May 16, 1944. I. Z. MARTIN 2,349,184

BALING PRESS

Filed Aug. 26, 1942 5 Sheets-Sheet 1

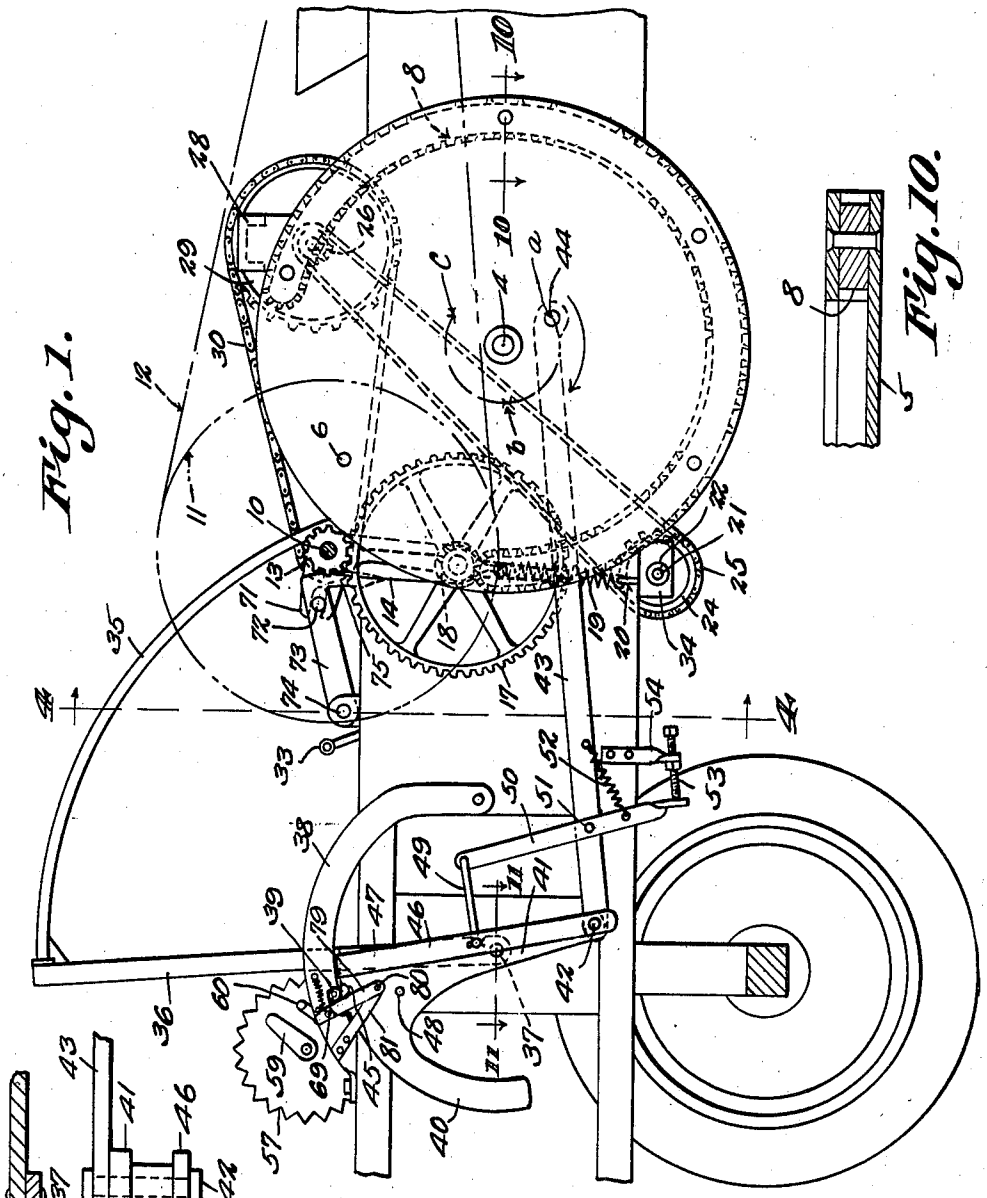


Fig. 1.

Fig. 10.

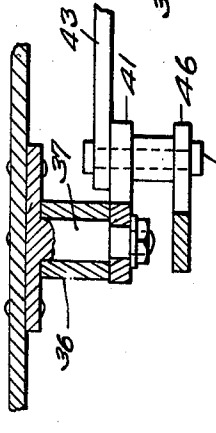


Fig. 11.

I. Z. Martin

INVENTOR.

BY C. Munn & Co.

ATTY.

