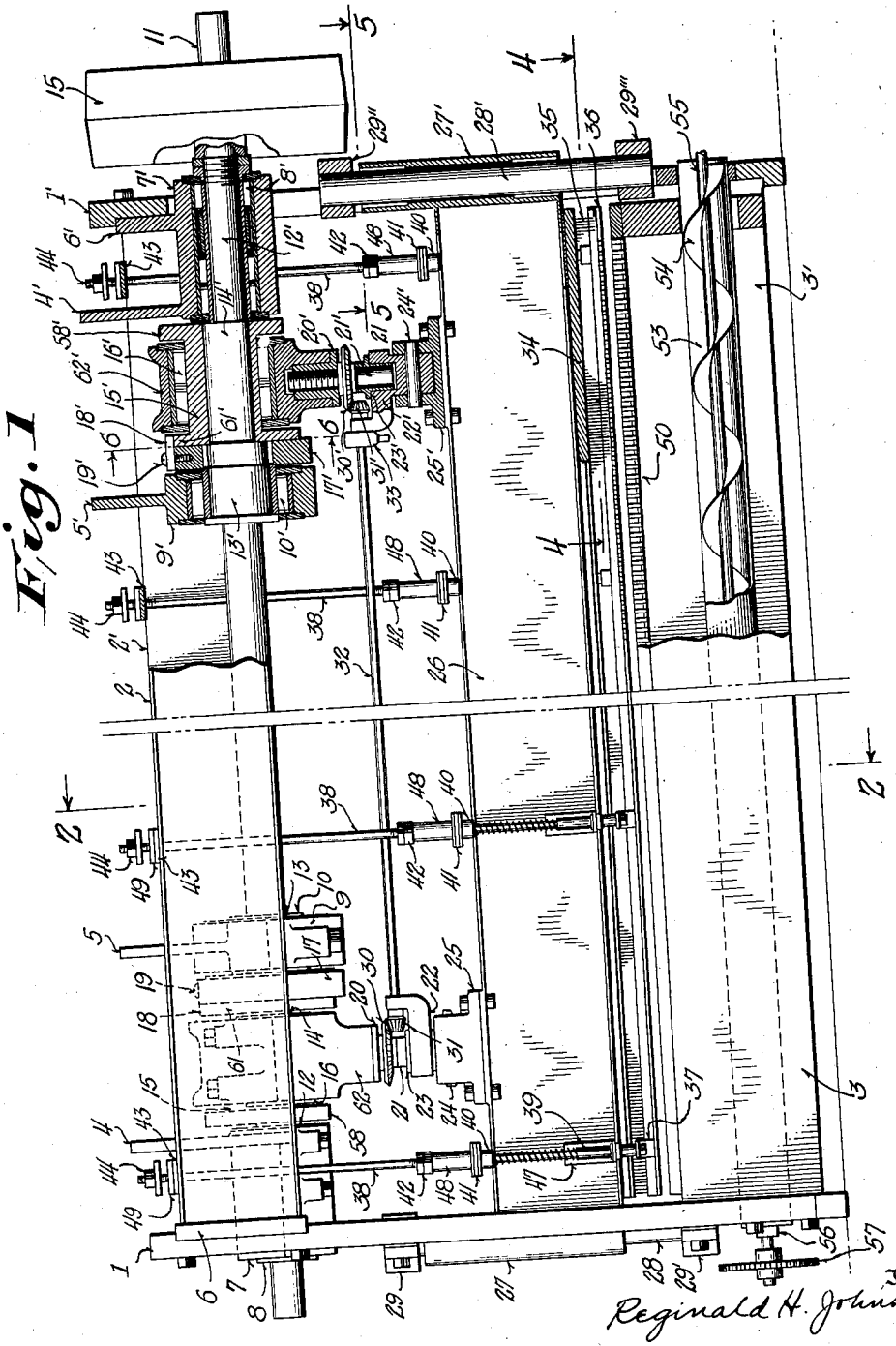
June 11, 1935. R. H. JOHNSON 2,004,725

FELT PUNCHING LOOM

Filed July 29, 1932 3 Sheets-Sheet 1

Fig. 1



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FELT PUNCHING LOOM

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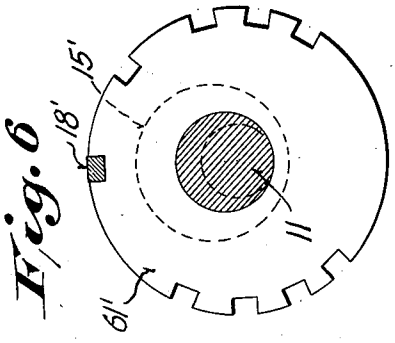


