March 21, 1967 S. MAURI 3,310,071

RECTILINEAR LOOM OF THE "PICK-PICK" TYPE

Filed June 9, 1964 4 Sheets-Sheet 1

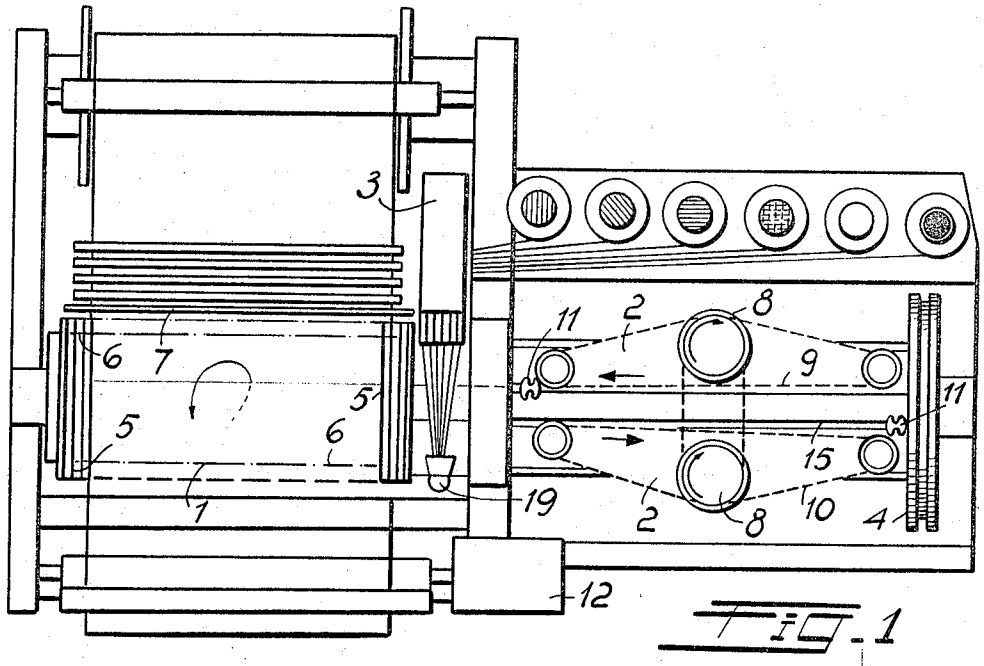


FIG. 1

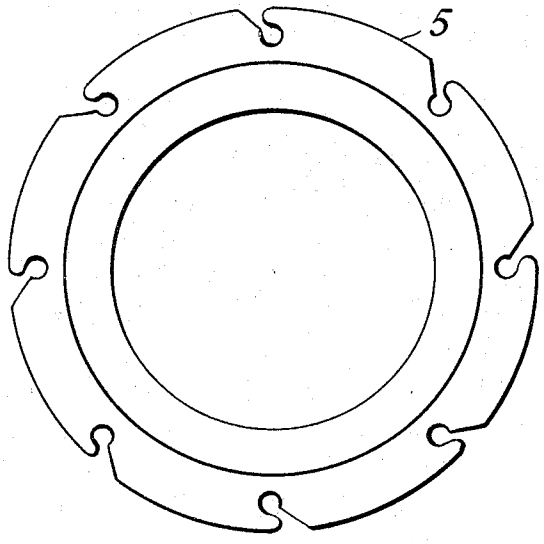


FIG. 4

FIG. 5

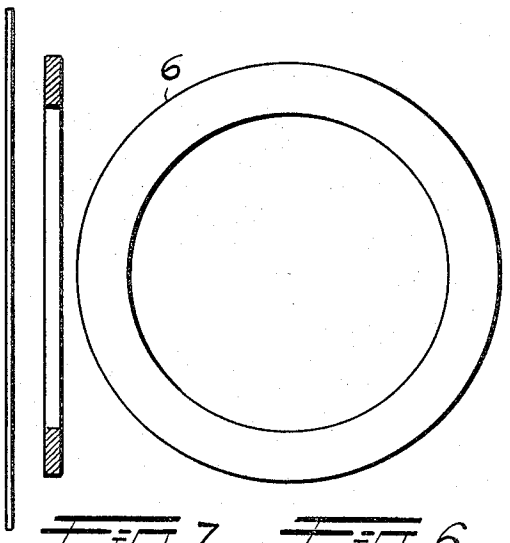


FIG. 7

FIG. 6

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RECTILINEAR LOOM OF THE "PICK-PICK" TYPE

