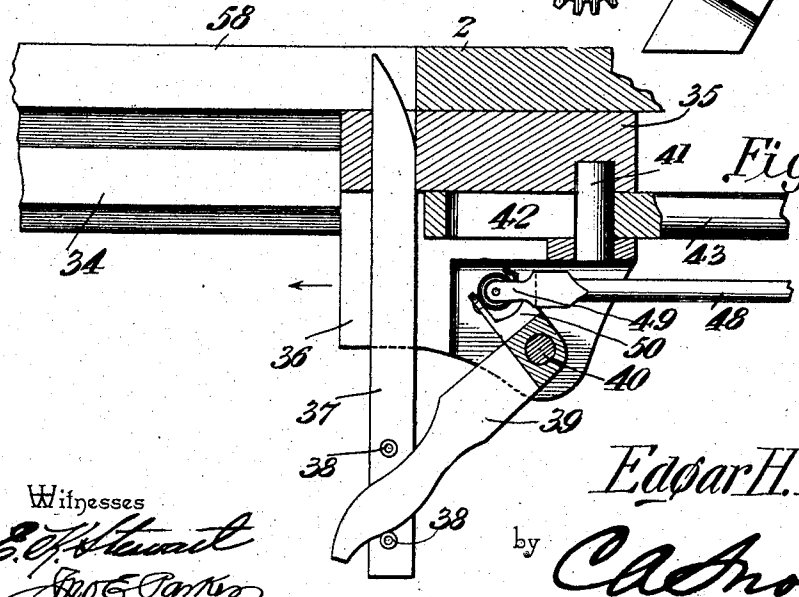


Fig. 11.



Witnesses

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6 SHEETS—SHEET 4.

Fig. 12.

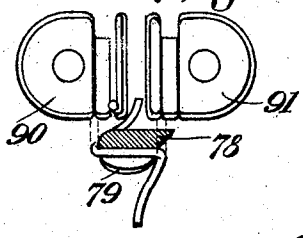


Fig. 13.

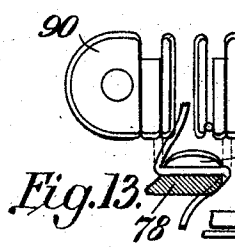
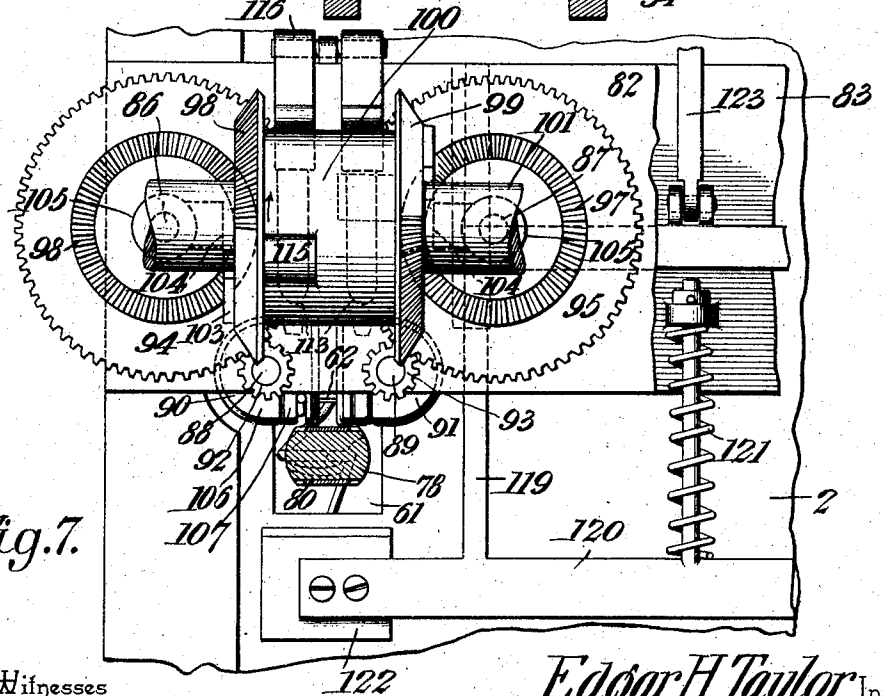


Fig. 4.

Fig. 7.



Witnesses

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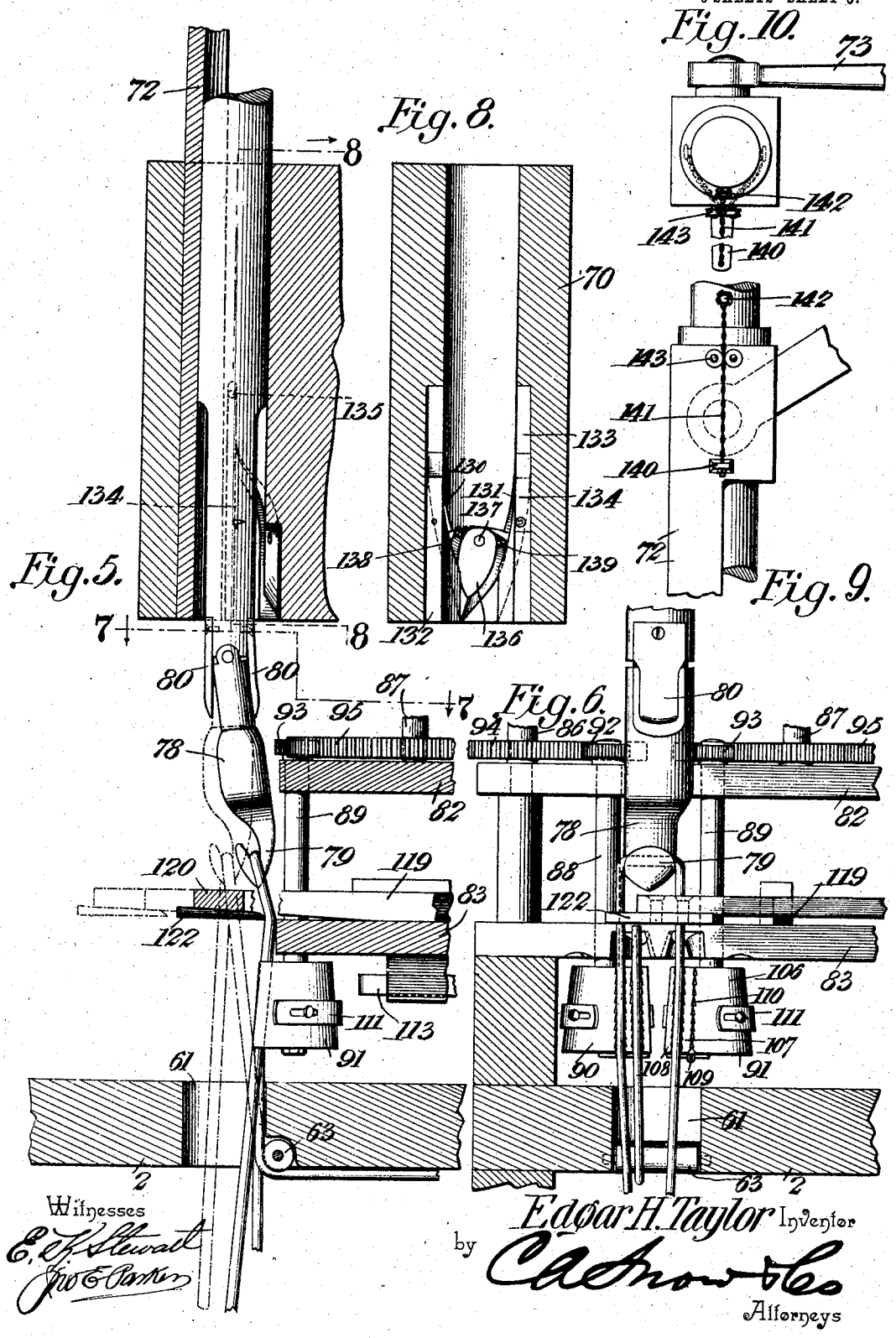
6 SHEETS—SHEET 5.



