

May 3, 1932.

J. MORTON

1,856,782

MANUFACTURE OF FABRICS

Filed Oct. 21, 1930

3 Sheets-Sheet 1

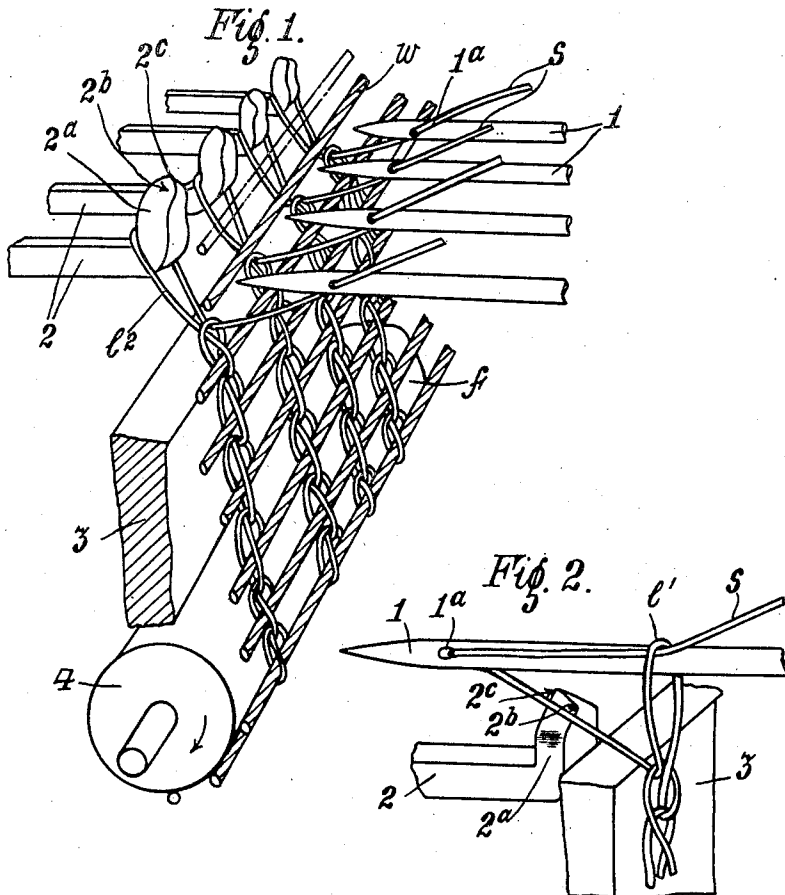
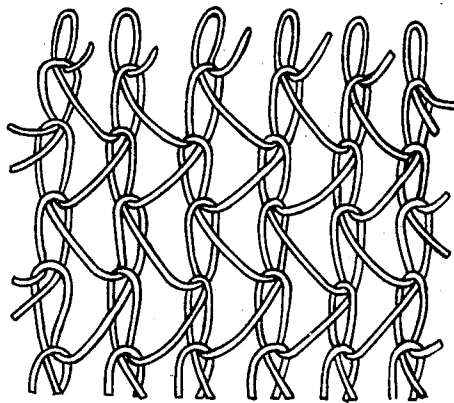


Fig. 6.



INVENTOR
J. MORTON

BY *[Signature]* ATTORNEY

May 3, 1932.

