May 10, 1927.

1,627,904

L. W. HURFF

BALING MACHINE

Filed April 16, 1923

4 Sheets-Sheet 1

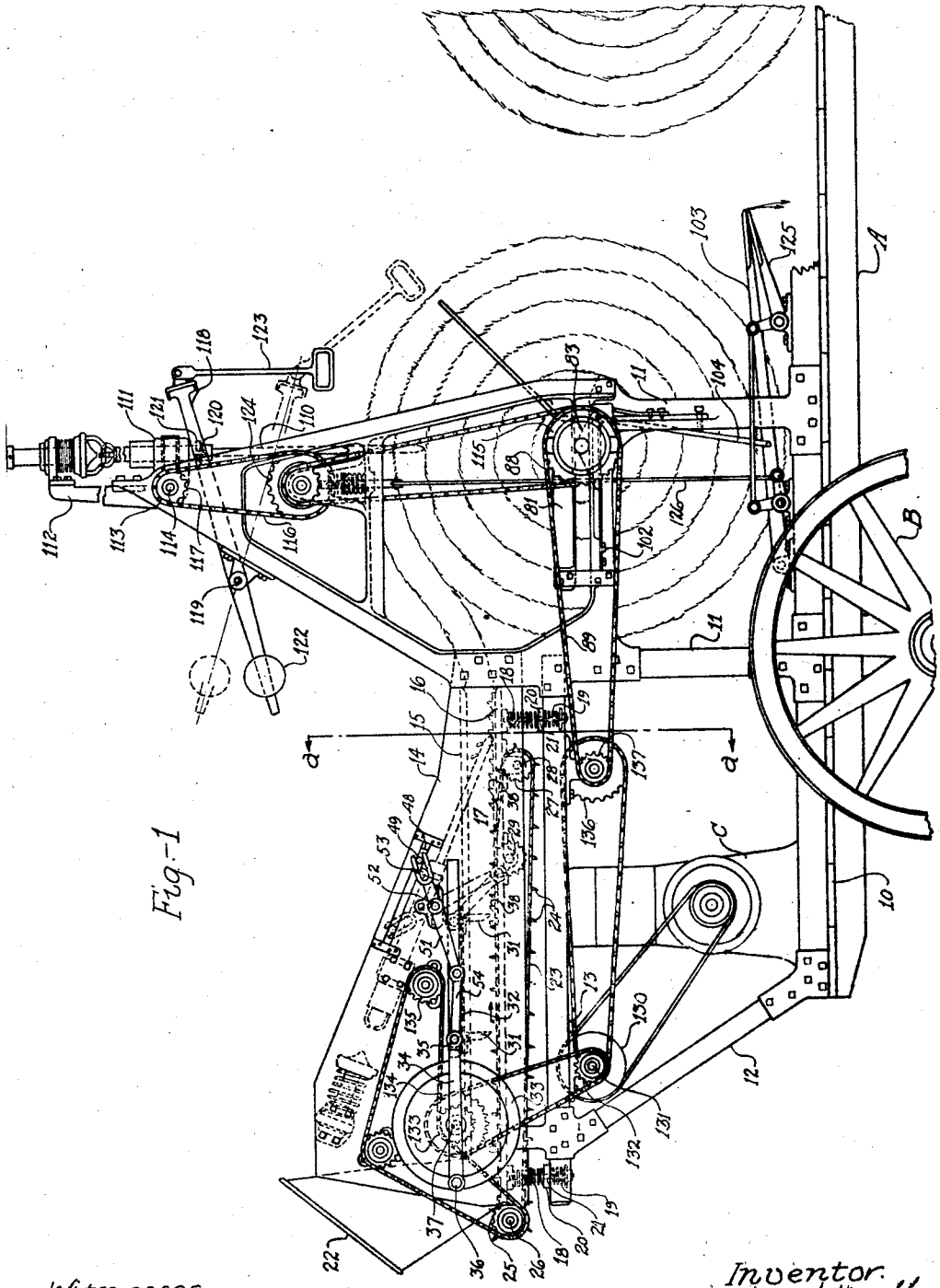


Fig. 1

Witnesses.
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May 10, 1927. 1,627,904

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BALING MACHINE

Filed April 16, 1923 4 Sheets-Sheet 2

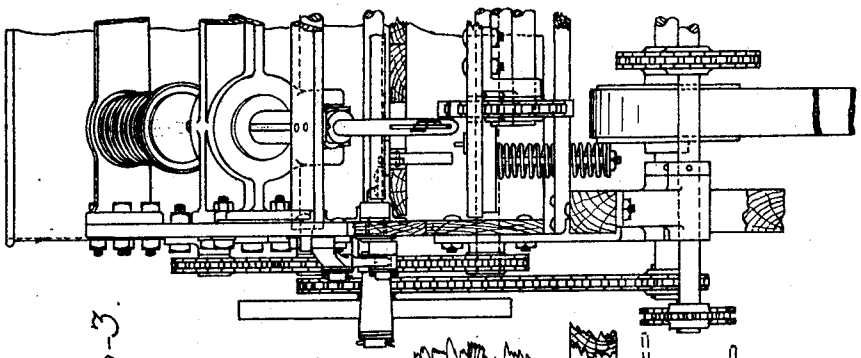


Fig-3.