Witnesses

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BALING PRESS.

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6 SHEETS—SHEET 6.

Fig. 14.

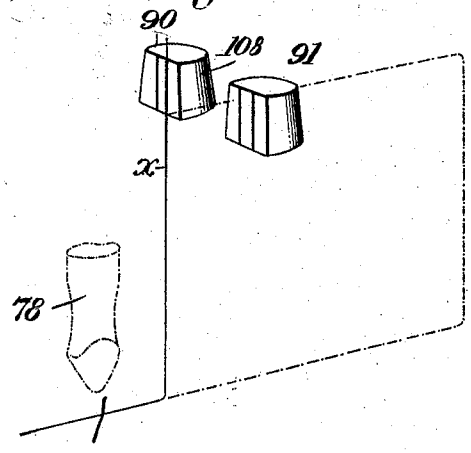


Fig. 15.

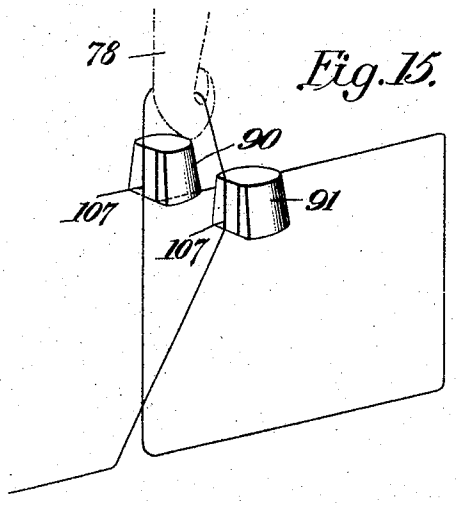


Fig. 16.

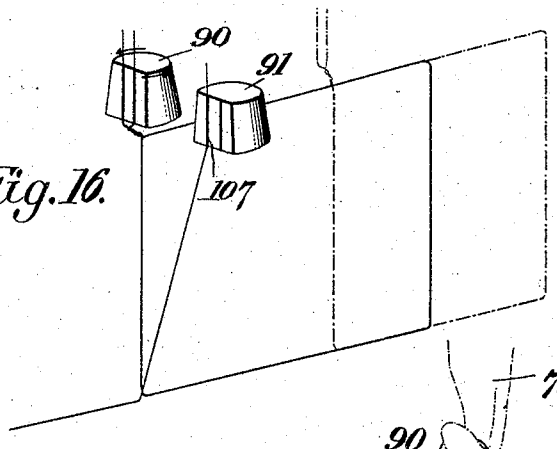


Fig. 17.

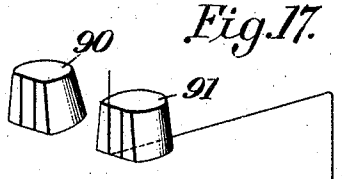
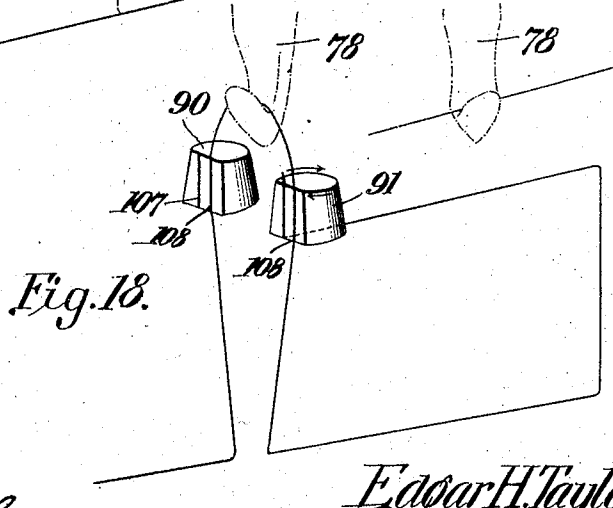


Fig. 18.



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No. 787,008. Patented April 11, 1905.

UNITED STATES PATENT OFFICE.

EDGAR HOUSTON TAYLOR, OF BIRMINGHAM, ALABAMA.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 787,008, dated April 11, 1905.

Application filed February 11, 1904. Serial No. 193,161.

To all whom it may concern:

Be it known that I, EDGAR HOUSTON TAYLOR, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented a new and useful Baling-Press, of which the following is a specification.

