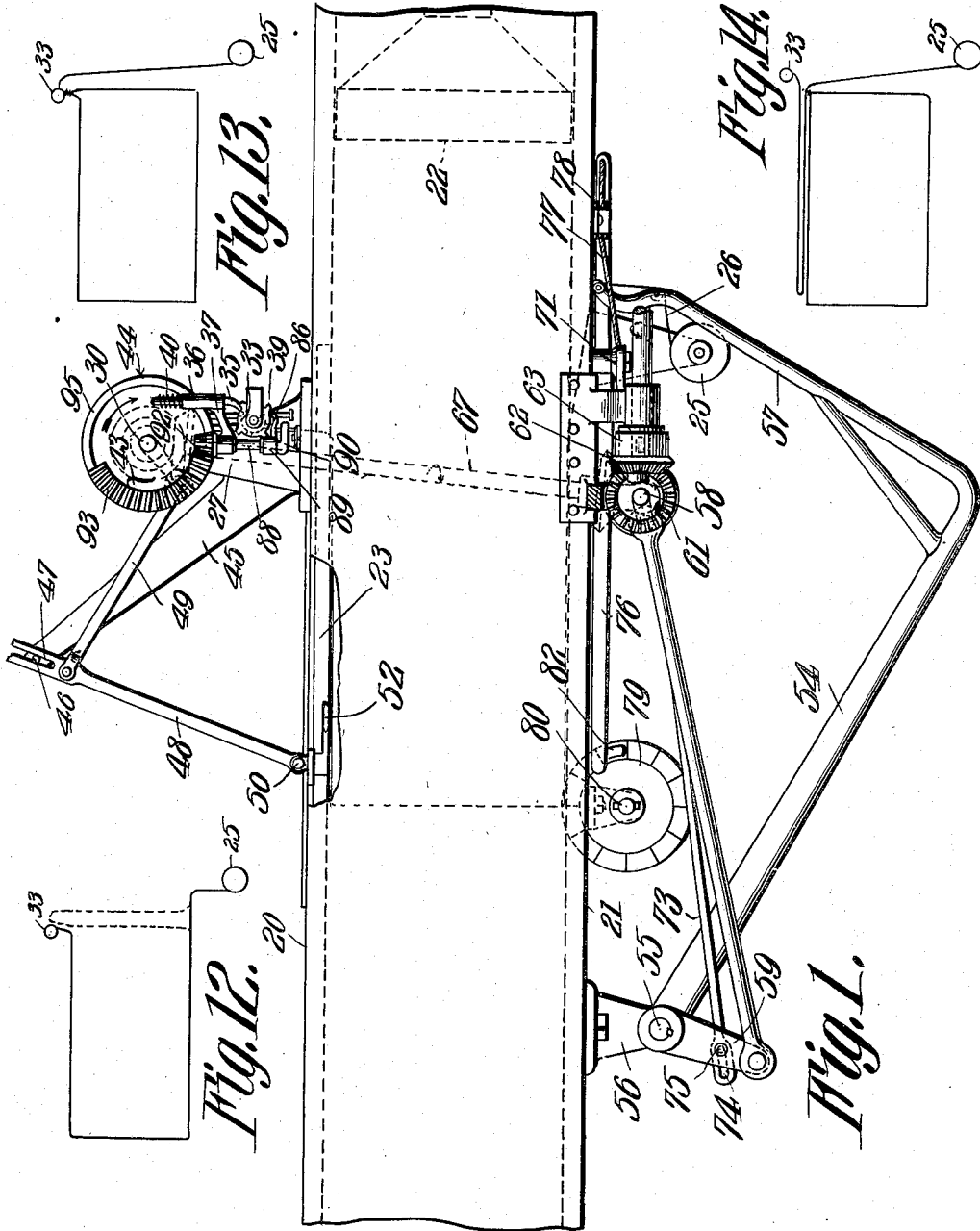


O. L. BOWERS.
 AUTOMATIC WIRE TYING MACHINE.
 APPLICATION FILED JAN. 14, 1909.

942,305.

Patented Dec. 7, 1909.
 4 SHEETS—SHEET 1.



Witnesses

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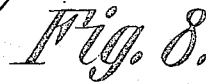
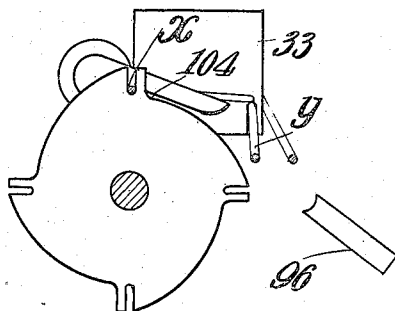
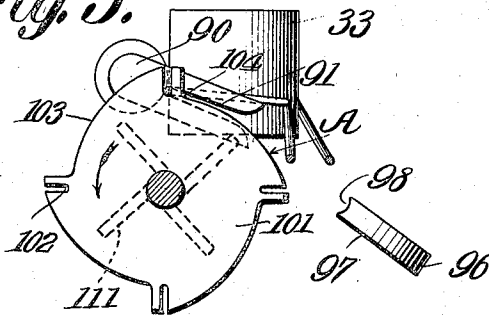
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4 SHEETS—SHEET 3.