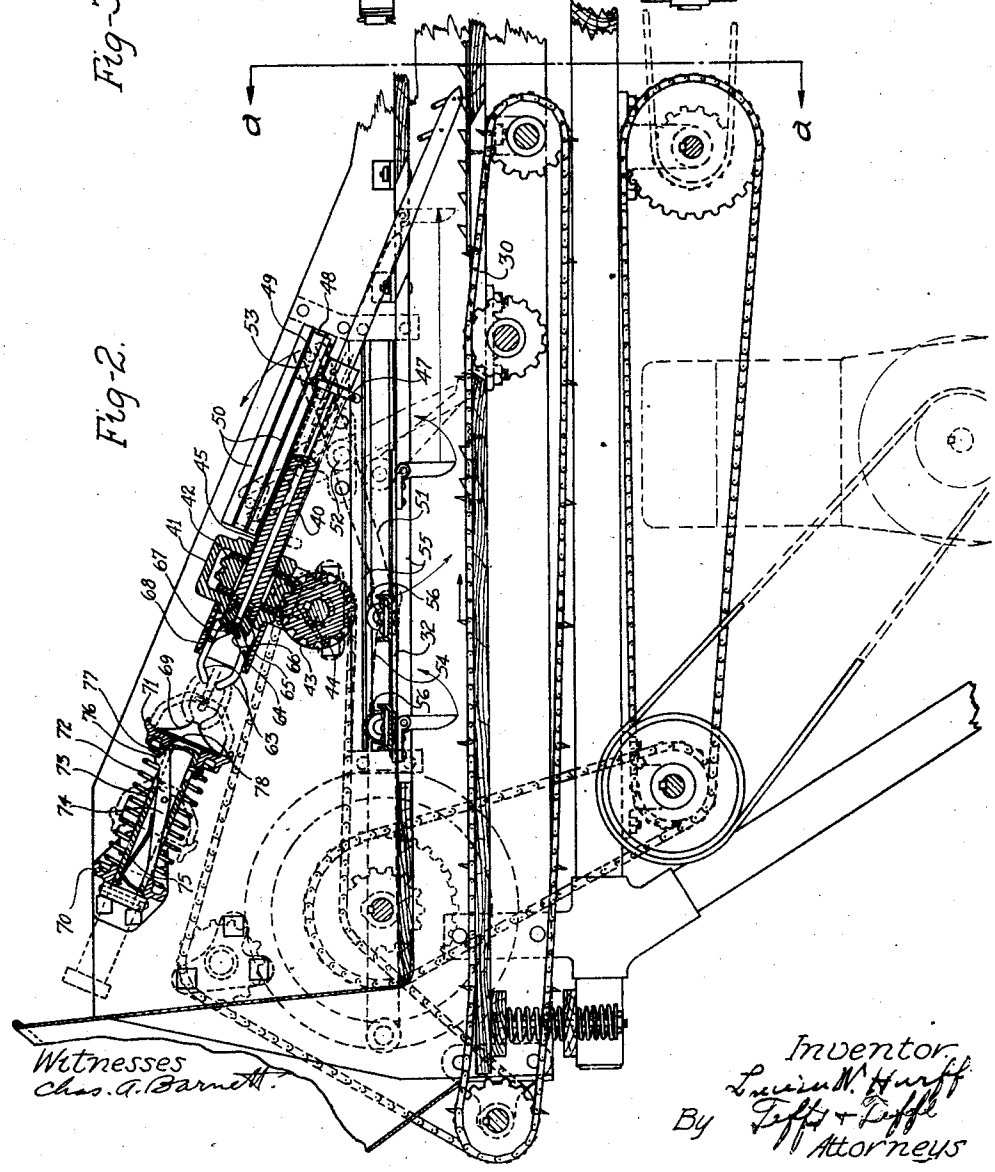


Fig-2.

Witnesses
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May 10, 1927. 1,627,904

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BALING MACHINE

Filed April 16, 1923 4 Sheets-Sheet 3

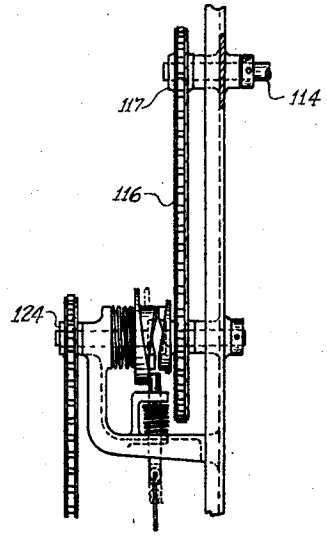
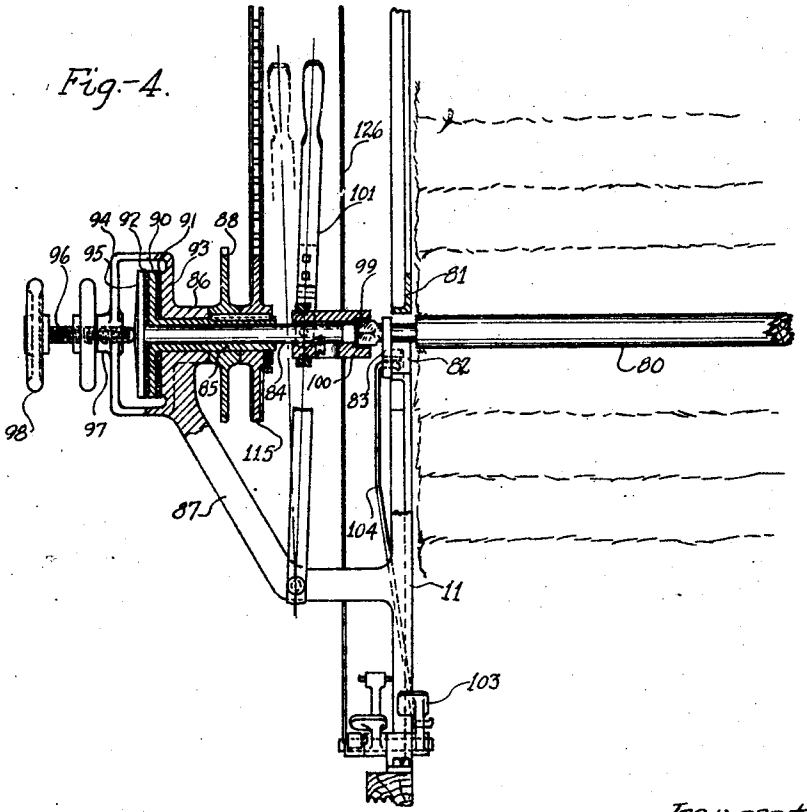



Fig.-5.