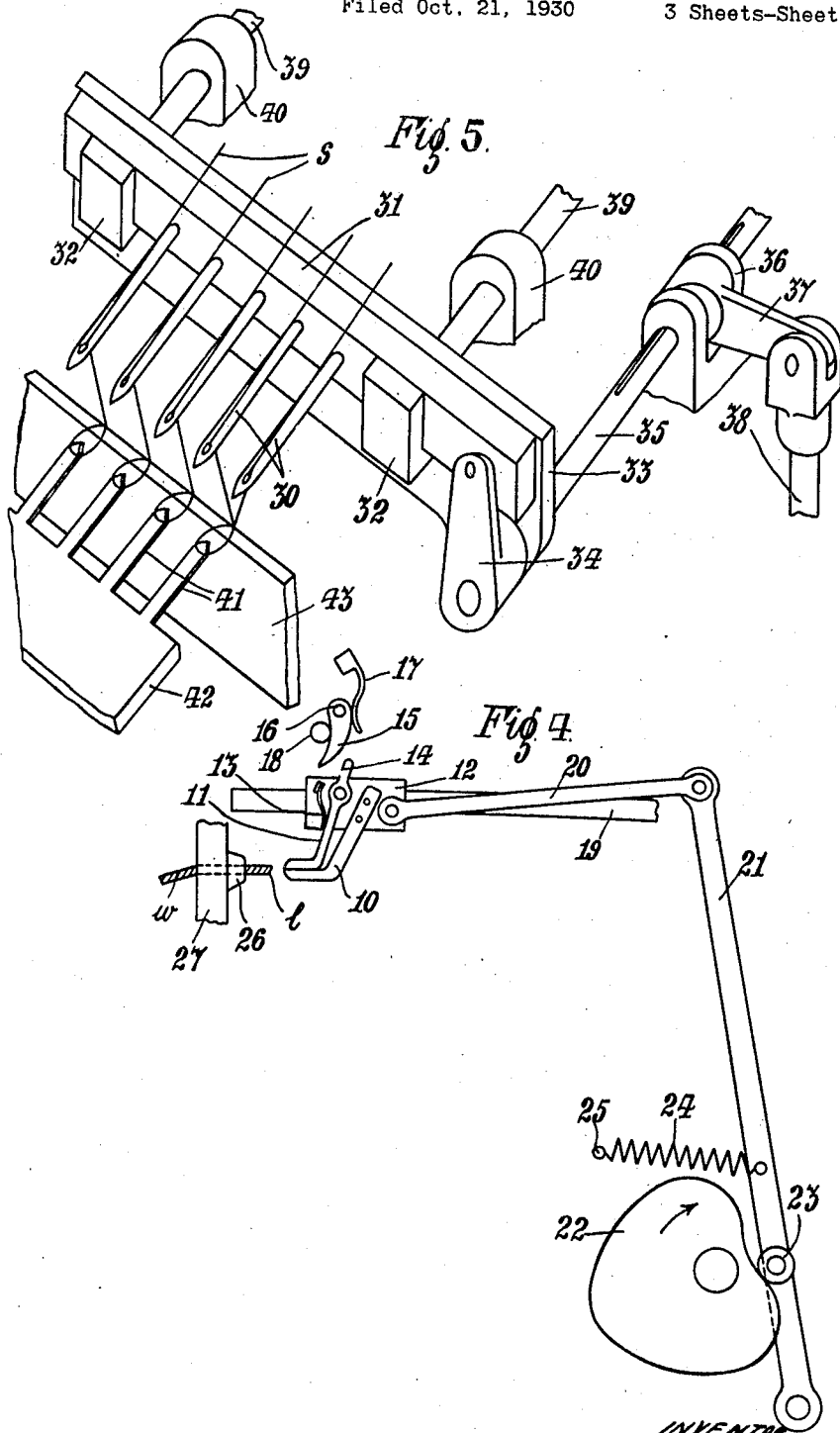
J. MORTON

1,856,782

MANUFACTURE OF FABRICS

Filed Oct. 21, 1930

3 Sheets-Sheet 2



INVENTOR
J. MORTON
BY *[Signature]* ATTORNEY

May 3, 1932.