Fig. 6

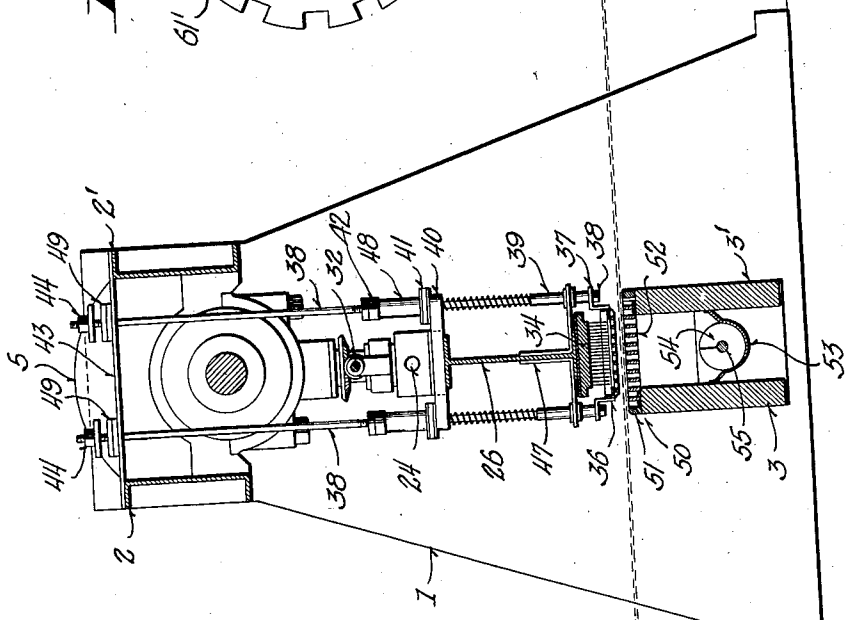


Fig. 2

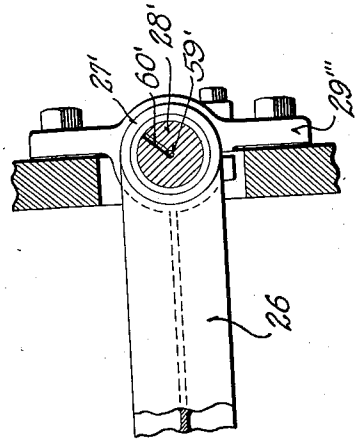


Fig. 5

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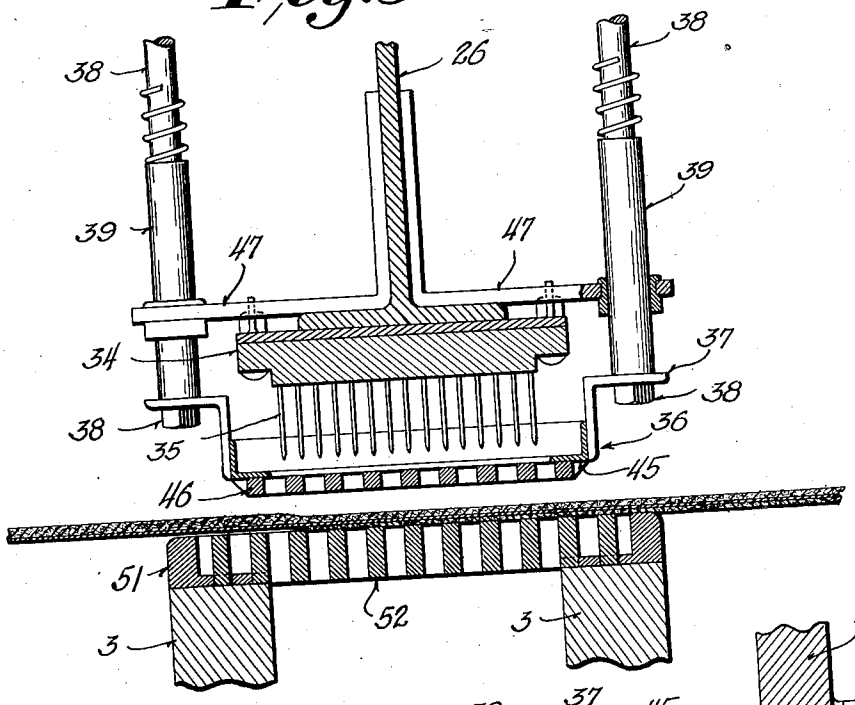
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FELT PUNCHING LOOM