Fig.-4.




Witnesses.
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May 10, 1927. 1,627,904

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BALING MACHINE

Filed April 16, 1923 4 Sheets-Sheet 4

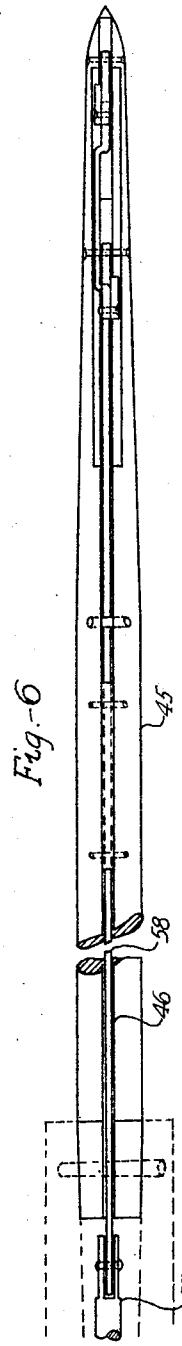



Fig.-6

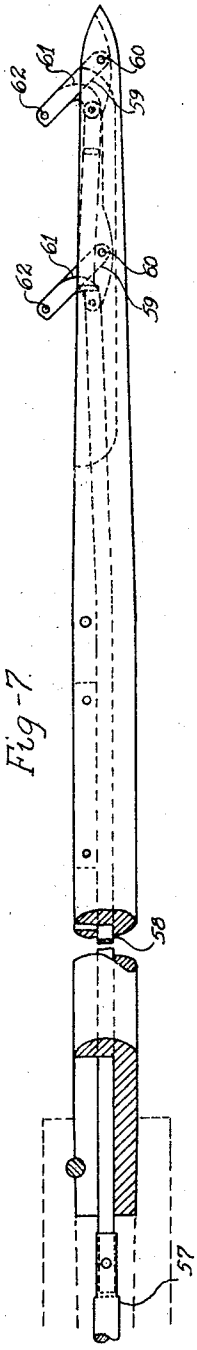



Fig.-7

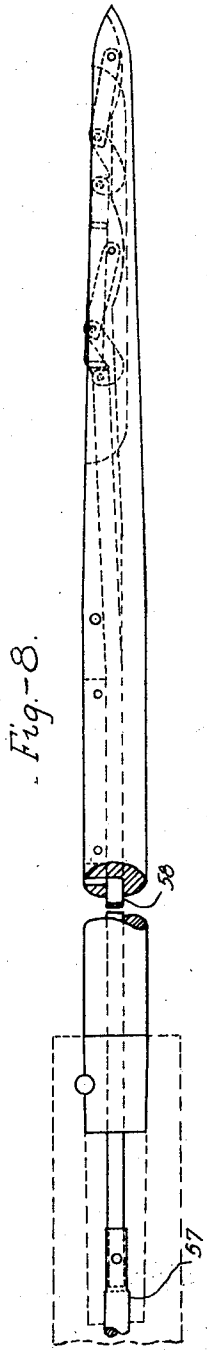



Fig.-8.

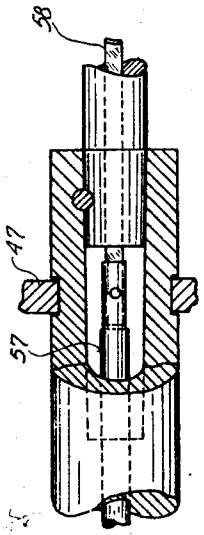



Fig. 9.

Witnesses.
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Patented May 10, 1927. 1,627,904

# UNITED STATES PATENT OFFICE.

LUCIEN W. HURFF, OF GALESBURG, ILLINOIS.

## BALING MACHINE.

Application filed April 16, 1923. Serial No. 632,581.

This invention relates to baling machines.

With special reference to a machine adapted to form a continuously running matlike body and to mount the same upon a central core, whereby rolls of desired form may be developed that when the core is removed a central air circulating opening will be provided in each roll.

The invention includes a relative arrangement of its mechanical parts adapted to develop the gradual force feed within and forming a compartment or way to the end that continuous matlike body may be developed; to means active to utilize the material of the mat body to form a binder or tie in a tufting like action whereby material may be integrated into a continuously integral body; to means for receiving and rolling the body upon a core member including tensioning means in the driving action of the roll that will permit, under abnormal stress, relative movement between a positively driven member and the core upon which the roll is mounted; also means active to tie the rolled layers together in a tufting like manner including in such action the utilization of the material of the layer bodies to effect such integration; means for co-relating the activities of relatively functioning parts of the machine; means for driving the machine and means for establishing or disconnecting intermittingly functioning parts of the machine and to general combinations and utilities that are especially novel in the structure.

Referring to the drawings, Fig. 1 is a side elevation of the machine. Fig. 2 is a vertical view, partly in section, a longitudinal of a portion of the machine. Fig. 3 is a fragmentary rear view of the machine on line "A—A" of Fig. 1. Fig. 4 is a rear fragmentary view, partly in section, showing parts of the machine active in mounting and forming cylindrical bales. Fig. 5 is a detailed view (incomplete). Fig. 6 is a plan view of the integrating needle utilized in tying materials together in the form of a mat. Fig. 7 is a side elevation of the same subject matter disclosed in Fig. 6, showing integrating fingers exposed for action on materials to be integrated. Fig. 8 is also a side elevation of the same subject matter shown in Fig. 7 but showing the integrating fingers sheaved against integrating activity. Fig. 9 is a view, partially in section, of the rearward portion of the integrating needle.

