

July 28, 1959

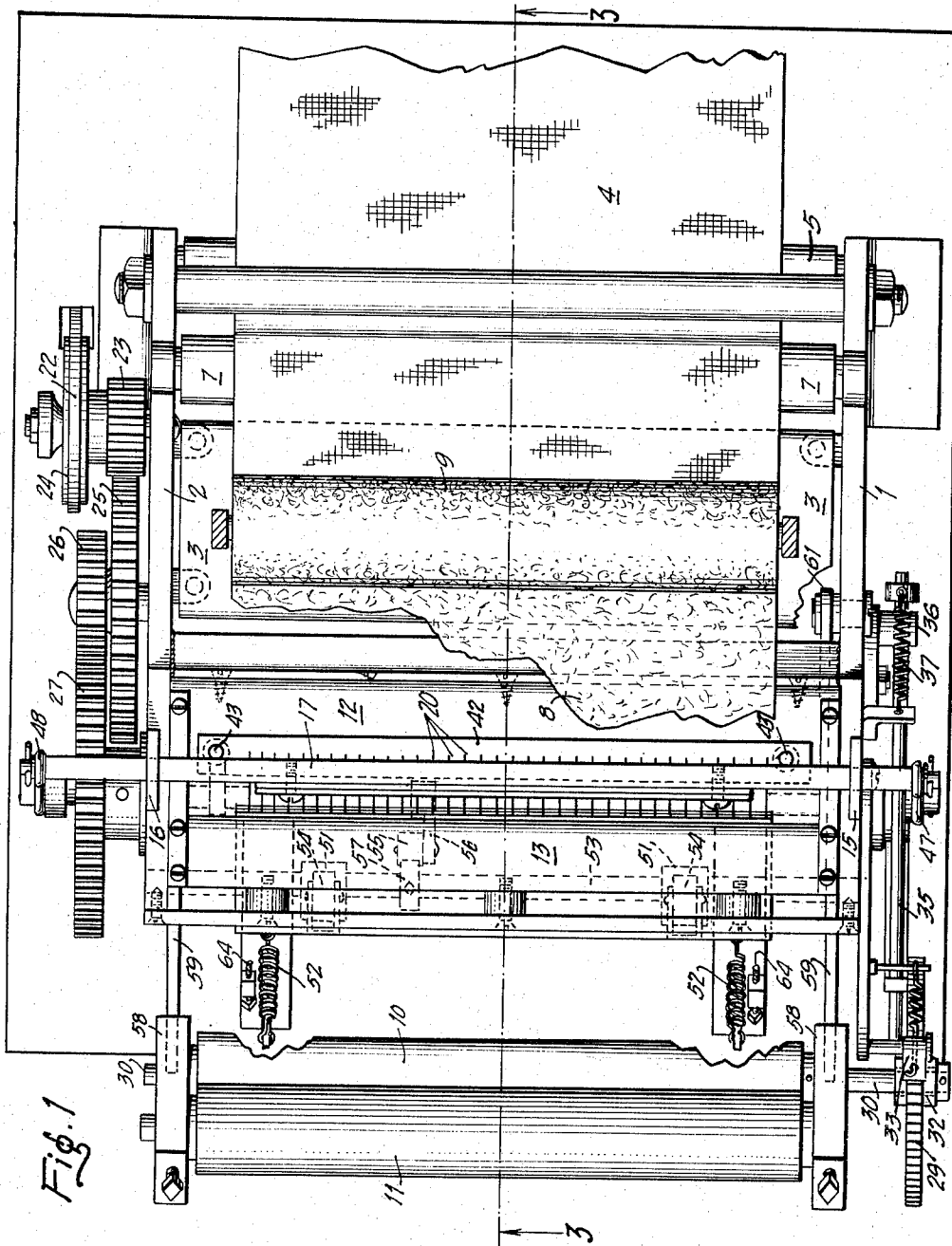
W. P. COSTELLO

2,896,302

NEEDLE LOOM

Filed Dec. 12, 1955

4 Sheets-Sheet 1



INVENTOR.