This invention relates to certain improvements in baling-presses.

One object of the invention is to construct a baling-press in which the hay or other material to be baled is forced into the open entrance end of a baling-chamber and after the accumulation of a sufficient quantity is compressed by a single movement into the form of a bale.

A further object of the invention is to construct a baling-press in which the usual compression-plunger is dispensed with, so that the feeding of material may be constant instead of intermittent.

A further object of the invention is to construct a baling-press in which the material to be compressed into the form of a bale is introduced directly at the front end of the press-box.

A still further object of the invention is to construct a baling-press into which a web of material is continuously fed.

A still further object of the invention is to construct a baling-press in which means are employed for forming the material to be compressed into a web in advance of its introduction to the baling-chamber.

A still further object of the invention is to construct a baling-press in which provision is made for separating the quantities of material sufficient to form a bale, so that while one portion of the material is being compressed in the baling-chamber a second quantity may be fed into the front end of such chamber without interfering with the compression of the first bale.

A still further object of the invention is to construct a baling-press in which the material to be compressed is separated by the compression devices in such manner as to prevent the material of which one bale is composed from coming into contact or in any manner interfering with the material to be compressed into another bale.

A still further object of the invention is to provide a baling-press with a novel form of tying mechanism in which the tie-wires are drawn completely across the press-box and connected together at one corner of the bale.

A still further object of the invention is to provide a tying mechanism duplex in its nature in order to permit the positive clamping of the cut end of the wire by the operative tying devices and to provide for the effective operation of such tying devices alternately.

A still further object of the invention is to provide a tying or twisting mechanism in which the tie-wires are forced to position in the tying or twisting devices by the wire-cutting mechanism.

A still further object of the invention is to provide a wire-engaging needle, which is moved alternately in opposite directions in order to feed the wire to the alternately-operating tying or twisting mechanisms.

A still further object of the invention is to provide means for positively centering the tying or twisting devices at the completion of each operative movement, so that they may be retained in proper position for the reception of the tie-wires.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of this invention.

In the accompanying drawings, Figure 1 is a side elevation of a baling-press constructed in accordance with the invention, portions being broken away in order to more clearly illustrate the construction. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal sectional view of the press on the line 3 3 of Fig. 2. Fig. 4 is a transverse sectional elevation of the same on the line 4 4 of Fig. 1. Fig. 5 is a longitudinal sectional elevation of a portion of the mechanism on the line 5 5 of Fig. 2, illustrating the tying mechanism on an enlarged scale. Fig. 6 is a transverse sec-

tional elevation of a portion of the mechanism on the line 6 6 of Fig. 2. Fig. 7 is a sectional plan view of a portion of the tying mechanism on the line 7 7 of Fig. 5. Fig. 8 is a sectional elevation on the line 8 8 of Fig. 5, illustrating a detail of the needle-operating mechanism. Fig. 9 is an elevation of a portion of the machine, showing the devices for returning the needle to an initial operative position. Fig. 10 is a plan detail view of the mechanism shown in Fig. 9. Fig. 11 is a sectional plan view on the line 11 11 of Fig. 1, illustrating a portion of the mechanism for pressing the bale. Figs. 12 and 13 are plan views illustrating the connections and relative positions of the twisters and wire-engaging means. Figs. 14, 15, 16, 17, and 18 are diagrams of the operation of the twisters and wire-engaging hook.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In baling-presses as ordinarily constructed the material to be compressed is fed intermittently to a press-box and operated upon by a reciprocating plunger in order to gradually form a bale. This mechanism is usually operated by animal power and while effective is comparatively slow in its operation.

In carrying out the present invention the material to be compressed is fed continuously into the box in the form of a previously-compressed web, and the final compression movement in order to form such material into a bale is accomplished by a single operation of a compression means as soon as a sufficient quantity of material has been supplied.

The working parts of the apparatus are supported on a suitable frame 1, which carries a press-box 2, disposed at an oblique angle, both ends of the box being open, the highest end at 3 being for the entrance of the hay or other material and the lowermost end 4 for the discharge of the completed bales. The inner walls of the press-box are provided with retaining-fingers 5, which may be of the construction ordinarily employed in press-boxes for engagement with the material to be compressed.

At the feed end of the machine are arranged three compression-rollers 6, 7, and 8, all carried by shafts having suitable supporting-bearings, and these rollers may be protected by a suitable casing 9. The rollers 6 and 8 are preferably provided with fixed bearings; but the supporting-shaft of the roller 7 is held in spring-pressed journal-boxes 10 in order to permit the yielding of the roller when large quantities of material are being fed, and in order to exert a substantially uniform pressure on the web the springs may be provided with suitable adjusting means of any character.

The front end of the framework carries bearings for the reception of the spindles of two sets of rollers 12 and 13, the rollers 12 serving as supports for an endless belt 14 and the rollers 13 supporting a small belt or conveyer 15, which is preferably of considerable length and on which the material to be compressed is deposited by the workmen. The length of the belt or conveyer is such that the workmen will have sufficient time to feed a layer of material of substantially uniform thickness, so that the feed to the press-box will be constant and uniform. These belts are traveled at the same surface speed and are arranged on gradually convergent lines, as shown in Fig. 1, so that the material carried by the lower belt will be gradually compressed between them and will be delivered in the form of a web to the two rollers 6 and 8, where such web may be further compressed, and thence the web will be fed through the final compression-rollers 6 and 7 to the baling-chamber, being delivered in the form of a web, which automatically folds back and forth in the form of layers in the baling-chamber, and thus to some extent compresses the material into the form of a bale in advance of the operation of the bale-compressing devices.