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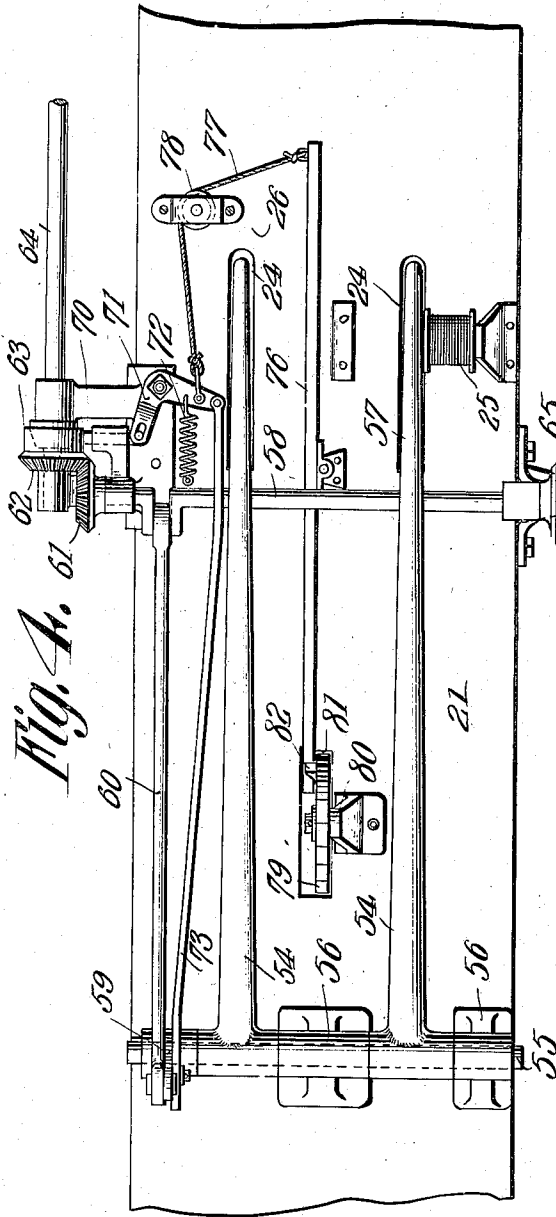
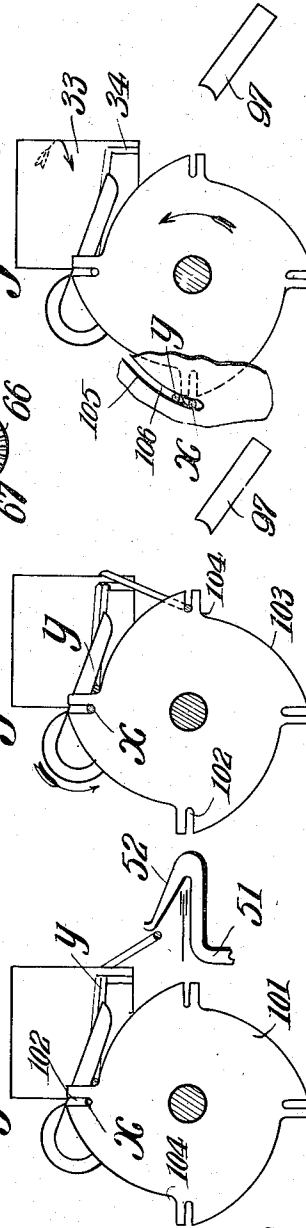


Fig. 4.

Fig. 11.

Fig. 10.

Fig. 9.



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UNITED STATES PATENT OFFICE.

OSCAR L. BOWERS, OF WILLARD, ILLINOIS, ASSIGNOR OF ONE-HALF TO JOHN L. BOWERS, OF WILLARD, ILLINOIS.

AUTOMATIC WIRE-TYING MACHINE.

942,305.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Application filed January 14, 1909. Serial No. 472,220.

To all whom it may concern:

Be it known that I, OSCAR L. BOWERS, a citizen of the United States, residing at Willard, in the county of Alexander and State of Illinois, have invented a new and useful Automatic Wire-Tying Machine, of which the following is a specification.

It is the object of the present invention to improve generally the construction and add to the efficiency of bale wire tying devices used in connection with baling presses. In practically all of such devices, as now constructed, the baling wire is held comparatively taut across the throat of the press box and is fed into the press box by the plunger and the material compressed in advance of the plunger. In such constructions, intermittent and sudden rotation is imparted to the wire storing reel and the wires themselves are placed under considerable stress so that it frequently happens that they break and the bale in partly completed condition is required to be removed from the press box and recompressed. In addition to this liability to breaking of the baling wires, the sudden jerky motion imparted to the reels not only renders them liable to injury but further results in more than the necessary length of wire being unwound therefrom so that when the needles swing across the throat of the press box to complete the ties, there is more or less slack in the wires which renders the ties insecure. In order to overcome these disadvantages it is contemplated, in the present invention, that prior to the beginning of each bale forming operation, a sufficient slack length of wire will be unwound from the reels or other storing means to encompass three sides of the bale, or more specifically speaking, the two sides and the front end, and this slack length of wire is readily taken up by the plunger and the material being compressed in advance thereof while the bale is being formed and without any stress being placed upon the reels or other wire storing devices; and, furthermore, the wire itself is relieved practically entirely of strain inasmuch as it is perfectly loose. One of the principal advantages accruing from this method of procedure lies in the fact that after the entire slack has been taken up and the wire so engaged about the completed bale as to encompass the two sides and one end thereof, the length of wire between the bale

and the wire storing reel or other means is comparatively taut so that when engaged by the needle sweeping across the throat of the press box, it will be pulled securely around the bale after which it is twisted together and cut.

