

Sept. 26, 1950

B. PEARSON

2,523,632

ARCHERY TARGET MAKING MACHINE

Filed Jan. 9, 1947

6 Sheets-Sheet 1

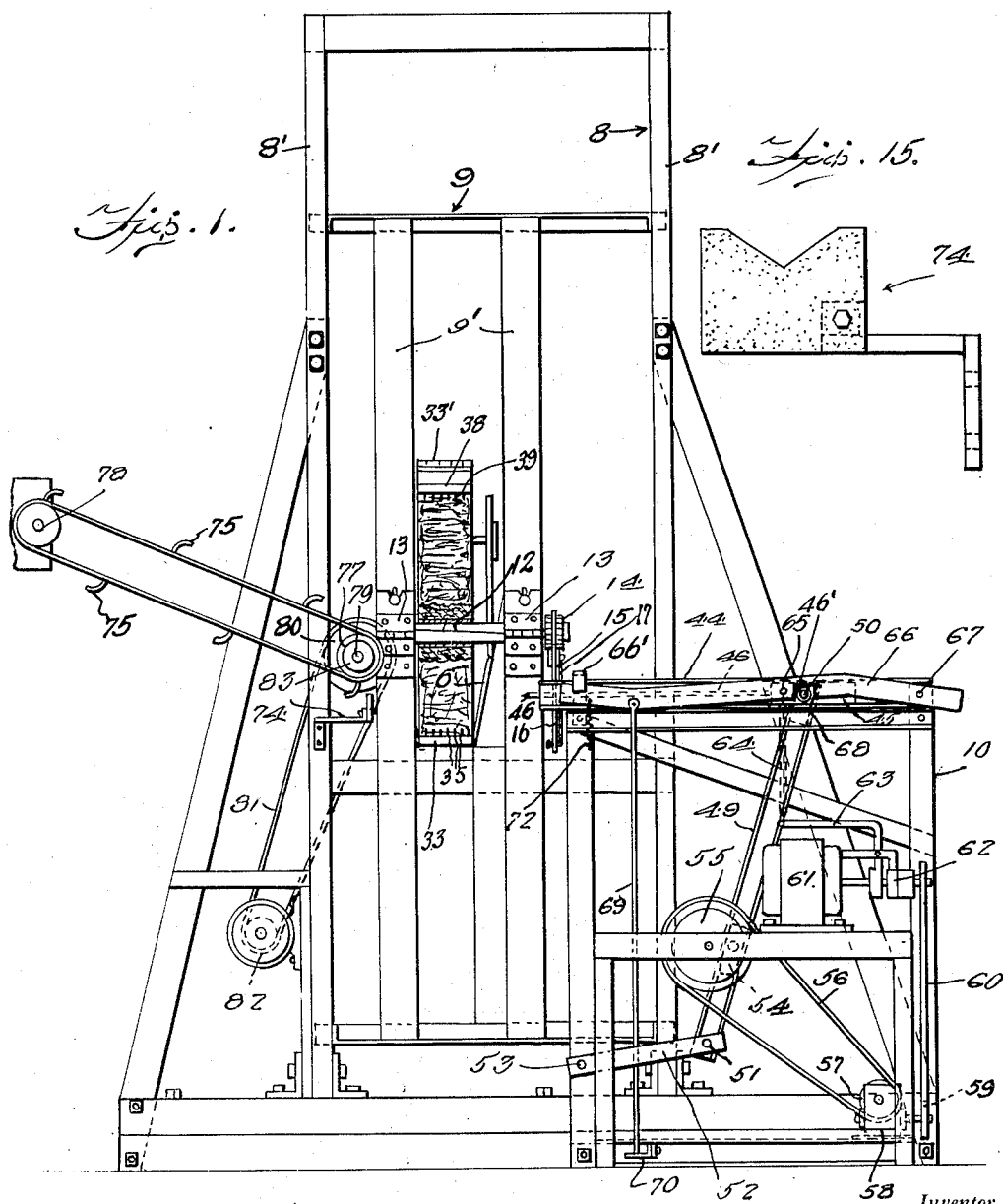
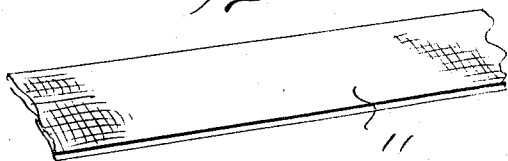


Fig. 14.