May 16, 1944. I. Z. MARTIN 2,349,184

BALING PRESS

Filed Aug. 26, 1942 5 Sheets-Sheet 2

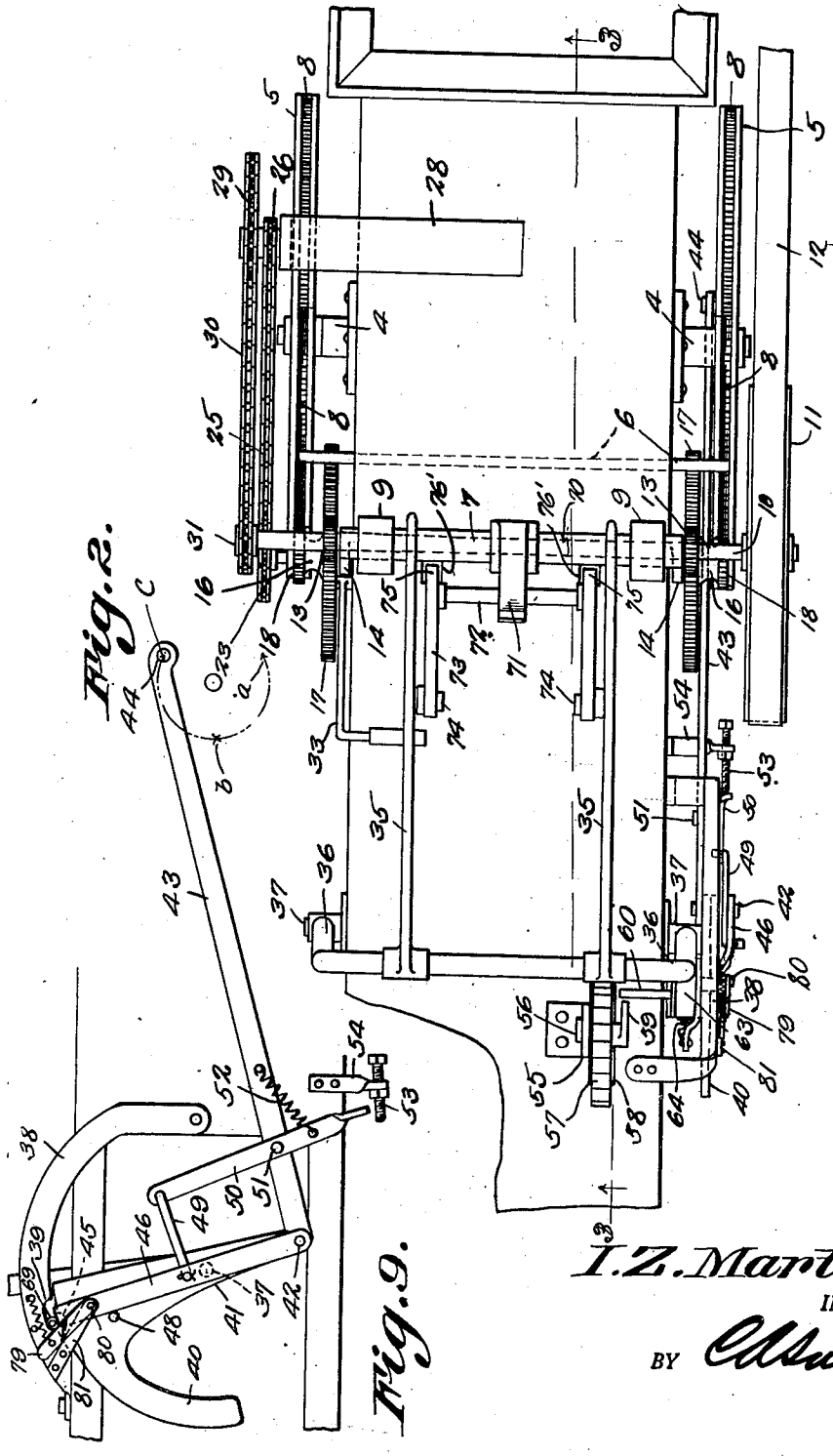


Fig. 2.

Fig. 9.

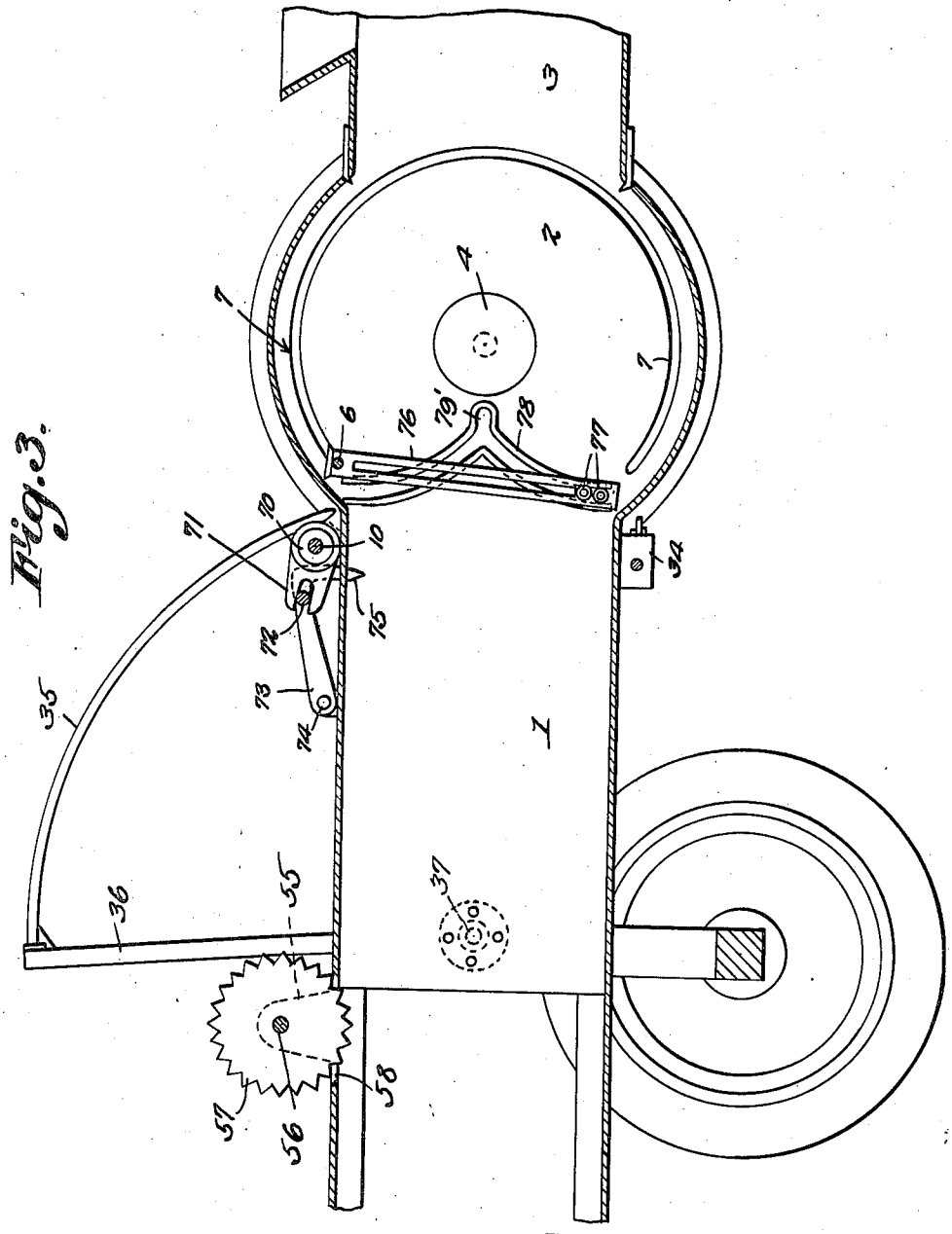
I. Z. Martin
INVENTOR.
BY Albert Leo.
ATTY.