J. MORTON

1,856,782

MANUFACTURE OF FABRICS

Filed Oct. 21, 1930

3 Sheets-Sheet 3

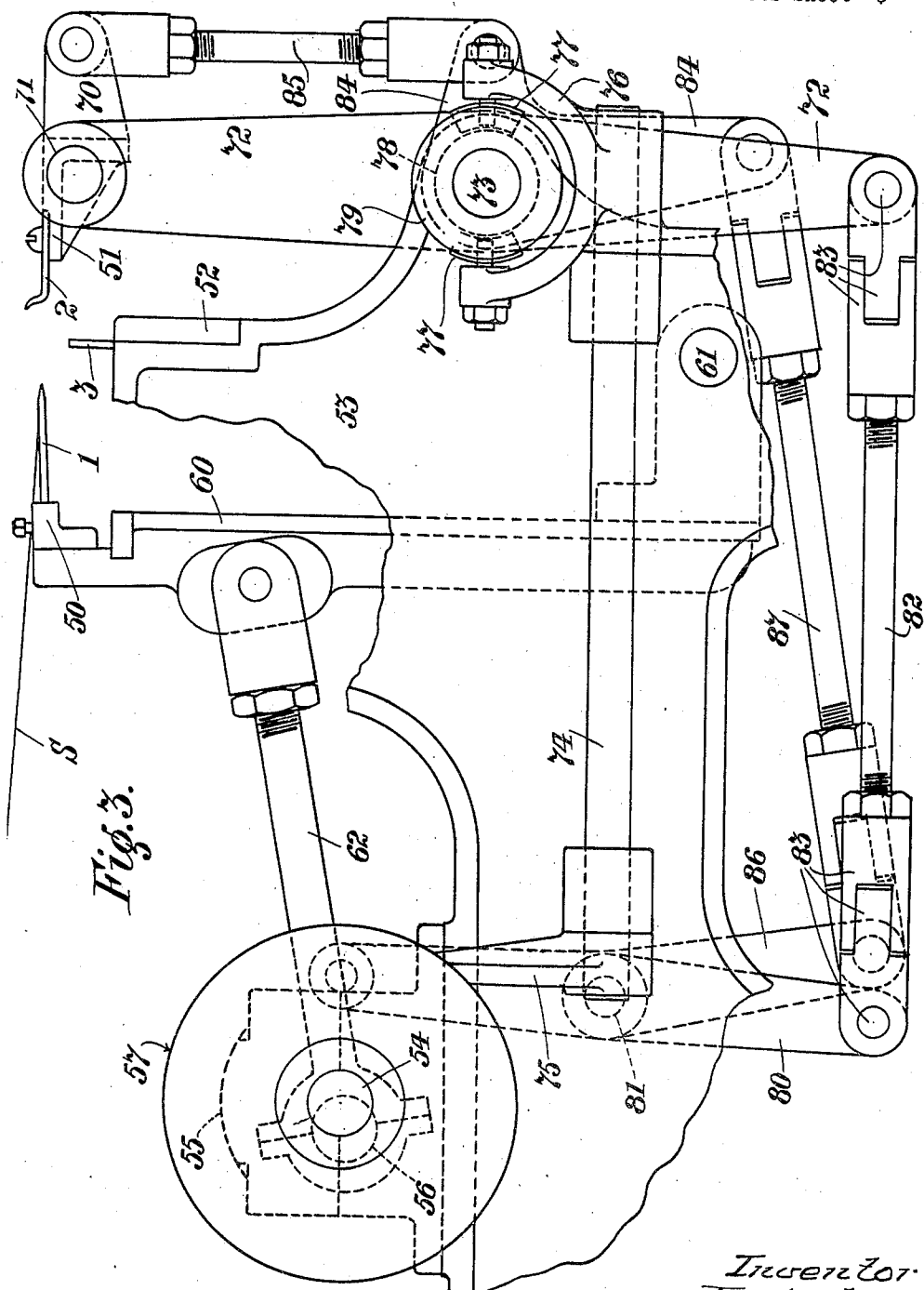


Fig. 3.

Inventor
J. Morton
by *J. L. Linn*
Atty.

UNITED STATES PATENT OFFICE

JAMES MORTON, OF CRAMOND BRIDGE, WEST LOTHIAN, SCOTLAND

MANUFACTURE OF FABRICS

Application filed October 21, 1930, Serial No. 490,281, and in Great Britain November 2, 1929.

This invention relates to the production of fabrics particularly weft preparatory cloth for chenille fabrics (such as described in my application numbered 391,369 filed September 9, 1929, Patent No. 1,804,106) by needles having an action which resembles a sewing action as distinguished from a knitting action.

The invention consists in supplying threads to a bank of thread-guiding needles which in conjunction with unthreaded loop-forming members are caused by suitable mechanism to act in such manner as to form said threads into chains which are bound together and/or interlaced so as to produce various fabrics as required.

