

June 23, 1936.

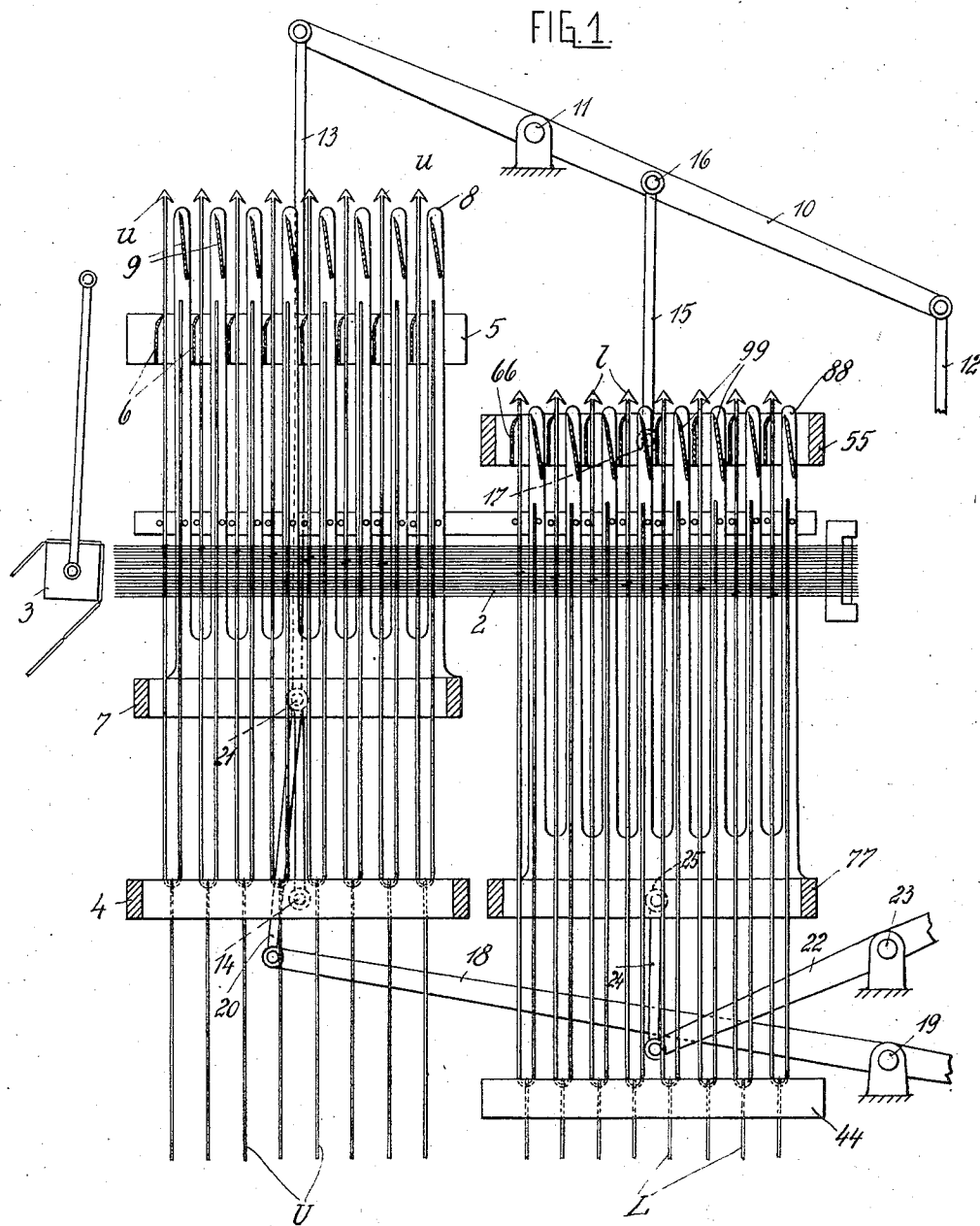
K. PETZOLDT

2,045,162

JACQUARD MACHINE

Filed Jan. 21, 1933

4 Sheets-Sheet 1



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June 23, 1936.