From the top of the discharge end of the press-box rise standards 20, that are provided with suitable bearings for the support of a transversely-disposed shaft 21, carrying a cam 22, adapted to operate on the short arm 23 of a bell-crank lever 24, that is fulcrumed on a cross-bar 25, also carried by the standards. The front end of the bell-crank lever 24 is connected by a link 26 to the upper end of a frame 27, having side bearings in guides 28, adjacent to the feed end of the press-box. The frame 27 is provided with one or more depending arms 29, that are adapted to pass through suitable openings in the top of the press-box when a sufficient quantity of material has accumulated therein to form a bale, and the lower ends of these arms may pass into pockets or recesses 30, formed in the bottom of the press-box, in order that the arms may be thoroughly braced. When sufficient hay or other material has accumulated in the box to form a bale, the cam 22 will be moved from under the arm 23 and the lever 24 will be pulled down by means of a helical compression-spring 31, so as to thrust the arms across the press-box at a point adjacent to the feed end thereof and form a backing against which the constantly-fed material may accumulate in the process of forming a second bale. These arms will also divide the web, and the quantity in the press-box in advance of such arms will be in the form of a more or less loosely-compressed mass, which must be further compressed in order to form a commercial bale.

At the opposite sides of the press-box are guides 34 for the reception of longitudinally-movable slides 35, and each of these slides is provided with guides 36 for the reception of any desired number of compression-fingers

37, which are moved in a direction transverse of the press-box. In the present instance each of the slides carries two fingers, and these move for a distance of about one-half the width of the box so that when in place in said box will form a compression-plunger. Each finger is provided with suitable means for effecting reciprocatory movement, and in the present instance two pins 38 are arranged on each finger, said pins being engaged by the cam-shaped ends of rocker-arms 39, that are rigidly secured to a rock-shaft 40, adapted to suitable bearings in the slide 35. Each slide 35 is provided with a pin 41, which passes through an elongated slot 42 in one end of a pitman 43, the opposite end of said pitman being connected to a wrist-pin 44 on a gear 45, that is mounted on a stud 46 at the side of the press-box, and the arrangement is such that at the completion of each rotative movement of the gears the slides will remain stationary while the gears continue to rotate to take up the lost motion represented by the length of the slots. To each pitman is secured a pair of ears or lugs 47, between which is pivoted one end of an auxiliary pitman 48, that is connected by a joint 49 to a rocker-arm 50, carried by the rock-shaft 40, and it is during that portion of the rotative movement of the gear when the lost motion is being taken up that the auxiliary pitmen are active and oscillate the rock-shaft. The two gears 45 are connected by pinions 52 to a transversely-disposed operating-shaft 53, mounted in suitable bearings in the press-box and operated by a belt or other driving mechanism in order to impart uniform movement to the two gears and the finger-rocking slides. In the operation of this portion of the mechanism, it being assumed that the feed has been sufficient to form a bale and that the arms 29 have descended to stop further feed to the compression-chamber proper, the gear-wheels are turned in order to force the pitman-rods toward the front end of the box. Owing to the slots 42 the auxiliary pitman-rods 48 will first operate on the rocker-arms 50 to effect partial rotative movement of the rock-shafts, and the rocker-arms 39 will engage the outermost pin 38 and move the compressed fingers 37 outward to the position shown in Fig. 11. At the completion of the outward movement of the fingers the rear walls of the slots 42 will engage against the pins of the slots, and the latter will be moved forward until the gears have arrived at the limit of the one-half revolution, the slides being stopped near the front end of the press-box and being held by friction-springs 55 from rearward movement. The fingers will now be in a position outside the box at a point to the rear of the arms 29. As soon as the gears start on the second half-revolution the pitman-rods will slide over the pins engaging therewith, and the auxiliary pitman-rods 48 by engaging the rocker-arms 50 will cause inward movement of the rocker-arms 39 and force the compression-fingers 37 into the press-box, said fingers passing through suitable slots 58, formed in the opposite sides of the box. Continued movement of the gears will then draw the slides and the fingers toward the rear end of the press-box, and the fingers each having engaged the hay or other material to be compressed will force such material in the direction of the discharge end of the box and will compress the same into the form of a bale, the box being of a character ordinarily employed and serving by frictional engagement of its sides with the material to afford the resistance necessary for the completion of the bale-forming operation. During this time the feed-belts have been operating and the material has been accumulating in front of the arms 29, and as soon as the full compressed bale has been tied the arms will be raised, and this accumulated material will be allowed to pass into the box for the formation of the second bale. It will of course be understood that while only two of the fingers have been shown for each side of the box the number may be increased to any desired extent in order to form, if necessary, a complete plunger of an area equal, or substantially, so to the cross-section area of the press-box. The wire-tying operation is carried on at about the inward limit of movement of the bale-compressing fingers, and while any number of tie-wires may be employed two have been illustrated in the present instance; but it will be understood that any number may be employed and that the number may be increased or diminished in accordance with the size of the bale. These tie-wires enter the bottom of the press-box through openings 60 and after being guided around the front end of the bale pass to the top of the press-box and out through openings 61 to the twisting or tying devices, a loop of the lower run of wire being caught up and twisted with the end of the wire at the upper and rear end of the bale. The wires at the top of the press-box pass over small rollers 63 in order to reduce friction and prevent the wearing away of the walls of the openings and the breakage of the wires.

At the top of the press-box are arranged two side frames or supports 70, each of which is provided with a guideway 71 for the reception of a longitudinally-movable needle-carrier, which in the present instance is shown as of rectangular form. These needle-carriers are connected by links 73 to rocker-arms 74, that are pivoted on the cross-bar 25 and have cam-shaped end portions 75 under the control of cams 76 on the cam-shaft 21, and as the latter rotates the needle-carriers are reciprocated in the direction of their length. Each needle-carrier is provided with a central bore for its entire length and supports a needle 78, which in addition to its recipro-

cating movement receives partial rotative movement on its own axis in order that the needle or hook which it carries may be properly presented to the wire to be engaged.

At the lower end of each needle 78 is pivoted a wire-engaging hook or needle 79, of suitable shape to engage the lower run of the wire at the opening 60 and raise said wire up through the opening 61. The hook is held in proper position by means of a pair of flat springs 80, rigidly secured at their upper ends to the needle-bar and having their free ends pressing against the sides of the hook and serving to restore the same to an initial central position after each operative movement. It will be noted on reference to Fig. 6 that one side of the hook is nearer to the axial line of the carrier than the opposite side thereof, so that the hook as a whole may be deemed eccentrically mounted, this for a purpose to be hereinafter described.