Under one mode of procedure binding weft threads are simultaneously pulled forward a predetermined distance and cut to a desired length at a single operation and are then fed forward side by side in parallel formation to the bank of threaded needles, which coact with movable unthreaded loop-forming members, or "looper points," to produce chains which bind the first mentioned threads together in such manner as to form the fabric. These first mentioned threads are hereinafter referred to as "wefts."

Under another mode of operation, the chains produced in the needle threads are interlaced or inter-looped by the joint action of the needles and looper points so as to form net or lace like fabrics; and, in this case, the needles would be given an oscillatory or shogging motion.

When various coloured threads are supplied for incorporation in the fabric they may be selected, as desired, by selecting mechanism under jacquard or other control in order to produce the required effects in the final fabric.

In certain cases, the wefts, instead of being fed forward to the needles in parallel formation, may be laid by travelling fingers into the open shed formed in the threads by the co-operating needles and looper points.

In order that the invention can be clearly understood reference will now be made to the accompanying diagrammatic drawings, in which:—

Fig. 1 is a perspective view of a bank of needles and associated parts.

Fig. 2 is a somewhat similar view, only one needle being included amongst the parts shown.

Fig. 3 is an elevation of part of a machine including mechanism according to this invention.

Fig. 4 is a view of mechanism including travelling gripper fingers for inserting weft.

Fig. 5 is a perspective view of a bank of sewing needles having means whereby a shogging motion can be imparted to them.

Fig. 6 is a view of a fabric which can be produced by needles such as those hereinafter described with reference to Fig. 5.

With reference to Fig. 1, the needles 1 therein shown are secured in a row to a needle-bar (not shown) and all project forwards therefrom in the same horizontal plane. Looper members or points 2 also arranged in a horizontal row work above and at the front side of a retaining member 3, which is stationary. Each point 2 is bent upwards at a right angle at its rear end, the upturned portion 2^a being formed with an angular thread-engaging recess 2^b and terminating in a sharp beak 2^c. The needle-bar is connected with mechanism (hereinafter described) whereby it is reciprocated horizontally across the top of the retaining member 3 and the points are mounted on a common support operatively connected with mechanism (also hereinafter described) adapted to impart to the points lateral movements and also composite vertical and longitudinal rocking movements to produce effects hereinafter described.

The needles 1 are formed with vertical eyes 1^a through which are threaded threads *s* passing from a beam, or creel, bobbins, or other suitable source, by way of thread-tensioning devices (not shown).

The fabric *f* to be produced by the needles is passed down the rear side of the retaining member 3 and is wound under slight tension around a take-up roller 4.

Wefts *w* are fed forward sidewise in parallel formation and are stitched into the loops formed in the threads *s* by the needles 1.

Referring now to Fig. 3, mechanism is therein shown for reciprocating the needles 1 horizontally over the retaining member 3 and for imparting to the points 2 their lateral movements and their composite vertical and longitudinal movements. The needle bar is denoted by 50, the support for the points 2 by 51, and a stationary bar supporting the member 3 by 52, the bar 52 being supported at each end by a frame 53, shown with parts broken away. All the movements are derived from a continuously rotatable shaft 54 journaled in stationary bearings on the frame 53, one of these bearings being denoted by 55. The shaft 54 at or near each end has a crank or eccentric 56 and an assembly of cams denoted conventionally by 57. It is from the said crank and cams that the movements are derived, as will now be explained.

The needle bar 50, at each end, is supported by an arm 60 which is pivoted at 61 to the frame 53. The arm 60 is rocked by a connecting-rod 62 pivotally connected at its ends to the arm and the crank or eccentric 56. In the rotation of the shaft 54, the crank or eccentric imparts a rocking movement to the arm 60 through the rod 62, with the result that the required movement is imparted to the needle bar 50.

The support 51 of the points 2 has a short extension 70 at each end and is pivotally connected at 71 to a lever 72 secured to a rock-shaft 73 which is slidable endwise in bearings in the frame 53. The arrangement is such that, when the rock-shaft is slid endwise, a lateral movement is imparted to the support 51 and points 2, and, when the rock-shaft is rocked, a longitudinal movement is imparted to the points.