Other novel features and advantages accruing from the specific construction and arrangement of elements of the device will be made apparent in the specific description which is to follow and in the claims.

In the accompanying drawings, Figure 1 is a top plan view of the press box of a baling press showing the mechanism embodied in the present invention in place thereon. Fig. 2 is a rear elevation of the mechanism for gathering, holding, twisting and cutting the strands of baling wire, Fig. 3 is a bottom plan view in detail of the mechanism illustrated in Fig. 2. Fig. 4 is a view in side elevation showing the needle operating mechanism. Fig. 5 is a view in detail of the gathering and holding disk and the elements of the mechanism associated therewith, Figs. 6, 7, 8, 9, 10 and 11 are diagrammatic views of the portion of the mechanism shown in Fig. 5 showing the successive steps in the operation of the said mechanism, and Figs. 12, 13 and 14 are diagrammatic views showing the method of distributing and arranging the bale tying wires, the successive steps being illustrated in the said figures.

In the drawings, there is shown the press box of a baling press and of this press box one side wall is indicated by the numeral 20, and the other by the numeral 21. The plunger of the press is also shown and is indicated by the numeral 22 and, for a purpose to be presently described, each of the side walls 20 and 21 is formed with at least a pair of longitudinally extending slots 23 and 24 respectively, the slots in the wall 20 extending practically the entire length of the said wall and those in the wall 21 but a portion of the length of the wall.

A pair of wire storing reels 25 are mounted upon the side 21 of the press box and it is from these reels that the baling wires are drawn (only one of the reels being, however, shown in the drawings), the wires being indicated by the numeral 26 and being led through the slots 24 in the side wall 21 of the press box and transversely across the throat of the box and through the other slots

23 in the side walls 20. The ends of the wires are securely held while they are being formed around the bale and the means for holding the said ends of the wires and for gathering, twisting, and cutting them after the bale has been completed is embodied in a mechanism arranged upon the side wall 20 of the said box, and this mechanism will now be specifically described.

10 A pair of frames 27 are mounted one above the other upon the side wall 20 of the press box and in suitable bearings 28 formed at the extremities of arms 29 of each frame there is journaled a vertical crank shaft 30 the crank portion of which is indicated by the numeral 31. This shaft 30 carries a pair of master gears which are constructed and arranged to impart motion each to a mechanism arranged opposite each of the slots 23 in the side walls 20 for gathering, holding, twisting, and cutting the baling wires after they have been formed around the bale.

Journalled for rotation upon a vertically extending stub shaft 32 is a hollow cylindrical wire holding device 33 the said device being open at its lower end and having its vertical walls formed with a plurality of slots 34, these slots being here shown as four in number and being designed to receive the end of the respective baling wire. The slots are spaced around the vertical wall of the device substantially 90° apart and the device is intermittently rotated in such manner as to successively bring a pair of these slots in a line with the line of feed of the baling wire, as is clearly shown in Fig. 3 of the drawings.

The means for intermittently rotating the wire gripping and holding element just described is embodied in a plunger 35 which is mounted to reciprocate in a bearing 36 formed at the upper end of an arm 37 constituting a portion of the frame 27. The inner end of this plunger 35 is turned downwardly as indicated by the numeral 38 and slightly laterally and is arranged to engage successively with radially projecting lugs 39 formed at equi-distant points around the circumference of the wire-holding device 33, the said lugs being preferably equal in number to the number of slots 34. A spring 40 upon this plunger bears at one end against the bearing 36 in which the plunger reciprocates and at its other end against a shoulder 41 at the upper end of a downwardly projecting finger 42 formed at the outer end of the plunger 35. The lower end of the finger 42 above referred to projects in the path of movement of a lug 43 formed upon the upper face of a master gear 44 it being understood that when this lug 43 engages with the lower end of the said finger, the plunger 35 is shifted in the direction of the wall 20 of the press box and its downturned end 38 will rotate the wire holding device

33 one step by reason of the engagement of the said end of the plunger with one of the lugs 39. The spring 40 is so arranged as to not only hold the plunger 35 normally at the outer limit of its movement but is also arranged to permit slight rocking of the plunger to permit the downturned end 38 thereof to follow around the circumference of the wire holding device 33.

As will be presently explained, one end of the baling wire is at all times gripped by the member 33 and prior to the operation of the bale forming means, the baling wire is to be engaged at a point between the holding device 33 and the reel 25 or other wire storing device, and a certain slack length of the wire removed from the reel and deposited or arranged in the corresponding slot 23 in the side wall 20 of the press box and the means for accomplishing this feed of the wire will now be described.

Projecting from each of the frames 27, rearwardly at an angle from the side wall 20 of the press box is an arm 45 and extending vertically between the extremities of these two arms 45 is a rod 46, the said arm projecting through a slot 47 formed in the arm 48 which is in this manner mounted for oscillatory movement, the inner end of the arm supporting wire gripping means which will be shortly described. A connecting rod 49 serves to connect this arm 48, at a point adjacent one end of the slot 46, with the crank 31 of the shaft 30 so that upon rotation of the shaft, the arm will be oscillated upon the rod 46 as an axis. At its said extremity, the arm 48 supports a vertically positioned rod 50 the upper and lower end portions of which are turned at right angles as indicated by the numeral 51 and are each formed, at the extremity, with a hook 52, it being understood that means is in this manner provided for simultaneously gripping both of the baling wires. The hooks 52 are so arranged that when the shaft 30 has reached such a point in its rotation as to bring the wire gripper carrying end of the arm 48 to position between the two baling wires, the said hook will ride beneath the wires and upon movement of the said end of the arm 48 from the position stated in a direction toward the position shown in full lines in Fig. 1 of the drawings, the wires will be engaged simultaneously by the hook and will be pulled rearwardly, unwinding from the respective reel 25.