Referring to the drawings, a truck upon which the machine may be supported includes a body portion "A" and wheels as "B."

The general frame work of the machine adapted to support its working parts include bottom framing members as 10; vertically disposed framing members 11 at either side of the machine, an inclined framing member 12 and a longitudinal framing member 13 at either side of the machine, and cross framing members hereinafter more particularly designated. 14 is a plate member adapted for supporting working parts of the machine.

Referring now particularly to the working parts of the machine: 15 and 16 refer to upper and lower wall portions of a mat forming enclosure 17, the upper of said members being fixed and the lower one supported under the resilient tension of spring members comprising co-active pairs 18 and 19 relatively spaced apart by intervening members 20 and supported on framing member 13, and co-active through connecting bolt members 21, whereby clogging action between the walls of the box member 17 may be compensated for through the yielding action of bottom wall member 16, acting under the resiliency of the spring members. 22 is a hopper, adapted to receive and direct disposition of material to the mat space 17. This hopper may be in any form that will best serve its purpose.

Means for advancing material through the matting box include a plurality of sprocket chain members 23 provided with relatively spaced spike members as 24, said chains being driven from sprocket wheels as 25 on transverse shaft 26 and being supported to be a rearward extension on sprocket wheels as 27 supported on transverse shaft 28, and their upper reach being intermediately supported upon idler sprockets as 29. The carrier sprocket chain 23 is arranged with reference to the packing box that its upper reach, which in action travels lengthwise of the box in the direction of the arrow, travels upon the upper surface of the lower wall members 16 to the point

of the entry of the clearance opening 30 (see Fig. 2) in said wall member at which point the carrying members are deflected downwardly and out of travel relation with respect to said box. Supplemental to the activity of carrying member 23, I have provided finger members 31 in numbers as may be desired, which are pivoted to bar member 32 and are so pivotally related to said bar that in the forward projection of said bar the finger members will be maintained in a vertical position whereby they are rendered active to advance material within the forming box, but in the rearward projection of said bar, said fingers turn upon their pivots to effect relief of impingement of the mat being developed within the forming box. Bar 32 is driven from disc wheel 33 by means of arm 34 pivotally related thereto at its rear end as at 35 and eccentrically connected with the disc as at 36, whereby reciprocal action will be developed. Disc 33 is mounted on transverse shaft 37.

Upon the upper surface of wall member 16 adjacent the forward end of the clearance opening therein and substantially continuously rearwardly of said opening are disposed plate members fashioned with retarding tooth members 38, fashioned for active resistance against movement of the mat being formed in the box rearwardly of its normal advancing movement. The mat forming box is open at its rear end to accommodate projection of the mat designed to be ultimately engaged with and rolled upon a core, as hereinafter described.

Referring to the tying or tufting device utilized to integrate the mat as it passes through the forming box 30, refers generally to a sleeve 40 and 41 a housing connected therewith adapted to enclose a worm gear member 42 and 43 is a worm wheel adapted to co-act with worm gear 42 for the purpose of rotating the tufting members, as hereinafter explained, and 44 is a cross shaft to which worm wheel 43 is attached. 45 refers generally to a reciprocally active needle supported within the sleeve 40, the general form of said needle being best exemplified in Figs. 6, 7 and 8. The needle is slotted lengthwise as at 46 to facilitate co-active relationing with worm member 42. The needle is reciprocally active within sleeve 40 through and by means of a collar 47 being engaged in a circular groove in said needle and a projection 48 therefrom having a pin 49 thereon, the latter being supported and guided in a spaced frame member 50, whereby projectal force being applied to the pin, the needle will be reciprocated. The means I employ for reciprocating the needle includes a rocker arm 51 pivoted to a stud member 52, said rocker arm being slotted at its outer end as at 53 to embrace pin member 49. Rocker arm is driven by means of the connection of link member 54 in a pivotal manner respectively with said rocker member and with driver arm 34, which latter is eccentrically connected with disc 33. To guide the movements of link member 54, an angle bar 55 is provided and to the pivoting centers at the ends of said link, rollers 56 are adapted and relatively arranged with respect to working space within angle bar that in the projectal movements of the link it will be caused to travel within the angle bar space and in off centered relation with respect to its opposed pivot points. Forward projection of link 54 will cause rocker member 51 to be moved finally to the position shown in dotted lines in Figs. 1 and 2, at which time the needle will have been withdrawn from engagement with material within the forming box and when projected to the position shown in said lines will be in engagement of such material.

Attention is here called to active devices for effecting tufting action. The means employed for this purpose include a rod 57 reciprocally active centrally of the needle, also it includes an extension 58 of said rod angularly offset therefrom, also a pair of buckling finger members, each comprising reach portions 59, pivoted at their lower ends at 60 to the body of the needle and reach members 61 pivoted each at one end to rod 57 and rod extension 58 respectively, and the free ends of the two sets of reach members being pivotally related respectively as at 62. By this construction arrangement of parts, it will be observed that upon reciprocation of rod 57 and with it the extension 58 thereof, in a forward direction, the rod members 61, which form the tufting fingers will be relatively buckled and projected into the exposed position with respect to the needle, as shown in Fig. 7, at which time the needle body being turned, a tufting coil or spiral web will be formed within the body of material. Rearward projection of rod 57 will cause the fingers to be extended and to lie within the position shown in Fig. 8, thereby adapting the needle for entry or withdrawal within the material mass.