The endwise movement of the rock-shaft 73 is derived from another rock-shaft 74, one end of which has an arm 75 controlled by elements of the assembly of cams 57 and the other end of which has secured to it a fork 76 carrying thrust-pads 77 engaging in an annular groove 78 in a collar 79 secured to the shaft 73.

The rocking movements of the shaft 73 are derived from a lever 80 which is fulcrumed at 81 and which receives from an element of the respective cam assembly 57 rocking movements transmitted through the connecting rod 82 to the lever 72. The rod 82 is connected to the levers 72 and 80 by universal joints 83.

The vertical movements of the points 2 are derived from an operative connection between the extension 70 at each end of the support 51 and an element of the respective assembly of cams 57, said operative connection comprising a bell-crank-lever 84 freely fulcrumed on the shaft 73 and connected to the extension 70 by a link 85; a lever 86 which also is fulcrumed at 81 and is rocked by the said element of the assembly of cams 57; and

a link 87 universally jointed at its ends to the levers 84 and 86. It will be clear that, when the lever 86 is rocked, the support 51 is also rocked about its pivotal mounting 71, so that the points are moved vertically.

It will thus be clear how the points 2 receive the requisite lateral movement and composite longitudinal and vertical movements.

Referring once more to Figs. 1 and 2, the manner in which the threads *s* are formed into chains and the manner in which the wefts *w* are bound into these chains will now be described.

For convenience in description, it will be assumed that chains of a few stitches have already been formed in the threads *s* and that these chains are each suspended as shown in Fig. 2 from the needles 1 by their topmost loops l^1 through which the needles have been advanced almost to their foremost position. Moreover, each point 2 is located beneath the respective needle to the left thereof (i. e. to the left of an operator standing at the front and looking towards the sharp ends of the needles).

First of all, each of the points 2 moves below the respective needle laterally to the right, and its recess 2^b engages with a length of thread l^2 passing between the chain and the needle eye. The point is gradually raised and its beak passes between length l^2 and the needle itself. When the point rises to above the level of the needle it returns laterally to mid-position immediately above the needle, carrying with it the length of thread engaged in its recess. Meanwhile, the needle is being withdrawn and eventually casts off the topmost loop l^1 , so that the length l^2 is drawn into a new loop (see Fig. 1) around the up-turned portion 2^a . As the needle approaches its rearmost position, the point moves longitudinally forwards and elongates the new loop l^2 , so that the loop l^1 just cast off is tightened. When the needles are withdrawn and the points advanced as above described, a weft *w* is fed forwards by appropriate means above the points and rests upon the row of elongated loops, the weft *w* being shown approaching this position in Fig. 1. The needles now advance above the weft *w* and the points are withdrawn into a position in which each of them holds open a loop l^2 through which the respective needle passes. The point now moves laterally to the extreme left and also downwards, thus transferring to the advancing needle the open loop l^2 .

The above constitutes one cycle of operations. In the next and succeeding cycles; whenever the points are advanced to draw out the lengths of thread engaged by them into elongated loops, they at the same time draw tightly around the newly fed weft the loops from which the needles have just receded, thereby binding the weft securely to the chains.

The fabric thus produced consists of transverse wefts bound closely together by longitudinal chains which are spaced apart at equal or other distances according to the spacing of the needles and associated parts. Where the fabric is produced as preparatory cloth for chenille, the fabric is ultimately cut between adjacent chains into strips constituting the chenille fur.

The wefts can be fed forward sidewise in parallel formation and transferred to the chains, for binding therein, by conveyor mechanism similar to that described in my aforesaid patent numbered 1,804,106 and, if desired, the wefts can be selected according to their colour or other characteristic by the use of selecting mechanism controlled for example by a jacquard, such mechanism also being described in my above mentioned patent.

Alternatively, the wefts may be drawn into position for binding the fabric by travelling gripper fingers adapted to engage the projecting ends of successive threads and pull these in turn endwise transversely of the fabric.