As is clearly shown in Fig. 1 of the drawings, the hooked ends of the wire carrier or feeder travel in the upper and lower slots 23 in the side wall 20 of the press box so that when the arm 48 has passed through one cycle of movement, an elongated loop will be formed in each wire and these loops will be deposited in the respective slots in the side wall of the press box, a portion of the length

of each wire extending at the same time transversely across the throat or front end of the said box. After the loops have been thus formed in the baling wires, and have
 5 been deposited in their respective slots in the side wall 20, the arm 48 rocks forwardly gradually so as to permit the slack of the loop to be taken up in a step by step manner by the impact of the baling plunger and
 10 the material being compressed in advance thereof against the said wires, the result being that both wires are gradually worked into position in the press box to extend
 15 along each side wall thereof and across the rear end of the bale.

From the foregoing, it will be understood that a sufficient slack length of each baling wire is unwound from the respective reel 25 to encompass three of the sides of the bale being formed and that no wire is unwound
 20 from the reel due to the action of the baling plunger, the slack merely being taken up by the operation of the plunger. There is for this reason no sudden rotative movement imparted to the reels 25 and no undue
 25 and sudden stress placed upon the wires themselves so that snapping of the wires or injury to the reel is effectually obviated.

After the completion of the bale, the baling wires encompassing the three sides of the same, an additional length of the baling wire is carried across the throat of the
 30 press box or in other words across the front end of the bale and is connected with that end of the wire previously referred to and initially gripped by the wire holding means
 35 33. The means for carrying the baling wires across the throat of the press box and the front end of the bale is embodied in needles 54 which are carried by a vertically
 40 disposed rock shaft 55 mounted in suitable bearings 56 upon the side wall 21 of the press box. Each of these needles includes a shank and an angularly turned end 57
 45 which latter is designed to be forced transversely across the throat of the press box, the said portions of the needles passing through the slots 24 in the said wall 21. Normally, the extremities of the portion 57
 50 of the needles lie substantially in registration with the respective slots 24 and the baling wires 26 pass into the press box, from the reels, across the ends of the said portions of the needle and through the slots 24
 55 as is clearly shown in Figs. 4, 12, 13 and 14 of the drawings. When the needles are in normal position as stated above, their shanks 54 extend at an angle forwardly from the side 21 of the press box, but when the shaft
 60 55 is rocked so as to swing the needle shanks in the direction of the said side and to position substantially parallel therewith, the ends 57 of the needles will be forced across the throat of the press box carrying with
 65 them the proper length of baling wire.

This movement of the needles and rocking of the shaft 55 is had through the instrumentality of a vertically disposed crank shaft 58 which is connected with a crank
 arm 59 upon the shaft 55 by means of a
 70 connecting rod 60, the crank of the shaft 58 and the crank arm 59 of the shaft 55 being so proportioned that one complete revolution of the shaft 58 will rock the shaft
 55 sufficiently to force the needles across the throat of the press box and withdraw them
 75 from such position.

A gear 61 at the upper end of the shaft 58 meshes with a gear 62 driven through the instrumentality of a friction clutch 63 from 80 a shaft 64 by which it is carried and which in turn is driven from the power supplying mechanism for the entire press. It might be here stated that at the lower end of the shaft
 58 there is provided a bevel gear 65 which
 85 meshes with a similar gear 66 upon one end of a shaft 67 journaled transversely beneath the press box of the baling press. This shaft 67 carries at its other end a gear 68 which meshes with a gear 69 fixed at the lower end
 90 of the crank shaft 30 so that when motion is imparted to the shaft 58, it is transmitted also to the shaft 30. It is of course only desired that the shaft 58 be rotated during a
 95 period immediately subsequent to the formation of each bale and in order that the shaft may be automatically thrown into and out of operation at the proper time, I have provided a clutch mechanism, the clutch proper
 100 of which has already been referred to and designated by the numeral 63. The clutch is preferably of that type in which one member, in this instance the member carrying the
 105 gear 62, is held at times against rotation by means of a suitable latch or detent device and in Fig. 4 of the drawings, this device is indicated by the numeral 70, it being in the
 110 nature of a sliding latch having its upper end arranged to engage with the member 63 and its lower end connected pivotally with
 115 the extremity of one arm of an angle lever 71. To the other arm of this lever 71 is connected one end of a spring 72 which at its other is secured to the wall 21 of the press
 120 box, the spring tending normally to hold the lever in such position as to cause the detent 70 to engage with the clutch. A rod 73 is also pivotally connected with the last mentioned arm of the angle lever 71 and is provided
 125 at its other extremity with a slot 74 in which works a pin 75 carried upon the crank arm 59, it being understood that rocking of the shaft 55, and consequently the crank arm 59, will result in this rod 73 being shifted to
 130 such a degree and in such manner as to move the latch 70 out of engagement with the friction clutch device and thereby provide for rotation of the shaft 58 and consequently the shaft 55. The operation of the angle lever 71 to accomplish the result stated is accom- 130

plished automatically by means of a rocking beam 76 which is mounted upon the side 21 of the press box and has flexible connections as at 77 with the last mentioned arm of the angle lever, the connection being passed over a pulley 78 also mounted upon the said side of the press box.