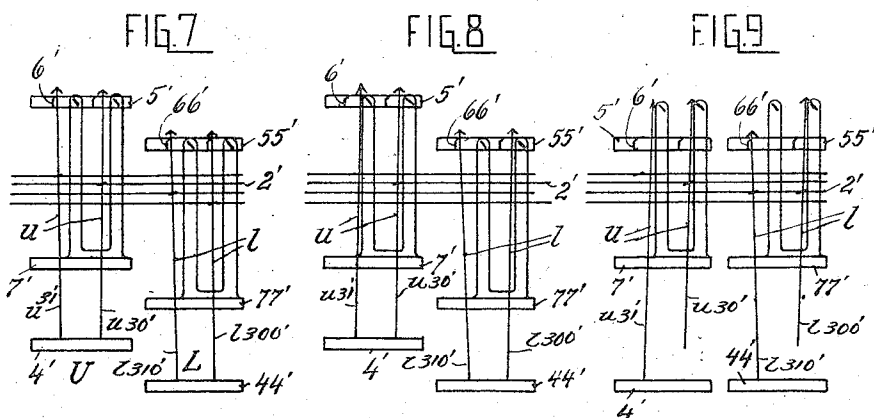
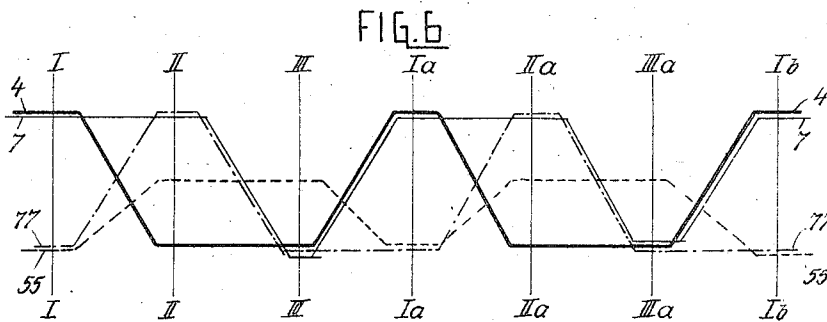
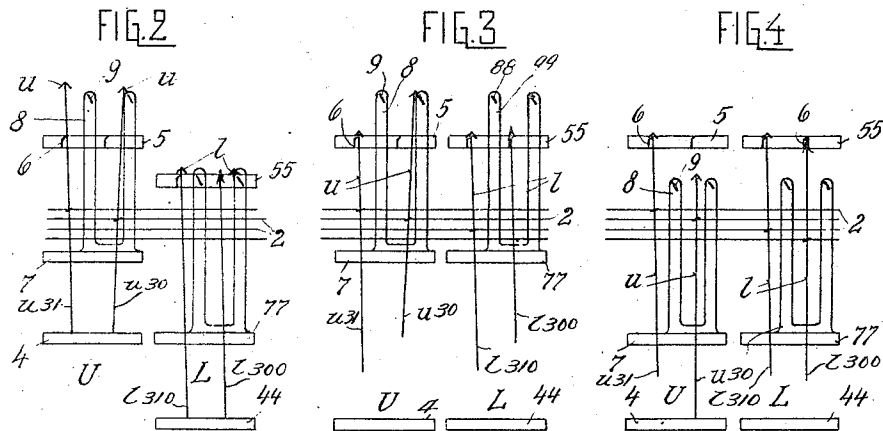
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JACQUARD MACHINE

