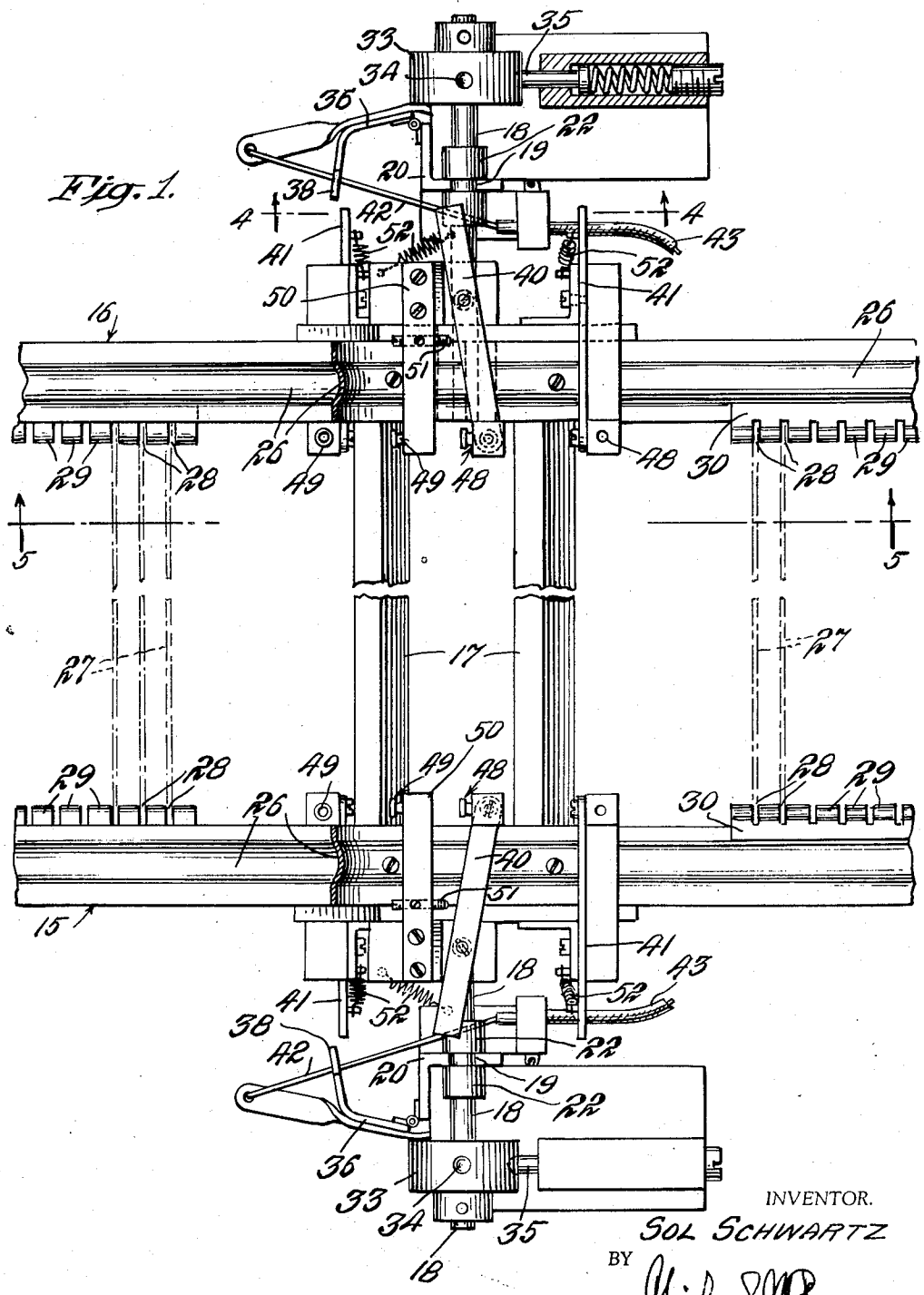
July 12, 1960 S. SCHWARTZ 2,944,752

MACHINE FOR PACKING PILE FABRICS

Filed July 2, 1957 6 Sheets-Sheet 1

Fig. 1.



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Fig. 4.

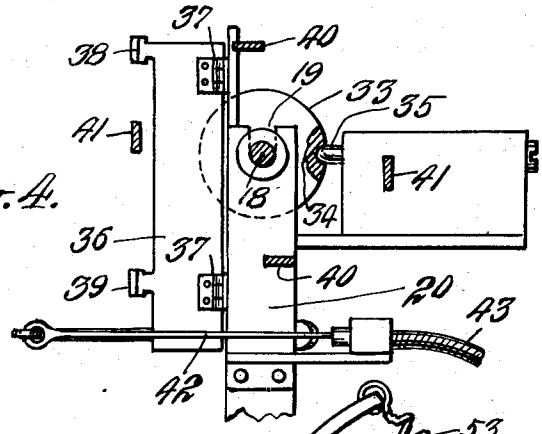


Fig. 2.