BY Walter P. Costello

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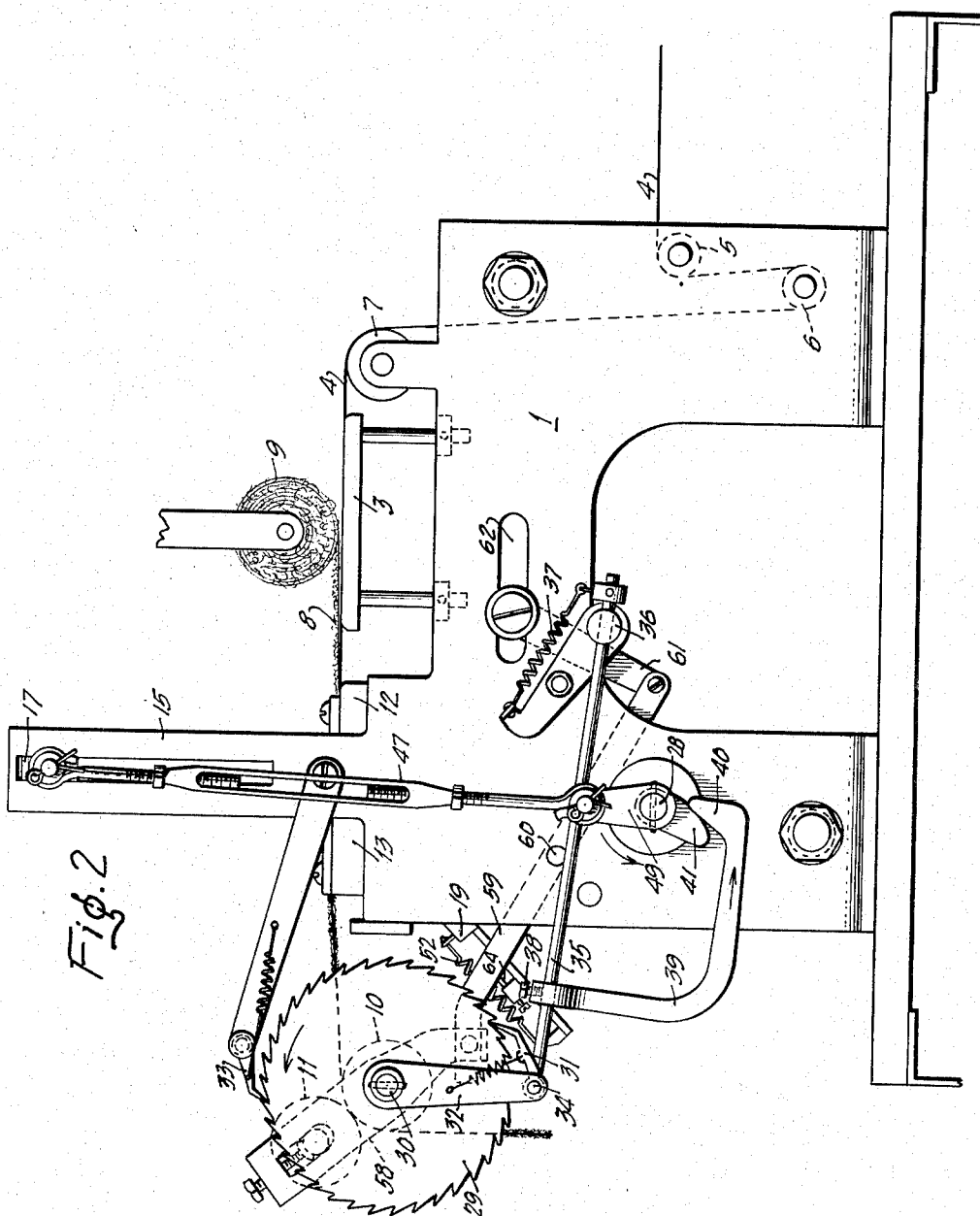
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4 Sheets-Sheet 2