Filed Jan. 21, 1933

4 Sheets-Sheet 2



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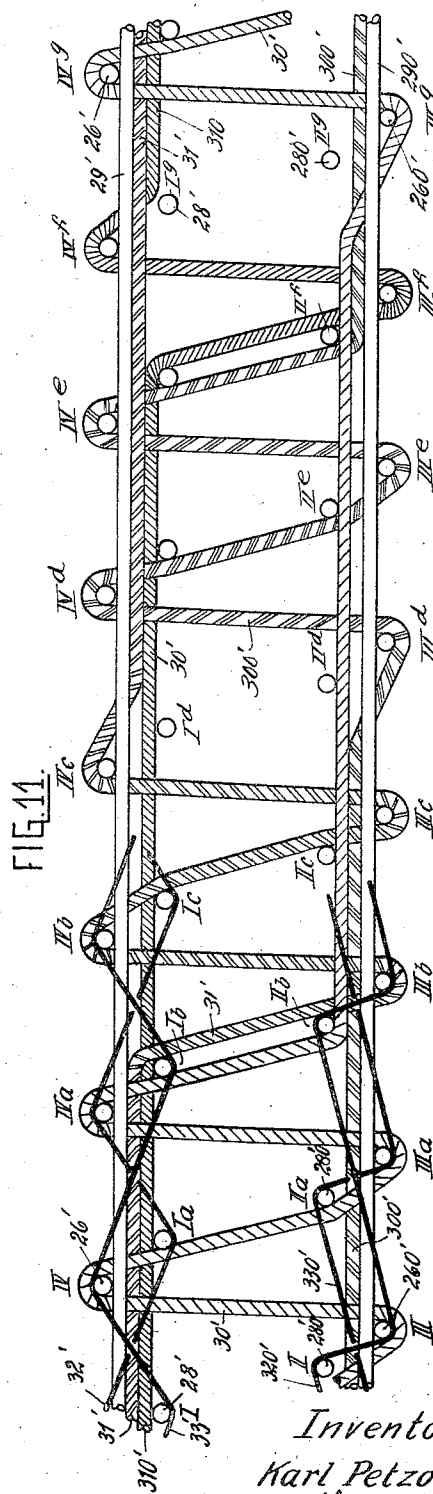
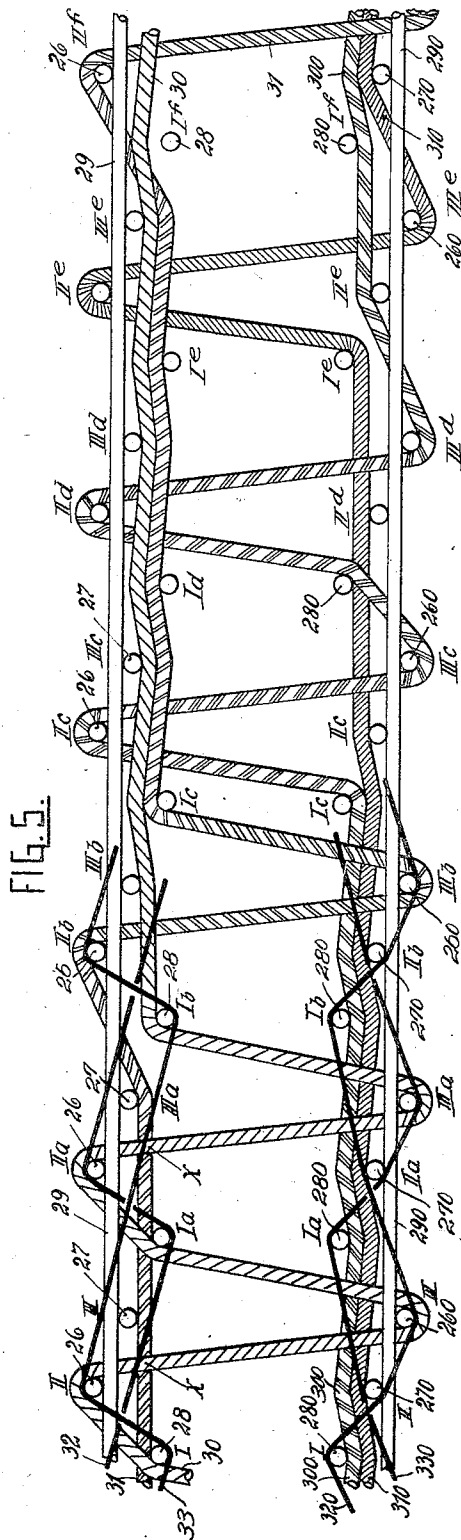
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JACQUARD MACHINE