Referring to the manner of manipulating rod 57 and relating it to the movement of the needle to the end that the tufting fingers should be rendered active or inactive at the proper time, I have provided means for actuating said rod at proper intervals with respect to the activities of said needle, including spacing fingers 63 that are pivotally secured as at 64 to finger members 65 at the forward end of the needle body. The finger members are fashioned with inturned members at both ends and the rear end members are slotted as at 66 and are both engageable with a pin member 67 interposed in the slotted forward end of rod 57. The finger members 63 are adapted to cooperate in con-

nection with sleeve member 68 attached to housing member 41 and projecting rearwardly therefrom in a manner to embrace the finger members when the needle is in forwardly projected position, said sleeve being provided with a taper at its open end. When rod 57 is in its forwardly projected position to dispose the tufting fingers in working position, the fingers lie in the position shown in solid lines in Fig. 2. When the needle is reciprocated rearwardly, under the stroke of rocker arm 51, rod 57 will continue at rest with the tufting fingers exposed until the forward ends of finger members 63 engage the tapered stud member 69, at which time and during the continued rearwardly projectal movement of the needle, the fingers will be expanded until they finally reach a position of expansion shown in dotted lines in said figure and in assuming such position, the forward extremity of said arm members will be projected rearwardly and through the action of the slotted connection thereof with the pin on the rod, said rod will be projected within the needle sufficiently to cause the finger members to be withdrawn into clearance seating with respect to the needle, at which time the needle may be freely withdrawn from the mass of material.

It is necessary that the rearward projection of the needle shall be continued after the tufting members have been seated and to facilitate this further projection and still maintain the finger members in seated position, I have provided a suitable frame member, including stationary end member 70 and movable end member 71 and disposed between said members, coil spring 72 and a centrally disposed hollow sleeve 73, fixed to end member 71 and shiftable through an opening in end member 70. Normally these members are held apart under the tension of the spring and are held locked in such position by means of a locking lever 74, pivoted to the sleeve and tensionally held by spring 75 in contact, their respective ends with end frame members 70 and 71. The lever is fashioned at its rear end with an offset lug that is engageable with a shoulder member on end member 70, and its forward end is similarly fashioned with an offset portion but there is included in its fashioning a stud 76 and an inclined face portion 77, whereby normally the forward extremity of the locking lever is in contact with a lug member 78 on movable frame member 71. Because of the fashioning of the forward end of the locking lever, it will be observed that when in course of the rearward projection of the needle, the finger members 63 are brought into the expanded position shown in dotted lines in Fig. 2, that further independent movement will be stopped and that as the needle is still further projected rearwardly under the action of rocker arm 51, framing member 71 will be moved rearwardly and in such action lug member 78 thereon traveling on the inclined face of the forward end of said lever, the latter will be depressed, causing its rear end to be freed from its engagement with framing member 70, thus allowing head member 71 and sleeve member 73 to be moved rearwardly under the tension of spring 72 until the final determined rearward movement of the needle is reached, thereby accomplishing a complete withdrawal of the needle from the material mass.

The reverse action of the needle, that is, its forward projection is substantially obvious inasmuch as it will appear that, as under the stroke of rocker arm 51, the needle is advanced, in the course of such advancement, it will be seen that as frame member 71 reaches its maximum forward position that finger members 63 will then be released and in the continued advance movement of the needle, said finger members will be brought into contact with sleeve member 68 and thereby adjusted into the position shown in solid lines in Fig. 2 and in such activity of said fingers through the pivot and slot connection thereof with rod 57, the latter will be forwardly projected within the needle, thereby causing the tufting fingers to be projected into exposed working position.

When the needle is in position within the mass and the tufting fingers have been projected, it is then necessary, in order to accomplish the tufting result, that the needle shall then be turned. The means I have provided consist in the provision of the worm 42 which is driven from worm wheel 43. The worm is fashioned with a spline which engages the groove in the needle whereby as the worm is turned, it will turn the needle and because of the splined relation therebetween, the needle may be advanced or retracted during such active driving.

While I have referred to hereinbefore, to a single needle, single carrier and feeding members, it will be understood that in the actual machine, a plurality of such individual units are provided in number as many as may be desirable in connection with the desired application or use of the machine.

I have hereinbefore indicated parts and mechanisms without particular reference to their support. However, it will be understood that suitable mechanical supports will be provided wherever necessary, in connection with the working out of the designs and purposes of the machine.

Referring now to the means provided for developing rolls of integrated material, attention is called to Fig. 5, wherein 80 is a core, it being designed in practice that a multiplicity of such cores be provided in

order to avoid the requirement of removal of the core at the time of completing each roll. The cores are adapted to be entered at the forward end of a guide or frame work comprising longitudinal members 81 and 82 spaced apart as shown and finally to be engaged as by a hooked member 83, as hereinafter explained, in centered relation with respect to shaft 84 in which position, after first manually acting to develop an attachment of the integrated body of material to the core, power means is designed to be employed to carry forward a rolling action in developing the finished roll.

The means I have employed for turning the core include shaft 84 mounted in sleeve 85, said shaft being in turn supported in sleeve member 86, supported in connection with the general framing member 11, by means of frame member 87. For driving the sleeve, sprocket 88 is splined thereon and is adapted to be driven from sprocket member 89. (See Fig. 1.) It being expedient that a friction drive be developed for the purpose of turning core 80 in order to accommodate slippage as between driving parts, in order to compensate for a coactive relation of a positive drive to a constantly decreasing movement of the core as the roll is developed, shaft 84 has a free turning relation with respect to sleeve 86 and a friction drive means is provided between said shaft and sleeve, including a disc 90 on said sleeve, friction mats 91 and 92 disposed upon opposed faces thereof, and means for effecting compression forces therebetween, including a wall member 93, of a bracket member 94 integrally related to the frame, a plate member 95 with a centering seat for co-operating connection with the end of screw member 96, the latter carried in a threaded opening in the stud portion 97 connected with bracket 94, said screw member being provided with a suitable hand wheel 98. The functioning of the friction device will be readily understood, it is thought, without further description.