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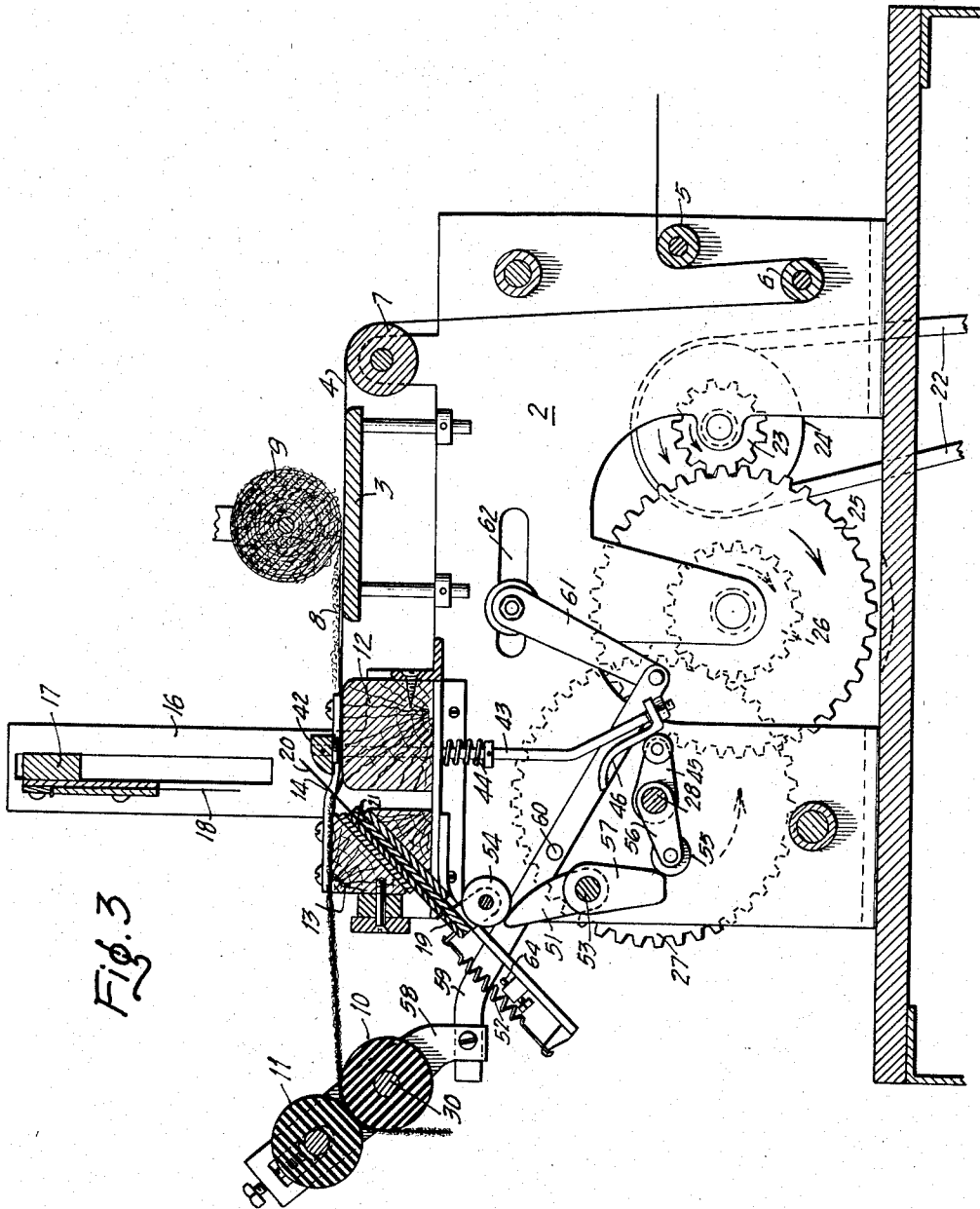


Fig. 3

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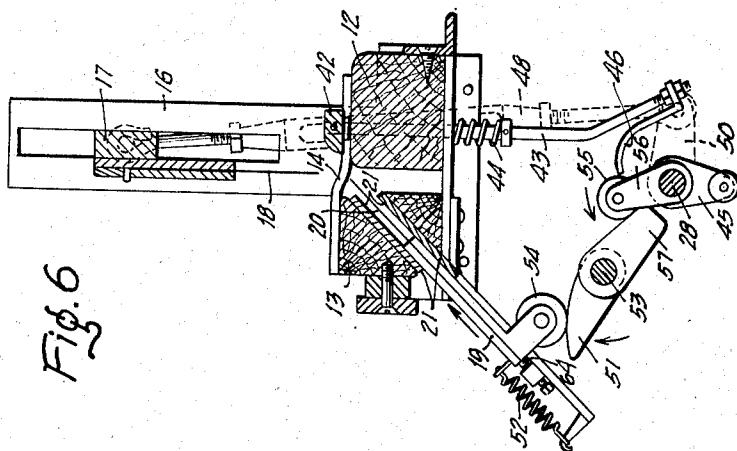