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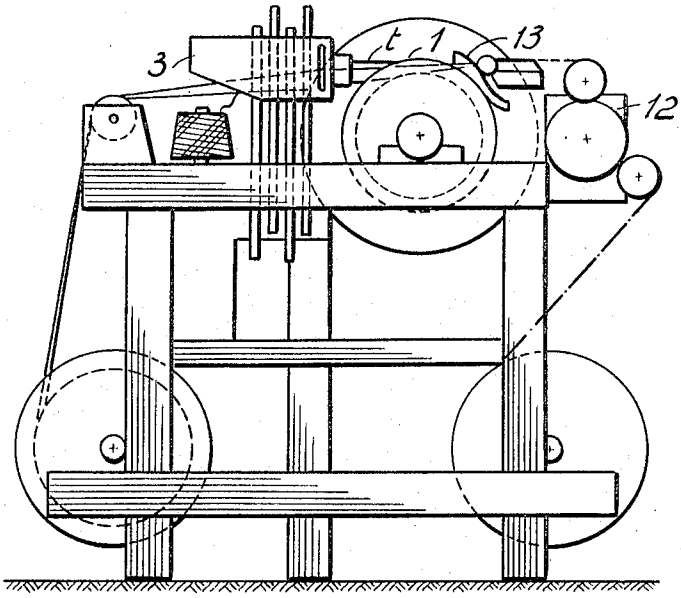


FIG. 2

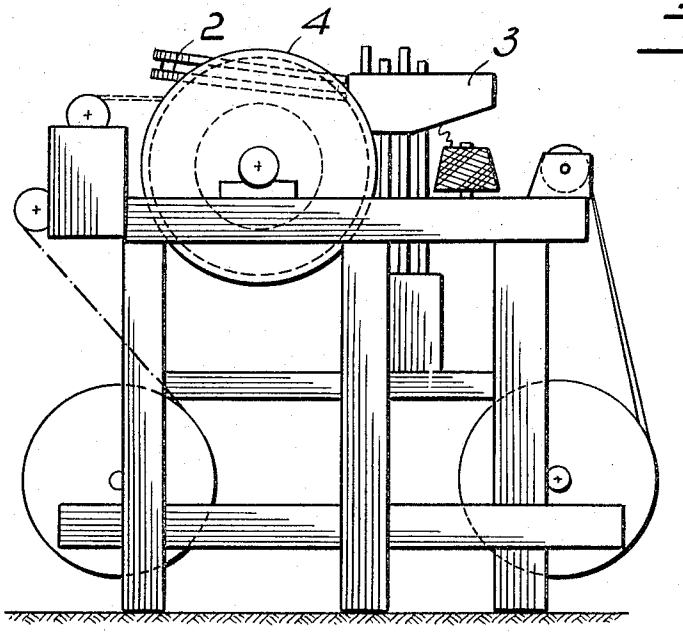


FIG. 3

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RECTILINEAR LOOM OF THE "PICK-PICK" TYPE