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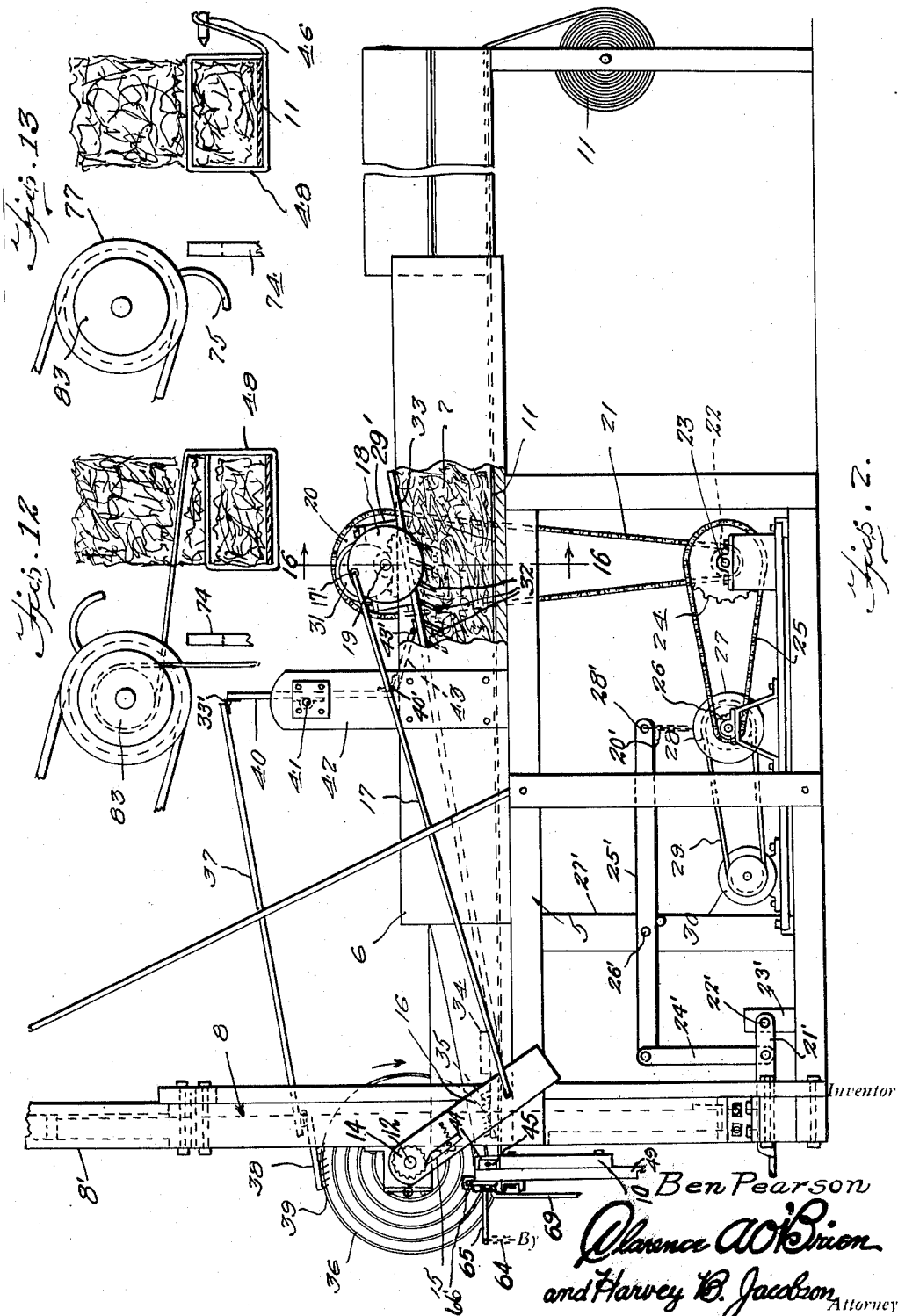
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ARCHERY TARGET MAKING MACHINE

