

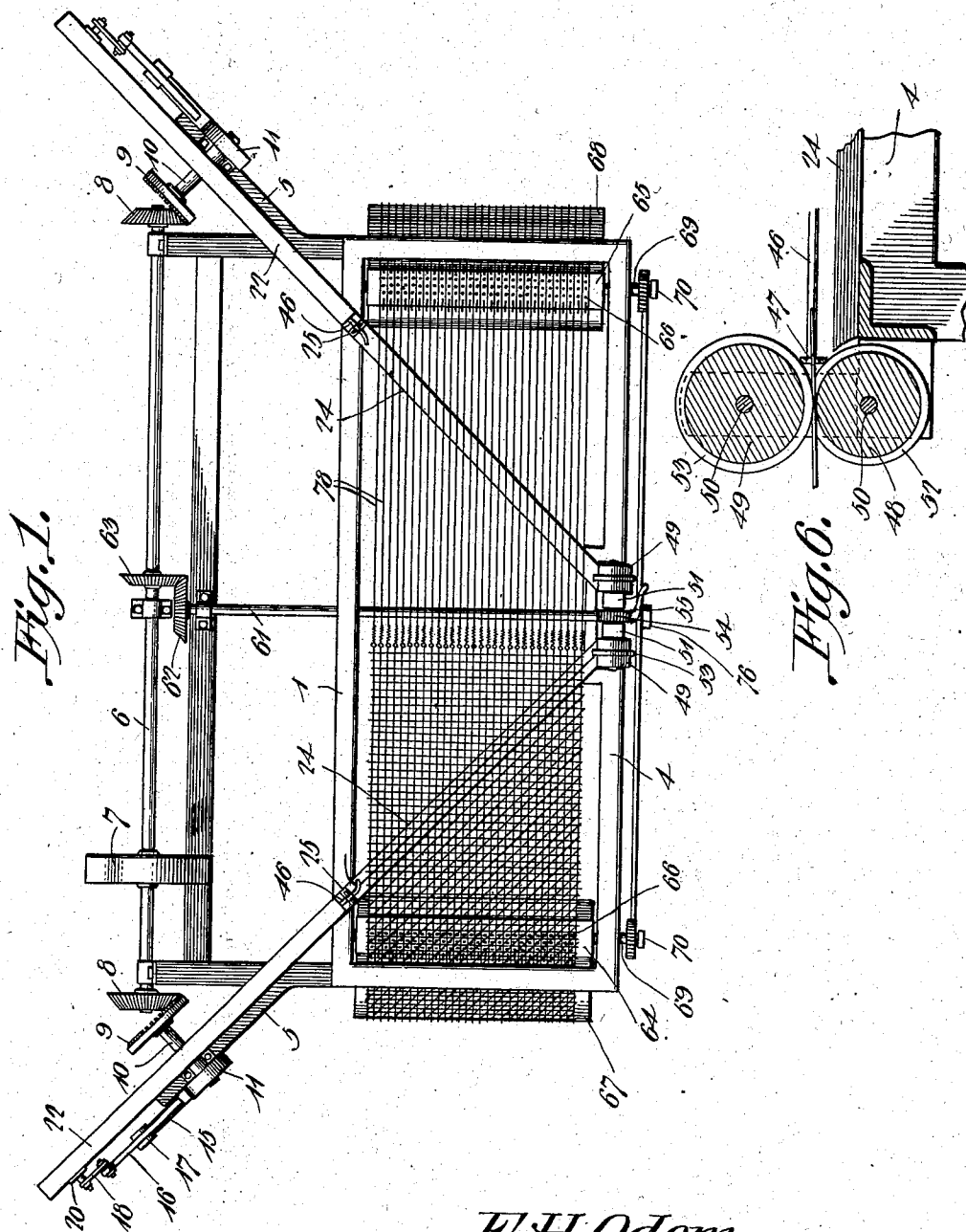
No. 729,958.