Filed Jan. 21, 1933

4 Sheets-Sheet 3



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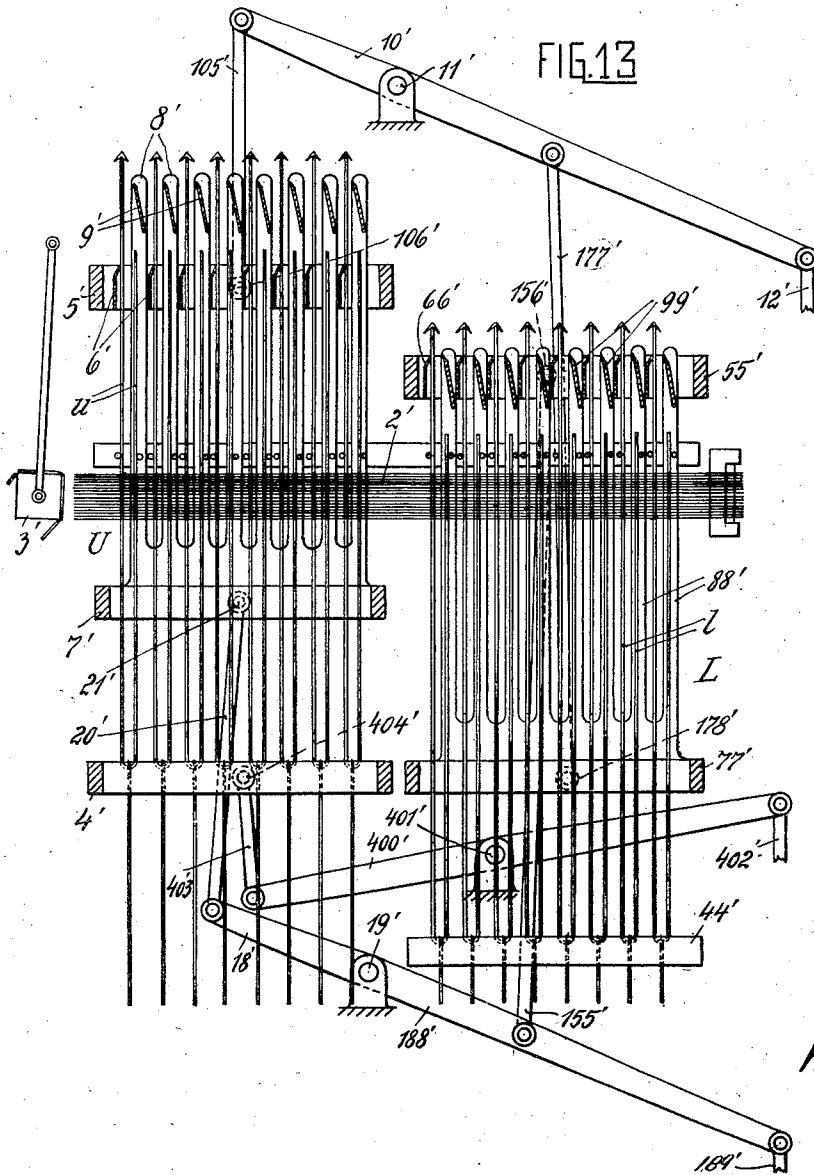
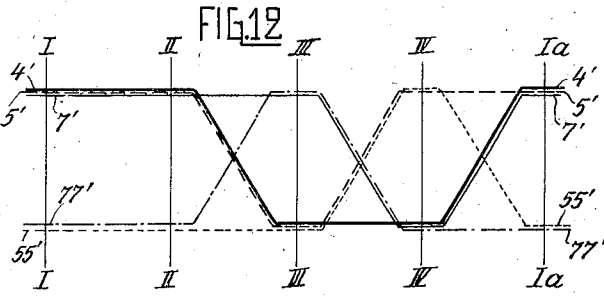
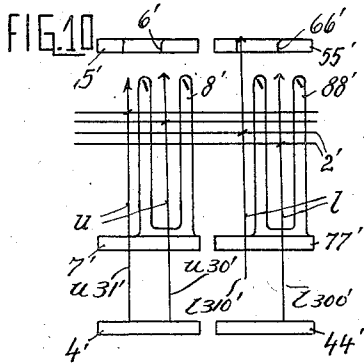
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2,045,162

JACQUARD MACHINE

Filed Jan. 21, 1933

4 Sheets-Sheet 4



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## UNITED STATES PATENT OFFICE

2,045,162

## JACQUARD MACHINE

Karl Petzoldt, Chemnitz, Germany

Application January 21, 1933, Serial No. 652,855  
In Germany September 4, 1931

6 Claims. (Cl. 139—65)

My invention relates to jacquard machines and is particularly useful for the weaving of one-shuttle and two-shuttle double-warp pile fabrics, such as carpets.

5 In the weaving of such fabrics jacquard machines are used whose catches are subdivided into two or more sets, each with a griff and a bottom board. The catches and knives in the several sets are, as a rule, arranged in opposite direc-  
10 tions, unless double-hook catches and knives adapted to be inverted are provided for selecting the lower shed from a single card, as desired.

Jacquard machines of this type are satisfactory, particularly in heavy and wide double-  
15 carpet fabrics with patterns on the back, if weaves are used which permit the individual sets of catches to return into their initial positions at least for one operation when moving from the upper to the lower shed and vice versa, so  
20 that the change from one shed to the other is comparatively gradual and the stress resulting from the inertia of the heavy jacquard mechanism is moderate. If, however, a weave is used which requires abrupt change from one shed to the  
25 other without return of the catches into their initial positions, the stress becomes so great that the machines fail altogether or the fabric becomes defective. Besides, operation under heavy stress is not desirable with respect to efficiency and  
30 economy.