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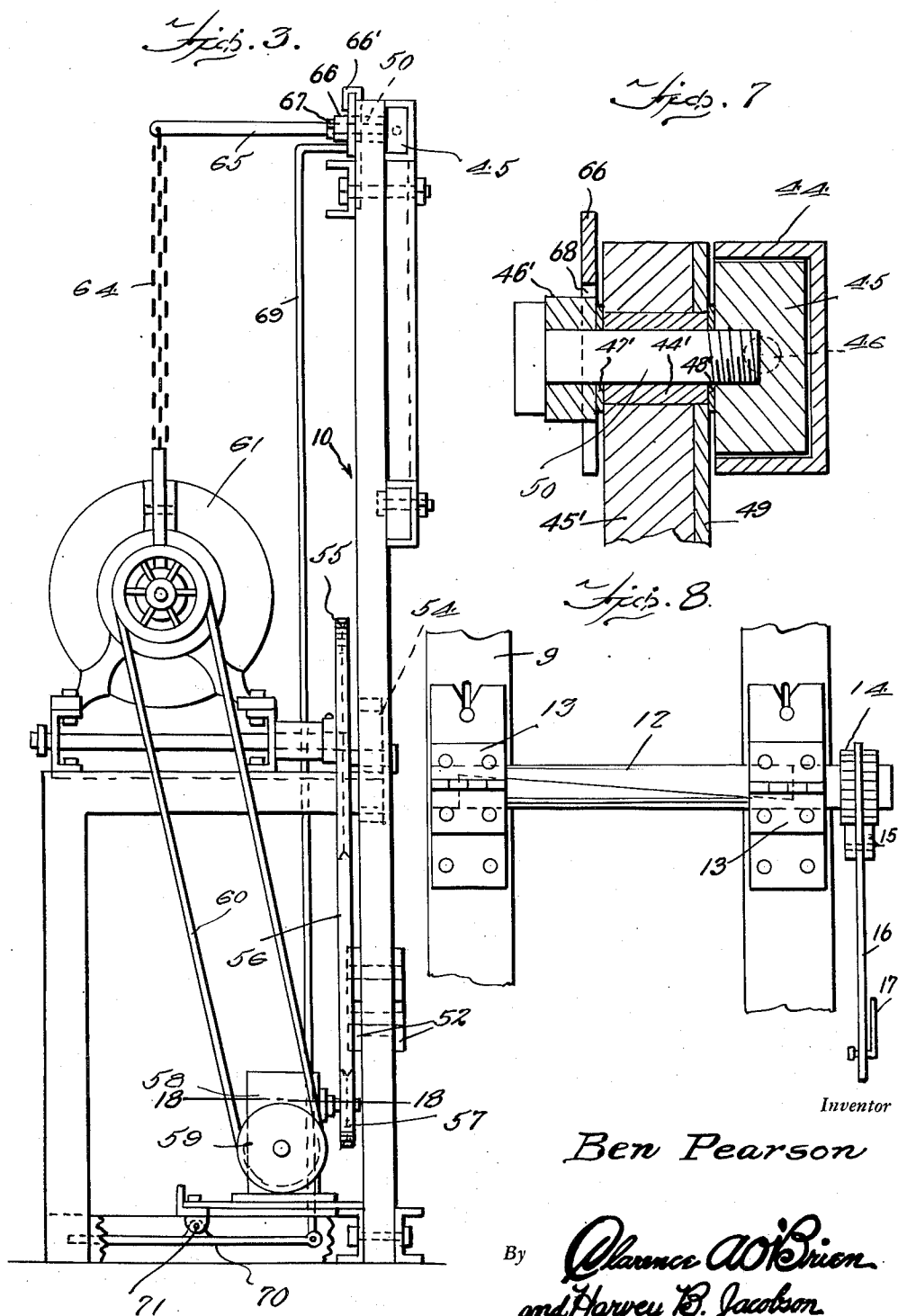
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ARCHERY TARGET MAKING MACHINE

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Sept. 26, 1950

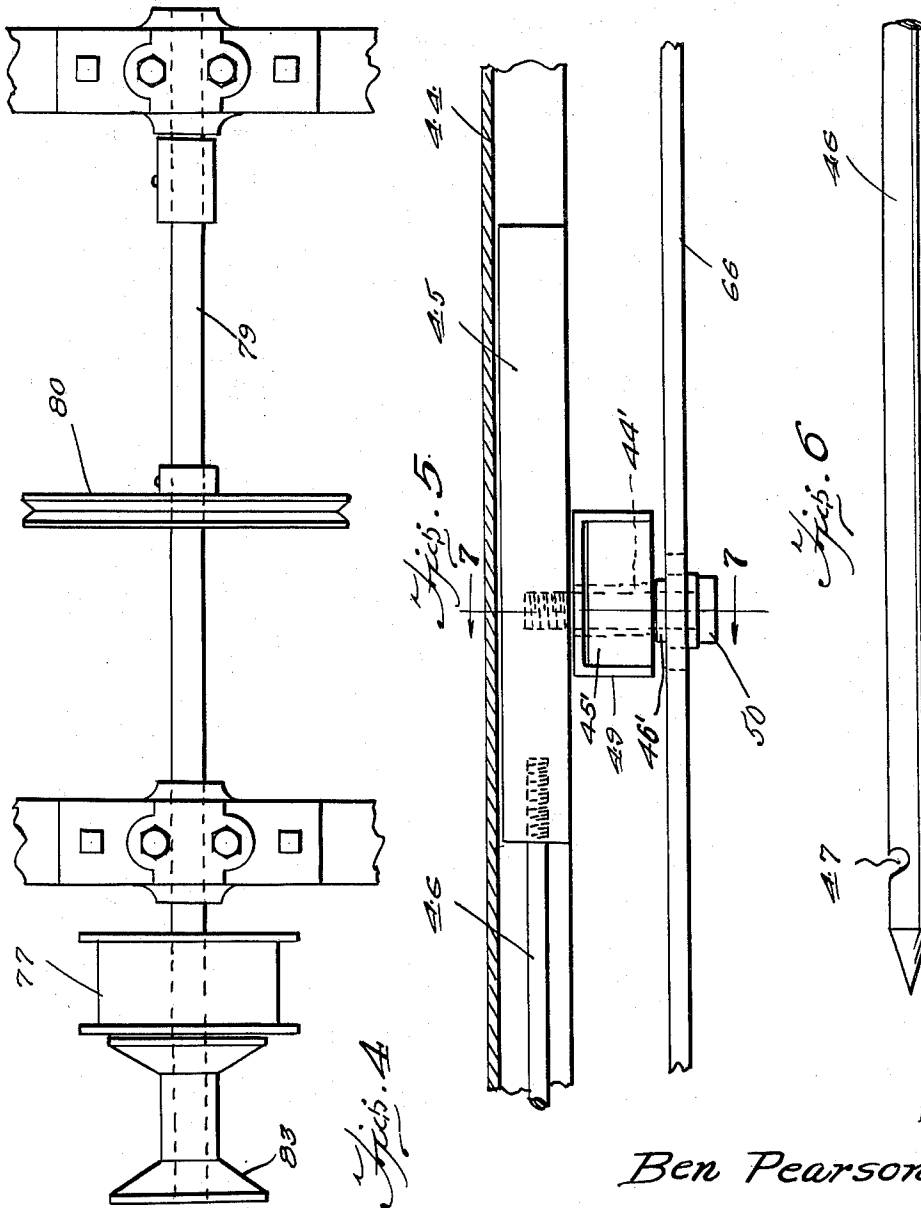
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ARCHERY TARGET MAKING MACHINE