PATENTED JUNE 2, 1903.

E. H. ODOM.
CANE WEAVING MACHINE.
APPLICATION FILED SEPT. 23, 1901.

NO MODEL.

8 SHEETS—SHEET 1.



Witnesses

Chas. S. Hoyer.

E. H. Odom,

by

Calnow & Co.
Attorneys

Inventor.

No. 729,958.

PATENTED JUNE 2, 1903.

E. H. ODOM.
CANE WEAVING MACHINE.
APPLICATION FILED SEPT. 23, 1901.

NO MODEL.

3 SHEETS—SHEET 2.

Fig. 2.

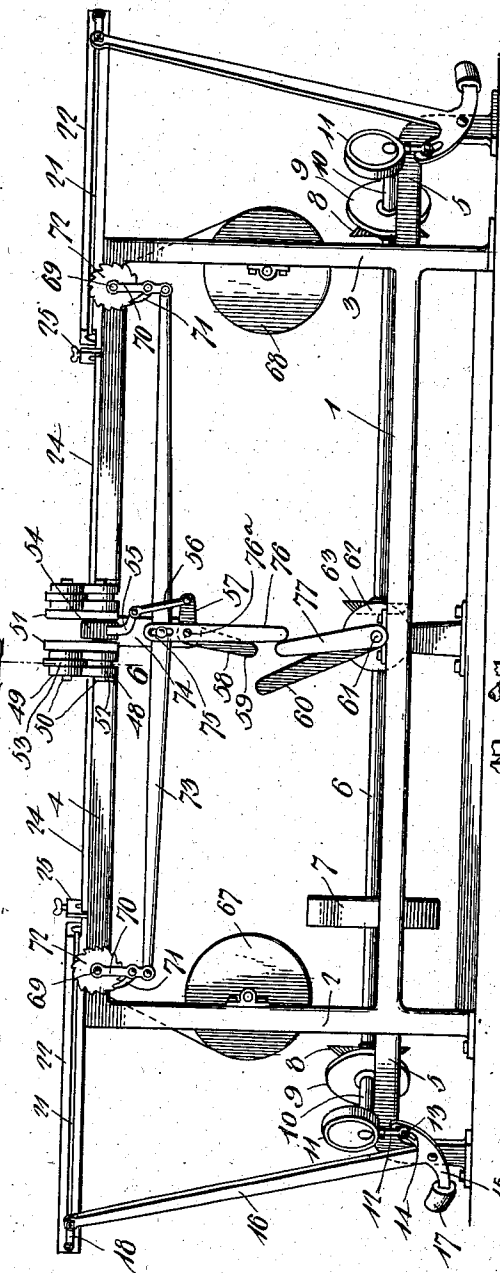


Fig. 7.

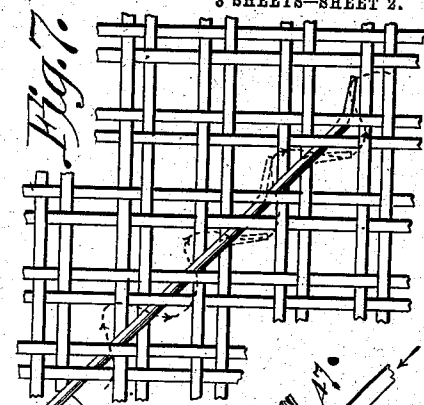


Fig. 8.

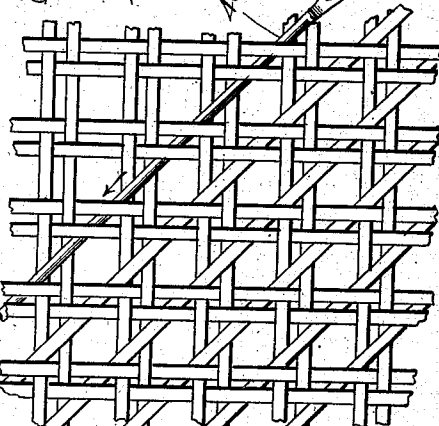
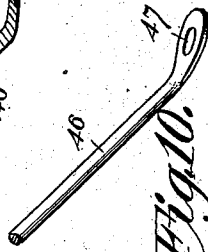


Fig. 9.