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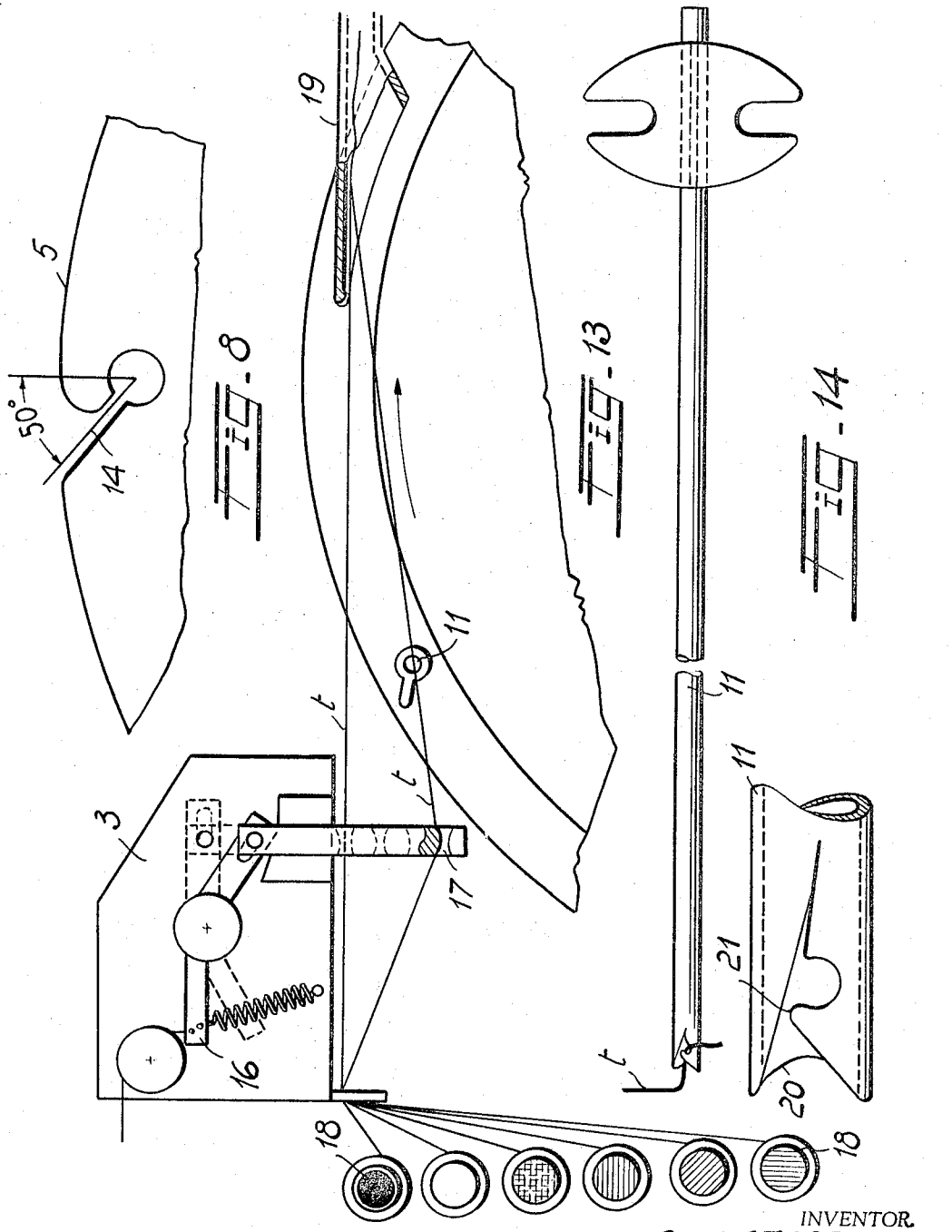


FIG. 8

FIG. 13

FIG. 14

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RECTILINEAR LOOM OF THE "PICK-PICK" TYPE

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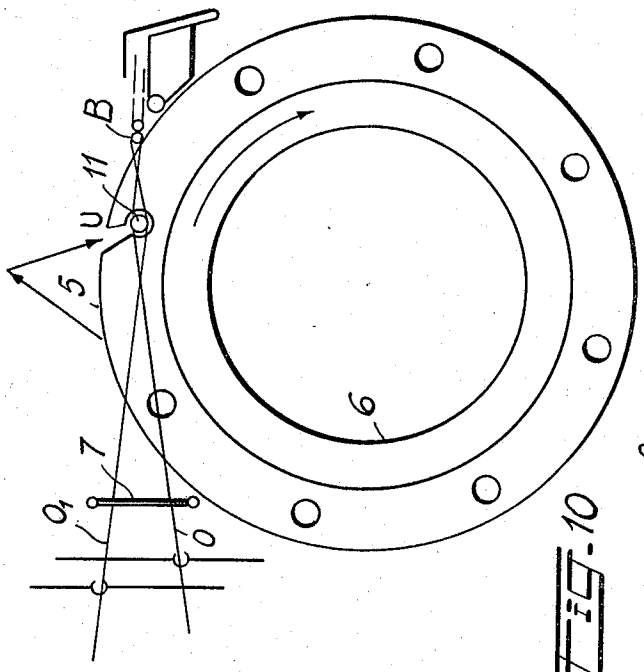