The standards 70 carry a pair of cross bars or plates 82 and 83, in which are formed bearings for the reception of two sets of twisters and twister-operating shafts, it being understood that one set of these devices is arranged at one side of the machine and another at the opposite side of the machine; but a description of one set will be sufficient to a thorough understanding of the present invention. Each set of shafts is four in number, as indicated at 86, 87, 88, and 89, the latter two carrying twisters 90 and 91, respectively. The twister-shafts 88 and 89 are provided with pinions 92 93, each respectively intermeshing with gears 94 and 95, carried by the shafts 86 and 87. The shafts 86 87 also carry bevel-gears 96 97, and these respectively intermesh with mutilated bevel-gears 98 99, preferably carried by a single hub or collar 100 on a transversely-disposed shaft 101. Each mutilated gear is provided with teeth for a portion only of its periphery, and the teeth of one are disposed opposite to the teeth of the other, so that they will become operative alternately on the gears 96 97, and as a consequence the twisters 90 and 91 will be operated alternately, the gearing being properly proportioned so as to impart the required number of revolutions to the twisters. In order to properly halt the twisters at the end of each operative movement, and thus position the same for the reception of the wires, each mutilated gear is provided with a smooth segment 103, which comes into engagement with the feeding side 104 of a collar 105, carried by each of the shafts 86 87. After the intermeshing teeth have properly accomplished their work the vertical shafts 86 87 will have been rotated to an extent sufficient to bring the collars 105 into such position that the flattened sides 104 will be engaged at the smooth segments 103, and these smooth segments will hold the shaft locked from further rotative movement until the operating-shaft 101 has rotated to an extent sufficient to again bring the teeth of the mutilated gear into mesh with the bevel-gears. Each of the twisters comprises a central member 106, that is rigidly secured to its shaft, and a pair of jaws 107 108, that are connected to the rigid member 106 by means of hinges 109 at the bottom of the twisters. At one side of the jaws are clamping-faces 110, that are provided with wire-engaging teeth in order to firmly grip the tie-wires, and said jaws are held inward toward the center fixed member by means of springs 111, which at all times will tend to clamp the jaws on the wires, and owing to the fact that the jaws are hinged at the bottom any downward stress exerted on the wires will tend to move such jaws closer together, and thus exert a gripping force proportionate to the longitudinal stress of the wire. The mouths of the jaws will be slightly beveled in order that the wires may conveniently be introduced between them, and at the lower ends of the jaws the central rigid member 106 is partly cut away in order to permit entrance of a tongue 113, which separates the jaws for the purpose of releasing the twisted wires.

On the shaft 100 are arranged sets of cams 115, one set being disposed at each side of the machine. Each set of cams comprises a pair, and the cams of each pair operate alternately on the bell-crank levers 116, that are connected at their lower ends to the twister-opening tongues 113. At the completion of each bale one of these tongues will enter between the jaws of one only of each set of twisters and release the wire, the opposite tongue remaining inactive, so that its associate twister, which carries the cut end of the wire in readiness for the formation of the next bale, shall not be disturbed.

The lower plate 83, previously referred to, carries guides for the reception of longitudinally-movable bars 119, which at their outer ends support a knife-carrying bar 20, extending transversely of the press-box and normally held out in inoperative position by means of one or more compression-springs 121. This knife-carrying bar supports cutting-blades 122 at its opposite ends, and the knife-frame as a whole is connected by a link 123 to the lower end of a rocker-arm 124, that is operated upon by a cam 125. The cam 125 is rigidly secured to a shaft 126, having bearings in the standards 70 and geared or otherwise connected to the shaft 101.

Referring now to the diagrams, Figs. 14 and 15, it will be seen that one end of a wire x is carried by the jaw 108 on the twister 90, while the two jaws of the twister 91 are empty. During the progress of formation of a bale the wire x will be gradually forced from the position shown in full lines to that indicated in dotted lines, and after the operation of the compression-fingers the needles will descend and each of the hooks 79 will engage a loop

of the wire and carry such loop up through the opening 61. The hook will then be turned on its axis through an arc of about ninety degrees and will present the two runs of the wire opposite the jaws 107 of the twisters 90 and 91. At this time the cutting-blade is out to the dotted-line position shown in Fig. 5 and full-line position shown in Fig. 7. The cutter-bar then starts to move toward the rear, and the cutting-blades engage the wires and move the same to the full-line position shown in Fig. 5, or until the wires engage against the forward edge of the plate 83, and the blades will not up to this time cut the wire, owing to the fact that there is little or no resistance to the movement. This operation of the blades will force the two runs of the wire into the jaws 107 of both twisters, or until the wires assume the position in the diagram in Fig. 15. At the next step of the operation the blades coact with the forward edge of the plate 83 and sever the wire. The twister 90 will then be operated and the wires held by the jaws 107 and 108 of said twister will be intertwisted in the manner shown in the diagram of Fig. 16, while the cut end of the wire will still be firmly held by the jaw 107 of the twister 91. Immediately after the stopping of the twisting operation one of the fingers 113 will enter between the jaws of the twister 90 and release the upper ends of the twisted wires. During the formation of the next succeeding bale the end of the wire will be held by the jaw 107 of the twister 91, as shown by the diagram in Fig. 17, and at the completion of the compressing operation of this second bale the hook will again descend and raise the wire, said hook and its needle being turned through an arc of ninety degrees in a direction opposite to that in which it was first turned and placing the two runs of the wire in alinement with the jaws 108 of both twisters, and when the cutting-knives again act they will force such wires into the jaws, it being noted that the jaws 108 are now active, while during the previous operation the jaws 107 were active, and this feeding of the wires to the jaws is due in part to the eccentric mounting of the hook, as shown in Fig. 6, and to its axial rotative movement in opposite directions.