Fig. 10.



Witnesses
John A. Culverwell.
Chas. S. Hoyer.

E. H. Odom, Inventor
by *C. A. Snow & Co.* Attorneys

No. 729,958.

PATENTED JUNE 2, 1903.

E. H. ODOM.
CANE WEAVING MACHINE.
APPLICATION FILED SEPT. 23, 1901.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 4.

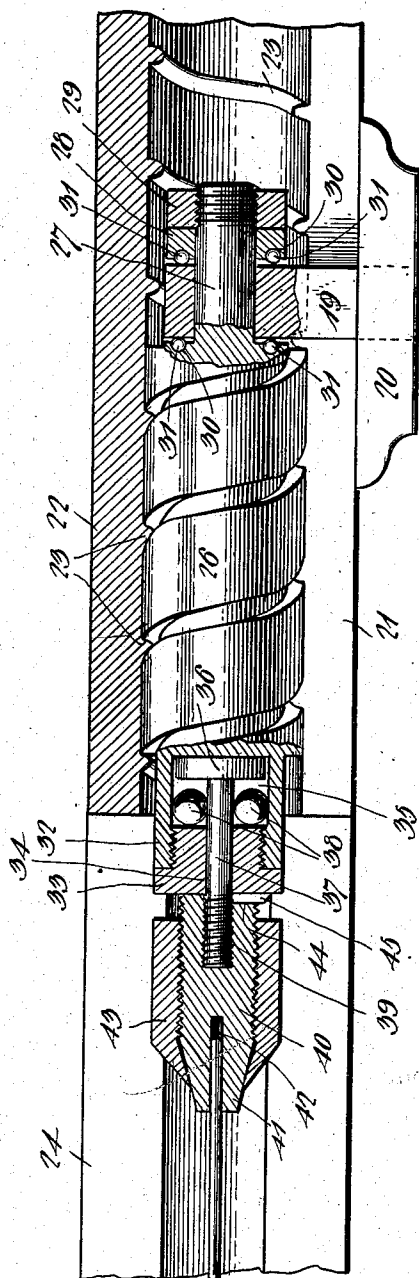
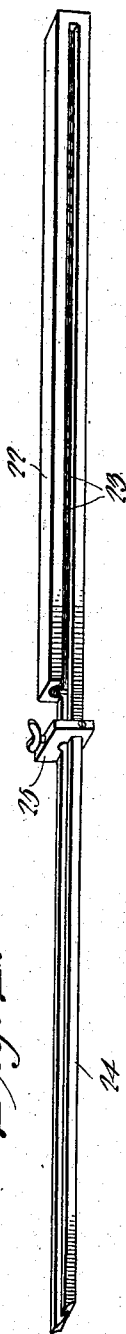


Fig. 3.

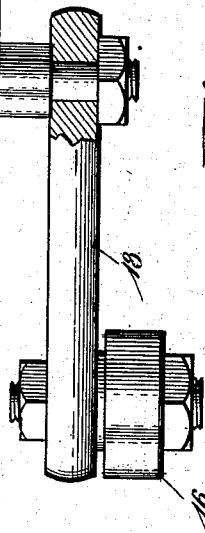
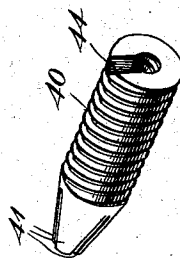


Fig. 5.



Witnesses

J. F. Lamberton.
Chas. S. Hoyer.

E. H. Odom,

by

C. A. Snow & Co.
Attorneys

Inventor

UNITED STATES PATENT OFFICE.