FIG. 10

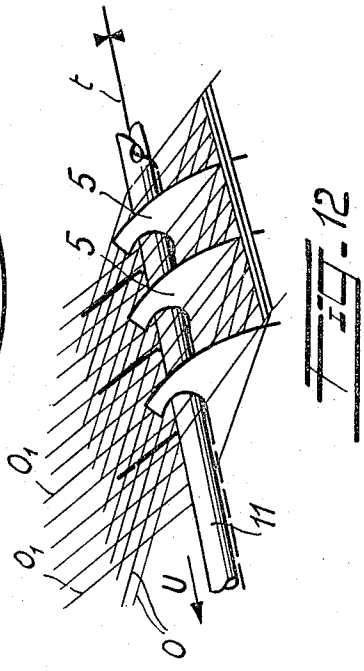


FIG. 12

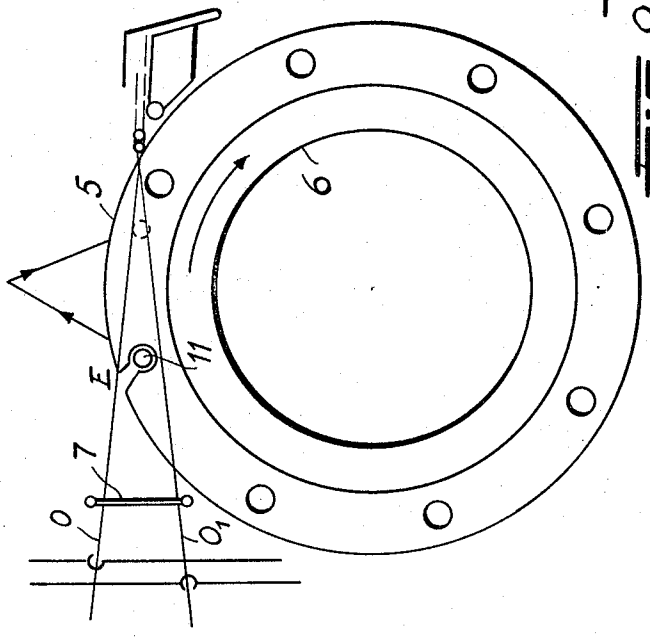


FIG. 9

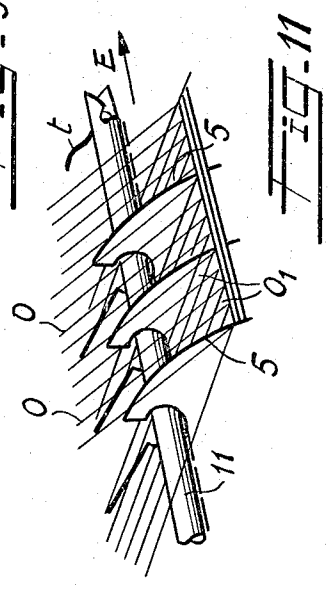


FIG. 11

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3,310,071

RECTILINEAR LOOM OF THE "PICK-PICK" TYPE

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Filed June 9, 1964, Ser. No. 373,744
2 Claims. (Cl. 139—122)

In the construction of textile machines and particularly looms considerable progress has been made; from the conventional loom with picking of the weft with shuttle we have come to looms with picking with one or more needles having a sley or even rotating. Each one of these looms has advantages and drawbacks. One of them (Sulzer) of the high picking constant shuttle type is used for wool and cotton.

Another rectilinear needle picking loom is also known (Universal Iwer) but operates at very low speed. A loom having two needles, a male one and a female one (Draper), which approach simultaneously the centre of the sley to then bring the weft to picking, is also known.

In all of the above mentioned types of looms the conventional sley more or less modified is used offering with respect to the normal types the advantage of picking an unlimited number of weft colours in addition to a very small warp opening.

A rotating sley device appreciable to any type of loom is also known, which holds the main members (shuttle picker, cop-holder, automatic-change gear, heddles, etc.); it comprises a roller with several planes for shuttle passage having special combs for approaching of the weft and allows a production increase to about the double with the same type of yarn and warp width in comb of a normal loom.

In addition, the change gears (box movement, cop change) and passage of the shuttle take place in rest positions, the fixed boxes being in the picking position and similarly for the cop changing; the shuttle passes on a plane of said roller in the satisfactory position, after which the roller rotates sufficiently enough to approach the warp to the weaving point and thus the shuttle to the subsequent picking is caused to pass immediately on the following plane.

Furthermore, the weft is picked in a rectilinear instead of parabolic manner.

In a known rectilinear rotating loom (Gentilini-Ripamonti), one has the advantage of high speed weaving (about 800 picks per minute); in said loom the shuttle is dispensed with and is replaced by needles and to the thread lifts of the conventional method disks suitably angularly shaped are substituted.