In order to effect the rotative movement of the needle or hook carrier 78 on its axis, the opening or recess in guide 71 is widened at its lower end and the walls of such recess are provided with curved cam-grooves 130 131, which extend, respectively, through arcs of ninety degrees in directions opposite to each other, and these cam-grooves merge at their upper ends in the grooves 132 and 133, respectively, that are arranged parallel with the axis of the carriers. At the juncture of each cam-groove with its associate straight groove is a small spring-switch 134 to permit the passage of a pin 135, projecting from the shank of the needle, and during the upward movement of said pin in the curved groove the spring will move slightly to permit the passage of said pin and will then close the passage to the curved groove, so that during the downward movement of the needle the pin will be retained in the straight groove. At the juncture of the two cam-grooves is a pivoted latch-cam 136, which is mounted to remain in the position in which it is adjusted. This cam is fulcrumed on a pin 137 and is provided with a bar or projecting lugs 138 and 139. When the needle moves up, it enters at one side of the cam, and its pin 135 is by engagement with the cam directed into the groove—as, for instance, 131—and the latter acts to effect axial rotative movement of the needle to an extent of ninety degrees. During forward movement of the needle its pin 135 will engage the lug 139 of the cam and will shift the position of the latter, so that when the pin 135 of the needle again enters the cam it will be deflected to the opposite cam-groove 130, and said pin 135 will then by engagement with the lug 138 restore the cam to the first position, so that at alternate forward movement of the needle it will receive alternate movements in opposite direction each to the extent of ninety degrees and in descending will move downward in a perfectly straight line along one of the grooves 132 133.

To provide for the restoring of the wire-engaging hook 79 to its wire-engaging position—that is to say, with the plane of the bill of the hook directed transversely to the baling-chamber—a spring 140 is secured to the upper portion of each carrier 72. This spring is connected by a flexible chain or cord 141 to a pin 142 on the needle, and this chain or cord is guided between a pair of rollers 143 at the upper end of the carrier. If the hook be in the proper position with the bill directed inward toward the center of the baling-chamber, the bill on downward movement passes outside the wire at the bottom of the baling-chamber, its end being pointed to facilitate this operation. On the upward movement of the hook the wire will be caught and the loop will be drawn up through the opening 61. The pin or pins 135 of the needle will then enter one or other of the curved cam-grooves of the carrier 72 and the bill of the hook will be turned around toward the twisters, it being shown in Figs. 5 and 6 as directed outward from the twisters. In this position the wires will be placed opposite the jaws 107 of said twister, owing to the eccentric mounting of the hook. On the clipping of the wire by the descent of the hook at the next operation the needle will be guided in a straight line until its pin 135 passes beyond the end of the straight slot. During the turning movement of the needle or carrier 78 the spring 140 has been placed in stress. As soon as the pin 135 leaves the straight slot the spring will act as a centering-spring to restore the hook to its initial

position. The operation will have shifted the cam 136 in position to engage the pin 135 and direct it until the opposite curved slot on the next ascent of the carrier, and the bill of the hook will then be turned to face the twisters, so that the wire will then be directed opposite the jaws 108 of the twisters, and thus operate alternately with alternate bales; but in each case the spring 140 acts to restore the hook to its initial position prior to its descent for engagement with the wire.

In order to properly operate the twisters, the shaft 126 is provided with a mutilated gear 150, that engages a pinion or gear 151 on the shaft 101, and the gears are so proportioned that each complete revolution of the mutilated gear will result in a half-revolution of the gear 151 and its shaft, and each half-revolution of such shaft 101 will result in a complete tying operation, so that a complete revolution of the shaft 126 may be made for each bale.

The various pulleys are shown as connected by suitable belts; but it will be understood that these may be in the form of plain belts or sprocket-chains, or gearing of any suitable character may be used.

To provide for the proper timing of the actuating mechanism, a shaft 21′ is disposed within the shaft 21 and is revolved continuously, said shaft being provided with suitable belt-wheels 150′, one of which is fast and the other is on the shaft, and at the opposite end of said shaft 21′ is a sprocket-wheel 151′, connected by a link belt 152 to a sprocket-wheel 153 on the shaft 53. The shaft 53 operates the shaft 46 through the gearing connections previously described and effects reciprocation of the compression-fingers.

On the hollow shaft 21 is slidably keyed a loose belt-wheel 154, over which passes a belt 155, the movement of which is transmitted to a belt-wheel 156 on the shaft 126, said shaft operating the twister mechanisms, as previously described. The loose belt-wheel 154 may be clutched to the shaft by a slidable clutch member 158, feathered on the shaft 21 and having a grooved collar 159, which is engaged by the bifurcated end of a lever 160, fulcrumed at a point intermediate of its length on a lug or bracket projecting from the frame of the machine. The lower cam-shaped end of the lever 160 is disposed adjacent to one of the gear-wheels 45 and is engaged by a lug 161, projecting from the end of one of the pitman-rods 43, so that each time the larger gear-wheel is rotated and a bale is formed the lug 161 will engage the lever and will shift the clutch 158 to such position as to firmly clutch the belt-wheel 154 of the shaft 21, and thus transmit operative movement to the twisting device through the medium of the belt 155 and belt-wheels 154 and 156. The shaft 21′ carries a friction-wheel 162, which is engaged by the outer face of the wheel 154 when the latter is clutched to the shaft 21, and thus movement is imparted to the shaft 21 and its cams, as well as to the twisting devices. As soon as the lug 161 passes beyond the end of the lever the clutch will release the belt-wheel and the operation of the twisting device will cease.

Having thus described the invention, what is claimed is—

1. In a baling-press, an intermittently-operable compression means, a baling-chamber open at one end for the entrance of material and at the opposite end for the discharge of the bales, a feeding means for introducing a mass of partly-compressed material into the baling-chamber in all positions of said compression means, and means independent of the compression means for dividing the partly-compressed material into quantities each sufficient to form a bale.

2. In a baling-press, means for continuously feeding material to the press, means for dividing such material into quantities sufficient to form separate bales, and an independently-operable means for separately compressing the divided quantities into separate bales.

3. In a baling-press, means for continuously feeding material to the baling-chamber, means for dividing such material into quantities sufficient to form separate bales and for temporarily limiting the extent of movement of the material into the chamber, and an independently-operable means for compressing the separate quantities of material into successive separate bales.

4. In a baling-press, means for feeding material continuously to the baling-chamber, means for dividing the material within said chamber into quantities sufficient to form separate bales and for temporarily arresting the progress of the material, and means for engaging separate quantities, and independently and successively completing the compression of each bale by a single movement.