ERASTUS HOWARD ODOM, OF MARIETTA, GEORGIA.

CANE-WEAVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 729,958, dated June 2, 1903.

Application filed September 23, 1901. Serial No. 76,249. (No model.)

To all whom it may concern:

Be it known that I, ERASTUS HOWARD ODOM, a citizen of the United States, residing at Marietta, in the county of Cobb and State of Georgia, have invented a new and useful Cane-Weaving Machine, of which the following is a specification.

This invention relates to a cane-weaving machine, and has particular reference to means for mechanically and automatically inserting or threading the diagonal cane-strands through the woven warp and weft strands to produce the ordinary open-mesh cane weave, and thereby overcome and dispense with the tedious and slow manual operations now commonly employed to arrive at the same result and also cheapen the cost of manufacture of cane fabrics and expedite the production of the same.

In the drawings, Figure 1 is a top plan view of a simple form of a diagonal-strand-threading attachment embodying the principle of the invention. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal vertical section, broken away in parts, of the principal part of the mechanism for impelling and withdrawing the diagonal-strand-holding device. Fig. 4 is a detail perspective view of the part of the mechanism which carries and operates the device for operating the diagonal-strand-threading device. Fig. 5 is a detail perspective view of a part of the gripping mechanism for the diagonal-strand-threading device. Fig. 6 is a transverse vertical section taken in the plane of line 6-6, Fig. 2. Figs. 7 and 8 are diagrammatic plan views of the cane fabric, showing the diagonal-strand-threading device in different positions therein and indicating the direction and manner of movement thereof in the forward and rearward strokes. Fig. 9 is a sectional side elevation of the forward extremity of the diagonal-strand-threading device. Fig. 10 is a detail perspective view of the forward extremity of the diagonal-strand-threading device.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates a frame of suitable dimensions and proportions and having opposite pairs of legs 2 and 3, an upper bed 4, and end extensions 5. In suitable bearings

at one side of the frame a drive-shaft 6 is mounted and provided with a belt or other power wheel 7. On opposite ends of the said shaft 6 are bevel-pinions 8, which are in continual mesh with diagonally-arranged face-gears 9, carried by short diagonally-disposed counter-shafts 10, held in suitable bearings in the extensions 5. On the opposite ends of the said shafts 10 eccentrics 11 are secured, one on each shaft, which are provided in each instance with an eccentric-arm 12, connected by a suitable pin or bolt 13 in the slotted end 14 of the T-head 15 of a T-lever 16, the end of the head opposite that to which the eccentric-arm 12 is secured having a weight 17 thereon. The upper end of each lever 16 is movably secured to a connecting-arm 18, as clearly shown by Fig. 3, and this arm 18 is in turn attached to a cross-head 19, carrying a guard 20, the cross-head 19 being disposed in a plane at a right angle to the connecting-arm 18 and longitudinally movable or slidable in a slot 21 in one side of the rear inclosure or boxing 22 of the holder for the device for guiding and operating to thread the diagonal strand through the cane fabric. The inclosure or boxing 22 is formed with a series of regularly-arranged interiorly-located threads 23, extending from end to end thereof, and the said boxing or inclosure and the threads therein have an extent proportionate to the necessary stroke of the device for threading the diagonal strands. Extending forwardly from the lower portion of the boxing or inclosure is a horizontal guide 24, and thereover at a suitable location is applied a guide-clamp 25, which operates to hold the device for threading the diagonal strands in proper relation to the guide and to prevent irregular movement of said device, so as to effect an accuracy in operation of the said strand-threading device.