To accommodate an optional engagement of drive shaft 87 with the core, one end of the core or a shaft projection therefrom is squared as at 99 and a clutch member 100 is splined on shaft 84, whereby relative reciprocal action is established between said sleeve and shaft, whereby the sleeve may be shifted on said shaft either to engagement with the core or in disengagement therefrom. I provide means for shifting the sleeve, consisting of a suitably centered lever 101 having collar-like engagement with a groove in said sleeve, whereby through manual action, the clutch may be shifted in the usual and well known manner.

Referring now to means for locking the core in proper position for working relation with respect to shaft 84, 83 is a hooked bar pivotally supported as at 102 and so related to the core that normally it will be in engagement thereof or capable of adjustment in relief of the core to permit its withdrawal after the bale has been completed. The means shown herein for releasing the roll, consist of the foot pedal 103 and the rod 104 connecting said foot pedal with locking bar 83.

In carrying out the purposes and functions of my device for developing circular bales of material as hay or other farm products, it is thought that integrating the mat layers may not generally be required. However, I have provided a means for integrating the mat layers, if found desirable.

The integrating means for the roll, so far as means is concerned, is substantially a repetition of the means hereinbefore described for integrating the mat as it is developed in the forming box. However, as the application is slightly different, I have shown a construction and arrangement of parts in connection with Fig. 1. The structure for the purpose indicated includes a needle 110, a worm gear housing 111 and other parts in general, utilized as shown in Figs. 1 and 2, said parts being supported in connection with frame member 112, which is merely an extension of the general framing hereinbefore referred to as including—11. The worm in housing 111 is driven from worm wheel 113 on stud shaft 114, the latter being suitably journaled in the frame work. The worm wheel is driven from sprocket wheel 115 fixed to sleeve 85, which acts through sprocket chain 116 to drive sprocket wheel 117 on stud shaft 114. Power means, as shown in Figs 1 and 2, for shifting the needle but in using the needle for integration of the layers of the bales, manual means are employed, said manual means including a lever 118, pivoted to the frame work as at 119 and centered with respect to the needle upon pin 120 turnably related to the needle engaging slot member 121 in said bar. The rear end of the bar carries a weight 122 active to hold the needle normally in disengaged position from the roll, said bar being manually depressible to cause the needle to enter the material of the rolls by means of hand hold member 123, whereby at option of the operator the needle may be depressed to cause integrating coils to be formed between the layers of material.

I have provided means for throwing needle 110 into or out of operation, consisting of any ordinary well known clutch, interposed between shaft 114 connected with the worm wheel 113 and drive sprocket 124, to which a part of the clutch is attached and including a foot pedal 125 co-operating through rocker arms and connections with a rod 126 which is active, through proper connection, with said clutch member to ac-

complish such desired driving connection to operate the needle or to effect disengagement, whereby the needle will be at rest.

Referring to the detailed operation or driving of the machine parts, "C" refers generally to a motor. Power is conveyed from said motor to a band wheel 130 on shaft 131. A general connection for driving the conveyor chains 23, the reciprocating finger members 31, the worm wheel 43 and for reciprocating the needle as from sprocket wheel 132 to sprocket wheel 133 on shaft 37 whereby said sprocket 133 being turned, sprocket chain 134 will be driven, which acting through engagement with sprocket wheel 25 will cause sprocket chain members 23 to be driven and through its driving connection with sprocket wheel 135, worm wheel 43 will be driven to cause the needle to be turned. Through the connection of sprocket wheel 133 with disc 33, the latter is driven to effect reciprocation of bar member 32, carrying finger members 31 and also of lever 51, to effect reciprocation of the needle. Through connection of sprocket wheel 132 with sprocket 136, sprocket wheel 137 is driven whereby a corresponding driving action is imparted to sprocket chain 89 which acts to turn sleeve member 85 which in turn is active to turn the roll core and also to drive the tufting needle utilized to integrate roll layers.

I claim:

1. In a baling machine, in combination, a forming box adapted to receive material to be fashioned into continuously running mat form, means for advancing the mat within the forming box and tufting means active to fashion an integrating tie from the material of the mass, consisting of needle members active for the purpose at spaced intervals.

2. In a baling machine, in combination, a forming box adapted to receive material to be fashioned into mat form including relatively spaceable upper and lower wall members, means for advancing the mat within the forming box and means for effecting intervaled integrating of the mass, comprising rotatable and reciprocally active needle members.

3. In a baling machine, in combination, a forming box adapted to receive material to be fashioned into mat form including relatively spaceable upper and lower wall members, means for advancing the mat within the forming box, means for effecting intervaled integrating of the mass, comprising rotatable and reciprocally active needle members, and including relatively adjustable members functioning in such relative adjustment to project associated parts to finger-like exposure for action upon the material of the mat body or for seating within the needles to effect release from engagement of such material.

4. In a baling machine, in combination, a forming box, means for advancing material through the forming box in mat form, tufting needles for integrating the material of the mat, comprising a main needle-like formed body, relatively adjustable bar members and pairs of link members pivoted respectively to the needle body, to each other and to the bar members whereby through relative reciprocation of the bar members, the link members may be either projected to exposure to facilitate engagement of the material of the mass or to seating within the body of the needle in clearance of such mass, means for effecting timed reciprocation of the bar members, means for timed reciprocation of the needle body and means for timed intervaled turning of the needles.

5. In a tufting needle for integrating mats, in combination, a needle like formed body, relatively adjustable bar members therein, pairs of link members pivoted respectively to the needle body, to each other and to the bar members whereby through relative reciprocation of the bar members, the link members may be either projected to exposure to facilitate engagement of the material of the mass or to seating within the body of the needle in clearance of such mass and means for effecting timed reciprocation of the bar members.