5. In a baling-press, a baling-chamber, an intermittently-operative means arranged in the chamber for compressing material into the form of bales, means for partly compressing the material into the form of a continuous web and for feeding the same continuously into the baling-chamber irrespective of the movement of the bale-operating means, and means for preventing contact between the material being fed and the compression means during operative movement of the latter.

6. In a baling-press means for effecting initial compression of the material into the form of a continuous web, means for forcing such material into the baling-chamber, and means for dividing the web into lengths, each containing a quantity sufficient for the formation of a bale, and means independent of the feeding means and the dividing means for effecting the compression of the separate web lengths into bales.

7. In a baling-press, means for initial com-

pression of the material into a web, and for forcing the web into the baling-chamber, means for dividing the web into lengths, and means independent of such feeding means and the dividing means for engaging each separate length and independently compressing it into the form of a bale.

8. In a baling-press, means for forming the material into a web and continuously feeding the web into the baling-chamber, means for dividing the web into lengths and temporarily arresting the progress of the web lengths into the baling-chamber proper, and means independent of the dividing means for independently engaging the severed web lengths and compressing the same into the form of bales.

9. In a baling-press, means for feeding material to a baling-chamber, compression-fingers movable in a direction transverse of the baling-chamber for engaging the material, and means for effecting the movement of said fingers longitudinally of the baling-chamber to effect compression of such material and for holding such material compressed into the form of a bale, and means for carrying a tie around the compressed material while it is held by said fingers.

10. In a baling-press, a baling-chamber having slotted side walls, compression-fingers, means for moving the compression-fingers into the baling-chamber at a point near the feed end thereof and for forcing said fingers in a direction lengthwise of the chamber to effect compression of the material and for holding such material compressed into the form of a bale, and means for carrying a tie around the compressed material while it is held by said fingers.

11. In a baling-press, a baling-chamber or press-box, compression-fingers, means for moving said fingers both transversely and longitudinally of the baling-chamber, and means for carrying a tie around the compressed material while it is held by said fingers.

12. In a baling-press, a baling-chamber or press-box, compression-fingers, a means for moving the fingers into the chamber at the beginning of a compression-stroke and for withdrawing them from the chamber at the end of a compression-stroke, means for reciprocating said fingers in a direction lengthwise of the baling-chamber, the fingers being retained in the chamber during the in or compression stroke, and being outside the chamber during the outstroke, and means for tying the compressed material in the form of a bale while such material is held by said fingers.

13. In a baling-press, a baling-chamber open at one end for the reception of material, and open at the opposite end for the discharge of bales, a compression member movable in the chamber during the compression-stroke and outside the chamber during the return stroke, and means for placing the tie-wire around the compressed material and said compression member at the completion of such compression-stroke.

14. In a baling-press a press-box, means for feeding material thereinto, guides disposed on opposite sides of the box, reciprocatory frames adapted to said guides, finger-guides carried by the frames, compression-fingers mounted in said finger-guides, rock-shafts mounted in the frames, and connected to the fingers, pitman-rods having pin-and-slot connections with the frame, and auxiliary pitman-rods connected to the rock-shafts and serving during lost motion, due to said pin-and-slot connections, to effect longitudinal movement of the compression-fingers.

15. In a baling-press, a press-box, guides on the opposite sides of said press-box, reciprocatory frames adapted to the guides and provided with projecting pins or lugs, pitman-rods having slotted end portions for engagement with the pins, finger-supporting guides carried by the frames, compression-fingers adapted to said finger-supporting guides, rock-shafts journaled in the frames, rocker-arms carried by the shafts and connected to the fingers, and auxiliary pitman-rods movable with the main pitman-rods and connected to said rock-shaft.

16. In a baling-press, a press-box, guides disposed on the opposite sides of the box, frames adapted to said guides and provided with projecting pins or lugs, gears mounted on shafts at opposite sides of the box, transverse shafts having pinions intermeshing with the gears, slotted pitman-rods connecting the pins or lugs to wrist-pins on the gears, finger-supporting guides carried by the frames, compression-fingers adapted to said finger-supporting guides, rock-shafts carried by the frame, rocker-arms connected to the rock-shafts, links connecting said rocker-arms to the fingers, and auxiliary pitman-rods pivotally connected to the slotted pitman-rods and serving to transmit operative movement to the rock-shafts.

17. In a baling-press, a feeding and compression means, wire-twisting devices disposed in sets near opposite sides of the press-box, and wire-engaging means for directing the wire alternately to alternate twisters.

18. In a baling-press, a press-box, compression means, alternately-operable twisters, and means for engaging a loop of the wire and for directing said loop into engagement with both the operative and inoperative twisters.

19. In baling mechanism, a pair of alternately-operative twisters, each adapted to receive and hold the cut end of the wire for the tying of a fresh bale.

20. In baling mechanisms, a pair of alternately-operative twisters.

21. The combination with a baling-press, of a plurality of successively-operative twisters.

22. The combination with a baling-press, of a pair of twisters arranged to act in alterna-

tion, one to hold the end of the cut wire, and the other to twist the ends of the bale-wire.

23. In a baling-press, a pair of twisters having a plurality of wire-receiving jaws adapted to act successively as holding devices for the end of the wire.

24. In a baling-press, a twister having a plurality of alternately-operative wire-receiving jaws.

25. In a baling-press, a twister including a stationary member having a stationary wire-engaging face, and a pair of movable clamping-jaws of which one is adapted to coact with the stationary wire-engaging face.

26. In a baling-press, a pair of pivotally-mounted wire-engaging jaws, and a stationary jaw serving as a carrier for the pair of jaws and adapted to coact with one of them.

27. In a baling-press, a stationary member provided with a wire-engaging face, and a pair of pivotally-mounted spring-pressed jaws in which the pivot-points of the jaws are disposed in the direction of longitudinal stress of the wires.

28. In a baling-press, a twister comprising a revoluble member having a pair of wire-engaging faces, a pair of pivotally-mounted jaws coacting therewith, and a spring normally tending to press the jaws in the direction of the stationary member.

29. In a baling-press, a rigidly-mounted rotative member, and a pair of pivotally-mounted jaws carried thereby.

30. In a baling-press, a twister, including a revolubly-mounted member, a pair of pivoted jaws carried thereby, and a spring for forcing the pivoted jaws into engagement with the wire.