Filed July 29, 1932 3 Sheets-Sheet 3

Fig. 3



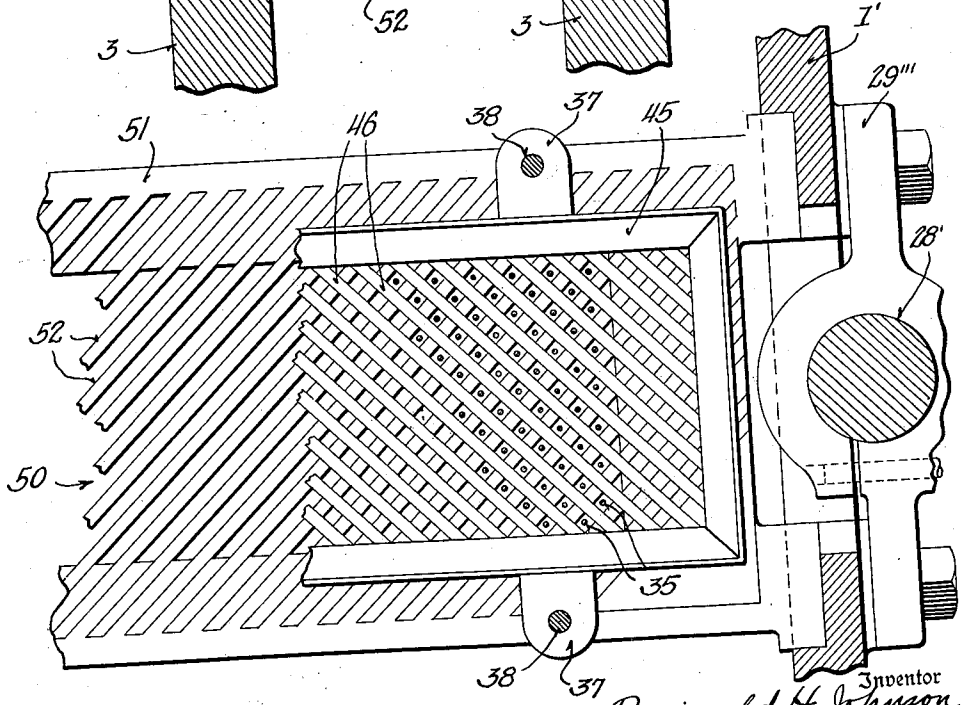


Fig. 4

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2,004,725

UNITED STATES PATENT OFFICE

2,004,725

FELT PUNCHING LOOM

Reginald H. Johnson, Maplewood, N. J., assignor to American Hair & Felt Company, Chicago, Ill., a corporation of Delaware

Application July 29, 1932, Serial No. 625,891

2 Claims. (Cl. 28—4)

This invention relates to machines for forming punched felt and it resides in a new form of punching loom comprising novel driving means permitting regulation of the amplitude of the needling oscillation, novel lifting means for imparting accommodating movements to the stripper frame, improved gibs for the needling beam and a novel arrangement below the bolster for removing dirt resulting from the operation of the machine; the novel organization and coaction of said parts resulting in a new ease, rapidity and economy in the production of punched felt as well as a new flexibility with respect to the economic production of widely varying weights of felt products.

When run at higher speeds the looms known prior to this invention have been subject to destructive vibration due to faulty communication of the oscillating movement of the drive shaft to the beam supporting the needle board. The supporting and guiding of the beam has also been faulty in the larger sizes of such machines resulting in deflections of such magnitude that needles are frequently broken and due to unequal punching a thoroughly unsatisfactory quality of work is produced.