6. In a tufting needle for integrating mats, in combination, a needle like formed body, relatively adjustable bar members therein, pairs of link members pivoted respectively to the needle body, to each other and to the bar members, whereby through relative reciprocation of the bar members, the link members may be either projected to exposure to facilitate engagement of the material of the mass, or to seating within the body of the needle in clearance of such mass, means for limited reciprotation of the needle and means active at intervaled periods of such reciprocation to effect projection and retraction of the bar members in said needle, whereby at the proper period during the active engagement of the needle with the mat, the integrating fingers may be brought into active relation with said mat and similarly at the proper period said integrating fingers may be seated, whereby the needle may be withdrawn from the mass.

7. In a tufting needle for integrating mats, in combination, a needle like formed body, relatively adjustable bar members therein, pairs of link members pivoted respectively to the needle body, to each other and to the bar members, means for limited reciprocation of the needle and means active at intervaled periods of such reciprocation to effect projection and retraction of the bar members in said needle, in-

cluding a reach member connected with one of said bar members, pivoted operating fingers supported in connection with the needle body with their forward ends inturned and slotted for pivotal relationing with the reach member and having their outer ends inturned and relatively spaced apart and abutting frame member normally spaced from the rear end of the needle, including relatively adjustable parts normally held in locked relation through a resiliently active locking member and including an abutting finger, spacing stud and stop member being arranged relative to the needle, that as the latter is projected rearwardly, the pivoted operating fingers will be laterally deflected to effect a rearward projection of the reach member associated with the connected bar members to cause the integrating fingers to be seated within the body of the needle, such deflection of the operating fingers being continued until a release of the interlock between relatively movable parts of the stop member has been effected, whereby further rearward movement of the needle is facilitated and whereby through a forward projection of the needle, the operating fingers will be permitted to assume a position to effect a forward projection of the reach member to cause the tufting fingers to be projected into exposed position.

8. In a tufting needle for integrating mat like bodies, in combination, a needle like formed body, tufting members thereon, comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members and means for rotating the needle.

9. In a baling machine, in combination, a mat forming chamber, means for tensional packing of the mat within the chamber, a tufting needle for integrating mat like bodies, including a needle like formed body, tufting members thereon, comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members and means for rotating the needle.

10. In a bailing machine, in combination, a mat forming chamber, means for tensional packing of the mat within the chamber, a tufting needle for integrating mat like bodies, a needle like formed body, tufting members thereon, comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members, means for rotating the needle and means for receiving and rolling the mat in baled form.

11. In a baling machine, in combination, a suitable supporting framing, a feed hopper for receiving and directing materials to a forming box, a forming box for material to be fashioned into tensional running mat like form, including an upper stationary wall member and a lower wall member spaced therefrom, tensionally held to permit limited relative spacing between said wall members, a carrier member disposed in supported traveling relation with a portion of the link of the lower wall of the chamber but diverted in clearance thereof adjacent the rear end of said wall, retarding members on the upper face of said lower wall, feeding means active in connection with the upper portion of the mat body, including reciprocally active pivoted finger members operative in their forward projection to advance the mass and in their rearward projection to be in clearance of the same, means for actuating the conveyor member and the reciprocally active finger members and tufting means for integrating mat like body including a needle like formed body, tufting members thereon, comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members and means for rotating the needle.

12. In a baling machine, in combination, a suitable supporting framing, a feed hopper for receiving and directing materials to a forming box, a forming box for material to be fashioned into tensional running mat like form, including an upper stationary wall member and a lower wall member spaced therefrom, tensionally held to permit limited relative spacing between said wall members, a carrier member disposed in supported traveling relation with a portion of the line of the lower wall of the chamber but diverted in clearance thereof adjacent the rear end of said wall, retarding members on the upper face of said lower wall, feeding means active in connection with the upper portion of the mat body, including reciprocally active pivoted finger members operative in their forward projection to advance the mass and in their rearward projection to be in clearance of the same, means for actuating the con-

veyer member and the reciprocally active finger members and tufting means for integrating the mat like body including a needle like formed body, tufting members thereon, comprising parts relatively adjustable to develop finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members, means for rotating the needle and means for receiving and rolling the mat in baled like form.

13. In a baling machine, in combination, a forming box adapted to receive material to be fashioned into mat like form, conveyer means for advancing the material through the box, tufting means for integrating the material into mat form including a needle like formed body, tufting members thereon, comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members, means for rotating the needle, means for receiving and rolling the mat into baled form comprising a core member, framing means for supporting the core member, means for driving the core member including frictionally tensioned means active under normal conditions to turn the core but capable of relative slippage under abnormal strain.

14. In a baling machine, in combination, a forming box adapted to receive materials, feeding means for advancing the material through said box, means for intervaled tufting of material as it passes through said box including needle like formed body, tufting members thereon, comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members, means for rotating the needle, means for receiving and rolling the tufted mat in baled like form including a removable core and power means for actuating said core, and means for integrating the flap end of the completed bale to the body of the roll.

15. In a baling machine, in combination, a forming box adapted to receive materials, feeding means for advancing the material through said box, means for intervaled tufting of material as it passes through said box including needle like formed body, tufting members thereon, comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members, means for rotating the needle, means for receiving and rolling the tufted mat in baled like form including a removable core and power means for actuating said core, means for integrating the flap end of the completed bale to the body of the roll, a needle like formed body, tufting members thereon, comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, means for projecting the needle for timed entry within the mat or withdrawal therefrom, means active during such projection of the needle to effect timed exposure or withdrawal from exposure of said finger members and means for rotating the needle.

16. In a baling machine, in combination, a mat forming enclosure comprising relatively adjustable tensionally coactive top and bottom wall members and side closure members, a hopper communicating with the interior of the enclosure, means for feeding material through the enclosure space, tufting means reciprocally active for intervaled tufting of the mat within the enclosure and means for rolling the mat into baled form comprising a core member and means for actuating the core to roll the mat thereon.