It is an object of my invention to eliminate this drawback so that weaves of various kinds may be used in the same machine, and good fabrics obtained economically and without dif-  
35 ficulty with all weaves.

To this end I provide in each set, in addition to the usual fixed or moving bottom board and to the usual fixed or movable griff, a second movable griff which on account of its shape, will be referred to as "the grid". The fixed or movable  
40 griff of the set engages those catches which are in a definite position, for instance, those catches which have not been deflected by the needles, while the grid engages those catches which have  
45 been deflected. I also provide means for effecting relative movement of the members in each set, i. e. for displacing its movable members with respect to each other and to the fixed member. By providing the grid referred to, I obtain  
50 certain fabrics of good quality under economical conditions and without difficulties which could not be made at all, or only under less satisfactory conditions, in machines without the grid, for instance double-shuttle triple-weft double-carpet  
55

fabrics or a single-shuttle two-weft double carpet fabrics, both with patterns at the back.

In the drawings affixed to this specification and forming part thereof, two sets of catches in a jacquard machine for weaving two-shuttle triple-  
5 weft double-carpet fabrics and two sets of catches for weaving single-shuttle double-weft double-carpet fabrics embodying my invention are illustrated diagrammatically by way of example. The drawings also show two kinds of carpet fab-  
10 rics and diagrams illustrating the several weaving operations.

In the drawings

Fig. 1 is an elevation showing the two sets for weaving two-shuttle triple-weft double-carpet  
15 fabrics, one set for the upper, and one set for the lower pile threads, and means for operating the sets,

Figs. 2, 3 and 4 are diagrams illustrating various positions of the parts shown in Fig. 1 for  
20 weaving the two shuttle triple-weft double-carpet fabric of which

Fig. 5 is a longitudinal section,

Fig. 6 is a time-stroke diagram illustrating the movements of the parts for a complete cycle in  
25 the weaving of the fabric shown in Fig. 5,

Figs. 7, 8, 9 and 10 are diagrams illustrating various positions of the parts shown in Fig. 13 for weaving the single-shuttle double-weft  
30 double-carpet fabric of which

Fig. 11 is a longitudinal section,

Fig. 12 is another time stroke diagram showing the movements of the parts for a complete cycle in the weaving of the fabric illustrated in Fig. 11,  
35 and

Fig. 13 is an elevation showing the two sets for weaving single-shuttle double-weft double-carpet fabrics, one set for the upper, and one set for the lower pile threads, and means for operating the  
40 sets.

Referring now to the drawings, and first to Fig. 1, the catches for the upper and the lower pile threads are arranged in two sets, one set U for the upper, and one set L for the lower pile threads being shown by way of example, it being understood that any number of sets may be provided as required. The set U for the upper pile threads is equipped with double-hook catches *u* and the set L for the lower pile threads is equipped with double-hook catches *l*. The double-hook catches  
45 *l* and *u* are so arranged, in manner per se known, that they automatically return into their initial positions after having been released by their lifting means, unless controlled by the jacquard card. *2* are needles by which all catches *u* and *l* in the  
55

respective sets U and L are deflected, and 3 is the usual prism for the jacquard cards by which the needles 2 are operated.

Each of the sets U and L has three members for moving, i. e. raising and lowering its catches *u* or *l*, as will now be described. In the set U, 4 is a movable bottom board for lifting all the catches of a set together. 5 is a griff which is fixed in central-shed position, with knives 6 for engaging those catches which have not been deflected by the needles 2 in consequence of the operation of the prism 3, and 7 is the grid referred to for engaging those catches *u* which have been deflected by the needles 2. The grid 7 is another but movable griff, with fingers 8 for supporting its knives 9. The fingers are so long that they extend between and beyond the knives 6 of the fixed griff 5. The knives 9 of the grid 7 are arranged on that side of each catch *u* which is opposite to the corresponding knives 6 of the fixed griff 5.

In the set L for the lower pile thread, the bottom board 44 is fixed in lower-shed position and the griff 55, with its knives 66, and the griff 77, with its fingers 88 and knives 99 on the fingers, are movable.