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6 Sheets-Sheet 4



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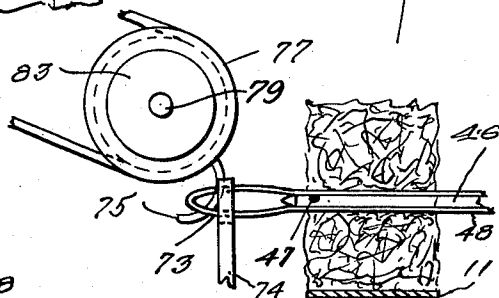
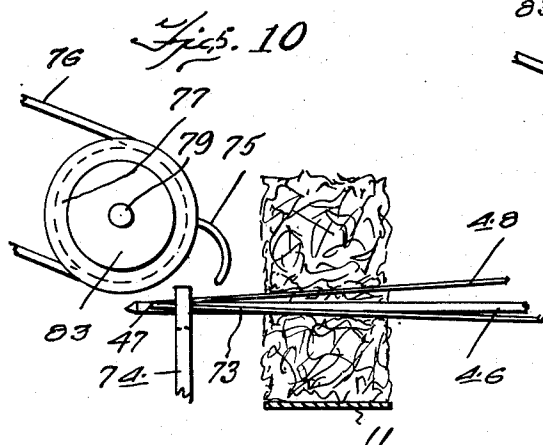
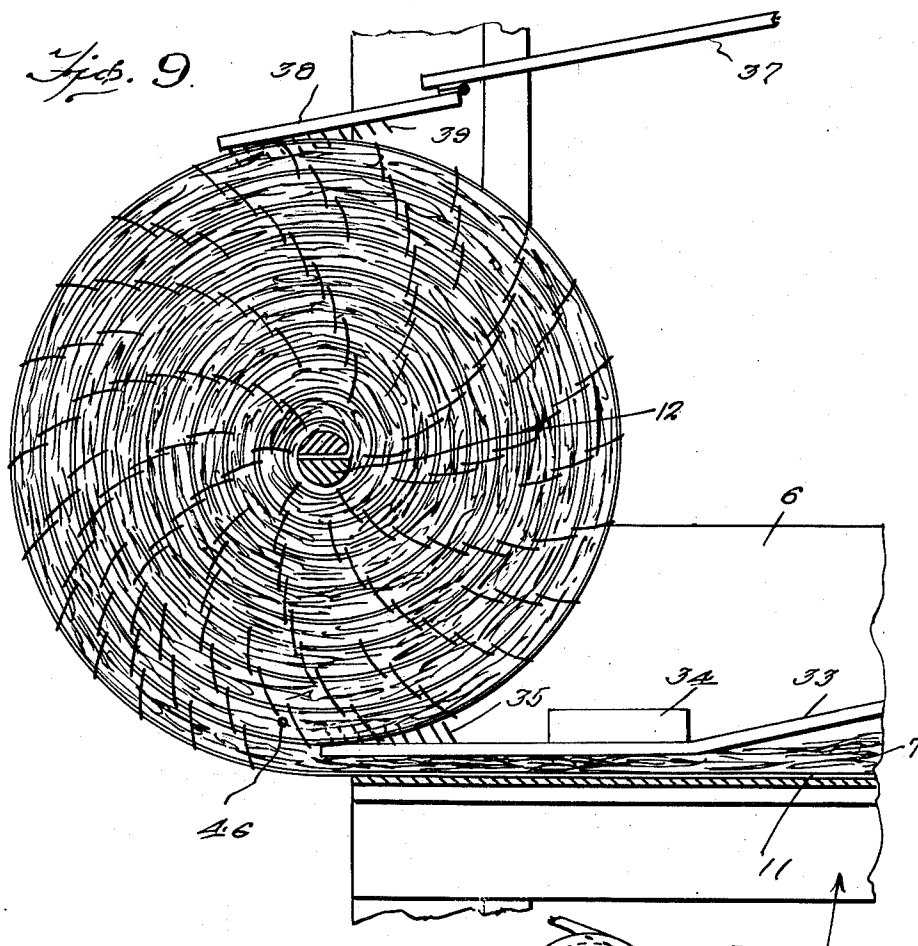
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ARCHERY TARGET MAKING MACHINE

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6 Sheets-Sheet 5



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ARCHERY TARGET MAKING MACHINE

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Fig. 16.