17. In a baling machine, in combination, a mat forming box, means for advancing material through the box, including traveling draper members acting on the lower portion of the mat and reciprocally active pivoted finger members acting upon the upper portion of the mat, tufting means for intervaled entry and withdrawal from the body of the mat while in the forming box including a plurality of needle like body members and finger members adjustable with respect to the bodies of the needles whereby said fingers may be projected for exposure to material to be tufted or to be seated in clearance of such matters, means for driving the draper members, common means for reciprocating the pivoted finger members and the needle members, means for adjusting the tufting fingers and means for rotating the needles.

18. The method of forming an integrated mat from grain products, consisting in feeding a grain product mass, under pressure, through a restricted way, and tufting the mat formation during passage through said way, from the constituent material of said mat.

19. The method of forming an integrated mat from grain products, consisting in feeding a grain product mass, under pressure, through a restricted way, and operating on

said mat formation during its passage through said restricted way, to tuft the same from the constituent material of said mat.

20. In a baling machine, in combination, a mat forming enclosure, means for feeding materials through the forming way and means for intervaled integration of the materials of the mat, including means active for intervaled entry and engagement of the material of the mat and for turning action with respect to the mat, whereby the materials may be so interwoven as to form an integrated web.

21. In a baling machine, in combination, a mat forming way, means for feeding materials thereto, means for advancing the materials through the way under tensional resistance of the enclosure, means for intervaled integrating of the mat body, means for receiving and rolling the mat into baled like form and means for integrating the free end of the mat when severed thereto at the completion of the bale, including a plurality of needle like formed bodied and adjustable integrating fingers therein, means for manually projecting the needles into engagement with the materials of the roll and means under the control of the operator for causing said needles to be turned when so engaging the materials.

22. In a baling machine, in combination, mat forming means, means for intervaled integration of the mat while in the forming process, a core member upon which the mat is designed to be rolled into baled form, means for optional engagement and release of the core whereby the latter may be in detached or driven relationship with the machine, means for turning the core under frictional tension and means for integrating the free end of the mat to the body of the roll including needle like formed bodies, tufting members thereon comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, manual means for projecting the needle into engagement with the roll and means active during such projection to rotate said needle.

23. In a baling machine, in combination, mat forming means, means for intervaled integration of the mat while in the forming process, a core member upon which the mat is designed to be rolled into baled form, means for optional engagement and release of the core whereby the latter may be in detached or driven relationship with the machine, means for turning the core under frictional tension and means for integrating the free end of the mat to the body of the roll including needle like formed bodies, tufting members thereon comprising parts relatively adjustable to produce finger like members adapted for exposure or retracted seating, manual means for projecting the needle into engagement with the roll, means active during such projection to rotate said needle, including power driven means and an interposed resiliently active clutch member between the driving means and the needle and means for manually controlling said clutch.

24. In a baling machine, in combination, a forming way for a continuously running mat, means for feeding materials through the forming way, means for intervaled integrating of the mat body while in the forming way, a core member upon which the mat is designed to be rolled, driving means for the core member including a relationing of a driven shaft thereto in a manner for optional engagement or release of said core, a sleeve member on said shaft, disc members respectively related to the shaft and the core, interposed friction material coactive with said disc members, relative tensioning means for said discs and means for driving the sleeve.

25. A tufting needle for integrating mat like bodies formed from material as hay or the like, in combination, a support, a needle like formed body rotatably held in the support, adjustable tufting fingers pivoted to the forward end portion of the needle, means for adjusting the fingers to exposure or in seated relation with respect to the needle and means for turning the needle body when the tufting fingers are so exposed.

26. A tufting needle for integrating materials as hay or the like including a needle like formed body provided with a longitudinal seat for operating members, plate members arranged in pairs and pivoted respectively to the needle body and to the operating member, whereby through relative longitudinal movement of said needle body and operating members, the plate members may be optionally projected to exposure or seated within the needle body, means for reciprocating the needle and means for rotating the same.

27. A tufting needle for integrating materials as hay or the like including a needle like formed body provided with a longitudinal seat for operating members, plate members arranged in pairs and pivoted respectively to the needle body and to the operating member, whereby through relative longitudinal movement of said needle body and operating members, the plate members may be optionally projected to exposure or seated within the needle body, means for reciprocating the needle, means for effecting relative reciprocation between the needle body and the operating members and means for rotating the needle.

28. A tufting needle for integrating materials as hay or the like into a continuously running mat form body including a needle

formed body provided with a longitudinally extending opening therein, finger members pivoted within said opening, operating means also within said opening and connected with said fingers in a relation whereby by relative reciprocation of the needle and the operating members will cause projection to exposure or retraction to seating position with respect to said needle body, means for reciprocating the needle body, means for effecting relative reciprocation of the needle body and operating members and means for turning the needle.

29. A tufting needle for integrating materials as hay or the like into a connected body including a needle like body provided with a clearance way longitudinally thereof, finger members pivoted to the needle body, reciprocating members supported in the needle body and related to the finger members in a manner whereby through relative reciprocation of the needle body and said reciprocating members, fingers may be adjusted optionally for exposure or seating in connection with the needle body, means for effecting reciprocation of the needle body, means for projecting the reciprocating members including a stop member spaced from the normal positioning of the needle body and spaceable finger members co-active with the operating members and operatively related through projectal movement of the needle body for expansion or retraction and means for turning the needle.

30. A tufting needle for integrating materials as hay or the like into a continuously running mat form adapted to be rolled into bales including a needle like formed body provided with adjustable tufting fingers, means for actuating said fingers for engagement of the material to be integrated or in disengagement of the same, means for projecting the needle into engagement with the mass and means for rotating the same when in such engagement whereby a web tie may be formed in the mass through the action of the needle and tufting fingers to effect integration of such mass into a mat like form body.

In testimony whereof I affix my signature.

LUCIEN W. HURFF.