The bottom board 4 in the set U and the griff 55 in the set L are connected so as to move together, but in opposite directions and through strokes of different lengths. 10 is a double-armed lever which is fulcrumed at 11 and is operated by a rod 12 at one of its ends. The rod 12 is reciprocated by any suitable means (not shown) such as a jacquard eccentric. 13 is a link which connects the free end of lever 10 to a pivot 14 on the bottom board 4, and 15 is a link which is connected to a point 16 intermediate the fulcrum 11 of the rocking lever 10 and the end where the rod 12 engages the lever. The lower end of the link 15 is connected to the griff 55 at 17. As the arm to which the bottom board 4 is connected, is longer than the arm to which the griff 55 is connected, the bottom board 4 moves through a greater distance than the griff 55 for a given angular displacement of lever 10.

Means independent of the rocking lever 10 are provided for operating the grid 7 in the set U and the grid 77 in the set L. 18 is a rocking lever which is fulcrumed at 19, and 20 is a link which connects the free end of the rocking lever 18 to the grid 7 at 21. 22 is a rocking lever which is fulcrumed at 23, and 24 is a link which connects the free end of the rocking lever 23 to a point 25 on the grid 77. The mechanism for operating the grid levers 18 and 22 forms no part of the invention and will not be described.

The fixed griff 5 in the set U, the movable griff 55 in the set L, and the grids 7 and 77 of both sets are so designed that they can assume positions at an angle of 180° to those illustrated in Fig. 1, placing their knives at the opposite side of the catches as compared with Fig. 1. Thus, the knives 6 of griff 5 will then be at the right of the catches. This modification is provided if it is desired that the knives 6 of griff 5 would engage the deflected catches, and the fingers 8 of grid 7 should engage the undeflected catches, conversely to the operation described with reference to Fig. 1. Some manufacturers prefer unperforated jacquard cards to perforated ones, and this is considered by the relative position of the catches and knives.

Referring now to Figs. 2 to 5, and first to Fig. 5, this is a longitudinal section of a two-shuttle triple-weft double-carpet fabric with a pattern at the back. In this fabric, 26, 27 and 28 are the

three upper weft threads and 29 is the upper wadding warp. At the back of the weave, 260, 270 and 280 are the three lower weft threads and 290 is the lower wadding warp. 30 and 31 are two of the upper pile threads. The threads are distinguished by their shading, the thread 30 being shaded lightly and the thread 31 being shaded with pairs of parallel lines at a short distance from each other. 300 and 310 are two of the lower pile threads, the pile threads 300 being shaded with three parallel lines and the pile thread 310 being shaded darkly. 32 and 33 are the upper binding threads which are shown in black, and 320 and 330 are the lower binding threads, also shown in black. The pairs of weft threads at the upper and lower sides of the weave are marked with Roman characters. Thus, the first pair of weft threads 28 and 280 is marked I, the corresponding pair of threads 26 and 270 is marked II and the pair 27 and 260 is marked III.

The weaving of the two shuttle triple-weft double-carpet fabric illustrated in Fig. 5 will now be described, the time-stroke diagram Fig. 6 showing the corresponding movements of the jacquard machine.

As shown in Fig. 5, the pattern of the fabric is such that, beginning from the left, two pile loops are formed on the upper side of the fabric by the upper pile thread 30 (shaded lightly) at II and IIa, one pile loop is formed by the other upper pile thread 31 (shaded with pairs of parallel lines) at IIIb, two pile loops are formed by the lower pile thread 300 (shaded with three parallel lines) at IIc and IId, one pile loop is formed by the other lower pile thread 310 (darkly shaded) and the last loop illustrated is again formed by the upper pile thread 31.

It is understood, of course, that any pattern may be woven and that the pattern need not begin at the extreme left of the fabric, as shown in Fig. 5, nor is it necessary that the wefts should be inserted in the order which will be described by way of example only. Every portion of the fabric shown can be woven on the machine. The units U and L are interconnected by double-armed lever 10 but this does not diminish the flexibility of the pattern which is determined by the pattern of the jacquard card. The kind of drive to be used is determined by the time-stroke diagrams but the diagrams are not determined by the kind of drive. In other words: A certain pattern is selected and the drive is adapted to the pattern, not the pattern to the drive. The kind of drive required for a given pattern is determined by the movements the drive has to perform to obtain the pattern. In most cases, two or more drives will be combined.