May 16, 1944. I. Z. MARTIN 2,349,184

BALING PRESS

Filed Aug. 26, 1942 5 Sheets-Sheet 3

Fig. 3.



I. Z. Martin
INVENTOR.

BY C. L. Knowles.

ATTY.

May 16, 1944. I. Z. MARTIN 2,349,184

BALING PRESS

Filed Aug. 26, 1942 5 Sheets-Sheet 4

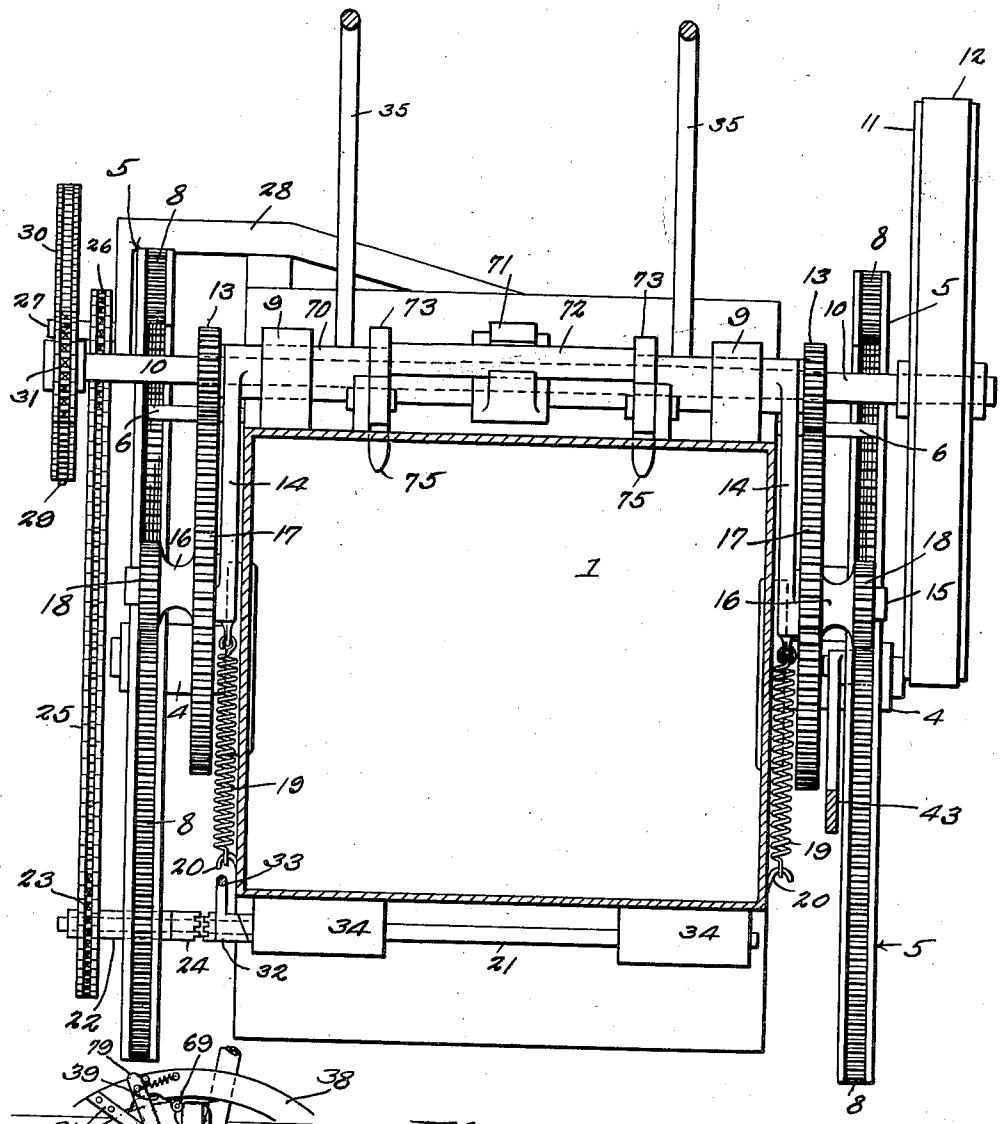


Fig. 4.