The angular disks coupled with the offset angles form therebetween the lifting and lowering of the warp yarn providing the mouth within which the weftholding needle passes. The warp yarns bear one by one on said disks which proves to be a drawback in relation to the usual heddles because the number of warp yarns is very limited and the range of fabric types is very narrow with the same count and height in comb of any type of loom.

On one side of said disks different types of blades are coupled: one type for supporting of the yarn and another connected to the first one serving as separator between each yarn, while from the opposite side other blades act as extractor of the weft and initiate weaving.

As far as the various yarn weaves are concerned, still having a complete range, this has to be provided before mounting with moulded disks of a number equal to the weaves.

The time required for assembling and disassembling the single pieces, angular disks, supporting blades, separators, extractors, which are of different thickness according to each type of yarn, surely represents a drawback.

Another disadvantage is constituted by the needle because the weft yarn is threaded from the rear side and goes through the needle throughout its length (equal to the fabric width) ending at the front side at a suitable eye for hooking of the yarn.

Furthermore, the needle weft yarn is tied to the bobbin colour and is unwound in "defilé" fashion up to the end of the bobbin itself. The same needle cannot bear another yarn of a different colour if the bobbin is not replaced.

In addition there is the difficulty of weft recovery or fabric undoing because rotation takes place in one way only. When the weft yarn breaks up, to replace the knotted yarn, the needle has to be withdrawn with consequent trouble.

With the type of loom just described it is not possible to obtain Jacquard weaves, which are otherwise obtained on common dobby looms or Jacquard machines.

The object of the present invention is a rectilinear loom of the "pick-pick" type, provided with a continuous picking rotating comb and with weftbearer with the option of picking wefts of any colour. It is completely different from the types just described, because all the main members present in the common loom except the sley and shuttle are maintained unchanged in the loom to which the rotating comb is applied.

The lifting and lowering movement of the wrap yarns is carried out with the usual heddles by means of any type of dobby or Jacquard machine and any type of Jacquard weaves may be obtained. In this type of loom the needle takes the weft directly from a front mouth by means of a weftbearer device which from time to time stretches it upon passage of the needle. While in Gentilini-Ripamonti's loom the needle is always tied to the same reel, in the loom provided with the rotating comb according to the invention, there is the possibility of picking according to the pattern, the required colour of weft, a socalled "pick-pick" loom is thus obtained.

The rotating approachment comb does not require any type of blade as previously described. A loom with a rotating comb applied to it according to the invention yields a considerable increase in the production.

The invention is illustrated by way of example in the accompanying drawings, in which:

FIG. 1 is a plan view of the frame of a rectilinear loom of the "pick-pick" type, provided with a rotating comb and weftbearer according to the invention;

FIGURES 2 and 3 are a front view and a schematic rear view respectively of the loom itself;

FIGURES 4 and 5 are front view and a side view respectively of a detail of a toothed disk;

FIGURES 6 and 7 are a front view and side view respectively of the detail of a spacer disk;

FIG. 8 is an enlarged view of a portion of the toothed disk of FIG. 4;

FIG. 9 shows schematically a toothed disk with the warp yarns in the opening position, with the weftbearing needle in the entering position;

FIG. 10 is similar to FIG. 9 but with the warp yarns already matted around the needle;

FIG. 11 is a perspective enlarged view of the needle detail with the weft yarn threaded in the feeding step;

FIG. 12 is similar to FIG. 11 and shows the needle in the return step with the warp yarns matted and the weft stretched;

FIG. 13 shows the weftbearer device at the time it stretches the weft yarn at the needle mouth;

FIG. 14 shows on an enlarged scale the needle detail with the threading mouth at the front side.

As may be seen from FIG. 1 of the drawings, showing in a plan view the frame of a loom drawn in a thin line, indicated instead in solid lines are the rotating comb 1, the insertion control 2, the weftbearer device 3, pulley 4 located rearwardly for the brake provided for any work interruption. The rotating comb 1 comprises a toothed disk 5, a circular spacer 6 provided in a number according to the warp width in comb.

In FIG. 1 at 7 is indicated also a usual comb for the warp reduction. Control 2 comprises sprocket wheels 8 arranged in spider fashion for movement of the chain 9 for the insertion of the needle 11 and chain 10 for unthreading of the needle 11 upon withdrawal. At 12 (FIG. 2) the fabric feeding control box is indicated.