When the first pair I of wefts is picked, all upper pile threads 30 and 31 are in the upper, and all lower pile threads 300 and 310 are in the lower shed. Fig. 2 shows the corresponding positions of catches *u* and *l*. In the set U for the upper pile threads 30, 31, all upper-pile catches *u* are raised into the upper shed by the bottom board 4, while in the set L for the lower pile threads 300, 310, all catches *l* rest on the bottom board 44 which, as mentioned, is permanently fixed in the lower-shed position. At the same time, in the set U, the grid 7 has been moved into its topmost position as it is to select those catches *u* which will be deflected by the needles 2 for the subsequent operation in conformity with the pattern. In the set L, the griff 55 and the grid 77 are in their lowermost position.

While the pair I of wefts is picked, the card on

the prism 3, through the medium of needles 2, selects the catches *u* for the upper pile thread 30, which now is the pattern thread.

In the pair II of wefts, the pattern upper pile thread 30 must be above the weft thread 26, while all other pile threads are in the central shed and between the two shuttles. Fig. 3 shows the corresponding positions of catches *u* and *l*. The shed is formed by lowering the bottom board 4 of the set U, so that all non-deflected catches *u* descend until they are arrested in central-shed position by the fixed griff 5, as shown for the catch *u* at the left. The deflected catches *u* which hold the upper pile threads 30, are suspended on the fingers 8 of grid 7 in their topmost position, as shown for the catch *u* at the right. In the set L, all catches *l* are non-deflected and are raised from lower-shed into central-shed position by the griff 55, as shown in Fig. 3. When the catches are in this position, the pair II, II of wefts is picked.

In the pair III, III, the same upper pile thread 30 which has just formed the pile loop at II and is above the weft thread 26, now forms part of the pattern at the back of the fabric, the lower weft thread 260 passing above the pile thread 30. The thread 30, therefore, passes from the upper-shed position directly into the lower-shed position while all other pile threads float and remain in central-shed position. This abrupt change from the upper to the lower shed at X which was impracticable or at least undesirable in machines of old type, on account of the heavy stress, as explained above, involves no difficulties in my machine and is effected by moving the grid 7 in set U into its lowermost position from its topmost position, as shown in Fig. 4, which thereby moves into lower-shed position any catches *u* for the pattern threads 30 which are suspended on the fingers 8 of grid 7, as shown for the catch *u* at the right in Fig. 3. The catches *l* for the floating lower pile threads remain suspended in central-shed position on the griff 55 whose position is the same as for the preceding operation, Fig. 3. When the pair III of wefts has been picked in this position, a row of pile loops has been completed in the upper and lower cloths.

The same sequence of operations is repeated for the three pairs Ia, IIa, IIIa, Ib, IIb, IIIb, etc. The corresponding movements of the upper and lower binding threads 32, 33 and 320, 330 (black) are without importance for my invention and appear from Fig. 5 without explanation.

Fig. 6 is a time-stroke diagram illustrating the movements for seven pairs of wefts. The strokes or movements of the various parts are plotted against time, as follows: The movement of the bottom board in set U is indicated by the heavy line 4 and the movement of the grid 7 in set U is indicated by the thin line 7. For the set L, the movement of the grid 77 is indicated by the dot and dash line 77, and the movement of the griff 55 is indicated by the dotted line 55, for seven pairs of wefts as indicated by the Roman numerals. The vertical lines in the diagram indicate that the bottom board 4 and the griff 55 start moving and are arrested at the same time. Thus, the first break in the heavy line showing the movement of bottom board 4 is vertically above the first break in the dotted line showing the movement of griff 55, and so on throughout the diagram.

As mentioned, the upper pile thread 30 is the pattern thread also in the second row of pile loops, as the card on the prism 3 again deflects

the same catches *u*, and the three movements of the parts of a jacquard machine are repeated without variation for each row of pile loops, the second row of loops, with the pairs Ia—IIIa of wefts, is formed in the manner described. In the third row of pile loops, the upper pile thread 31 is to be the pattern thread. The corresponding catches *u* are selected by the card on the prism 3 during the formation of the first pair Ib of wefts allotted to this row. It should be noted that all catches *u* and *l* are in the same initial position for all pairs of weft numbered "I", i. e., in this initial position all upper pile threads are in the upper, and all lower pile threads are in the lower shed. Obviously, in the pairs IIb and IIIb of wefts, the upper pile thread 31 whose catch *u* is now deflected, is first moved into the upper shed and then into the lower shed by the movements of grid 7 in set U while all other pile threads remain in the central shed.