Within the boxing or inclosure 22 a helically-grooved screw feeder 26 is operatively mounted and has a reduced shank 27 at its rear end, which is loosely engaged by the cross-head 19, and next to the cross-head a sleeve 28 is applied to said shank, and the cross-head and sleeve are held in connected relation by a nut 29, engaging the rear screw-threaded extremity of said shank. In the rear portion of the feeder 26 and the front

face of the sleeve 28 ball grooves or races 30 are formed, and therein are held a series of balls 31, which contact with the front and rear sides of the portion of the cross-head engaging the shank 27. The front end of the feeder is provided with a socket 32, having the interior portion of the front end thereof screw-threaded to receive a closing-cap 33, which is formed with a central bore 34, extending longitudinally therethrough, the inserted portion of the cap being of materially less length than the socket 32 to form a chamber 35, and in the said chamber the disk head 36 of a stem 37, movable through the cap 33, is mounted, and is of such thickness as to be free to have longitudinal movement in the chamber 35 and to contact with balls 38 in said chamber to reduce the friction. The front projected extremity 39 of the stem 37 is screw-threaded, and thereon is removably mounted an elongated clamping-head 40, having conically-tapered yielding jaws 41 at its front extremity, as clearly shown by Fig. 5, the said jaws surrounding a longitudinally-extending bore 42. Over this elongated clamping-head 40 a clamping-sleeve 43 is movably and adjustably mounted and operates to compress the jaws 41 when turned rearwardly over the head and to relax said jaws when moved in a forward direction. The rear end of the head 40, adjacent to the front face of the cap 33, is formed with an angular or V-shaped radial recess 44, the cap 34 having a forwardly-projecting lug or tooth 45 to take into the said recess 44 and cause the head to rotate equally with the feeder when the latter is moved forwardly. This simple form of clutch will be positive in its operation, and on the return movement of the feeder the resistance set up on the device held by the head 40 will draw said head and the shank 37 forward, thereby disengaging the recess 44 from the lug or tooth 45 and permit the head 40 to be drawn backwardly without rotation, the balls 38, against which the disk 36 then engages, avoiding any frictional binding on the said disk which might tend to rotate it and the parts intimately connected thereto.

The device for threading the diagonal strands and firmly clamped in the head 40 is what is known in the art of cane-fabric manufacture as a "needle," and which is clearly shown in Figs. 7, 8 and partially in Figs. 9 and 10 and designated by the numeral 46. The needle in the present instance is mainly in the form of a straight hard-metal or steel rod of suitable dimensions and has an obliquely-deflected eye 47 at the front end, which is disposed at such an angle by predetermined calculation as to regularly thread itself under and over the intersecting weft and warp strands of a cane fabric prepared for the insertion of the diagonal strands by a weaving-machine especially provided for the purpose. As clearly shown by Fig. 1, the boxing or inclosure 22, guide 24, and oper-

ating mechanism for the feeder are arranged in diagonal relation to the longitudinal extent of the bed 4, and a separate set of similar mechanisms are disposed at each end of the machine, so that when the partially-completed cane fabric has traveled over the bed a suitable distance the opposite diagonal strands necessary to be inserted can be placed in position during one movement of the cane fabric over the bed. The guides 24 extend under the plane of the cane fabric at reverse angles to each other, and their free extremities project beyond the outer side of the fabric and lie adjacent to diagonal-strand-feeding devices, which will now be explained.