The form of the machine of this invention, however, is especially adapted for construction in large dimensions. Machines designed in accordance herewith may be constructed in sizes quite capable of producing uniformly punched felt in widths exceeding 130 inches and having weights exceeding 24 ounces per square foot. The manufacture of material in widths and weights approaching the above has not been heretofore accomplished. The increase in size with its attendant economy is an advantage of the machine of this invention but features of greater importance are those which enable the loom of this invention to operate with equal facility upon any weight of material desired and to do the same with greatly improved smoothness, convenience and speed and at the same time to create a product of greater uniformity and higher quality.

Through the accompanying drawings and the description which follows the construction of a typical machine of this invention and the manner of operating the same will be pointed out.

In the drawings, Fig. 1 represents a front view of a machine built in accordance with this invention, the same being shown broken away in places to reveal sections of the parts;

Fig. 2 represents a section of the machine looking endwise thereof at the plane 2—2 shown in Fig. 1;

Fig. 3 represents an enlarged sectional view of a portion of the machine shown in Fig. 2;

Fig. 4 represents a partial plan view looking downwardly upon the stripper grid at the plane 4—4 shown in Fig. 1;

Fig. 5 represents a detail of the gib looking downwardly upon the same at the plane 5—5 of Fig. 1, and

Fig. 6 represents a detail end view of the eccentric sleeve as seen at plane 6—6 of Fig. 1.

Referring to Fig. 1, the machine is shown mounted in a frame comprising standards 1 and 1' rigidly joined together near the top by a box-like beam formed of channel members 2 and 2' and near the bottom by the bolster chairs 3 and 3', the latter being shown more clearly in Fig. 2. Secured between the channel members 2 and 2' as by welding are the webs 4, 4', 5 and 5'. The ends of the channel members 2 and 2' are rigidly secured together by the end pieces 6 and 6'. Integrally formed with the end pieces 6 and 6' and the spacing webs 4 and 4' are the bearing caps 7 and 7' enclosing the main bearings 8 and 8'. Rigidly secured to web members 5 and 5' are bearing caps 9 and 9' enclosing intermediate main bearings 10 and 10'. The four main bearings 8, 8', 10 and 10' are arranged in axial alignment, and within the same is rotatably supported, the main shaft 11, the latter having bearing faces 12, 12', 13 and 13' and eccentric faces 14 and 14'. Shaft 11 is driven through suitable driving means such as pulley 15 by a source of driving energy not shown. Mounted upon eccentric faces 14 and 14' closely fitting the same but capable of turning thereon are the eccentric sleeves 15 and 15' having slotted flanges 61 and 61'. The eccentric sleeves 15 and 15' are provided with external bearing surfaces upon which follower bearings 16 and 16' are mounted. Keyed to shaft 11 to turn therewith are the driving disks 17 and 17', the same being provided with locking bars 18 and 18' secured to said disks by screws 19 and 19'. The slotted flanges 61 and 61' are placed adjacent the driving disks 17 and 17', the slots in the flanges being capable of registry in a plurality of positions with locking bars 18 and 18'. Thus by removing screws 19 and 19' and locking bars 18 and 18' and by rotating shaft 11, a plurality of effective eccentricities of the bearing faces of sleeves 15 and 15' may be obtained and by placing locking bars 18 and 18' into one or another of the slots in the flanges 61 and 61' and locking the same in position with screws 19 and 19', any one of a plurality of adjustments may be preserved.

Surrounding bearings 16 and 16' are the followers 62 and 62', the same having depending tubular portions secured to and enclosing female threaded members 20 and 20'. Engaging the threaded members 20 and 20' are adjusting screws 21 and 21', the same being rotatably secured to jack heads 22 and 22' by shoulder sleeves 23 and 23'. Jack heads 22 and 22' bear wrist pins 24 and 24', the same being pivotally mounted in wrist sockets 25 and 25'. Wrist sockets 25 and 25' are secured to a beam 26, the latter bearing on its outer ends tubular guide members 27 and 27'. The tubular guide members 27 and 27' are slidably mounted upon vertical cylindrical gibs 28 and 28' which in turn are securely fastened to standards 1 and 1' by jaw supports 29, 29', 29'' and 29'''. When the crank shaft 11 is rotated, the connecting rods including the followers 62 and 62' impart to the beam 26 a vertical oscillatory movement the amplitude of which may be varied at will through the adjustment of eccentric sleeves 15 and 15'.