The rear end of the lever projects above a friction disk 79 which is journaled upon a stub shaft 80 and rotates partly within a slot 81 formed in the side wall 21 of the press box, the periphery of the disk being in contact with the bale being formed in the said box. This disk 79 is of such construction as to be adjustable as regards its circumference and it is intended that the disk should rotate, due to frictional contact with the material of the bale as it is compressed, one revolution during the complete process of forming the bale and at each revolution of the disk, a cam lug 82 thereon rides beneath the said rear end of the rocking beam 76 and rocks said beam thereby causing the same to exert a pull upon the flexible connection 77 thereby operating the angle lever 71 to render the clutch 63 operative. From the foregoing, it will be seen that there is provided means automatically operating at the time of completion of each bale to set the wire applying devices, as a whole, in operation.

As is clearly shown in Fig. 3 of the drawings, the extremity of each needle, after passing across the throat of the press box, sweeps beneath the corresponding wire gripper and holder 33 with the baling wire 26 extending in a line with a pair of the slots 34 in the vertical wall of the said gripper and pivoted in the frame 27 for rocking movement in a vertical plane is a lever 83 which has its inner end positioned so as to engage with the wire at a point between the pair of slots through which the wire extends. At its outer end, this lever is provided with a roller or other suitable anti-friction device 84 which is so positioned as to be engaged by a cam lug 85 upon the under face of the master gear 44 once in each revolution of the gear. This engagement of the cam lug 85 with the said outer end of the lever 83 will result in the said end being depressed and the inner end being raised so as to force the wire up into the said slot 34, the wire holder and gripper 33 being rotated one step to cause the wire to bind in the slot, which operation will be presently more fully stated. It will be observed, from an inspection of Fig. 2 of the drawings, that the inner end portion of the lever 83 is curved upwardly so that its extremity, when the said end of the lever is raised, projects upwardly into the gripper and holder 33 at a point between the axis of the said member, namely the stub shaft upon which it rotates and the vertical wall

of the member so that rotation of the member is not interfered with.

A knife 86 is rigidly mounted in the frame 27 and has its cutting edge disposed practically in contact with the outer surface of the gripper and holder 33 and immediately upon starting of the wire twisting mechanism, it is designed that this knife shall have a shearing action against the strands of wire held in the slots in the holder and in this manner sever the said strands at a point beyond their portions which are to be twisted together.

The wire twisting means or mechanism is embodied in a shaft 88 which is journaled for rotation in suitable bearings 89 formed upon the frame 27, and the inner end of this shaft is bent at right angles to form a finger 90 provided with a longitudinal slot or kerf 91. When in normal position, the finger of the twister shaft extends, as illustrated in Figs. 3 and 5 of the drawings, between the side wall 20 of the press box and the wire gripper and holder 33 so that when the strands are gripped and held by the said device 33, they will be in position to be inserted or forced into the slot or kerf of the said twister finger after which the shaft 88 carrying the finger is rotated to twist the ends of the strands together. At its outer end, the shaft 88 carries a mutilated bevel gear 92 the gear portion of which is arranged to mesh with a gear section 93 of the master gear 44, the said gear section extending throughout practically one-half of the circumference of the master gear. The gear 92 upon the twister shaft is formed with a flattened side portion 94 which is designed to ride over a raised semi-annular rib 95 which extends throughout the remainder of the circumference of the master gear, it being understood of course that when the flattened side of the gear 92 is in such engagement with the rib 95, the shaft 88 will be idle, but that as soon as the gear section 93 comes in the path of the gear 92, the shaft 88 is rotated the required number of revolutions so as to twist the ends of the strands of wire. As a means for feeding or forcing the baling wire into the kerf 91 of the twister finger 90, there is provided a lever 96 which is mounted to rock in an inclined plane and has its inner end turned angularly as at 97 and its extremity notched as at 98 to engage with one strand of the baling wire. As clearly shown in Figs. 3 and 5 of the drawings, the said laterally bent end of the lever is presented in the direction of the slotted extremity of the twister finger 90 so that should the lever be rocked upon its pivot to move its end in the direction of the said finger, and should a strand of wire be in the path of movement of the extremity of the lever the

strand will be forced into the kerf in the twister finger. In order that the lever may be so rocked at the proper moment, it is provided at its outer end with a roller 99 which is to be engaged by a cam lug 100 formed upon the under face of the master gear 44, this engagement being had subsequent to the gripping of the strands by the wire gripper and holder 33.