At the center of one side of the machine are opposite pairs of vertically-aligned rollers 48 and 49, which are held by studs 50, projecting horizontally from uprights 51 and having a clear space between the inner sides thereof. The lower rollers 48 have central circumferential grooves 52, one in each, and the upper rollers 49 are each provided with a circumferential rib or flange 53, which fits in the groove of the roller below, enough space being allowed between the ribs 53 and bottom of the groove 52, as clearly shown by Fig. 6, to permit a diagonal cane-strand to pass between the rollers and yet be held tight enough to prevent slipping thereof. The diagonal cane-strands are manually supplied to these feeding-rollers 48 and 49, and the stud 50 is continuous in relation to the lower grooved rollers and between the uprights 51 has a ratchet-wheel 54 keyed thereon, which is engaged by a pawl 55, carried on the upper end of a link 56, which is connected to the upper short arm 57 of a bell-crank lever 58, having its depending lower longer arm 59 free for contact with an elongated wiper 60, secured on a counter-shaft 61, having bearings in the lower central portion of the frame and extending transversely under the bed, the said counter-shaft having on its opposite end a bevel-pinion 62, meshing with a corresponding pinion 63 on the drive-shaft 6. This mechanism is provided for the purpose of a step-by-step feed and for actuating the lower rollers 48, and it will be seen that as the wiper 60 rotates (see Fig. 2) the lower arm 59 of the bell-crank lever 58 is moved and the upper shorter arm of said lever is elevated, thereby pushing the pawl 55 upwardly and rotating the ratchet-wheel 54, and thus cause the rollers 48 to similarly rotate and draw the strands inwardly toward the cane fabric arranged over the bed. The pawl then returns to its initial position by gravity, or a spring may be used to assist in resetting it in normal position ready for a successive feeding stroke, the pawl slipping over the ratchet-wheel in its downward movement. The length of the needle 46 and the forward movement of the feeder 26 for actuating the same are so proportioned and timed that when the needle shall have passed through the partially-completed cane fabric the eye 47 thereof will be disposed close to

the inner portions of the rollers 48 and 49 directly in line with the space allowed for the feeding of the cane-strands therethrough, and the spiral grooves of the feeder 26 will be so arranged that when the needle-eye reaches the position just explained it will be given a half-turn to longitudinally expose the opening therein to receive the extremity of the inwardly-fed cane-strand therethrough, as clearly shown by Fig. 6. When the needle is thrust forward by the feeder, the projection 45 is in engagement with the recess 44 of the chuck 40, and this relation exists when the eye 47 of the needle has received the end of the cane-strand. When the feeder starts on its return movement, it moves very steadily and has at the same time a rotary motion. This rotary motion is imparted to the chuck 40 and rotates the same about a quarter of a revolution before the projection 45 has become disengaged from the recess 44. It will be seen that the needle leaves and opens up the way for the introduction of the diagonal strand by first being properly threaded through the warp and weft strands. In threading the needle 46 through the warp and weft strands it describes the movement shown by dotted arrow lines in Fig. 7 and first passes under the adjacent weft-strand and over the next or adjacent set of warp-strands, and so on until it has traveled its full course or passed entirely across the partially-completed cane fabric. The threads or ribs 23 of the boxing or inclosure 22 impart a rotary movement to the feeder by engaging the grooves of the latter, and this rotary movement is imparted to the needle, and owing to the particular oblique position of the eye 47 of said needle said eye alternately passes under the weft-strands and over the warp-strands without tearing the latter loose or otherwise disarranging them. The several parts are so proportioned and move with such regularity that the operation of the needle in the manner set forth will be reliably carried on in correspondence to the size of the mesh of the fabric operated upon, and it is obvious that needles will be provided having oblique eyes of such length and angle as to operate in conjunction with fabrics having different sizes of mesh or made up of different widths and number of warp and weft strands.

It will be understood that in describing the operation of one needle and the feeder therefor the same is equally true of and applies to the other needle and operating mechanism therefor, and this dual-needle provision will materially facilitate and expedite the insertion of diagonal strands in cane fabrics and also greatly reduce the cost of manufacture of said fabrics.

At opposite ends of the bed 4 drums 64 and 65 are located and provided with suitable teeth 66 to take into the mesh of the cane fabrics to regularly feed the same over the bed. Below the drum 64 a carrying roll or reel 67 is located and rotatably held by a part of the