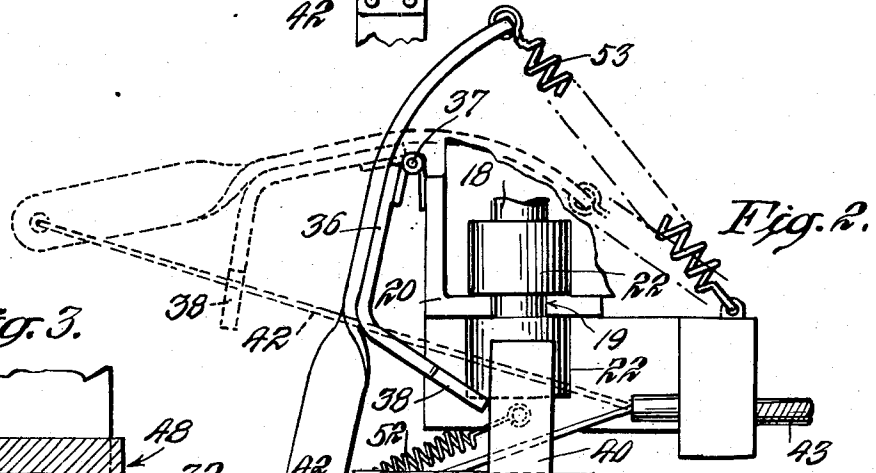
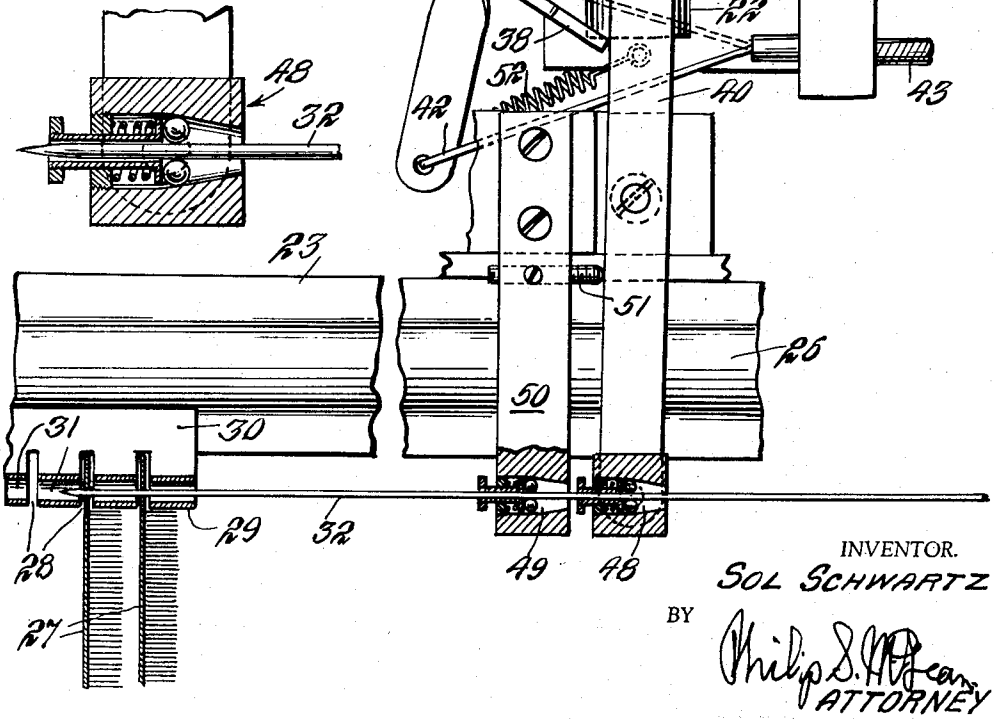


Fig. 3.