Fig. 6

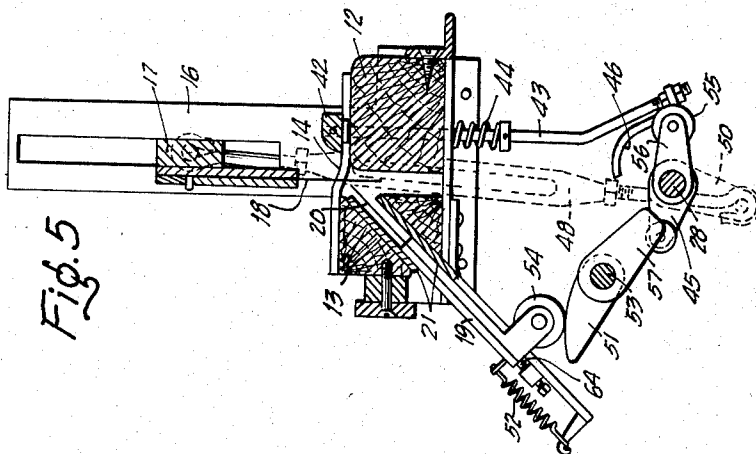


Fig. 5

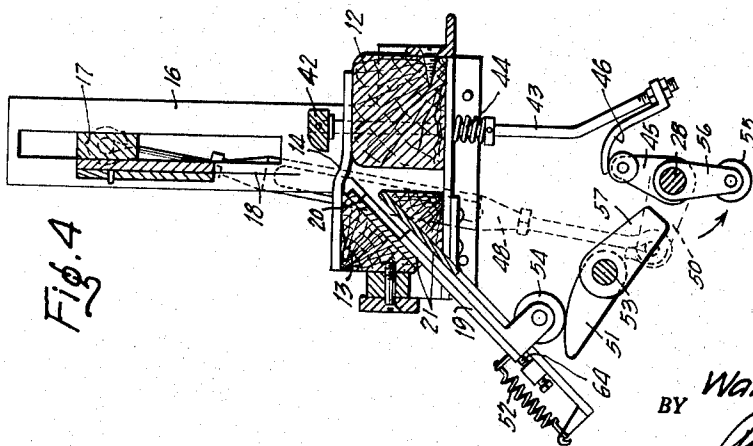


Fig. 4



Fig. 7

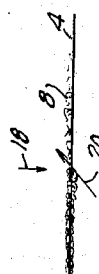


Fig. 8

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2,896,302

NEEDLE LOOM

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Application December 12, 1955, Serial No. 552,329

8 Claims. (Cl. 28—4)

My invention relates to needle looms and particularly to looms of this type in which the base fabric is needled from both sides thereof but in which a stuffing material is applied to only one side of the base fabric.

Where a fibrous stuffing material is needled into one side of a base fabric the material is carried into the fabric by needles which reciprocate in a direction substantially normal to the base fabric with the result that they do not interlock too well with the base fabric and an appreciable proportion thereof project through the other side of the fabric.

The principal objects of my invention are to provide a needle loom in which the stuffing material will be carried into the base fabric by the usual arrangement of needles but in which those fibers or portions of the stuffing material which were carried entirely through the base fabric will be forced back into the base fabric by needles disposed on the other side of the base fabric.

Another object is to provide a loom in which the stuffing material, instead of being carried into the base fabric by needles which are reciprocating in a plane substantially normal to said fabric, may be carried in by needles which are reciprocating in a plane angularly disposed to the base fabric, or at least to that portion thereof which is penetrated by the needles.

Another object is to provide a needle loom in which the needles operating on the opposite side of the fabric from which the stuffing material is needled will engage the fibers and portions of the stuffing material which project through said opposite side of the base fabric in a direction which will lay them back in the fabric in a zone through which the needles which are forcing the stuffing material into the base fabric will pass on their next movement into the fabric.

I accomplish these objects by the mechanism described below and illustrated in the accompanying drawings, in which—

Fig. 1 is a top plan view of my loom;

Fig. 2 is a right hand side view of the loom as shown in Fig. 1 with certain details omitted;

Fig. 3 is a section of Fig. 1 in the plane 3—3;

Figs. 4, 5 and 6 are sections similar to Fig. 3 showing the needles in various positions;

Fig. 7 is a diagrammatic illustration of the operation of the needles on the upper beam; and

Fig. 8 is similar to Fig. 7 showing the operation of the needles on the lower beam.

Referring to the drawings, my loom comprises a frame having upstanding side elements 1 and 2. Extending transversely of the frame and supported on the side members thereof is a plate 3 over which the base fabric 4 moves into the loom. As illustrated, the fabric 4 is drawn from a roll or reel, not shown, around the rollers 5, 6 and 7, but it will be apparent, as the description proceeds, that the invention may be applied as well to an endless base fabric. A layer of the stuffing material 8 is placed upon the top of the base fabric from the roll 9. The fabric is pulled through the loom by the roller 10, which is turned

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by means described below, and passes through the pinch of the rollers 10 and 11.