As a means for assembling the strands and holding them in assembled relation while they are being twisted, there is provided a strand assembling disk 101 which is clearly illustrated in Figs. 5 to 11 inclusive of the drawings. This disk 101, which is associated with each one of the wire twisting and severing devices of the press, is provided at equi-distant points throughout its periphery with wire strand receiving notches 102, which are four in number. Between each pair of the notches 102 in the assembling disk, the edge or periphery of the disk is of cam formation as indicated by the numeral 103, this peculiar formation of the edge of the disk resulting in a wire strand receiving seat 104 adjacent to each of the notches 102, it being understood that one strand of the two strands to be twisted is received in one of the notches 102 and the other one of the two strands in the related seat 104. This disk 101 is mounted upon the side 23 of the press box in such position as to cooperate with the corresponding needle slot in the said side of the press box, the slot at that end at which the said disk is located being at one edge of cam formation as indicated by the numeral 105 and the other edge being of cam formation as indicated by the numeral 106, the edge 106 being convex and the edge 105 being parallel with respect thereto. The operation of this strand assembling disk will be fully described in the statement of the various steps in the operation of the mechanism as a whole. It is intended, for reasons which will presently be made apparent, that the wire strand assembling disk shall have a step by step or intermittent rotary movement imparted to it, and in order to accomplish this result, a lever 107 is provided as at 108 in the frame 27 and is provided at its inner end with a pivoted dog 109 at all times held against the outer face of the disk by means of a spring 110 which is secured upon the said end of the lever and bears against the dog. This dog engages successively in notches 111 formed in the said outer face of the disk and at its inner end, the lever is provided with a roller 112 which is to be engaged by a cam lug 113 formed upon the under face of the master gear 44, it being understood that as this lug 113 rides over the roller at the said outer end of the lever, the inner end of the

lever will be elevated and the wire assembling disk will be rotated one step, or more specifically speaking throughout an annular movement of substantially 90°.

In order to hold the wire strand assembling disk against backward rotation, a spring pressed detent 114 is mounted upon the side 20 of the press box and engages successively behind the shoulders 104 of the said assembling disk.

The operation of the mechanism is as follows:—It will first be supposed that a length of baling wire is unwound from its reel and is manually engaged in the wire holder 33 and that the strand is then led manually down the side 20 of the press box in the manner of the loop which is mechanically formed by the mechanism while in operation. The press is then set in operation and material is fed into the hopper of the press box and is compressed into the box by the baling plunger. Immediately subsequent to the completion of the bale the shaft 58 will be set in motion through the release of the clutch 63. During the process of forming the bale the slack length of baling wire has been gradually fed into the press box as will be readily understood to embrace three of the sides of the bale as it is formed, so that at the time of completion of the bale, the baling wire embraces three sides thereof or specifically speaking the two sides and the rear end, the forward end of the bale not being embraced by the wire. As soon as the shaft 58 is set in motion, the shaft 55 will be rocked so as to force the needles across the throat of the press box, and as the ends of these needles engage with the two baling wires, the said wires are carried across the front end of the bale. After the needle has passed across the throat of the press box, its position is as shown in dotted lines in Fig. 3 of the drawings, and one strand of the loop of wire formed by the needle is forced upwardly into the pair of slots 34 beneath which it extends, the end of the baling wire being already engaged in one of these slots.

Immediately following the impression of the strand of wire into the slots in the wire gripper and holder, the assembling disk is rotated one step with the original strand of wire or in other words the strand the end of which is primarily engaged with the gripper and holder 33, seating in the right hand one of the notches 102, so that the said strand is brought to the position shown in Fig. 7 of the drawings, this strand is indicated throughout the several figures by the reference character X. The other end of the strand of wire has, as above stated, been brought through the press box or rather across the throat thereof and seated in the gripper and holder 33, this strand being indicated by the reference character Y. The

cam lug 100 at this time engages the wheel 99 at the outer end of the lever 96 and the strand Y is forced into the kerf of the twister finger 90 and at the same time rides over that cam edge of the assembling disk indicated by the reference character A in Fig. 5 of the drawings so that it seats in the recess or seat 104 adjacent the notch occupied by the strand X. Immediately subsequent to this disposal of the strand Y in the twister finger kerf 91, and acting practically simultaneously, the wire gripper and holder 33 is rotated one-quarter of a revolution or in other words through an angular movement of substantially 90° and the twister shaft 88 is set in motion, the two strands Y and X being severed practically at the time the twister rotates so that while the twisting operation will not be interfered with, the strands will be held against separation to such a degree as to render the operation of the twister ineffective. This latter step completes the wiring of the bale and the entire operation is repeated except of course the manual application of the baling wire to the gripper and holder 33, it being understood that the end of the strand Y remains engaged with one of the slots of the said gripper and is firmly held thereby in the manner as was the corresponding end of the original strand X. In the operation which follows, the rotation of the wire strand assembling disk through 90° will act to cause the twisted ends of the wire strands to ride over the cam edge 106, or more specifically speaking between this edge and the edge 105 and it is by reason of this engagement of the strands with the said edges that they are forced out from their seats in the disk so as to permit of ready ejection of the completed bale from the press box.

What is claimed is:—

1. In a baling mechanism, means for feeding a predetermined slack, non-restrained, length of baling wire into the press box prior to the operation of the bale forming means.

2. In a baling mechanism, a baling wire storing spool, means for feeding a predetermined length of wire from the spool into position beside the press box prior to the operation of the bale forming means, said length being slack and non-restrained and being adapted to be fed into the box by the bale during formation, the spool being designed to overcome the resistance offered by the wire to the bale whereby no wire will be unwound from the spool during the period of formation of a bale.

3. In a baling mechanism, means for forming a predetermined non-restrained slack in the baling wire prior to the operation of the bale forming means.

4. In a baling mechanism, means for feeding into the press box a sufficient non-re-

strained, slack, length of the baling wire to embrace a plurality of the sides of the bale.

5. In a baling mechanism, means operable prior to the operation of the bale forming means for feeding into the press box a slack, non-restrained length of baling wire sufficient to embrace two sides and one end of the bale.