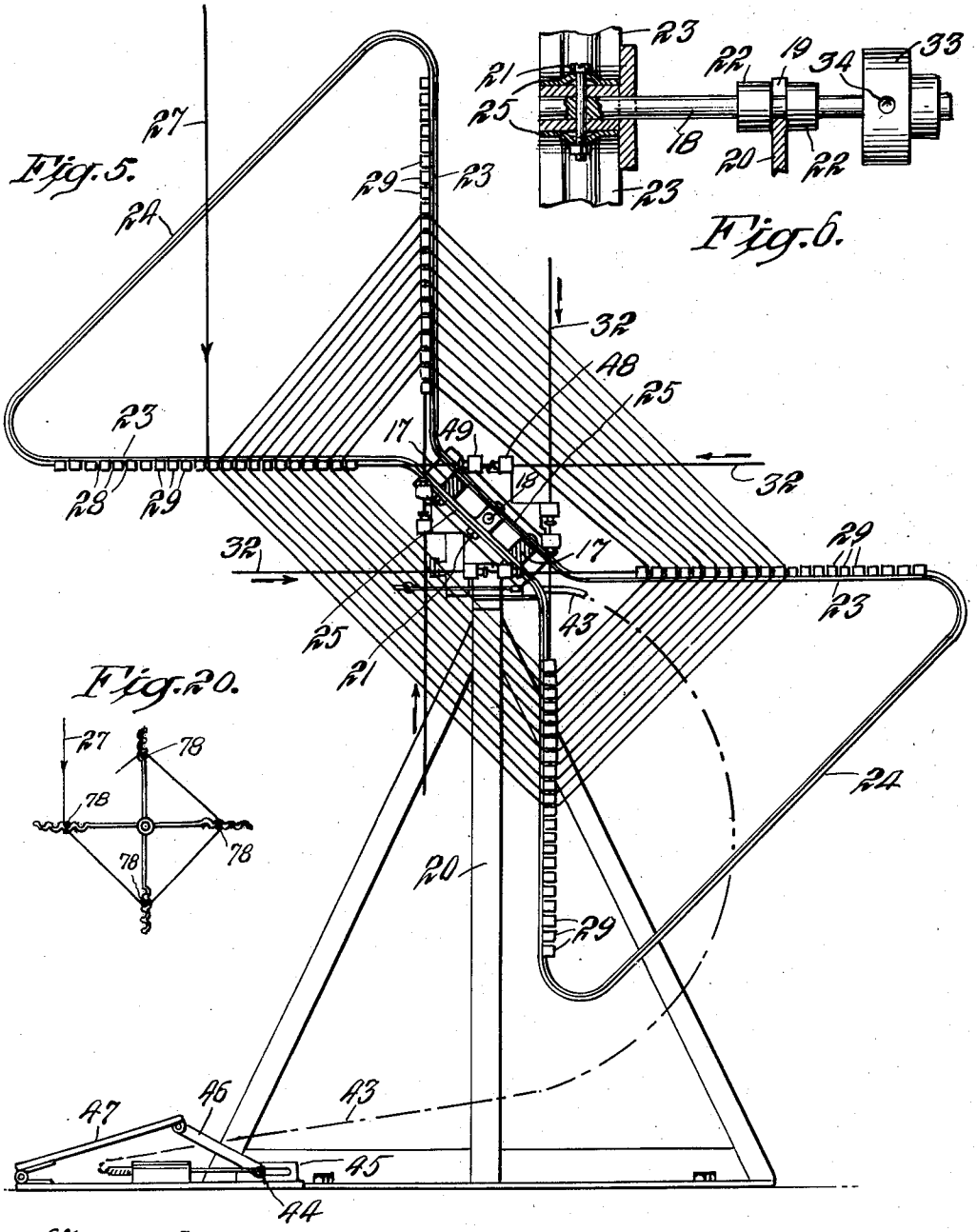


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MACHINE FOR PACKING PILE FABRICS

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MACHINE FOR PACKING PILE FABRICS

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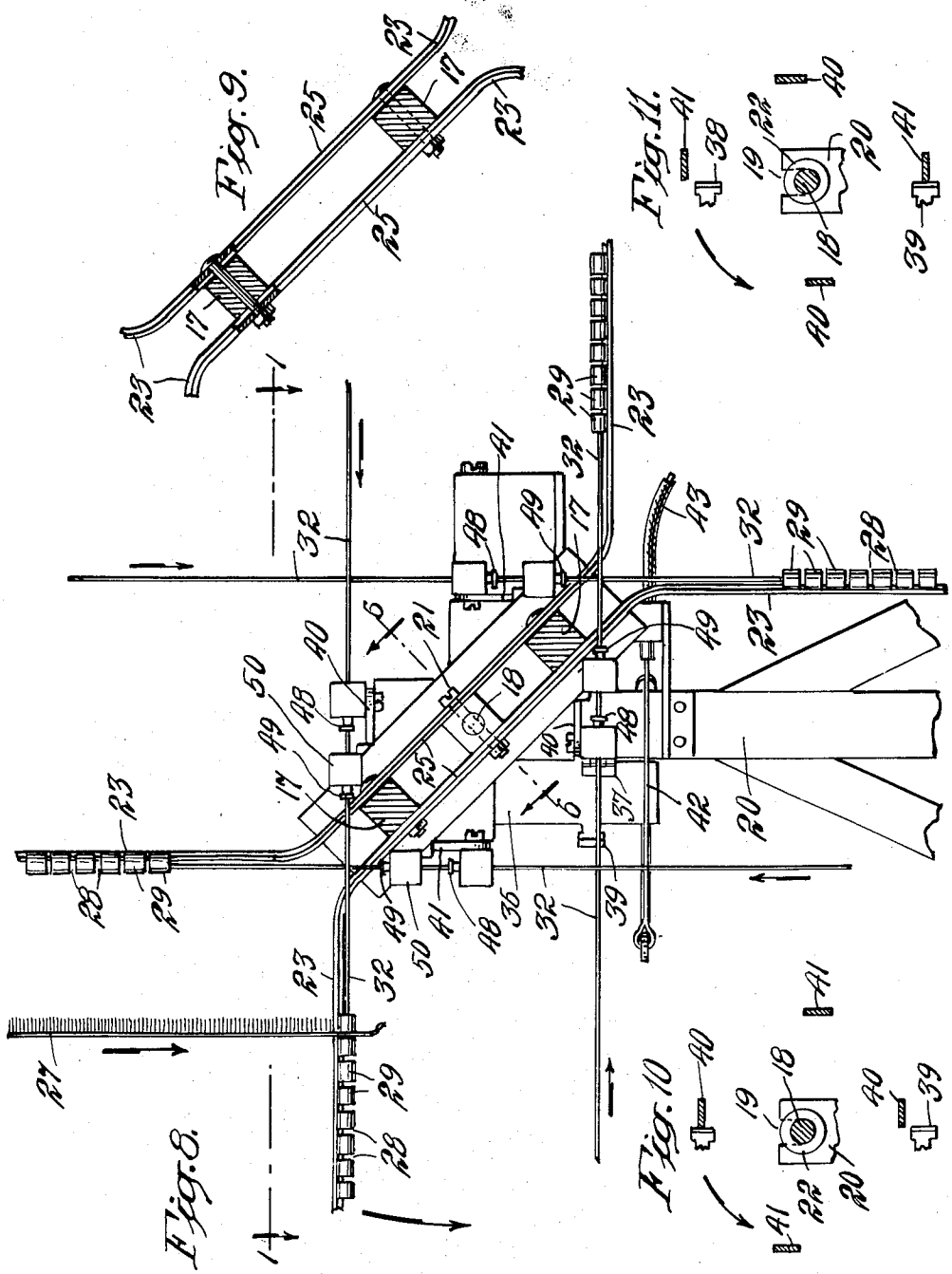


Fig. 8.

Fig. 9.

Fig. 11.