The machine of this invention is also provided with means for adjusting the location of the median about which the beam 26 oscillates. The threaded members 21 and 21' have keyed thereon to rotate therewith beveled gears 30 and 30' which mesh respectively with beveled pinions 31 and 31'. The beveled pinions 31 and 31' are secured to connecting shaft 32, the latter being adapted to rotate within projections of jack heads 22 and 22'. A ratchet handle 33 of any convenient form is mounted upon shaft 32 so that the same may be rotated by hand. In rotating shaft 32, threaded members 21 and 21' are caused to rotate and to alter the vertical height of the beam 26 or more specifically the degree of approach between beam 26 and followers 62 and 62'.

The needling mechanism proper comprising the needle board, the stripper grid and the bolster is best described by referring to Figs. 2, 3 and 4 in conjunction with Fig. 1. Secured to the lower portion of beam 26 is the needle board 34 bearing a plurality of downwardly extending needles 35. Suspended below the needle board 34 is the stripper grid 36 having openings therein to accommodate the passage of needles 35 and being formed of the frame 45 and bars 46 best shown in Fig. 4. Stripper grid 36 is provided with a plurality of brackets 37 which engage rod supports 38. Rods 38 pass upwardly through guide bushings 39 which are slidably secured to beam 26 by means of brackets 47. The rods then pass upwardly through lifting arms 40 which are mounted upon and secured to the beam 26. Above the lifting arms 40 and loosely fitted upon the rods 38 are the resilient buffer plates 41 and the adjusting collars 48. The rods 38 have threaded portions in the vicinity of the collars 48 upon which threaded portions are mounted lock nuts 42. The rods 38 then extend upwardly between the channel members 2 and 2' and through guide members 43 which are secured to the channel members 2 and 2'. Upon the upper extremities of rods 38 are mounted limiting nuts 44 and between said limiting nuts and guide supports 43 are inserted resilient washers 49. By supporting stripper grid 36 in this manner a novel and very useful motion is imparted to the same.

When the needle board 34 and the beam 26 descend the lifting arms 40 are carried downwardly causing a descent of the stripper grid 36. Stripper grid 36 continues to descend with the downward movement of the beam 26 until limiting nuts 44 engage the washers 49 whereupon the support of the stripper grid is transferred from the moving beam 26 to the stationary guide supports 43. Upon the upward return movement of the beam 26 the lifting arms 40 again engage the resilient buffers 41 and lift the stripper grid 36. This arrangement causes the stripper grid to descend and rest momentarily at a predetermined height while the needle board completes the lowermost portion of its travel and to again rise when the needles are withdrawn from the fabric during the upper portion of their movement. By regulating the adjustment of lock nuts 42 and limiting nuts 44 the downward limit of movement of the stripper grid may be adjusted to any point desired and the extent to which the stripper grid is raised during the upper part of the stroke may also be regulated. Through the adjustment of these nuts the stripper grid may also be operated as a stationary grid. Further, in the event that an exceptionally bulky portion of the bat is fed into the machine, the stripper grid will accommodate itself thereto, a fixed approach between the same and the bolster 50 not being necessary.

The bolster best shown in Fig. 4 is composed of a frame 51 bearing space bars 52. The bolster frame as shown in Figs. 2 and 3 is securely mounted upon chairs 3 and 3' which in turn derive their support from standards 1 and 1'.

Below the bolster 50 and between the chairs 3 and 3' is placed a conveyor trough 53 containing conveyor screw 54, the latter turning on shaft 55. Shaft 55 is journalled to turn in the bearing 56 which in turn is mounted upon standard 1. Mounted upon shaft 55 to turn therewith is the sprocket 57 adapted to turn the shaft 55 through the application of a source of energy not shown.

In operating the machine of this invention, a fibrous bat is conveyed between the bolster 50 and the stripper grid 36 by any suitable means, sometimes such as shown by dotted lines in Fig. 2. While feeding the bat through the machine, shaft 11 is rotated, causing an oscillating movement of the beam 26 and the needle board 34. The needles 35 are driven downwardly through the spaces in the stripper grid as shown in Fig. 4 through the fibres of the bat and then into the spaces between the bars 52 of the bolster 50 and are then withdrawn. This operation is repeated with great rapidity and during the movement of the needles the stripper grid moves downwardly to a determined position above the bat and is then raised with each repetition of the needling movement.