Fig. 8.

I. Z. Martin

INVENTOR.

BY Albert Co.

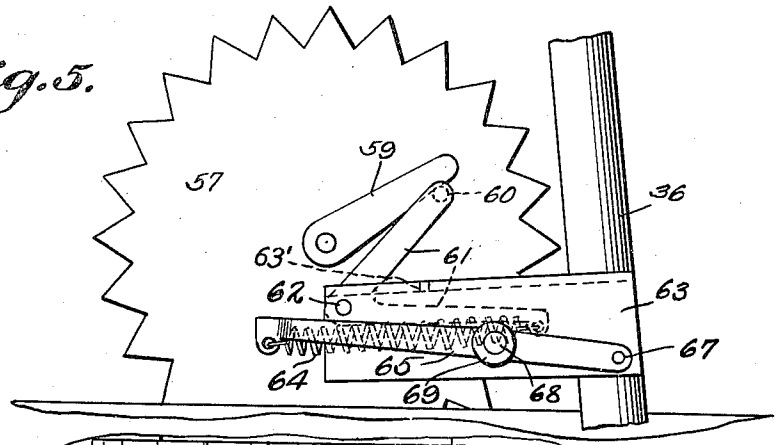
ATTY.

May 16, 1944. I. Z. MARTIN 2,349,184

BALING PRESS

Filed Aug. 26, 1942 5 Sheets-Sheet 5

Fig. 5.



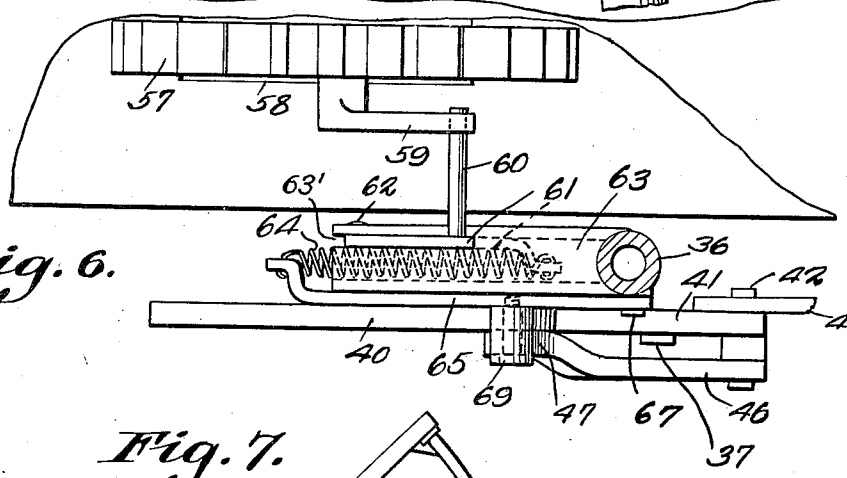
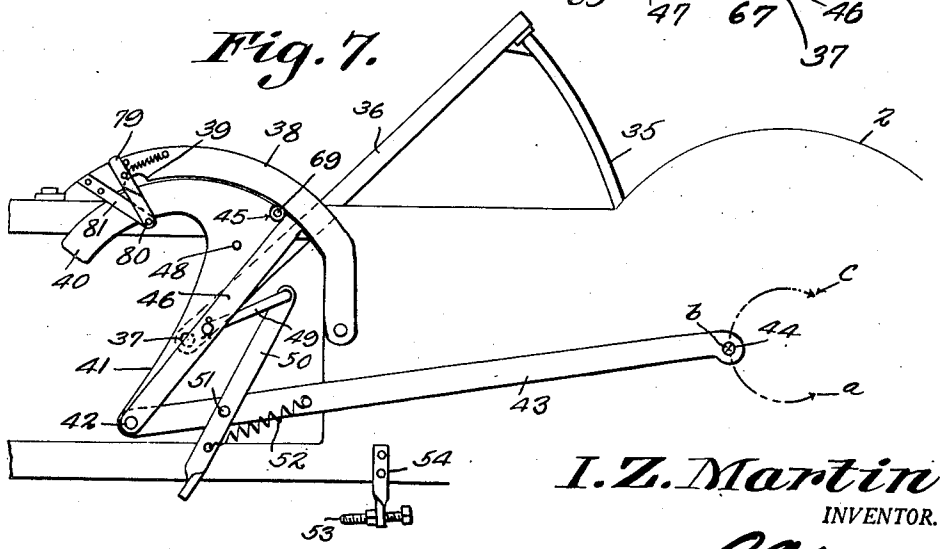


Fig. 6.

Fig. 7.



I. Z. Martin
INVENTOR.

BY Albright & Co.

ATTY.

Patented May 16, 1944 2,349,184

UNITED STATES PATENT OFFICE

2,349,184

BALING PRESS

Ivan Z. Martin, Ephrata, Pa., assignor of one-half to Noah N. Burkholder, Ephrata, Pa.