Fig. 10

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July 12, 1960 S. SCHWARTZ 2,944,752

MACHINE FOR PACKING PILE FABRICS

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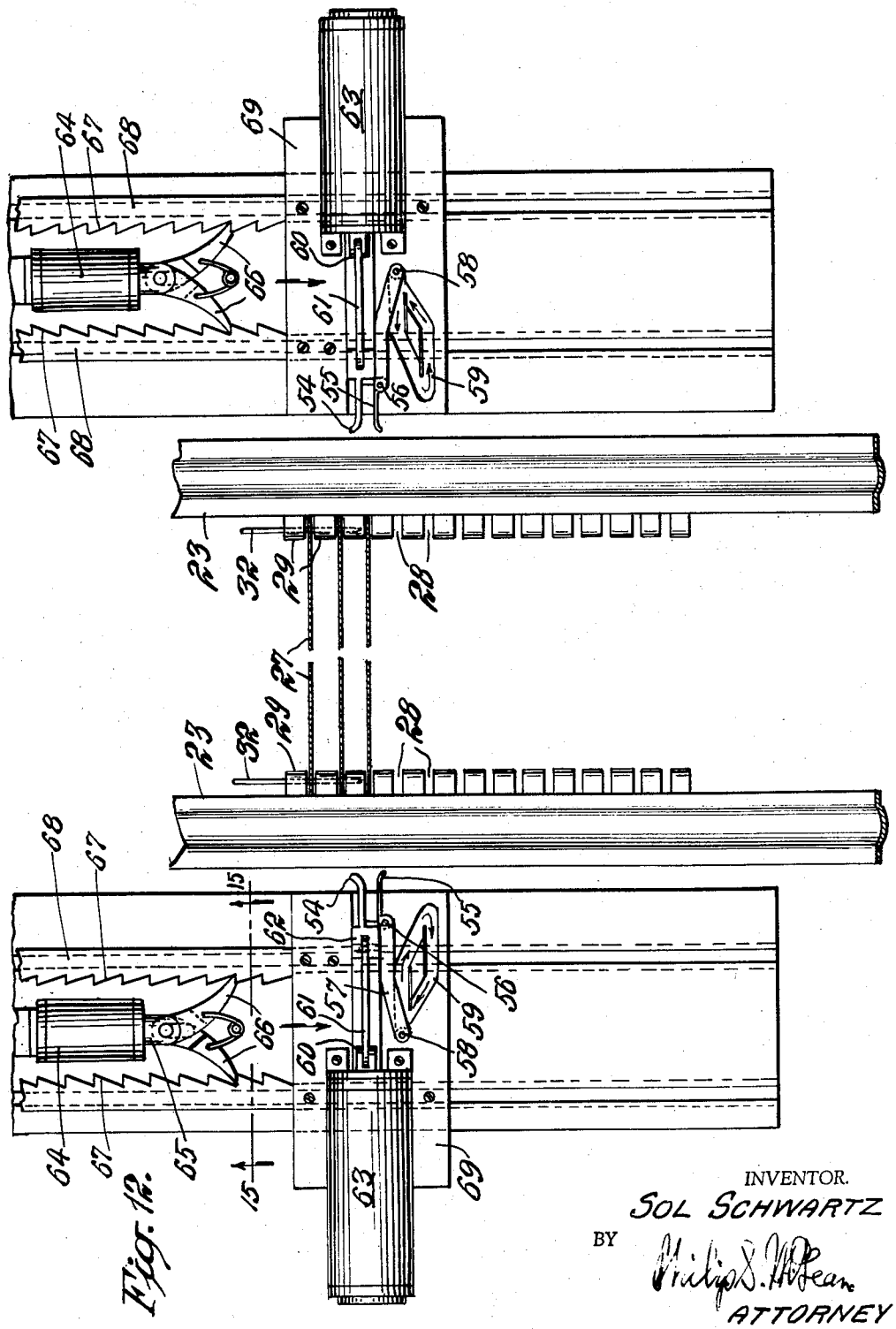


Fig. 12.

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MACHINE FOR PACKING PILE FABRICS

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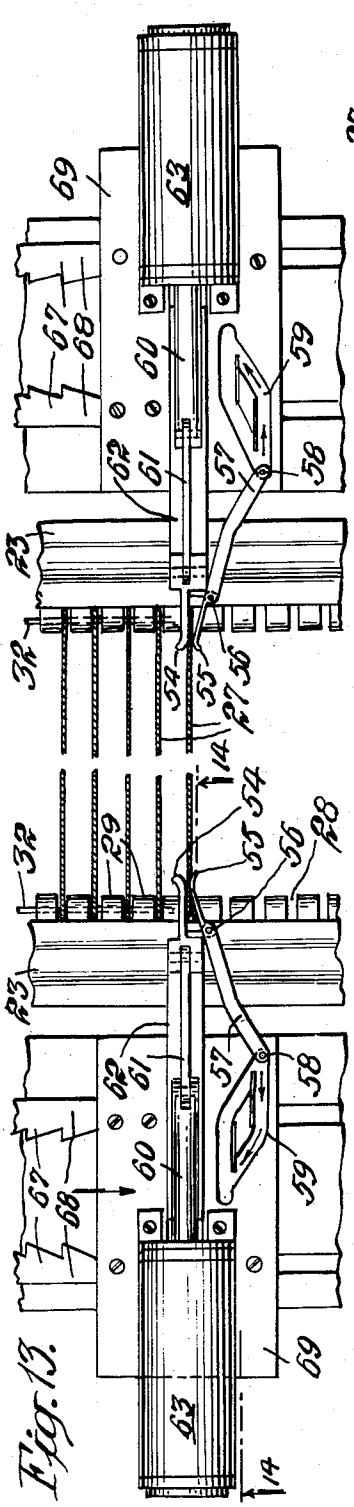


Fig. 13.