One form of gripper finger mechanism is illustrated in Fig. 4. As therein shown, the mechanism comprises two fingers 10, 11 the first of which is a fixture on a slide-block 12 and the second of which is pivoted to the block 12 and is normally pressed by a spring 13 against the finger 10. The finger 11 has an upward projection 14 adapted to co-act with a depending pawl 15 pivoted to a stationary pin 16 and pressed against a fixed stop 18 by a spring 17, which is anchored at one end to a stationary part (not shown). The block 12 is slidably mounted on a fixed guide bar 19 and is connected by a link 20 to an oscillating lever 21. The oscillations of the lever 21 are derived from a rotary cam 22, the follower of which consists of a roller 23 mounted on the lever 21 and held against the cam by a spring 24 connected to the lever and to a fixed anchorage 25. The gripping ends of the fingers 10, 11 reciprocate with the guide-block in the same horizontal plane as a one-way guide 26 for the weft to be gripped.

In operation of the mechanism, the block 12 slides to the left, and the projection 14 engages and is pressed back by the pawl 15. The fingers 10, 11 are thus opened, and they pass in this condition above and below an end e of weft projecting from the guide 26. When the projection 14 passes beyond the pawl 15, the finger 11 is caused by its spring 13 to snap on the end e which is thus seized. The movement of the block 12 is at this instant reversed. The projection 14 again moves against and displaces the pawl 15, with the result that the finger 11 receives a short additional gripping pressure from the spring 17 at the time when the act of pulling-out the end e is commenced. Thereafter, the

requisite length of weft w is pulled out into position for binding into the fabric by the sewing mechanism. Finally, the weft is cut in any appropriate manner so as to leave a short end projecting from the guide 26 in readiness for the next cycle of operations.

The carrier 27 of the guide 26 may have several such guides and may be controlled by selecting mechanism adapted, in known manner, to bring selected wefts in appropriate sequence to the level at which they can be gripped by the fingers.

In this manner wefts of different colours or other characteristics may be fed forward for incorporation in the fabric.

In the arrangement above described with reference to Figs. 1, 2, 3 and 4, the needles are given purely an endwise reciprocating motion and the fabric depends for its entirety upon both the wefts and the binding threads. In a modification of this arrangement, the need for wefts may be obviated. According to this modification, the needles receive in addition to their endwise movement a lateral or shogging movement, as a result of which the threads are inter-looped and in themselves produce an entire fabric. Means for carrying out said modification are illustrated in Fig. 5, which will now be described.

The needles 30 are secured to a needle bar 31 which is slidable endwise (i. e. transversely of the machine) in guides 32 on a support 33. The bar 31 has a pin-and-slot connection with a crank 34 on a rock-shaft 35 which is slidable endwise in a fixed guide-bearing 36. The rock-shaft 35 has a feather-and-groove connection with a crank 37 pivotally connected to a rod 38, which receives from cam or other mechanism (not shown) predetermined vertical reciprocations. The support 33 is carried by rods 39 which are slidably mounted in fixed guide-bearings 40.

The looper points co-operating with the needles are denoted by 41, these being supported by a bar 42. The numeral 43 denotes a vertical retaining plate.

In the operation of the above described mechanism, when producing the simplest form of fabric, the needles 30 are reciprocated and loops are formed in the threads by the points 41. Then the needles are shogged, by a vertical movement of the rod 38, to the extent of one needle pitch. Another reciprocation is imparted to the needles, and a new row of loops are thus formed. Thereafter, the needles are shogged back to their original position and given another reciprocation. Meantime, the looper points act in the same manner as already described with reference to Figs. 1 and 2.

By repeating the above cycle of operations, a fabric such as that shown in Fig. 5 is produced. As therein shown, this fabric consists of chains of loops, each of which is interlaced with loops of adjacent chains, that is

to say, the fabric consists of inter-looped chains of thread. Further, the fabric does not include laid-in wefts in its composition, but it will be obvious that such wefts could be inserted in the same manner as described with reference to Figs. 1 and 2. Where the wefts are inserted by mechanism such as that shown in Fig. 3, the fingers may be reciprocated to an extent which may be less than the width of the fabric and which may be varied, if desired. In this manner a pattern of wefts could be produced in the fabric. Further, the shogging of the needles need not follow the simple procedure described with reference to Fig. 4, but may be varied to produce a pattern effect in the fabric. Further, wefts to form a filling or ground could be inserted in parallel formation and additional wefts could be laid-in by fingers, for instance coloured threads or even strips of chenille to form a pattern or figure on the ground.