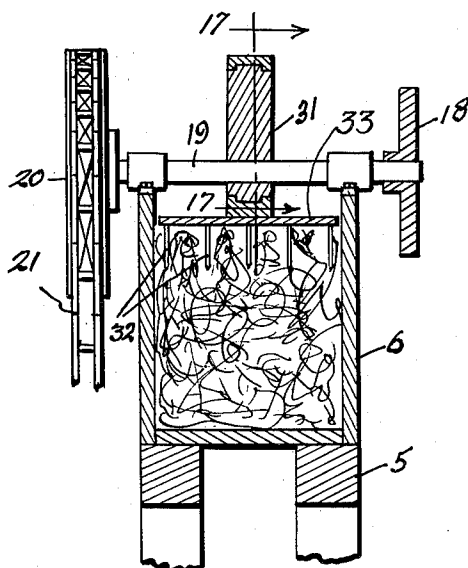


Fig. 18.

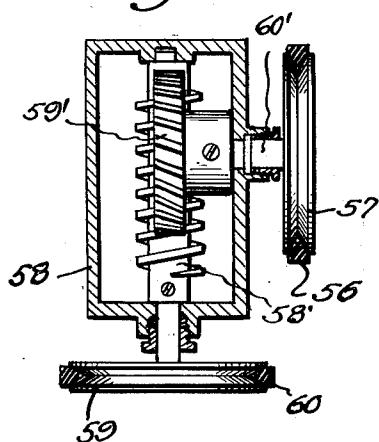
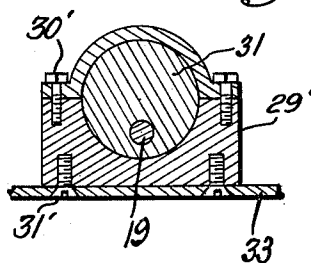


Fig. 17



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UNITED STATES PATENT OFFICE

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ARCHERY TARGET MAKING MACHINE

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15 Claims. (Cl. 112-24)

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My invention relates to new and useful improvements in machines for making archery targets.

The primary object of the invention is to provide a machine for forming such targets of convolutions of fabric and straw wound with the straw compressed and the convolutions tied together by sewing through the same, all to the end of obviating manufacturing such targets solely by hand.

Other objects together with the advantages to be derived in the practice of my invention will become apparent when the following description and claims are read with reference to the drawings accompanying and forming part of this specification.

In said drawings:

Figure 1 is a view in front elevation of the invention.

Figure 2 is a view in side elevation.

Figure 3 is an enlarged view in side elevation of the needle-actuating and control mechanism.

Figure 4 is a detail view of the thread-pulling and snubbing device for the needle drawn to a larger scale.

Figure 5 is a fragmentary detail view of the guide for the needle and control means therefor drawn to a larger scale.

Figure 6 is a fragmentary view in side elevation of the outer end of the needle.

Figure 7 is a view in transverse section taken substantially on the line 7-7 of Figure 5.

Figure 8 is a detail view in front elevation of the mandrel on which the target is wound drawn to a larger scale.

Figure 9 is a fragmentary view in side elevation of the arms for turning the target.

Figure 10 is a fragmentary view in section through the target and showing the needle feeding the thread therethrough.

Figure 11 is a similar view showing the needle in its retracted position and with the thread-engaging hook in position for pulling the thread through the target.

Figure 12 is a similar view showing the snubber in use for tightening the thread.

Figure 13 is a similar view showing the thread wrapped over the outer convolution of the target and engaged with the needle for continuing the threading action.

Figure 14 is a fragmentary perspective view of the strip of fabric forming a cover for the straw used in building the target.

Figure 15 is a perspective view of the bracket for supporting the loop of thread in position for engagement by the thread-pulling hook,

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Figure 16 is a view in vertical transverse section taken in the line 16-16 of Figure 2 and drawn to a larger scale.

Figure 17 is a view in section taken in the line 17-17 of Figure 16.

Figure 18 is a view in horizontal section taken on the line 18-18 of Figure 3.

Referring now to the drawings in detail, wherein for the purpose of illustration I have disclosed a preferred embodiment of the invention, the numeral 5 designates a frame having a trough 6 supported thereon adapted to contain straw 7 of a type generally employed for building archery targets. At the front end of the frame 5 is an upstanding frame structure 8, which includes a pair of spaced parallel, vertical frame members 8' of channel shape in cross-section and forming guides in which the side edges of a floating mandrel frame 9 are positioned for vertical sliding movement.