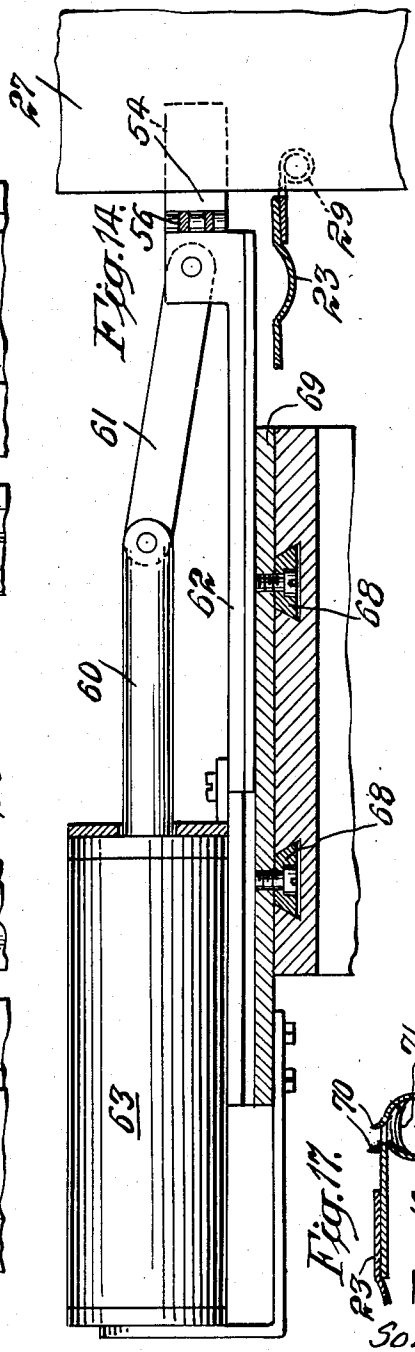


Fig. 14.

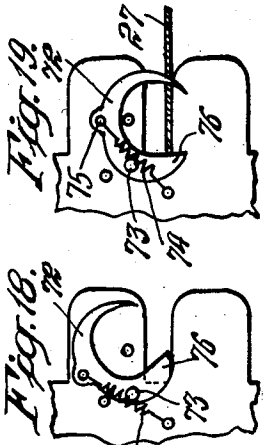


Fig. 19.

Fig. 18.

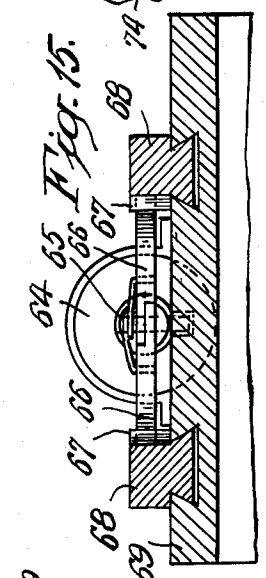


Fig. 15.

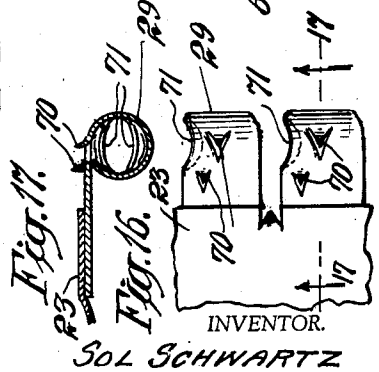


Fig. 17.

Fig. 16.

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MACHINE FOR PACKING PILE FABRICS

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Filed July 2, 1957, Ser. No. 669,519

16 Claims. (Cl. 242—62)

The invention herein disclosed is a machine for packing pile fabrics.

To protect the nap or pile, it has been the practice to wind such materials in spirally separated layers by catching the selvage edges of the material over sharply pointed supporting hooks on the opposite end heads of a rotatably mounted rack or reel.

This is a time consuming operation requiring the constant attention of a skilled operator and even under the most favorable circumstances, the cloth may be unevenly stretched, torn or become detached from the hooks resulting in impairment and injury to the goods.

Objects of the present invention are to avoid and to eliminate these possibilities and to provide a machine in which pile fabrics and the like may be quickly and accurately positioned and effectively secured without the possibility of injury or coming loose as heretofore.

These objects have been attained by provision of a rack or reel having longitudinally aligned spaced supports for the selvage edges and the provision of means for projecting binding wires successively through these supports and through the intervening layers of material positioned on such supports.

These operations may be accomplished partly by hand and partly automatically or be either wholly automatic or manual as will be seen in the course of the following description.

Other important objects of the invention are to provide a machine of the character indicated of relatively simple, inexpensive construction not requiring the services of a specially skilled operator.

Other desirable objects attained by the invention and the novel features of construction, combination and relation of parts embodying the invention are set forth and will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present commercial embodiment of the invention. Structure, however, may be modified and changed as regards the immediate illustration, all within the true intent and scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawings is a broken plan view of one of the machines with the upper arms of the reel appearing in section.

Fig. 2 is an enlarged broken part sectional detail of one of the arms showing two layers of cloth engaged in the holding notches thereon and pierced by the securing wire associated with that arm, the full lines indicating position of the actuating lever in the wire feeding act and the dotted lines indicating the normal rest position of this lever.

Fig. 3 is an enlarged broken sectional detail of a ball type form of clutch which may be used for feeding and holding the wire.

Fig. 4 is a broken vertical section view on substantially the plane of line 4—4, Fig. 1, showing the indexing mechanism and the swinging lever for actuating the

clutch levers as they come around into the wire feeding position.

Fig. 5 is a vertical sectional view of one of the end heads as taken on substantially the plane of line 5—5 of Fig. 1.

Fig. 6 is a broken sectional detail showing the detachable connection of one of the rotatable, supporting hubs with one of the real heads, this view taken on substantially the plane of line 6—6 of Fig. 8.

Fig. 7 is a broken part sectional detail of the foot pedal for actuating the flexible pull wire connections to the levers for advancing the wire feeding clutches.

Fig. 8 is a broken vertical sectional view illustrating particularly, relation of the pedal operated actuating lever to the wire feeding clutch levers.

Fig. 9 is a broken cross-sectional detail of one of the reel head centers removed from the supporting hubs.

Figs. 10 and 11 are broken sectional diagrams showing how the two arms of the actuating lever operate sequentially to effect successive action of the wire feeding clutch levers.

Fig. 12 is a horizontal plan and part sectional view of a form of the machine in which the fabric is automatically gripped and located in the holding notches of the machine, the grippers being shown in open, retracted position.