It is to be understood that various modifications can be made without departing from the scope of the invention. For example, two or more separate banks of needles, with co-operating looper points, may be provided.

Throughout this specification I have used the word "threads" and it is to be understood I mean this term to cover and include not only cotton or other threads, but woollen or other yarns, as well as strips of chenille or fur pile when it is desired such should be incorporated in the fabric being manufactured.

I claim:—

1. Mechanism for producing fabrics comprising an assembly of reciprocatory thread-guiding needles, loop-forming members co-operating with the respective needles to alternately engage and release the threads guided by said needles and thereby produce chains of stitches in said threads and means for introducing connections between said chains of stitches to bind said chains together and thus produce a fabric.

2. Mechanism for producing fabrics comprising a row of thread-guiding needles respectively supplied with threads, a movable support for said needles adapted to impart thereto endwise reciprocatory movement, loop-forming members co-operating with the respective needles, a support for said members adapted to impart thereto a composite looping movement so that said members alternately engage and release the threads guided by said needles and thereby produce chains of stitches in said threads and means for introducing connections between said chains of stitches to bind said chains together and thus produce a fabric.

3. Mechanism for producing fabrics comprising an assembly of reciprocatory thread-guiding needles respectively supplied with threads, loop-forming members co-operating with the respective needles to alternately engage and release the threads guided by said

needles and thereby produce chains of stitches in said threads and means for imparting a relative shogging movement between said needles and said members between successive stitches so as to cause said threads to interconnect adjacent chains and thus produce a fabric.

4. Mechanism for producing fabrics comprising a row of thread-guiding needles respectively supplied with threads, a movable support for said needles adapted to impart thereto endwise reciprocatory movements, loop-forming members co-operating with the respective needles, a support for said members adapted to impart thereto a composite looping movement so that said members alternately engage and release the threads guided by said needles and thereby produce chains of stitches in said threads and means for imparting a relative shogging movement between said needles and said members between successive stitches so as to cause said threads to interconnect adjacent chains and thus produce a fabric.

5. Mechanism for producing fabrics comprising a row of spaced thread-guiding needles respectively supplied with threads, a movable support for said needles adapted to impart thereto endwise reciprocatory movements, loop-forming members co-operating with the respective needles, a support for said members adapted to impart thereto a composite looping movement so that said members alternately engage and release the threads guided by said needles and thereby produce chains of stitches in said threads and means for imparting between successive stitches to the support for the needles a shogging movement to the extent of at least one needle space so as to cause said threads to interconnect adjacent chains.

6. Mechanism for producing fabrics comprising an assembly of reciprocatory thread-guiding needles respectively supplied with threads, loop-forming members co-operating with the respective needles so that said members alternately engage and release the threads guided by said needles and thereby produce chains of stitches in said threads, means for imparting a relative shogging movement between said needles and said members in the interval between successive stitches so as to cause said threads to interconnect adjacent chains and thus produce a fabric, and means for inserting wefts into said stitches as additional connections between the chains.

7. Mechanism for producing fabrics comprising a row of thread-guiding needles respectively supplied with threads, a movable support for said needles adapted to impart thereto endwise reciprocatory movements, loop-forming members co-operating with the respective needles, a support for said members adapted to impart thereto a composite

looping movement so that they engage and thereafter entirely release the threads guided by the needles in order to produce chains of stitches in said threads, means for imparting a relative shogging movement between said needles and said members in the interval between successive stitches so as to cause said threads to interconnect adjacent chains and thus produce a fabric, and means for inserting wefts into said stitches as additional connections between the chains.