A frame structure 10 projects laterally from one side of the frame 5 adjacent the front end of said frame 5 for a purpose presently seen.

At the rear end of the frame 5 is rotatably supported a roll of burlap 11 or other fabric in strip form, the burlap extending forwardly along the bottom of the trough 6 with its free end clamped between the longitudinally split mandrel 12 having its ends journaled in hinged bearing brackets 13 secured to the upright members 9' of the floating frame 9. The bearing brackets 13 are hinged in any suitable manner for opening to remove and replace the mandrel 12 for a purpose presently seen.

On one end of the mandrel 12 is secured a ratchet 14 operatively engaged by a pawl 15 pivoted on an arm 16, one end of the arm being pivotally supported on the mandrel, and the other end of the arm having an actuating rod 17 pivoted thereto. The actuating rod 17 extends rearwardly of the machine and has its rear end eccentrically connected as at 17' to a wheel 18 secured on a shaft 19 journaled on the upper edges of the trough 6 and extending transversely thereof. The shaft 19 is driven by means of a sprocket 20 and chain 21 from a small sprocket 22 secured on a shaft 23 journaled on the lower portion of the frame 5, the shaft 23 also having a large sprocket wheel 24 secured thereto, driven by a chain 25 from a smaller sprocket 26 on a clutch device 27 also journaled on the lower portion of the frame, the clutch device including a pulley 28 driven by a belt 29 from an electric motor 30. The clutch device 27 may be of any conventional type adapted to be engaged as by a pull chain 20'. For exerting pull on the chain

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20' a foot pedal 21' is pivoted as at 22', on a post 23' on the frame 5 and is operatively connected by a link 24' to one end of a rocker bar 25' pivoted as at 26' on an upright 27' on the frame 5, the other end of said rocker bar 25' being operatively connected as at 28' to said chain 20'.

An eccentric 31 is also secured on the shaft 19. Connected at its rear end to the eccentric 31 is a lower feed arm 33 which is of a width substantially equal to the width of the trough 6 and rests on top of the straw 7 overlying the burlap 11 in the trough 6 therein for reciprocation by the eccentric 31. The connection between the feed arm 33 and the eccentric 31 takes the form of a grooved cap bearing 29' bolted together, as at 30', with the eccentric 31 rotatably confined therein and suspending the same, said lower feed arm 33 being secured by screws 31' to the bottom of the bearing 29', as best shown in Figures 16 and 17, so that said arm is swingable vertically about said eccentric with its front end adapted to rest, under the influence of gravity, on the straw 7 in the bottom of the trough 6. As will be clear, the eccentric 31 is revolved by the shaft 19 in the bearing 29' to reciprocate said lower feed arm 33 so that the front end of said arm 33 intermittently rams and packs straw 7 between the lowermost completed convolution of the target being formed and the succeeding one being wound on the completed one. The arm 33 is inclined downwardly and forwardly in the trough 6 and adjacent its front end is provided with a weight 34 adapted to cause said front end to compress the straw in the bottom of the trough 6 and the front end of the arm 33 is provided with a series of upstanding, forwardly inclining spikes or teeth 35 adapted to engage the lowermost completed convolution of the target 36 as the same is wound on the mandrel to thereby assist in rotating the target. As will be apparent from an inspection of Figure 9 of the drawings, the teeth 35 are inclined in a direction to disengage themselves upon a rearward movement of the arm 33. Forwardly and downwardly inclined spikes 32 depend from the lower feed arm 33 along the rear end portion thereof for feeding the straw 7 forwardly as said arm 33 is reciprocated. The straw is thus fed on top of the burlap toward the front end of the trough 6 to be wound in layers on the mandrel 12.

An upper arm 37 (similar to the arm 33) is also employed for assisting in the rotation of the target. The front end of the arm 37 is provided with a hinged vertically swingable head 38 thereon having depending rearwardly inclined teeth 39 for engaging the upper edge of the target, the rear end of the arm being hinged as at 33' to the upper end of an oscillating rod 40 pivoted intermediate its ends, as at 41, to an upstanding support 42 on the frame 5, the lower end of the rod 40 being pivotally connected as at 40' to a link 43 pivotally connected as at 43' to the lower arm 33 whereby to provide a simultaneous operating connection between the arms 33 and 37 arranged so that said arms are oppositely actuated.

As will be understood, the mandrel frame 9 rises as the convolutions of straw 7 and burlap 11 are wound on the mandrel 12 and the target is thus increased in size, said target engaging the bottom of the trough 6 and thereby raising said frame. The winding operation is started with said frame 9 lowered so that the mandrel 12 is spaced from the bottom of the trough 6 by only the thickness of the front end of the burlap strip inserted in the mandrel. By opening the bear-

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ings 13, the sections of the split mandrel 12 may be separated for inserting the burlap 11 therebetween to be clamped by said sections.