Fig. 13 is a similar broken plan view with the grippers extended and closed on the fabric.

Fig. 14 is an enlarged broken vertical sectional view of one of the grippers, on substantially the plane of line 14—14 of Fig. 13.

Fig. 15 is a cross-sectional view of the sliding carriage supporting one of the grippers on substantially the plane of line 15—15 of Fig. 12.

Fig. 16 is a broken plan view of a modified form of the tubular supporting fingers.

Fig. 17 is a cross-sectional view of the same on substantially the plane of line 17—17 of Fig. 16.

Figs. 18 and 19 are broken detail views of a modified form of holding means for the cloth.

Fig. 20 is a diagrammatic view illustrating a further modification in which the successive layers of the cloth are supported on rods inserted in sockets on the arms of the packaging reel.

As particularly shown in Figs. 1 and 5, the reel or rack is made up of opposite end heads **15** and **16** secured in spaced relation by spacing bars or rods **17** and supported in the machine by projecting stub shafts or hubs **18**, removably seated in open journal sockets **19** in spaced upright stands or posts **20**.

Fig. 6 shows how these supporting shafts may be secured in quickly removable relation to the end heads by through screws **21**. Quick acting clamps may be used for the same purpose.

Fig. 6 also shows how the reels may be held against endwise movement in the supporting stand by spaced collars **22** on the shafts rotatably engaged over opposite sides of the bearings **19**.

Each end head is made up in the illustration of a continuous length of strip material bent into a loop of substantially X formation with triangular end portions providing convergently inclined arms **23** connected at the outer more widely spaced ends by straight bar sections **24** and connected across the center by intermediate spaced straight parallel portions **25**.

The longitudinal spacing bars or rods **17** and the central supporting shafts **18** are shown in Figs. 5, 8 and 9 as secured between these parallel intermediate portions **25** of the reel head forming strips.

For additional rigidity and strength, the intermediate

portions of the arm forming strips 23 may be transversely corrugated or bowed as indicated at 26, Fig. 1.

The pile fabric indicated generally at 27, Figs. 1, 2, 5, and 8, is guided, supported and positively and uniformly held in accurately positioned relation by having the selvage edges of the same entered in notches 28, between aligned supporting loops 29 on the inner edges of the generally radially extending arms of the reel heads.

These loops are shown as provided by doubled or folded strips 30, Figs. 1 and 2, welded or otherwise secured over the inner edges of the generally radially extending arms of the reel heads providing spaced, aligned guide passages 31 for the needles or wires 32.

As the edges of the fabric are engaged in opposing notches in the reel heads, the wires which are aligned with those particular notches, are advanced one step to impale these particular edges, the reel being indexed and held at this point for operation of these particular wire feeding clutches.

The indexing mechanism, as shown in Figs. 1, 4 and 6, comprises annular flanges 33 on the reel shafts 18 having positioning pockets 34 to receive the spring pressed detent plungers 35.

By this mechanism, the reel is brought to a stop and held in position for the binding wires to be advanced each time a layer of the cloth is engaged in the notches between adjoining supports.

In the machine illustrated, this position is the one shown in Figs. 5 and 8 with the rows of spaced supports 29 and wire 32 substantially horizontal and the cloth 27 substantially vertical.

In this position, wire advancing levers on the reel heads come in to register with levers for actuating the same on the stands or end frames 20 of the machine.

These actuating levers are designated 36, and are shown hingably mounted at 37 on vertical axes on the supporting stands in position for vertically spaced projections 38, 39 thereon to engage clutch levers 40, 41 respectively.

Because of the X-shaped formation of the reel heads, the clutch levers 40 which are diametrically opposite, Fig. 10, are at a lesser distance from the reel centers than the opposite clutch levers 41 so the lugs 38, 39 on actuating levers 36 are positioned at one time to operate levers 40 and the next time to operate levers 41 on the two reel heads.

While power means may be provided for the purpose, the actuating levers 36 are shown as operated in the present disclosure by pull cables 42 extending through guides 43 from the two reel stands to a cross-pin 44, Figs. 5 and 7, sliding in a slotted bracket 45 and actuated by a pivoted link 46 connected with a foot pedal 47. This may be a Bowden wire type of flexible connection between the operating pedal and the two clutch actuating levers.

The clutches for feeding the wires and for holding the wires against retractive movement may be of the automatic ball and cone type as shown in Figs. 2 and 3, though it is contemplated that spring pressed pawl clutches may be employed, the latter having the advantage that they may be of open construction and hence, be more readily released if there is occasion to release them from the wires.

The feed clutches are designated 48 and are shown mounted on the ends of clutch levers 40 and 41 faced to advance wires 32 through the spaced selvage supports or holders 29 and the holding clutches are indicated at 49 on stationary brackets 50 faced to prevent reverse movement of the advanced wires.

The wire advancing movement of clutch levers 40, 41 is adjustably controlled by set screws 51, Fig. 2.

Springs 52 yieldingly hold the clutch levers 40, 41 in the retracted position shown in Fig. 1 and springs 53 normally hold the actuating levers 36 in the open or inactive position appearing in this view and shown in dotted lines in Fig. 2.

Operation

As shown in Figs. 1, 2, 5 and 8, the selvage edges of the pile fabric 27 are introduced in the notches 28 between adjoining spaced supports 29 to form the spiral pattern indicated. This engagement of the cloth folds over successive supports may be a hand operation or be effected automatically or semi-automatically, as by using guides to direct the cloth into successive notches. The reel may be rotated, a step at a time or continuously by hand or by automatic means.