6. In a baling mechanism, means for feeding into the press box, prior to the operation of the bale forming means, a slack, non-restrained, length of baling wire sufficient to embrace a plurality of sides of the bale, and means operable immediately subsequent to the formation of the bale for feeding a length of the baling wire across the remaining face of the bale.

7. In a baling mechanism, means for feeding a predetermined slack, non-restrained, length of baling wire a portion of which length extends across the throat of the press box in the path of the plunger.

8. In a baling mechanism, means for forming a predetermined non-restrained slack in the baling wire, a portion of the length of the wire extending across the throat of the press box in the path of movement of the plunger.

9. In a baling mechanism, means for forming a predetermined non-restrained slack in the baling wire, said slack lying beyond a length of the wire extending across the throat of the press box.

10. In a baling mechanism, wire storing means to one side of the press box of the press, and means at the other side of the said press box for feeding a predetermined slack, non-restrained, length of the wire from the storing means across the throat of the press box prior to the operation of the bale forming means.

11. In a baling mechanism, wire storing means located to one side of the press box, and means located to the other side of the press box for withdrawing a length of the baling wire from the wire storing means and storing it beside the press box prior to the operation of the bale forming means, the said length, when so stored, being non-restrained.

12. In a baling mechanism, means for storing baling wire, and means for disposing a predetermined slack, non-restrained length of such wire beside the press box prior to the operation of the bale forming means.

13. In a baling mechanism, means for disposing a predetermined slack non-restrained length of baling wire in position to be taken up by the compression of the material in the press box.

14. In a baling mechanism, baling wire storing means, and means for withdrawing a predetermined length of such wire from said means and disposing the same in position to be taken up by the compression of

the material in the press box, the said length, when so stored, being non-restrained.

15. In a baling mechanism, means for disposing within the press box a predetermined non-restrained slack length of baling wire in position to be taken up by the material being compressed in the box.

16. In a baling mechanism, baling wire storing means, means for disposing a predetermined non-restrained, length of such wire, in slack condition, in position to be taken up and fed into the press box by the compression of material into the box, and means for feeding a length of such wire across the throat of the press box subsequent to the formation of the bale therein.

17. In a baling mechanism, means for feeding baling wire across the throat of the press box, and means operable prior to the operation of the bale forming means for engaging the baling wire and disposing a non-restrained, slack length thereof adjacent the press box.

18. In a baling mechanism, a baling wire storing spool, means for feeding a predetermined length of wire from the spool across the throat of the press box, and to position in a slot in the side of the press box, said means operating prior to the operation of the bale forming means, the said lengths being slack and non-restrained and being adapted to be fed into the box by the bale during formation, the spool being designed to overcome the resistance offered by the wire to the bale whereby no wire will be unwound from the spool during the period of formation of a bale.

19. In a baling mechanism, means for drawing a predetermined slack length of baling wire across the throat of the press box prior to the operation of the bale forming means and for storing said length of wire in position to be taken up during the operation of the said bale forming means, and in non-restrained condition.

20. In a baling mechanism, means for drawing a predetermined slack length of baling wire across the throat of the press box and disposing a non-restrained portion of said length along one side of the press box prior to the operation of the bale forming means.

21. In a baling mechanism, means for drawing a predetermined length of baling wire across the throat of the press box, that portion of the said length which extends across the throat of the said box being comparatively taut, and that portion of the length which lies beyond the first mentioned portion being slack and non-restrained.

22. In a baling mechanism, means for drawing a predetermined slack length of baling wire across the throat of the press box prior to the operation of the bale forming means, a portion of the said length of

wire being supported comparatively taut and in position transversely of the said throat of the box, the other portion being in the condition of a non-restrained loop.

23. In a baling mechanism, means for drawing a predetermined slack length of baling wire across the throat of the press box, that portion of the said length which extends across the throat being comparatively taut and the remainder of the length being slack and non-restrained and disposed through the operation of the said means along one side of the press box, the said means being arranged for operation prior to the operation of the bale forming means.

24. In a baling mechanism, means for drawing a predetermined length of baling wire across the throat of the press box, that portion of the length which extends transversely of the said throat being comparatively taut, the portion of the length lying beyond the first mentioned portion being non-restrained and slack and disposed along the side of the press box, and means operable subsequent to the formation of the bale for feeding an additional length of the wire across the said throat of the box.

25. In a baling mechanism, means for storing baling wire, means for withdrawing a sufficient length of the said wire from the storing means to encompass three sides of the bale being formed, the said wire withdrawing means being operable prior to the operation of the bale forming means, and means operable subsequent to the formation of the bale for carrying an additional length of such wire across the throat of the press box beside a fourth face of the bale, that portion of such wire designed to encompass the three sides of the bale being so disposed and supported as to be non-restrained and free from tension.

26. In a baling mechanism, successively operating means for feeding lengths of baling wire across the throat of the press box, the combined length being sufficient to encompass four sides of the bale, the length fed by one of such means being non-restrained.

27. In a baling mechanism, a bale wire storing spool, means for feeding a predetermined length of wire from the spool across the throat of the press box and to position along one side of the box, said means being arranged to recede whereby the wire thus deposited in slack and non-restrained condition, said means actuating prior to the operation of the bale forming means, the said length of wire being adapted to be fed into the box by the bale during the formation, the spool being designed to overcome the resistance offered by the wire to the bale whereby no wire will be unwound from the spool during the period of formation of a bale.