The frame structure 10 includes an upper horizontally extending channel-shaped guide member 44 in which a needle-actuating block 45 is slidably positioned having one end of a needle 46 secured thereto, the needle having a notch 47 at its outer end and being adapted to be advanced and retracted transversely through the target, the notch 47 serving to pull a sisal thread 48 through the target for tying the convolutions thereof together.

The block 45 and needle 46 are reciprocally actuated by means of a pitman rod 49 pivotally connected at one end to a pin 50 carried by the block 45, the other end of the pitman arm being pivotally connected, as at 51, to one end of links 52 having its other end pivoted as at 53 to a part of the frame 10. The pitman rod 49 is of channel shape in cross-section and slidably mounted therein is a block 54 eccentrically connected to one face of a pulley 55 driven by a belt 56 and a pulley 57 from a transmission unit, designated generally at 58, supported at the lower end of the frame structure 10. The pin 50 is passed through a bushing 44' fixed in the pitman rod 49 and extending through a filler block 45' suitably fixed in said rod 49. A roller 46' is provided on the outer end of said pin 50 for a purpose presently seen. Suitable gaskets 47', 48' are provided on the pin 50 between the bushing 44' and the block 45 and roller 46'. The transmission unit 58 is driven by means of a pulley 59 and belt 60 from a motor 61, mounted at an intermediate portion of the frame structure 10. The transmission unit 58 preferably comprises a worm shaft 58' on which the pulley 59 is fixed and which drives worm gear 59' on a cross shaft 60' on which the pulley 57 is fixed.

The motor 61 is controlled by a clutch device 62 which includes a pivoted arm 63 having the lower end of a chain 64 attached to the free end of the arm, the chain having its upper end attached to an arm 65 extending horizontally outwardly from a locking lever 66 pivoted at 67 adjacent one end of the lever to the frame structure 10, the lever having a notch 68 formed in its lower edge adapted for receiving the roller 46' on the pin 50 of the slide block 45 of the needle to stop operation of said needle in a retracted position thereof.

Also attached to the lever 66, adjacent its free end, is a manually controlled rod 69 which extends downwardly and has its lower end connected to the rear end of a foot pedal 70. The pedal 70 is pivoted at 71 to the bottom portion of the frame structure 10 and is adapted, upon a depressing movement of the outer end of the pedal, to raise the lever 66 upwardly to disengage the notch 68 from the pin 50 and permit free operation of the needle. A coil spring 72, also attached adjacent the free end of the lever 66 assists in returning the same downwardly for engagement with the pin 50. An upward movement of the lever 66 will also raise the clutch control lever 63 to engage the clutch and thus operatively connect the needle with the motor. A suitable guide 66' is provided on the frame 10 for the free end of the locking lever 66.

The needle 46 is threaded manually, in its fully retracted position, with short lengths, successively, of thread 48 looped intermediate the ends thereof, as shown in Figure 10, across the needle through the notch 47. As the needle 46 advances;

it thrusts the length of thread 48 thereon through the target in looped form, as best shown in Figures 10, 11 and 13, with the ends of the thread free on the near side of the target. At the end of the advance stroke of the needle 46, a loop of the thread 48 is formed on the far side of the target and left there, when the needle 46 is retracted, the loop resting on the upper edge, as shown at 73, of a V-shaped bracket 74 and in position to be engaged by one of a plurality of traveling hooks 25 carried on an endless belt 76 traveling over pulleys 77, 78, as shown in Figure 11. The pulley 77 is fast on a shaft 79 driven by a pulley 80 and belt 81 from an electric motor 82. The hook 75 engaging the loop 73 of the thread 48 pulls the loop out and one end of the thread 48 through the target to fall off the hook, at which point said end is grasped by the operator and manually wound under the lowermost convolution of the target and then threaded through the eye 47 of the needle 46 to extend across the retracted needle, all as shown in Figure 13, and be thrust in loop form through the target as the needle 46 again advances, to again leave a loop on the far side of the target to be pulled out by one of the hooks 75. Thus, the length of thread 48 is stitched around each outermost convolution of the target, as shown in Figure 13. As a stitch is thus formed, the end of the thread 48 pulled through the target by a hook 75 is manually wound around a snubbing spool 83 fast on the shaft 79 and held fast by hand, for an instant, so that by friction the stitch is pulled tight, after which the end is passed under the lowermost or outermost convolution of the target to the near side and the needle 46 threaded therewith as previously described. When one length of thread 48 has become substantially used up, another length is tied thereto to be threaded on the needle 46.

Having thus described the invention what I claim is:

1. A target making machine comprising a floating mandrel, means for feeding layers of flexible material and loose stalk material to the mandrel for winding thereon, and means engaging the wound layers to rotate the same.

2. A target making machine comprising a floating mandrel, means for feeding layers of flexible material and loose stalk material to the mandrel for winding thereon to form a target, and means engaging the outer periphery of the target to rotate the same.

3. A target making machine comprising a floating mandrel, means for feeding layers of flexible material and loose stalk material to the mandrel for winding thereon to form a target, and means engaging the outer periphery of the target to rotate the same, said last-named means being movable radially with respect to the target in accordance with variations in the diameter thereof.