Should it be desired to operate upon relatively heavy material the adjusting screws 21 are turned to draw the beam 26 near to the eccentric followers 62 and 62'. The eccentric sleeves 15 and 15' may then be turned upon the eccentric faces 14 and 14' so that their eccentricity adds to the eccentricity of the faces 14 and 14', this adjustment being then secured through the clamping bars 18 and 18'. In this way a relatively long travel is communicated to the needle board 34. Having secured the desired adjustment in the travel of the needle board, lock nuts 42 and limiting nuts 44 are adjusted to obtain an appropriately large spacing between the stripper grid 36 and the bolster 50. With such an adjustment, the machine, at the top of its stroke, will accommodate the entrance of a relatively thick bat of fibres. In machines known prior to this invention in which a fixed stripper grid is employed, this wide opening to assist the entrance of a bat is not available and the greater facility with

which a machine of this invention may be started is one of the important advantages thereof. Having started the entrance of the material to the machine the adjustment to obtain the long travel of the needle board above referred to makes possible the effective treatment of the relatively heavy bat of material.

If it is desired to manufacture a light weight material, the eccentricity of eccentric faces **14** and **14'** and eccentric sleeves **15** and **15'** may be placed to oppose each other and to reduce the effective eccentricity to a smaller amount. At the same time adjusting screws **21** and **21'** may be turned to reduce the displacement of the needles **35** from the bolster **50** to a smaller amount. The machine thus adjusted is well adapted for the manufacture of light weight material. Intermediate adjustments are as easily made for the manufacture of intermediate weights of material. Machines known prior to this invention have been incapable of any adjustment in the length of stroke of the needles and consequently are entirely incapable of working upon a wide range of materials.

The machine of this invention is capable of exceptionally smooth operation for the reason that driving disks **17** and **17'** are of such widths and proportions as to completely counterbalance the eccentricities of eccentric faces **14** and **14'** while the flange portions of eccentric sleeves **15** and **15'** are dimensioned and positioned to counterbalance the eccentricity of said sleeves. Consequently, in any position which eccentric sleeves may be adjusted, complete balance of the rotating assembly mounted upon shaft **11** is obtained.

Further, the mounting of the wrist sockets **25** and **25'** intermediate the ends of the beam **26** makes possible the rapid oscillation of the beam with a minimum of deflection therein. Many needling machines now in use communicate the oscillating movement to the beam at the extremities thereof thus inducing the maximum possible deflection therein causing breaking of needles and non-uniform needling of the work.

The gibs, guiding the motion of the beam **26** are constructed in this invention, in a manner providing the greatest simplicity and strength. Tubular guide members **27** and **27'** can be fabricated with ease and their interior finish effected with great facility. The cylindrical guide members **28** and **28'** may also be constructed with a minimum of labor and formed with great precision on simple available machines. Cylindrical guides **28** and **28'** as shown in Fig. 5 are provided with a central bore **59** and **59'** communicating with lateral bores **60** and **60'** through which lubricant may be supplied. The cylindrical form of the contacting surfaces makes possible uniform distribution of lubricant rendering the gibs of the machine of this invention free of excessive wear. Further, the cylindrical form of said gibs provides for the proper guiding of the beam **26**, and properly caring for any unaccounted for thrusts and insuring the entrance of the needles **35** into the rather limited spaces provided for their accommodation between the bars of the stripper grid **36** and the bars of the bolster **50**.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except insofar as such limitations are included in the claims.

What I claim as my invention is:

1. In a needling loom, the combination of a bolster, a needling means mounted above said bolster and movable vertically toward and away from the same, a stripper grid cooperating with said needling means, carrying means for said stripper grid, a carrying connection between said carrying means and said needling means for movement of said stripper grid by said needling means and relative movement between said carrying means and needling means, means for limiting the upward movement of said carrying means, and adjustable means for positively limiting the downward movement of said grid by said carrying means.

2. In a needling loom, the combination of a bolster, a needling means mounted above said bolster and movable vertically toward and away from the same, a stripper grid cooperating with said needling means, rods carrying said stripper grid, arms connected with said needling means said rods being connected to said arms to be carried thereby and permit relative movement between said rods and said arms, means for limiting the upward movement of said rods by said arms, and means engaging said rods for positively limiting the downward movement of said grid by said arms.

REGINALD H. JOHNSON.