28. In a baling mechanism, baling wire storing means, and an oscillating arm arranged to withdraw a predetermined slack length of baling wire from said means and to dispose the same along one side of the press box finally in non-restrained position.
29. In a baling mechanism, wire storing means, and a constantly travelling oscillating arm for intermittently gripping the wire and withdrawing predetermined lengths thereof from the storing means and disposing the same in position to be taken up by the compression of the bale, the arm, after so disposing the wire, being arranged to recede whereby to leave the wire in non-restrained condition.
30. In a baling mechanism, baling wire storing means, and means arranged to intermittently engage the said wire and withdraw predetermined lengths thereof from such storing means, and to dispose the same in non-restrained condition.
31. In a baling mechanism, wire storing means, and means arranged to intermittently engage with the said wire and withdraw predetermined slack lengths thereof from the said storing means across the throat of the press box, and to finally dispose such lengths beside the box in non-restrained condition.
32. In a baling mechanism, a baling wire storing spool, means arranged to reciprocate continuously along one side of the press box for disposing a length of baling wire along the side of the box, means reciprocating across the throat of the box for depositing wire upon the said reciprocating means, the said reciprocating means, upon receding, leaving the length of wire thus deposited slack and non-restrained, the said length of wire being adapted to be fed into the press box by the bale during formation.
33. In a baling mechanism, means for intermittently feeding predetermined slack lengths of baling wire across the throat of the press box and disposing said lengths in non-restrained condition in position to be taken up by the compression of the bale.
34. In a baling mechanism, a baling wire storing spool, means arranged to reciprocate continuously along one side of the press box for disposing a length of baling wire along the side of the box, means reciprocating across the throat of the box for depositing wire upon the said reciprocating means, the said reciprocating means, upon receding, leaving the length of wire thus deposited slack and non-restrained, the said length of wire being adapted to be fed into the press box by the bale during formation, the spool being designed to overcome the resistance offered by the wire to the bale whereby no wire will be unwound from the spool during the period of formation of the bale.
35. In a baling mechanism, wire storing means, and means for intermittently feeding predetermined slack lengths of the baling wire across the throat of the press box and subsequently disposing a portion of each of such lengths along one side of the said box in non-restrained condition.
36. In a baling mechanism, wire storing means, and constantly reciprocating means for intermittently engaging the baling wire and withdrawing predetermined slack lengths thereof from the said storing means and disposing a portion of each of such lengths in comparatively taut condition transversely of the throat of the press box and the remainder of each length in slack non-restrained condition in position to be taken up by the compression of the bale.
37. In a baling mechanism, a wire storing means, means for drawing the wire from the said storing means across the throat of the press box, means for gripping the wire, means for twisting the wire interposed between the wire storing means and the gripping means, said gripping means being arranged for intermittent movement, lever means having operative connections with the gripping and twisting means, and a master gear common to both of such means arranged to actuate intermittently, said lever means.
38. In a baling mechanism, a wire storing means, means for drawing the wire from the said storing means across the throat of the press box, a cylinder formed with a plurality of wire receiving seats, the said cylinder being mounted for intermittent rotation, means for twisting the wire interposed between the said cylinder and the wire storing means, and a blade disposed with its cutting edge in coöperative relation to the cylinder for cutting the wire.
39. In a baling mechanism, a wire storing means, means for drawing the wire from the said storing means across the throat of the press box, a wire gripping means comprising a cylinder formed with a plurality of wire receiving notches, said cylinder being mounted for intermittent rotation, wire twisting means comprising a shaft having a laterally turned portion formed with a wire receiving kerf, means for assembling strands of wire to be twisted, means for feeding the strands of wire into the notches of the gripping cylinder, and a cutter for severing the twisted strands.
40. In a baling mechanism, a wire storing means, means for drawing the wire from the said storing means across the throat of the press box, a wire gripping means comprising a cylinder formed with a plurality of wire receiving notches, said cylinder being mounted for intermittent rotation, wire twisting means comprising a shaft having a laterally turned portion formed with a wire receiving kerf, means for assembling strands

of wire to be twisted, means for feeding the strands of wire into the notches of the gripping cylinder, a cutter for severing the twisted strands, and means for feeding the
5 strands of wire into the kerf of the laterally turned portion of the twisting shaft.

41. In a baling mechanism, a wire storing means, means for drawing the wire from the said storing means across the throat of
10 the press box, and an intermittently rotating disk formed with a plurality of seats adapted to receive strands of wire and to assemble said strands, means beyond the disk for gripping the strands, means interposed be-
15 tween the disk and the gripping means for twisting the strands, means cooperating with the gripping means for severing the strands subsequent to twisting, and a master gear common to all of said means and arranged
20 to actuate the said means successively.

42. In a baling mechanism, means for feeding the baling wire across the throat of the press box, a wire gripping and holding means, means for directing the strands of
25 the wire to be twisted into direct engagement with said gripping and holding means, and

a wire twisting means arranged in operative relation with respect to the gripping and holding means.

43. In a baling mechanism, a wire stor- 30 ing means, means for drawing the wire from the said storing means across the throat of the press box, means arranged at that side of the press box opposite to the side at which the wire storing means is located to advance 35 and recede, said means being arranged, upon advance movement, to feed and dispose a slack length of wire along one side of the press box, said means upon receding move- 40 ment being arranged to leave said deposited strand non-restrained, wire gripping means arranged at the opposite side of the press box, and wire twisting means arranged be- 45 tween the press box and the gripping means.

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

OSCAR L. BOWERS.

Witnesses:

LOUIE L. BOWERS,
JAMES H. EIDSON.