Application August 26, 1942, Serial No. 456,232

6 Claims. (Cl. 100—20)

This invention relates to baling presses and constitutes more especially an improvement upon the structure disclosed in my co-pending application filed December 8, 1941, Serial No. 422,144, which has issued as Patent No. 2,318,407, dated May 4, 1943.

In the application above identified there is disclosed a new and novel form of compressing head having means associated therewith whereby it is given an oscillatory motion so as to sweep material into the baling chamber during each sweep of the head.

The present invention relates to mechanism operating in timed relation with the head whereby, when the compressed material is ready for banding with the wire or string commonly employed, needles will be brought automatically into action to convey portions of the wire between the compressed material and the head so that the ends of the wire can be knotted by the usual or any preferred mechanism.

A further object is to provide a mechanism which will effect actuation of the needles into and out of the press only when a predetermined amount of material has been compressed in the baling chamber by the compressing head, this action being independent of the number of operations of the compressing head required in order to supply the predetermined quantity of material to the baling chamber.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings

Figure 1 is a side elevation of a portion of the baler showing the mechanism constituting the present invention, one of the supporting wheels being removed and its axle being shown in section.

Figure 2 is a top plan view of that portion of the baling press shown in Fig. 1, the supporting wheels being removed.

Figure 3 is a longitudinal section through the baling press taken on the line 3—3, Fig. 2.

Figure 4 is a vertical transverse section taken on the line 4—4, Figure 1.

Figure 5 is an enlarged side elevation of the needle-timing wheel and associated parts.

Figure 6 is a plan view of the structure shown in Figure 5, the needle arm being shown in section.

Figure 7 is an enlarged side elevation of the segmental arm and parts associated therewith, the needle being shown at the lower limit of its movement.

Figure 8 is a similar view showing the parts when in an intermediate position.

Figure 9 is a side elevation of the needle-coupling mechanism and showing the parts while at the upper limit of their movement.

Figure 10 is an enlarged section on line 10—10, Fig. 1.

Figure 11 is an enlarged section on line 11—11, Fig. 1.

Referring to the figures by characters of reference, 1 designates that portion of the baling press constituting the baling chamber and this extends from and opens into a substantially cylindrical intermediate chamber 2 which, in turn, communicates with a feed chamber 3, the chambers 1 and 3 being alined so that their longitudinal centers are in line with the center of chamber 2. Bearing studs 4 are carried by the side walls of the chamber 2 at the centers thereof and wheels 5 are mounted for rotation on these studs. These wheels are connected by a cross-rod 6 and, in order that the two wheels may be permitted to turn back and forth about their studs and relative to the intermediate chamber, the rod 6 is extended through arcuate slots 7 provided in the walls of the chamber 2. These slots terminate adjacent to the upper and lower portions respectively of baling chamber 1 and the length of the slots is substantially equal to the length of the path of movement of the rod 6.

Each of the wheels 2 has an arcuate double rack 8 built thereinto or connected thereto and extending through an arc substantially equal to that of the slots 7, the ends of the rack being rounded and toothed as shown so that the two toothed faces of the rack thus merge one into the other at the ends of the rack, as clearly shown by dotted lines in Fig. 1.

Journalled in bearings 9 on top of the chamber 1 and close to the chamber 2 is the main drive shaft 10 one end of which can be provided with a pulley 11 whereby motion can be received from a drive belt 12. Obviously the shaft could be driven by other means. Secured to the shaft so as to rotate therewith are small gears 13 and suspended from shaft 10 outside of but adjacent to the respective sides of the chamber 1 are hangers 14 mounted to swing relative to the

shaft. Each of these hangers is provided, adjacent to its lower end, with a laterally extended bearing stud 15 on which is journalled a sleeve 16 carrying a large gear 17 and a small gear 18. The large gear is of such size as to constantly mesh with and be driven by the gear 13 irrespective of any swinging movement of the hanger 14. The small gear 18 meshes with the adjacent arcuate rack 8 and is held in constant mesh with said rack by a constantly tensioned spring 19 connected to and extended downwardly from the hanger 14 and anchored at its lower end to a portion of the press structure as indicated at 20. The parts are so located and proportioned that when gears 18 are in mesh with one end of the respective racks 8, as shown for example in Fig. 1, the springs 19 and their hangers 14 are in substantial alinement. When the gears 18 are meshing with the toothed arcuate faces of the racks, the springs 19 continue to exert a pull upon the respective gears and their hangers to maintain the gears 18 in mesh with those faces of the racks with which they are engaged.

The shaft 21 of a knotting mechanism has been indicated in Figs. 1, 3 and 4. Rotatably mounted on one end portion of this shaft is a sleeve 22 carrying a sprocket 23 and a clutch member 24. The sprocket is adapted to be driven by a chain 25 or the like receiving motion from a sprocket 26 or the like rotatable with a shaft 27 supported by a bracket 28. This shaft 27 also has a sprocket 29 secured thereto and receiving motion through a chain 30 from a sprocket 31 on the shaft 10. As the two sprockets 26 and 29 rotate together, it will be obvious that by means of the mechanism described, motion will be transmitted continuously from the shaft 10 to the sleeve 22 on knotter shaft 21. A shiftable clutch member 32 is carried by the shaft 21 and has a shifting lever 33 whereby it can be moved into or out of engagement with the clutch member 24 for the purpose of coupling shaft 21 and its knotting mechanism to or uncoupling it from the sleeve 22.