The general control (not shown) of all the members takes place by means of other spider-like sprocket wheels arranged in a suitable position according to the type of loom whereby during operation running is almost noiseless, all movements taking place continuously.

In FIGURES 2 and 3 may be seen the suction device 13 of the weft yarn *t* which holds it to thread the needle 11. Each toothed disk 5 coupled with a spacer disk 6, in a number varying according to the type of loom, forms, as already mentioned, the rotating comb.

Said toothed disk 5 presents (FIG. 8) an aperture adapted for passage of the needle 11 and at 14 the weft outlet for approaching of the weft itself and then the fabric formation.

It has to be noted that the number of disks coupled 5–6 does not correspond to the number of warp yarns in comb, but is equal to about the same number of teeth of the reduction comb 7.

In FIG. 9. the warp yarns O–O' may be seen in the opening position with the weftbearing needle 11 moving in the direction of arrow E.

In the drawing the arrow E indicates the feeding direction, while in FIG. 10, the arrow indicates the return step U, the warp yarns being already matted around the needle 11. After the needle enters back in its housing 15 (FIG. 1) the weft is beaten at B and cut.

The weftbearer device 3 (FIG. 13) is composed of as many levers 16 as is the number of colours to be inserted; such levers move the drawers 17 which, according to the setting of the continuous paper or the dobby control, place the weft yarn for threading of the needle 11.

The weft yarns coming from reels 18, which unwind in "defilé" fashion pass by means of the above mentioned weft-bearer device 3 and are held by means of the suction device 19 until needle 11 is threaded.

From FIG. 14 it may be seen that in the front portion of the needle there is the threading mouth 20 having an inward hook-shaped small bill 21; the latter once it has fitted the yarn and inserted it in the rotating comb 1, allows sliding of the weft yarn still holding it slightly stretched until the weft is approached.

The needles provided in the present device are eight in number, independent from each other so as to allow odd weft picks of the so-called "pick-pick" type.

In case of weft rupture no unthreading whatever of the needle 11 is required; furthermore, weft recovery or undoing of the defective fabric piece is allowed. Selvedges are tied by means of some yarns of the selvedge itself working at double English row.

The loom thus far described provided with a continuous picking rotating comb presents the following advantages:

(a) Continuous picking of the weft;

(b) Production increase at high speed with maximum noiselessness;

(c) Possibility of using any type of yarn for the production of the fabric with any weave machine including Jacquard machines;

(d) Insertion of weft holding needles independent from each other;

(e) Weftbearer controlled directly by the weave machine allowing an unlimited selection of weft colours.

What is claimed is:

1. A rectilinear loom of the "pick-pick" type comprising, in combination, a continuously unidirectionally rotating picking comb composed of a plurality of coaxial circular disks axially separated by coaxial annular spacers; a reduction comb; the number of disks corresponding to the width of the warp in the reduction comb; heddles reciprocating the warp yarns to provide sheds; said picking comb being formed with a plurality of grooves in its periphery each extending rectilinearly parallel to the axis of said picking comb, said grooves being spaced equiangularly of the circumferential periphery of said picking comb; a plurality of weft bearer needles equal in number to said grooves and insertable independently into, and completely retractable independently from, said grooves; a needle insertion control adjacent one axial end of said picking comb and supporting said needles to extend in alignment with said grooves in the retracted positions of said needles; dobby-controlled weft feeding means positioned between said one axial end of said picking comb and the inner ends of said needles and operable to selectively position any one of a plurality of weft yarns in advance of the inner end of a needle, in accordance with the dobby pattern, for direct engagement with the inner end of the needle; said weft feeding means feeding the weft yarns transversely of the axis of the picking comb from one side thereof; suction means at the other side of the picking comb holding the free ends of the weft yarns for extension of the weft yarns transversely of the picking comb and, except for the selectively positioned weft yarn, out of the path of needle reciprocation; chain feeding means included in said insertion control and operable, as said grooves successively reach a first angular position relative to said weft feeding means, to successively advance said needles into and through the grooves to successively engage the weft yarns and lay them through said grooves; said chain feeding means, as said grooves successively reach a second angular position beyond said first angular position, successively retracting said needles completely from said grooves.

2. A rectilinear loom, as claimed in claim 1, in which said chain feeding means comprises endless chain means having adjacent runs in angularly spaced relation relative to the periphery of said picking comb; one of said adjacent runs moving continuously toward said one axial end of said picking comb, and the other of said adjacent runs moving continuously away from said one axial end of said picking comb.

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