In the machine here illustrated, however, the reel is indexed by detent 35, Figs. 1 and 4, to stop and hold it each time that one of the feed clutch levers 40, 41 is in line with lugs 38 or 39 on actuating levers 36. While the reel is thus indexed, the foot pedal is depressed causing Bowden wires 42 to pull the actuating levers 36 from the position shown in Fig. 1 to the full line position shown in Fig. 2, whereupon one pair of the lugs 38 or 39 will engage and operate clutch levers 40 or 41, this engagement alternating in the successive steps of rotary movement as above explained.

With each action of clutch levers 40 or 41, the wires 32 will be advanced as shown in Fig. 2 through one pair of cloth supports 29 into the next adjoining pair of cloth supports and through the layer of material then engaged between said supports.

These wires may be pointed as shown in Figs. 2 and 3 to pierce the selvage without spreading or tearing.

After a reel is fully loaded, the wires may be secured against accidental removal and the reel be removed from the stands by lifting it up out of the bearing sockets 19 after which the supporting shafts 18 may be removed by releasing set screws 21, Fig. 6, or the clamps or other means for temporarily securing these shafts to the reel heads.

The reel is of light, but strong construction with the arms reinforced by the wires extended through the rows of cloth supports.

In the fully automatic form of the machine illustrated in Figs. 12 to 15, the fabric is automatically entered in the notches 28 between the holding fingers 29 by grippers which engage the selvage edges and pull the fabric down and outward into the notches and advance one step laterally into alignment with the next row of notches at the end of one full revolution of the frame.

In these views the grippers are shown as made up each of a fixed jaw 54 and a companion jaw 55 pivoted at 56 and actuated by a leverage extension 57 carrying a pin 58 riding in a parallelogram cam groove 59 designed to open the jaws in the fully retracted position, Fig. 12, and to close them in the projected position and hold them closed while drawing the selvage edges into the notches, Fig. 13.

Inward and outward movement of the gripper jaws is effected in the illustration by plungers 60 connected by pivot links 61, Fig. 14, with the slides 62 carrying the fixed and relatively movable jaws. These plungers may be the magnetic cores of solenoids 63 but it is contemplated that hydraulic or compresed air cylinders and pistons may be used instead of the solenoid constructions illustrated.

The grippers are indexed to line up the cloth with the spaces between the supporting fingers by means here shown as solenoids 64, operating plungers 65 carrying spring pressed pawls 66 in engagement with ratchets 67 on the slides 68 carrying the base plates 69 on which the gripper solenoids 63 are mounted. In this case, also hydraulic or compressed air cylinders and pistons may be employed in place of the feed solenoids 64 and this feed mechanism may be controlled by cams or otherwise to bring the grippers and particularly the cloth

held by the grippers into register with successive pairs of the holding notches.

The entire gripper mechanism may be mounted for vertical movement and this mechanism actuated, when the grippers are closed, to pull down successive lengths of the cloth to extend from one pair of the radial arms to the next pair of such arms.

As an alternative, the reel, after the grippers have released hold on the cloth, may be rotated a step at a time to advance the cloth around the reel. This step rotation of the reel may be by hand or by pawl and ratchet or other such mechanism.

Instead of advancing the binding wires through the cloth one layer at a time, the wires may be advanced through all the layers after such layers have been wound on the reel.

In such case, it may be desirable to temporarily catch the selvage edge on the holding fingers and this may be accomplished by providing those fingers with sharp holding points as indicated at **70** in Figs. 16 and 17. These sharp holding points may be put directly on the holding fingers or on the supporting arms carrying these fingers as will be clear from the views referred to, and they may be located at different portions of these members where most convenient for catching the selvage and temporarily holding it before the wires are inserted.

To prevent the wires catching in the holding fingers, the entrance ends of the fingers may be turned inward to form a funnel structure **71** for guiding the wires and preventing them from catching in the openings left by the punched out holding points **70**.

The selvage edges may be automatically caught and held in the supporting slots or notches by means of pointed spring toggle levers arranged to snap from open to closed cloth holding position. These spring catches may be constructed to be actuated by the edges of the cloth being inserted in the notches.

Figs. 18 and 19 illustrate a form of these spring catches, comprising sharp pointed hook levers **72** pivoted on the arms of the reel at **73** in position to penetrate or grip the cloth inserted in the notches and adapted to snap into and be held in either the open or closed relation shown in Figs. 18 and 19 by springs **74** acting on the pins or shoulders **75** on the levers. These hook levers are shown as having angular extensions **76** at the inner ends to be engaged by the cloth entered in the notches to snap them into closed position and as having lugs **77** projecting in the closed position of the spring catches and by which they may be snapped to open position, if not released or fully opened by withdrawing the cloth from the notches in unwinding from the reel.

Other modifications come within the intent of the invention, including the provision of rods **78** or stiff wires which are dropped into sockets in the arms of the reel, in back of the cloth as the reel is rotated to wrap the cloth in spaced layers on the same as indicated in Fig. 20.

For holding some cloth, the binding wire may be in the form of stiff thread, cord or the like, of plastic or other suitable material.

In the wholly automatic form of the machine, where the cloth is advanced, engaged with and secured on the supports and the reel rotated in time with the advancing and securing actions, the parts are driven in properly synchronized relation by electric motors or other power means. Motors may be employed as well in the semi-automatic or part manually operated forms of the invention.

This invention is related to that covered in co-pending patent application entitled, "Packing Device for Pile Fabrics," Serial No. 669,377, filed July 1, 1957 (identified as Case #3913).

In one embodiment of the automatic machine, the cloth is supplied between the reel heads and as it reaches a position to be supported, a pair of holding fingers on the

heads are automatically projected beneath the cloth, these fingers preferably carrying points which will penetrate to hold the cloth in position while the reel is turning into position for a succeeding pair of the fingers to be projected into the holding relation.

It will be understood that a "throw-away" form of reel, if desired, may be removably set in the reel heads positioned to have the cloth wound thereon and adapted to wholly support the wound layers of cloth after the supporting fingers of the reel heads are withdrawn on completion of the winding operation. Before removing the "throw-away" frame from the machine, binding wires or the like may be passed through the wound material in a manner such as previously described.