The knotting mechanism, indicated generally at 34 and which is controlled by the shaft 21, is located under the baling chamber 1 close to the intermediate chamber 2 and is disposed in the path of arcuate needles 35 which are carried by upwardly extended arms 36. These arms are mounted to swing about oppositely extending bearing studs 37 carried by the side walls of the chamber 1 adjacent to that end remote from the chamber 2.

For the purpose of controlling the operation of the needles, there is provided a novel mechanism which has been shown in detail in Fig. 1 and in Figs. 5 to 9 inclusive. This mechanism includes a stationary arcuate guide or keeper 38 a portion of which is concentric with the stud 37 and has, in its lower edge, a recess 39. An arcuate sweep 40 is located under the guide or keeper 38 and has an arm 41 fulcrumed between its ends on the stud 37. The lower end of this arm is pivotally connected, at 42, to a pitman 43 which, in turn, is pivotally connected at 44 to one of the wheels 5. A notch 45 is provided in the upper arcuate edge of the sweep 40 and is adapted, during the oscillation of the sweep, to move back and forth to and from the recess 39.

Pivotally connected to the arm 41 at 42 is a resetting lever 46 the upper end 47 of which is extended close to the outer or upper arcuate edge of sweep 40 and is squared as shown. This upper end is adapted, at intervals, to move across the notch 45. It is limited in its movement in one direction relative to sweep 40 by a stop pin 48. A link 49 is extended in the opposite direction from lever 46 and connects the lever to a tripping lever 50 which is fulcrumed at 51 on the pitman 43 and is connected by a spring 52 to the pitman so that the lower portion of the lever 50 is thrust in the direction of an adjustable stop screw 53 carried by a bracket 54 fixedly secured to the side of the baling press structure. Stop screw 53 is located where it normally is engaged by the lower end of the lever 50, as shown, for example, in Fig. 1.

A bearing 55 is carried by the baling press adjacent to the guide 38 and in this bearing is journalled the shaft 56 of a toothed timing wheel 57. The lower portion of this wheel extends through a slot 58 in the top of the chamber 1 close to the outlet end thereof, which is the end remote from the chamber 2. A tripping arm 59 is movable with the gear and extending into the path of this arm is a pin 60 extending laterally from the upper arm of a bell-crank 61. This bell-crank is fulcrumed at 62 in a slot 63' in an inverted channel plate 63 fixedly secured to and extending backwardly from one of the needle arms 36. The other end of the bell-crank is connected by a coiled spring 64 to the free end of a lever 65 the other end of which is pivotally connected at 67 to the plate 63. At an intermediate point on the lever 65, there is a bearing pin 68 on which is mounted a laterally extending coupling element or roller 69 freely rotatable on the pivot stud 68 and extended normally into the recess 39 where it is held in this upper extreme position by the tension of spring 64, it being understood that when roller 69 is seated in recess 39 and positioned as shown in Fig. 5, the center of the stud 68 and roller 69 is above and out of line with a center line extending from pivot 67 to the point of connection between spring 64 and lever 65. Obviously the upward movement of the lever 65 under the action of spring 64 is limited by the upper wall of the recess 39 in guide 38 and as indicated clearly in Fig. 1.

The hangers 14 heretofore referred to are adapted to swing back and forth relative to the shaft 10 as already explained. This is due to the fact that both hangers are extended from a sleeve which extends through and is journalled in the bearings 9. A fork 71 is extended from and moves with the sleeve 70 and this fork loosely straddles a cross-rod 72 which joins arms 73 mounted to swing on brackets 74 carried by the top of the baling press. Restraining dogs 75 are formed integral with the arms and are extended downwardly through openings 76' into the top portion of the baling chamber 1 at points close to the intermediate chamber 2. Obviously as the sleeve 70 rotates back and forth during the oscillation of the hangers 14, the fork 71 will swing upwardly and downwardly and thus cause the arms 73 to have a corresponding movement with the result that the dogs 75 will be moved into and out of the baling chamber in timed relation to the oscillation of the hangers and the back and forth rotation of the wheels 5 and racks 8.

The compressing head used in the present structure is similar to the one disclosed in my application heretofore referred to. It has been indicated at 76 and is pivotally mounted, adjacent to one edge, on the rod 6 while adjacent to its other end are laterally extending rollers 77, in pairs. These rollers are adapted to work with-

in Y-shaped guides 78 located on the inner sides of the walls of intermediate chamber 2, the diverging portions of the guides being extended close to the upper and lower walls respectively of the chamber 1 and also close to the ends of the arcuate slots 7.