frame and from which the cane fabric is fed, the said roll or reel being supplied with the fabric from the weaving-machine. Under the drum 65 is a winding roll or reel 68, supported by a part of the frame in a manner similar to the roll or reel 67, both of the rolls 67 and 68 preferably having the same capacity, so that the fabric unwound from the roll or reel 67 may be completely wound upon the roll or reel 68. It is necessary that the drums 64 and 65 have a similar step-by-step feed motion imparted thereto, and for this purpose the shaft 69 of each is projected outwardly from the same side of the bed at which the rollers 48 and 49 are located, and to said shafts 69 swinging arms 70 are secured and movably carry pawls 71, which mesh with ratchet-wheels 72, keyed to the said shafts 69. The lower ends of the swinging arms 70 are movably attached to an oscillating lever 73 in advance of a depending fulcrum extension 74, extending downwardly from the adjacent side portion of the bed. To the center of the lever 73 the upper slotted end 75 of a depending striker 76 is secured, the lower end of the striker being in the path of movement of and adapted to be struck by the upper end of a wiper 77, also secured to the shaft 61 at an angle differing from that of the wiper 60, so as to have an advance movement or operate ahead of the said wiper 60. The striker 76 is fulcrumed by a bolt 76^a on the extension 74, and the slot in the upper end avoids sudden jar of the lever 73. The wiper 77 operates on striker 76 and through the lever 73 causes a simultaneous operation of the ratchet-wheels 72. After each operation the lever 73 returns by gravity to its lowest position. It will be understood that this feed of the fabric will be in timed relation to the operation of the needle, a movement of the fabric being effected immediately after the needles have completed their operation of drawing the diagonal strands through the fabric. The starting end of the fabric has wires 78 resiliently connected to the warp-strands thereof and which are first wound on the roll or reel 68, and at the beginning of the operation only one needle will be fed with diagonal strands, because the fabric will not have reached a position to be similarly operated upon by the remaining needles; but after the fabric has become properly positioned over the needle that has remained idle as to its threading operation said needle will be supplied with the diagonal strands and one feeder can readily supply the strands to the rollers 48 and 49, and the operation of threading the reversely-positioned diagonal strands may be rapidly carried on. The length of stroke of the needle at either end will be controlled by the adjustment of the eccentric-arm 12 in relation to the slotted end of the T-head of the lever 16, and the weight 17 operates as a counterpoise to overcome any tendency toward dead-center and irregular movement of the feeder.

The general speed of the mechanism will

be properly governed through the guide-shaft 6 in accordance with the work to be performed, and in some instances changes in the proportions, size, form, and minor details of the several parts may be resorted to without departing from the principle of the invention.

Having thus described the invention, what is claimed as new is—

1. In an apparatus of the class described, a rotatable needle, means for traveling the needle across and through the fabric, means for threading the needle, means for partially rotating said needle immediately after the threading operation, and means for withdrawing the needle without rotating the same.

2. In an apparatus of the class described, a needle-guide adapted to extend under the fabric, a supporting and guiding device having a helical thread, a helically-grooved feeder adapted to said thread, means for imparting longitudinal movement to said feeder, a needle-holder, an automatic clutching mechanism between the needle-holder and feeder, and a needle carried by the holder.

3. In an apparatus of the class described, a needle-actuating device comprising a threaded carrier, a helically-grooved feeder adapted to the threads of the carrier, means for imparting reciprocatory motion to the feeder, a needle-holding chuck, and a clutch for unit-

ing the chuck and feeder during the thrusting movement of the feeder and permitting the separation of the same during the reverse movement of said feeder.

4. In an apparatus of the class described, a threaded carrier, a helically-grooved feeder adapted thereto, means for imparting reciprocatory movement to the feeder, a needle-carrying chuck having a clutching groove or notch, and a tooth carried by the feeder for engaging said groove or notch.

5. In an apparatus of the class described, a threaded carrier, a grooved feeder adapted thereto and having a chambered front end, antifriction-balls in said chamber, a needle-chuck having a rearwardly-extending stem, a disk carried by the stem and adapted to engage the balls to permit rotative movement of the feeder independent of said chuck, and clutching-faces between the forward end of the feeder and the rear end of the needle-chuck.

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

ERASTUS HOWARD ODOM.

Witnesses:

W. M. HERRIN,
R. H. HUTCHESON.