31. In a baling-press, a twister comprising a revoluble twisting element having a wire-engaging face, a pair of movable jaws, and means for opening said jaws.

32. In a baling-press, a revoluble twisting element, a pair of pivotally-mounted jaws carried thereby, means for stopping the jaws in wire-engaging positions, and means for effecting opening movement of said jaws.

33. In a baling-press, a twister comprising a revoluble member, a pair of jaws supported thereby, and a reciprocating tongue for simultaneous engagement with the revoluble member and one of said jaws.

34. In a baling-press, a revoluble member, a pair of pivotally-mounted jaws carried thereby, and a tapered slide for engaging and opening said jaws.

35. In a baling-press, a wire-twisting device, a wire-engaging means, and a cutting mechanism, one of the cutting elements being adapted to force the wire into engagement with the twister in advance of the operation of severing the wire.

36. In a baling-press, a wire-twisting mechanism, and a wire-cutter including a movable element adapted to engage with said wire and force the same into engagement with the twister in advance of the severing of the wire.

37. In a baling-press, the combination with a twister, of a wire-severing device, and means for moving the same to force the wire into engagement with the twister.

38. In baling-presses, a wire twisting or tying mechanism, and a wire-cutter adapted to engage with and force the wire into engagement with the twister.

39. In a baling-press, a wire-twister, a pair of cutting elements of which one is rigid with respect to the other, a movable cutting element serving to force the wire into engagement with the twister in advance of the operative engagement of the two cutting elements with the wire.

40. In a baling-press, a twister, a stationary cutter adjacent thereto, a movable cutter for coöperation therewith, and means for operating the movable cutter to force the wire into engagement with the twister in advance of the cutting operation.

41. In baling-presses a revoluble twister, a stationary cutter disposed above the twister, a movable cutter adapted to force the wire into engagement with the twister, and means for moving the wire between the stationary and the movable cutter.

42. In baling-presses, a pair of alternately-operative twisters, a wire-engaging means, and mechanism for moving the same to present the wire to be twisted to the alternate twisters.

43. In baling-presses, a pair of alternately-operative twisters, and a wire-engaging hook for presenting the wire alternately to said twisters.

44. In baling-presses, a pair of alternately-operative wire clamping and twisting members, and means for operating the same in alternation for the tying of alternate bales.

45. In baling-presses, a pair of alternately-operative twisters, a yieldably-mounted wire-engaging member, and means for engaging the wire and moving said member together with the wire for the insertion of the latter in the twisters.

46. In baling-presses, the combination with twisting or tying devices, of a wire-engaging member having a yieldably-mounted hook.

47. In baling-presses, the combination with twisting or tying devices, of a wire-engaging hook, means for reciprocating and for effecting revoluble movement of said hook.

48. In baling-presses, a reciprocatory wire-engaging hook, and hook-carrying device revoluble in opposite directions, on its own axis, the hook being eccentrically mounted with respect to said axis.

49. In combination with a pair of alternately-operative twisters, of a wire-engaging hook, and means for revolving the hook alternately in opposite directions to present the wire to said twisters.

50. The combination with a pair of twisters, of a revolubly-mounted wire-engaging hook, of which the two sides of the hook are at different distances from its longitudinal axis.

51. The combination with a pair of twisters, an eccentrically-mounted wire-engaging hook, and means for partly revolving the same in opposite directions.

52. The combination with a pair of alternately-operative twisters, of a wire-engaging hook, and a hook-carrier for moving the same across the baling-chamber, there being a yieldable connection between the hook and its carrier.

53. In a baling-press, a twisting device, a wire-engaging hook, a carrier pivotally connected thereto and serving to move the carrier across the baling-chamber, and means for restoring the hook to an initial central position with respect to its carrier after each operation.

54. The combination with a pair of alternately-operative twisters, of a carrier, a hook or needle mounted eccentrically with respect to the carrier, and a carrier-support having oppositely-directed cam-grooves for effecting rotative movement of the carrier and hook.

55. The combination with a pair of alternately-operative twisters, of a hook, a hook-carrier having a projecting pin or lug, a support having a pair of oppositely-directed cam-grooves for the reception of said pin or lug, and a latch-cam controlling the entrance of the pin to said grooves.

56. The combination with a pair of alternately-operative twisters, of a hook, a hook-carrier having a projecting pin or lug, a carrier-support having a pair of oppositely-directed grooves, and a latch-cam arranged at the entrance end of said groove and movable by engagement with the pin or lug.

57. In baling-presses, a pair of alternately-operative twisters, a wire-engaging hook, a hook-carrier, a carrier-support having a pair of oppositely-directed cam-grooves and provided with straight grooves merging therein-to, a latch-cam for directing the course of the pin or lug, and spring-switches disposed at the entrance of the cam and the straight grooves.

58. The combination with a pair of alternately-operative twisters, of gears for operating the same, mutilated gears for transmitting movement to the twister-operating gears, and means for intermittently revolving said mutilated gears.

59. The combination with a pair of alternately-operative twisters, of gears revolving the same, mutilated gears for the transmission of power, each of said mutilated gears being provided with a smooth flange for a portion of its periphery, and a fixed collar carried by the driven gear and provided with a flattened face for engagement by said flange.

60. The combination with a pair of alternately-operative twisters, of a wire-engaging hook, a hook-carrier, means for imparting both longitudinal and rotative movement to the carrier, a carrier-support, and a yieldable connection between the carrier and its support for restoring said carrier to initial position after each operation.

61. The combination with a pair of alternately-operative twisters, of a wire-engaging hook, a carrier therefor, means for imparting both longitudinal and rotative movement to the carrier, a carrier-support, a spring secured thereto, and a flexible connecting device between the spring and the carrier.

62. In a baling-press, a bale-compressing means, a tier for tying or twisting the wires around both the bale and the compressing means, and means for withdrawing the compressing means after the tying operation.

63. In a baling-press, a baling-chamber, a bale-compressing means, mechanism for looping the tie-wires around both the bale and the compressing means, and mechanism for withdrawing said compressing means.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

EDGAR HOUSTON TAYLOR.

Witnesses:

J. ROSS COLHOUN,

J. H. JOCHUM, Jr.