Between the plate 3 and the rollers 10 and 11 the fabric with the layer of stuffing material thereon passes over and is supported by a first transversely extending beam 12; and spaced from the beam 12, is a second supporting beam 13 having its upper surface at a somewhat higher elevation than that of the beam 12, so that the fabric is inclined upwardly, in the direction in which it advances, in the zone between said beams, as shown at 14.

Mounted on the side frames 1 and 2 are slotted bearings 15 and 16 in which the needle beam 17 having a plurality of needles 18 therein is adapted to reciprocate to move the needles 18 vertically downward in the zone between the supporting beams 12 and 13.

Beneath the fabric is a second needle beam 19 having a plurality of needles 20 therein which may be said to lie in a plane angularly disposed to the plane of the needles 18. The beam 19 is adapted to reciprocate in a bearing 21 in the beam 13. While the drawings show only one row of needles in each beam, it is to be understood that additional needles disposed in rows, or otherwise, may be used.

The mechanism which advances the fabric through the loom and actuates the various elements which control the operation of the needles is driven from a motor or other source of power (not shown) through the belt 22 (see Figs. 1 and 3). A pinion 23 on the shaft of pulley 24 drives a gear 25 and the pinion 26, which is fixed to the same shaft as the gear 25, drives the gear 27 on shaft 28.

Referring more particularly to Fig. 2, the fabric is advanced through the loom, at intervals between the operations of the needle beams, by the operation of the ratchet wheel 29 which is fixed to the shaft 30 carrying roll 10 and is turned counter-clockwise by the pawl 31 on arm 32 rotatably mounted on the shaft 30. Rotation of the ratchet wheel 29 in a clockwise direction is prevented by the pawl 33. The arm 32 is pivotally connected at 34 to the rod 35 which is slidable through the stub shaft 36, and the pawl 31, arm 32 and rod 35 are normally held in the position shown in Fig. 2 by means of the spring 37. Adjustably secured to the rod 35 by means of the set-screw 38 is a depending lever 39 having an upstanding portion 40 at its free end which cooperates with the cam 41 as a follower; the cam 41 being secured to the shaft 28 carrying gear 27. Thus, at every turn of the shaft 28 the cam 41 cooperating with the follower 40 on the lever 39 pulls the rod 35 to the right, as viewed in Fig. 2, causing the pawl 31 to turn the ratchet wheel 29 the desired number of teeth to pull that portion of the fabric which has just been penetrated by the needles at least partially out of the path of the needles and advance the next adjacent zone of the fabric into a position to be penetrated by the needles. The distance which the fabric is advanced may be adjusted by moving the lever 39 on the rod 35.

Referring now more particularly to Figs. 3 and 7, in order to hold the fabric on the beam 12 during the operation of the needles, a transversely extending bar 42, which is mounted on vertically extending rods 43 is normally held in engagement with the fabric and presses the fabric on the beam by means of the compression springs 44. To release the fabric when the roll 10 is turned by the ratchet wheel, cams 45 are fixed to shaft 28 and cooperate with followers 46 which are secured to the rods 43.

Referring now more particularly to Figs. 2, 4, 5 and 6, the needle beam 17 is reciprocated by the turnbuckles 47 and 48 which are pivotally secured at their upper ends to said needle beam, and at their lower ends to the cranks 49 and 50, respectively, which are secured to the shaft 28. The needle beam 19 is reciprocated in timed relation to the beam 17 by means of the cams 51 and the tension

springs 52. The cams 51 are fixed to the shaft 53 and cooperate with the rollers 54 secured to the beam 19. The shaft 53 is oscillated by the springs 52 and by the roller 55 on cam 56 (see Fig. 6) on shaft 28 which cooperates with the arm 57 on shaft 53.

The shafts of the rollers 10 and 11 are mounted in the arms 58 which are secured to the bars 59 pivoted to the frame at 60 (see Figs. 2 and 3). The other ends of the bars 59 are pivotally connected to the arms 61, the other ends of which are adjustably fitted in the slots 62 so that by clamping the upper ends of the arms 61 in various positions in said slots the rolls 10 and 11 may be fixed at the desired elevation.