8. Mechanism for producing fabrics comprising a row of spaced thread-guiding needles respectively supplied with threads, a movable support for said needles adapted to impart thereto endwise reciprocatory movements, loop-forming members co-operating with the respective needles, a support for said members adapted to impart thereto a composite looping movement so as to produce chains of stitches in said threads, means for imparting in the interval between successive stitches to the support for the needles a shogging movement to the extent of at least one needle space so as to cause said threads to interconnect adjacent chains, and a reciprocatory gripper for seizing and inserting lengths of weft between the needles and loop-forming members during the formation of the stitches so that said lengths are engaged thereby.

9. Mechanism for producing fabrics comprising an assembly of reciprocatory thread-guiding needles respectively supplied with threads, loop-forming members co-operating with the respective needles to alternately engage and release the threads guided by said needles and thereby produce chains of stitches in said threads and means for introducing wefts into said stitches to serve as connections between said chains and thus produce a fabric.

10. Mechanism for producing fabrics comprising a row of thread-guiding needles respectively supplied with threads, a movable support for said needles adapted to impart thereto endwise reciprocatory movement, loop-forming members cooperating with the respective needles, a support for said members adapted to impart thereto a composite looping movement so that they alternately engage and release the respective threads to produce chains of stitches in said threads and means for introducing wefts into said stitches to serve as connections between said chains and thus produce a fabric.

11. Mechanism for producing fabrics comprising an assembly of reciprocatory thread-guiding needles respectively supplied with threads, loop-forming members co-operating with the respective needles to produce chains of stitches in said threads, and a reciprocatory gripper for seizing and inserting lengths of weft between the needles and loop-forming members during the formation of

the stitches so that said lengths are engaged thereby.

12. Mechanism for producing fabrics comprising a row of thread-guiding needles respectively supplied with threads, a movable support for said needles adapted to impart thereto endwise reciprocatory movement, loop-forming members co-operating with the respective needles, a support for said members adapted to impart thereto a composite looping movement so as to produce chains of stitches in said threads, and a reciprocatory gripper for seizing and inserting lengths of weft between the needles and loop-forming members during the formation of the stitches so that said lengths are engaged thereby.

13. Mechanism for producing fabrics comprising an assembly of thread-guiding needles respectively supplied with threads, movable loop-forming members co-operating with the respective needles, a loop-retaining abutment located between said needles and members, means for effecting relative reciprocatory motion between said needles and members so that said members alternately engage and release the threads guided by said needles and thereby form chains of stitches in said threads and means for introducing connections between said chains of stitches, thus producing a fabric.

14. Mechanism for producing fabrics comprising an assembly of thread-guiding needles respectively supplied with threads, a needle-bar to which said needles are secured, a support for said needle-bar, movable loop-forming members co-operating with the respective needles so as to alternately engage and release the respective threads, a loop-retaining abutment located between said needles and members, means for reciprocating said support lengthwise of the needles, and means for shogging said needle-bar along said support, the needles thus receiving both longitudinal and transverse reciprocations.

15. Mechanism for producing fabrics comprising an assembly of thread-guiding needles respectively supplied with threads, a needle-bar to which said needles are secured, a support for said needle-bar, movable loop-forming members co-operating with the respective needles so as to alternately engage and release the respective threads, a loop-retaining abutment located between said needles and members, means for reciprocating said support lengthwise of the needles, means for shogging said needle-bar along said support, the needles thus receiving both longitudinal and transverse reciprocations, and means for inserting wefts into said stitches as additional connections between the chains.

16. Mechanism for producing fabrics comprising an assembly of thread-guiding needles respectively supplied with threads, a needle-bar to which said needles are secured, a support for said needle-bar, means for re-

70

75

80

85

90

95

100

105

110

115

120

125

130

ciprocating said support lengthwise of the needles, means for shogging said needle-bar along said support, the needles thus receiving both longitudinal and transverse reciprocations, movable loop-forming members cooperating with the respective needles so that said members alternately engage and release the threads guided by said needles and thereby form said threads into chains of stitches, a loop-retaining abutment located between said needles and members, and a reciprocatory gripper for seizing and inserting lengths of weft between the needles and loop-forming members during the formation of the stitches so that said lengths are engaged thereby.

In testimony whereof I affix my signature.
JAMES MORTON.

20

25

30

35

40

45

50

55

60

65