4. A target making machine comprising a floating mandrel, means for feeding layers of flexible material and loose stalk material to the mandrel for winding thereon to form a target, and combined compressing means for the loose material and rotating means for the target.

5. In a machine of the class described, a support for a roll of flexible strip material adapted to be unwound from said roll, power-operated means for winding up the strip of material in convolute form from said roll, a receptacle for flexible stalk material, and power operated means for packing the stalk material in between

the convolutions of the strip material as said convolutions are wound comprising a member reciprocating between said convolutions.

6. In a machine of the class described, a support for a roll of flexible strip material adapted to be unwound from the roll, power-operated means for winding up the strip material from the roll intermittently into convolute form, a receptacle for flexible stalk material, and power operated means for packing the stalk material in between the convolutions of the strip material as said convolutions are formed comprising a member reciprocating between said convolutions and intermittently operated in timed relation to operation of the first-mentioned means.

7. In a machine of the class described, a support for a roll of flexible strip material adapted to be unwound from the roll, power means for winding up the strip material from the roll in convolute form, a trough through which said strip material is adapted to extend as it is unwound and adapted to contain flexible stalk material on top of said strip material, and power means for packing the stalk material in said trough in between the convolutions of the strip material as said convolutions are wound comprising a member reciprocating between said convolutions and on top of the stalk material in the trough.

8. In a machine of the class described, a support for a roll of flexible strip material adapted to be unwound from the roll, means operative to wind up said strip material from the roll in convolute form, a receptacle for flexible stalk material, power-operated means for packing the stalk material intermittently between the convolutions of the strip material as the same are wound comprising a member reciprocating between said convolutions, and means operated by said power means to intermittently operate said wind-up means.

9. In a machine of the class described, an elongated trough for containing stalk material, a support at one end of the trough for a roll of flexible strip material, a mandrel at the other end of the trough operative to wind up the strip material in convolute form from said roll with the strip between the roll and mandrel extended through the trough, power means for packing the stalk material in between the convolutions of the strip material as the same are wound including a reciprocating feed arm in the trough, and means operated by said power means for operating said mandrel.

10. In a machine of the class described, an elongated trough for containing stalk material, a support at one end of the trough for a roll of flexible strip material, a mandrel at the other end of the trough operative to wind up the strip material in convolute form from said roll with the strip material between the roll and mandrel extended through the trough, power means for packing the stalk material in between the convolutions of strip material as the same are wound including a reciprocating feed arm in the trough, and means operative by said power means for operating said mandrel, said arm coacting with said convolutions to wind up the strip material.

11. In a machine of the class described, a support for a roll of flexible strip material adapted to be unwound from the roll, power means for intermittently winding up said strip from the roll in convolute form, a thread-carrying needle mounted for advance and retraction transversely of said convolutions to pass a length of thread

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in loop form through the same with one end of the length free, and means to engage and exert a pull on the loops to pull said free end through the convolutions, and a rotary snubber around which said free end is wound manually to pull the thread tight.

12. In a machine of the class described, a support for a roll of flexible strip material adapted to be unwound from the roll, power means for intermittently winding up said strip material from the roll in convolute form, a thread-carrying needle mounted for advance and retraction transversely of said convolutions to pass a length of thread in loop form through the same with one end of the length free, and means to engage and exert a pull on the loops to pull said free end through the convolutions comprising a traveling series of hooks.

13. In a machine of the class described, power means for winding a strip of flexible material in convolute form, a thread-carrying needle, means to mount said needle for advance and retraction transversely of said convolutions for passing a thread therethrough, a motor drive for the needle normally ineffective, means for releasably locking said needle retracted, and pedal-operated means for releasing said needle and rendering said motor drive effective.

14. In a machine of the class described, means for winding a strip of flexible material into convolute form, a thread-carrying needle having a pin thereon, means to mount said needle for advance and retraction transversely of said convolutions for passing a thread therethrough, a motor drive

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for advancing and retracting said needle normally ineffective, a pivoted locking bar for said needle interlocking with said pin to lock said needle each time the same is retracted and swingable to unlock said needle, manual means for swinging the bar to unlock the needle, and means operated by such swinging of said bar to render the motor effective.

15. In a machine of the class described, means for winding up a strip of flexible material into convolute form, a thread-carrying needle having a pin thereon, means to mount said needle for advance and retraction transversely of said convolutions for passing a thread therethrough, a pivoted locking bar for said needle interlocking with said pin each time the needle is retracted and swingable to unlock said needle, pedal-operated means for swinging said bar, and a motor drive for advancing and retracting the needle when unlocked.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
191,647	Brown	June 5, 1877
1,082,563	Smith	Dec. 30, 1913
1,381,832	Heidenheim	June 14, 1921
1,854,486	Rogers	Apr. 19, 1932
1,944,388	Zimmerman et al.	Jan. 23, 1934
1,980,856	Fuchs	Nov. 13, 1934