By reference to Figs. 4, 5, 6 and 3, in the order named, the operation of the needle beams will be clear. In Fig. 4 the needle beam 17 is about to be pulled downwardly by means of the cams 50 and the turnbuckles 47 and 48 pulled to the position shown in Fig. 5. The beam 17 is then retracted and the roller 55 is about to turn the shaft 53 in a clockwise direction which will move the rollers 54 on beam 19, by the cooperation of the cam 51 on shaft 53, to the position shown in Fig. 3, at which point the cam 51 is about to be released from the rollers 54 so that the beam 19 will be retracted to the position shown in Figs. 4, 5 and 6 by means of the spring 52. As the beam 19 is retracted, the cams 45 will cooperate with the followers 46 on rods 43 which will cause the bar 42 to be raised out of contact with the fabric, at which time the cam 41 (see Fig. 2) will begin to move the rod 35 to the right and move the ratchet wheel 29 by means of the pawl 31 through the desired angle to pull a new zone of the fabric into position to be penetrated by the needles.

By reference to Figs. 7 and 8 it will be apparent that one of the great advantages of my machine arises from the fact that the needles in the lower beam push those fibers and portions thereof, such as shown at 63, which are pushed entirely through the base fabric by the needles, back into the fabric at a different angle from that in which they were pushed into the fabric by the needles 18 thus insuring a better interlocking of the stuffing material with the base fabric.

The extent to which the needles in beam 17 penetrate the base fabric may be varied by means of the turnbuckles; and the extent to which the needles in beam 19 penetrate the base fabric may be varied by changing the cam 51.

By raising the rollers 10 and 11 so that the base fabric is not supported on the beam 13 during the operation of the needles, or at least when they first strike the base fabric, a softer needled product is obtained. This also changes the angles at which the needles strike the fabric.

While I have described my invention in its preferred embodiment, it is to be understood that the words which I have used are words of description rather than of limitation and that changes, within the purview of the appended claims, may be made without departing from the true scope and spirit of my invention in its broader aspects.

What I claim is—

1. A needle loom comprising a first needle beam having a plurality of needles therein, and a mounting therefor in which said beam is adapted to reciprocate; a second needle beam having a plurality of needles therein and a mounting therefor in vertically spaced relation to the mounting of said first needle beam in which said second needle beam is adapted to reciprocate; means between said beams for supporting, at each side of the zone penetrable by said needles, a base fabric having a layer of

stuffing thereon; means for holding said fabric down on one of said supporting means; means for reciprocating said first beam to drive said stuffing material into said fabric; means for reciprocating said second beam to drive back into said fabric any stuffing material carried there-through by the needles in said first beam; and means for releasing said fabric holding means following a reciprocating movement of said second beam, advancing said fabric to bring another portion thereof into the zone penetrable by said needles, and restoring said fabric holding means to its fabric holding position.

2. The structure set forth in claim 1 together with means for varying the extent of the penetration of said needles into said fabric.

3. The structure set forth in claim 1 together with means for varying the angular relation of said needles and said fabric in the needle penetrable zone of said fabric.

4. The structure set forth in claim 1 together with means for varying the extent of the penetration of said needles into said fabric; and the angular relation of said needles and said fabric in the needle penetrable zone of said fabric.

5. In a needle loom, the combination with means for moving a base fabric having a layer of stuffing material thereon substantially horizontally through said loom; of a first needle beam having a plurality of needles therein disposed above the path of said fabric through said loom, and a mounting therefor in which said needle beam is adapted to reciprocate to drive said needles downwardly through said stuffing material and into said base fabric; a second needle beam having a plurality of needles therein disposed below said path, and a mounting therefore in which said second needle beam is adapted to reciprocate to drive said needles upwardly into said base fabric; means for reciprocating said needle beams in timed relation to each other, two, parallel disposed, transversely extending beams for supporting said fabric in longitudinally spaced zones thereof on opposite sides of the paths of said needles and at different elevations; means for holding said fabric in contact with the beam disposed in advance of the path of said needles during their fabric-penetrating movements, whereby that portion of said fabric in the path of said needles will be inclined to the horizontal; and means for releasing said holding means and actuating said moving means, following the reciprocating movements of said needle beams for advancing said fabric in said loom.

6. The structure set forth in claim 5 together with means for varying the extent of the penetration of said needles into said fabric.

7. The structure set forth in claim 5 together with means for varying the angular relation of said needles and said fabric in the needle penetrable zone of said fabric.

8. The structure set forth in claim 5 together with means for varying the extent of the penetration of said needles into said fabric; and the angular relation of said needles and said fabric in the needle penetrable zone of said fabric.

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