What is claimed is:

1. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports with longitudinally registered passages extending therethrough, and means for advancing binding wires through said passages and through successive layers of cloth introduced between said spaced supports.

2. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports with longitudinally registered passages extending therethrough, and means for advancing binding wires through said passages and through successive layers of cloth introduced between said spaced supports, including wire feeding clutches in line with said passages and means for reciprocating said clutches the distance equivalent to the spacing between said cloth supports.

3. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports with longitudinally registered passages extending therethrough, means for advancing binding wires through said passages and through successive layers of cloth introduced between said spaced supports, and clutch means for holding the advanced wires against reverse movement.

4. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports with longitudinally registered passages extending therethrough, and means for advancing binding wires through said passages and through successive layers of cloth introduced between said spaced supports, including means for intermittently indexing said reel.

5. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports, grippers engageable with opposite edges of the cloth and movable transversely in respect thereto for spreading the cloth and locating successive turns of cloth over said spaced cloth supports, and binding means extending continuously across the spaces between said supports and through the layers of cloth located in said spaces for securing the successive layers of cloth so positioned on said supports.

6. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports, for engaging opposite edges of the fabric being wound and for inserting between adjacent ones of said cloth supports successive turns of the fabric being wound, and means for securing the successive layers of cloth so positioned on said supports, including binding wires extended through the successive layers of cloth.

7. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports, means for locating successive turns of cloth over said spaced cloth supports and means for securing the successive layers of cloth so positioned on said supports, including hook levers having pointed ends to pierce the cloth and pivoted to extend from a nonprojecting position to a position projecting

across the spaces between the supports, spring means for snapping said hook levers from nonprojecting to projecting position and vice versa and said hook levers having projections engageable by the cloth edges to initiate said spring projecting movement.

8. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports with longitudinally registered passages extending therethrough, means for advancing binding wires through said passages and through successive layers of cloth introduced between said spaced supports, holding points for temporarily retaining the fabric on said cloth supports and funnel means at the entrances to said passages for directing the binding wire therethrough.

9. A machine for winding and packing pile fabric comprising the combination of a base structure having horizontally spaced supports, a rack for spooling pile fabric removably journaled on a horizontal axis on said spaced supports, said rack having radiating arms carrying rows of longitudinally spaced pile fabric supporting fingers provided with binding wire guides located at the opposite sides of the spaces between said spaced fabric supporting fingers, pile fabric piercing wires slidable in said guides across said spaces and through layers of pile fabric disposed therein, clutch means in gripping engagement with said wires and means for shifting said clutch means in the direction to advance said binding wires through said guides and layers of pile fabric spooled on said spaced fingers.

10. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports with longitudinally registered passages extending therethrough, and means for advancing binding wires through said passages and through successive layers of cloth introduced between said spaced supports, including wire advancing clutches rotatable with said reel, means disposed in the path of rotation of said reel for imparting movement to said clutches for advancing the wires and means for momentarily retaining the reel with said clutches in register with said clutch advancing means.

11. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports with longitudinally registered passages extending therethrough, and means for advancing binding wires through said passages and through successive layers of cloth introduced between said spaced supports, fabric margin engaging means positioned adjacent the axial position of said arms on said reel and adapted to releasably engage the margin of fabric being spooled and inserting the fabric between adjacent supporting fingers, clutch means adapted to releasably grip said wires, means for shifting said clutch means in the direction to advance said binding wires through fabric inserted between adjacent fingers and into the guide in the finger next after the inserted fabric.

12. Machine for packing pile fabric comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports with longitudinally registered passages extending therethrough, and means for advancing binding wires through said passages and through successive layers of cloth introduced between said spaced supports, fabric margin engaging means positioned adjacent the axial position of said arms on said reel and adapted to releasably engage the margin of fabric being spooled and inserting the fabric between adjacent supporting fingers, clutch means adapted to releasably grip said wires, means for shifting said clutch means in the direction to advance said binding wires through fabric inserted between adjacent fingers and into the guide in the finger next after the inserted fabric, means for detaining the binding wire in the advanced position, and means for releasing said clutch means and withdrawing the same in preparation for the next advance of said binding wire.

13. A machine according to claim 11 and in which said fabric margin engaging means comprises reciprocating power means acting in a direction substantially transverse to the row of supporting fingers, a pair of opposed fabric grippers mounted on said power means for reciprocal motion therewith.

14. A machine according to claim 11 in which said fabric margin engaging means comprises reciprocating power means acting in a direction substantially transverse to the row of supporting fingers, a pair of opposed fabric grippers mounted on said power means for reciprocal motion therewith, one of said grippers is fixed relative to said power means and the other of said grippers is openable and closeable on said one gripper, and cam means acting on said other gripper to open it upon motion of said power means toward the margin of fabric and to close it upon motion of said power means away from the margin of said fabric.

15. A machine according to claim 13 and which further comprises a base structure for rotatably supporting said reel, rack means fixed to said base structure and extending radially of the axis of said reel, traveling means mounted on said rack and carrying said power means, and actuating means to advance said traveling means along said rack means by a distance equal to the spacing of said supporting fingers upon completion of a predetermined number of operations of said clutch shifting means.

16. A machine for packing pile fabrics comprising a reel having radiating arms provided with rows of longitudinally aligned spaced cloth supports, said supports having longitudinally registered passages extending therethrough, each of said passages being substantially conical in shape, means for locating successive turns of cloth over said spaced cloth supports, and means for securing the successive layers of cloth so positioned on said supports, including means for inserting lengths of binding wires through the successive layers of cloth and aligned supports from the direction of the ends of the passages having the largest diameter.

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