The operation of the compressing head is similar to that disclosed in my application before mentioned. As the gears 18 are constantly in mesh with the arcuate racks 8, these gears, when rotated simultaneously in one direction while in the position shown in Fig. 1, will swing slightly toward the axis of rotation of wheels 5 so as to engage the inner toothed portions of the racks 8 and cause these racks and the wheels 5 to move in the direction indicated by the arrow in Fig. 1. This rotation will continue until the other ends of the racks reach the gears 18 whereupon said gears will swing across said other ends of the racks and move into engagement with the outer arcuate toothed faces of the racks so that the direction of movement of the wheels 5 will be reversed. During the movement of these wheels in one direction the rod 6 will be carried longitudinally of the slots 7, drawing the compressing head with it until the rollers 77 reach the intermediate recesses 79' in the guides 78. At that time the compressing head is substantially horizontal. Continued movement of the wheels in the same direction results in an upthrust through the compressing head to the rollers 77 which will travel upwardly within the guide 78 until the compressing head reaches a position opposite to that shown in Fig. 3. At that time the direction of movement of the wheels 5 starts to reverse whereupon the movement of the compressing head is reversed. Thus during each movement of the wheels 5 in one direction, the compressing head sweeps upwardly and forwardly any material contained in the path thereof, forcing it upwardly within chamber 2 and thence outwardly into chamber 1. During each movement of the wheels in the opposite direction this movement is reversed, the compressing head sweeping downwardly within chamber 2 and thence forwardly into chamber 1 any material fed into the path of said head from the chamber 3.

It is essential of course that the compressed material be held under restraint while the compressing head is moving away from the chamber 1. It is for this reason that the dogs 75 are provided, these dogs being moved downwardly while material is being pushed into the bottom portion of chamber 1 by the downward sweep of the compressing head but being moved upwardly while the material is being swept upwardly in chamber 2 and into the upper portion of chamber 1.

Material compressed in the baling chamber is utilized for the purpose of forcing a previously formed bale out of said chamber. As this previously formed bale moves out of chamber 1 under the action of the material being compressed back of the formed bale, the said formed bale slowly rotates the timing wheel 57. When sufficient material has accumulated under pressure back of the formed bale to form another bale, the formed bale will have caused the wheel 57 to almost complete one revolution. As the wheel approaches the end of its rotation, the arm 59, which moves therewith, presses downwardly on and moves past the pin 60 so that the lever 61 is shifted to change the position of spring 64 which thus will be caused to exert a downward pull on lever 65 instead of an upward pull as before. This results in holding the roller 69 pressed downwardly into an intermediate position on the upper edge of the sweep 40. Until this action took place the pitman 43 had been swinging the arm 41 and the sweep 40 back and forth between the positions shown in Figs. 1 and 7 without moving the needles 35. The movement of the sweep in a clockwise direction or toward the right in Fig. 1 was effected first during the movement of the pitman 43 from position *a* through an arc to position *b* in Fig. 1 whereas, during movement of this pitman through a longer arc in the same direction from position *b* to position *c* in Fig. 1, the sweep was swung in a counterclockwise direction until brought to the extreme position shown in Fig. 9.

During this counterclockwise movement of the sweep 40, following the downward shift of spring 64, the lever 46 had been held against the pin 48 by spring 52 so that when the sweep reached its extreme position, as shown in Fig. 9, said lever 46 was beneath the recess 39 and the roller 69 so that the roller could not drop out of the recess into the notch 45 which is likewise covered by lever 46 while at said extreme position. This movement of lever 46 in a counterclockwise direction was permitted in view of the fact that during movement of pitman 43 from position *b* to position *c*, the lower end of lever 50 was carried above and out of contact with the adjustable stop 53.

When the pitman 43 next moves from position *c* to position *b*, it thrusts against the lower end of arm 41 and causes the sweep 40 to swing in a clockwise direction at which time the stop 48 will likewise cause lever 46 to move therewith. During this operation lever 50 will swing downwardly across the end of stop 53. When the pitman continues its counterclockwise movement from position *b* to position *a*, it pulls on arm 41 and causes the sweep 40 to move in a counterclockwise direction. The lower end of lever 50 is brought against the end of stop 53 which thus becomes a fixed fulcrum for lever 50 with the result that said lever is swung in a clockwise direction and pulls through link 49 on lever 46 so as to uncover the notch 45. Consequently when this notch reaches the recess 39 during the counterclockwise movement of sweep 40, the roller 69 which is being subjected to a downward pull from spring 64, will snap into notch 45 to its lower extreme position back of the restrained lever 46.

The movement of the pitman 43 is then reversed, its connection 44 traveling through the short arc from position *a* to position *b*. This results in swinging the sweep 40 in a clockwise direction and as the roller 69 moves with the needles 35, the needles will be swung downwardly to the position shown in Fig. 7, carrying the banding wire with them so that the knotting mechanism can act on it. After the roller 69 reaches the position shown in Fig. 7, the connection 44 begins to move along the long arc from position *b* to position *c* in Fig. 7 and during this movement the pitman pulls on arm 41 and causes lever 50 to move upwardly away from stop 53. Just before the connection 44 reaches point *c* during this movement, the roller 69 arrives under recess 39 and during the balance of this movement the lever 46 thrusts against roller 69 which, in turn, is forced against a spring-restrained deflecting lever 79 pivotally mounted at its lower end, as shown at 80, on a bracket 81 secured to the guide or keeper 38. Consequently the continued thrust

against the roller will cause it to ride upwardly into recess 39 with the result that the roller carrying lever 65 will move past a dead center and spring 64 will act to support the roller yieldingly in its raised position. Lever 46 immediately snaps to position under the elevated roller 69 whereupon the spring-restrained deflecting lever 79 shifts from its extreme position shown in Fig. 9 to its normal position shown in Fig. 1. Thus the needles which were raised during the last counterclockwise movement of sweep 40 and roller 69 will be uncoupled from the sweep and said sweep can then proceed to oscillate independently of the needles until sufficient material has accumulated to form another bale whereupon the operation already described will be repeated.

What is claimed is:

1. In a baling press the combination with a baling chamber and means for compressing material within and forcing it longitudinally of said chamber, of a needle mounted for oscillation, a coupling element movable with the needle, yielding means for holding said element in either of two positions, a notched sweep, means operating with said compressing means for oscillating the sweep, a wheel positioned for actuation by material moving under compression within the baling chamber, and tripping means actuated by the wheel during the completion of each rotation thereof for shifting the coupling element into engagement with the notched sweep, thereby to couple the needle to the oscillating sweep, and means for automatically uncoupling said element from the sweep and resetting the tripping mechanism upon the completion of each movement of the needle in one direction, said means including a lever carried by the sweep, means controlled by the movement of the sweep for swinging the lever relative to the sweep, and a deflecting element, said lever being positioned to direct the coupling element against the deflecting element and out of engagement with the sweep when the needle reaches that limit of its movement where it is to be uncoupled.

2. In a baling press the combination with a baling chamber and means for compressing and shifting material in the chamber, of a needle mounted for oscillation relative to the chamber, a stationary keeper, an element normally seated in the keeper, yielding means for holding said element in either of two extreme positions one of which is in the keeper, a sweep mounted for oscillation adjacent to the keeper and having a notch for receiving said element, an operative connection between the sweep and the material-compressing means, a lever mounted on the sweep and actuated by said connection, a yieldingly restrained lever carried by said connection, a driving connection between the two levers, means for limiting the movement in one direction of one end of said yieldingly restrained lever, said levers and their cooperating connections constituting means for oscillating the levers relative to the sweep, a wheel positioned for rotation by material under compression moving within the baling chamber, tripping means operated by the wheel during the completion of each rotation thereof for shifting the coupling element from its normal position in the keeper into position for engagement by the notched sweep, thereby to couple the sweep to the needle, a yieldable deflector in the path of said coupling element, said levers being timed for cooperation with the deflector to reset the said element upon the completion of the movement of the needle in one direction.

3. The combination with a needle, of a sweep having a notched arcuate portion, said needle and sweep being mounted for independent oscillation about a common axis, a pitman connected to the sweep, means for actuating the pitman to oscillate the sweep, a resetting lever pivotally connected to the sweep and pitman, a tripping lever pivoted between its ends on the pitman, a link connection between one end of the tripping lever and the resetting lever, yielding means for holding the levers normally pressed in one direction relative to the sweep, means in the path of the tripping lever for shifting the levers oppositely to the sweep, a coupling element movable with the needle, and means for tripping said element into the notch and into the path of the resetting lever, thereby to couple said lever, needle and sweep for synchronous swinging movement in one direction.

4. The combination with a needle, of a sweep having a notched arcuate portion, said needle and sweep being mounted for independent oscillation about a common axis, a pitman connected to the sweep, means for actuating the pitman to oscillate the sweep, a resetting lever pivotally connected to the sweep and pitman, a tripping lever pivoted between its ends on the pitman, a link connection between one end of the tripping lever and the resetting lever, yielding means for holding the levers normally pressed in one direction relative to the sweep, means in the path of the resetting lever for limiting the movement of the levers in one direction relative to the sweep, a coupling element movable with the needle, means for tripping said element into the notch and into the path of the resetting lever, thereby to couple said lever, needle and sweep for synchronous swinging movement in one direction, and means in the path of the resetting lever for shifting the two levers oppositely to the sweep during the movement of the sweep in the opposite direction, thereby to move the resetting lever against the coupling element and eject it from the notch.

5. The combination with a needle, of a sweep having a notched arcuate portion, said needle and sweep being mounted for independent oscillation about a common axis, a pitman connected to the sweep, means for actuating the pitman to oscillate the sweep, a resetting lever pivotally connected to the sweep and pitman, a tripping lever pivoted between its ends on the pitman, a link connection between one end of the tripping lever and the resetting lever, yielding means for holding the levers normally pressed in one direction relative to the sweep, means in the path of the resetting lever for limiting the movement of the levers in one direction relative to the sweep, a coupling element movable with the needle, means for tripping said element into the notch and into the path of the resetting lever, thereby to couple said lever, needle and sweep for synchronous swinging movement in one direction, means in the path of the resetting lever for shifting the two levers oppositely to the sweep during the movement of the sweep in the opposite direction, thereby to move the resetting lever against the coupling element and eject it from the notch, and deflecting means positioned for engagement by the coupling element while being shifted by the resetting lever.

6. In a baling press a baling chamber having an inlet and an outlet, a feed chamber and an

intermediate chamber in communication with the baling chamber and feed chamber, a compressing head movably mounted within the intermediate chamber, means for actuating the head, a needle mounted for back and forth swinging movement, an arcuate sweep operatively connected to and mounted for oscillation by the head-operating means, and means operated by the movement of material under compression in the baling chamber for coupling the needle to the sweep for movement therewith, said means including a shiftable element movable with the needle, yielding means for holding said element past a dead center either out of contact with or pressed against the arcuate sweep, a wheel positioned for engagement by material under compression, tripping means controlled by the movement of the wheel for effecting movement of said element from one extreme position to an intermediate position past a dead center and in contact with the arcuate sweep, said sweep including means for releasing the element from said intermediate position to its second extreme position while contacting therewith and after a predetermined movement of the sweep to couple the needle and sweep to the head-actuating means.

IVAN Z. MARTIN.