In the fourth row of pile loops, with the pairs Ic to IIIC, the lower pile thread 300 is to be the pattern thread. In this fourth row, that catch *l* of set L is deflected which holds the lower pile thread 300. By the upward movement of grid 77 in set L on whose fingers 88 the deflected catches *l* are suspended, the pattern thread 300 is raised into the upper shed for the next pair IIc of wefts. As the catches *u* in the set U are not deflected, the upper pile threads get into the central shed with the floating lower pile threads, the catches *u* riding on bottom board 4. For the pair IIIC of wefts in which the lower pile thread forms the pattern on the lower cloth, the shed is inverted, the griff 55 in set L remaining in its position, holding catches *l* of the floating threads 310 suspended, while the grid 77 is lowered with the catches *l* for the pattern threads 300.

For the pattern of the next row of pile loops, with the pairs Id to IIId of wefts, the patterning lower pile thread 300 is transferred between the upper and lower sheds in a similar manner. For the next row of pile loops, the card on prism 3 selects the catch *l* of the other lower pile thread 310 so that in the pairs IId to IIId of wefts this thread is the pattern thread while the thread 300 floats again in the central shed. Finally, the upper pile thread 30 is used again as the pattern thread for the pairs If to IIIf as described for the pairs I to III.

As mentioned, the vertical lines in the time-stroke diagram Fig. 6 shows that the movements of the bottom board 4 in set U, and of the griff in set L always occur at the same time but in opposite directions, and that the strokes are not of equal length. In the mechanism illustrated in Fig. 1, the two strokes are performed through a single double-armed lever 10 whose arms are of unequal lengths, so that a single eccentric or the like (not shown) is required for operating the bottom board 4 and the griff 55. The diagram also shows that the movements of the grids 7 in set U and 77 in set L are not inter-related and so separate levers 18 and 22 are required for operating the respective grids.

Referring now to Figs. 7 to 13, and first to Fig. 11, the operations for this single-shuttle double-weft double-carpet fabric with a pattern at the back, as shown in this figure, will be understood without detailed explanation from the description of Fig. 5, the corresponding threads having primed reference numerals, and the parts of the machine, with the exception of the catches *l* and *u*, and the sets L and U, having primes on their reference numerals in Figs. 7 to 13, the numerals

being otherwise the same as in Figs. 1 to 6. However, while in the fabric shown in Fig. 5, the same operations are repeated for the several pairs of weft threads 28, 230, etc., in Fig. 11 four distinct operations are performed on the four subsequently inserted weft threads 28', 280', and 28'', 260'. The operations, as carried out by the two sets shown in Fig. 13, are indicated by the numerals I and IV in the upper, and II and III in the lower shed.

The patterning operation is performed as follows: The lower pile thread 30' is the pattern thread for weft pairs I to IV, Ia to IVa, and Ig to IVg. The upper pile thread 31' is the pattern thread for pairs Ib to IVb, and Ic to IVc. The lower pile thread 300' is the pattern thread for pairs Id to IVd, and Ie to IVe, and the upper pile thread 31' is the pattern thread for pairs If to IVf.

For the insertion of upper weft I (thread 28') in Fig. 11, the members of the set U are in their uppermost, and the members of the set L are in their lowermost positions, as shown in Fig. 7. For the next weft II in the lower shed (thread 280') they remain in the same position, Fig. 8, but while the weft thread 280' is picked, the catches are selected for the next shed by the jacquard card. For the weft III in the lower shed (thread 260'), Fig. 9, all catches *u* for the upper pile threads are deflected and are retained by the grid 7' which remains in the upper-shed position. The deflected catches *l* for the lower pile threads are lifted into the upper shed by the grid 77', while those catches which have not been deflected, remain in lower-shed position on the bottom board 44'. Without operation of the needles 2', the opposite shed for the upper weft IV is formed by raising the griffs 5' and 55' and lowering the grids 7' and 77' in both sets, as shown in Fig. 10.

Referring now to the time-stroke diagram Fig. 12, the movements of the bottom board 4' in the set U, the grid 7' in the same set, the griff 55' in the set L and the grid 77' in the same set are illustrated in the same manner as in Fig. 6. In this diagram, the vertical lines of diagram 6 have been omitted but it will appear that again the breaks in the lines showing the movements of bottom board 4' and griff 55' are vertically superimposed. In addition, the movement of the griff 5' in the set U is illustrated by a broken line. It will appear that the griff 5' in the set U and the grid 77' in the set L on the one hand and the griff 55' in the set L and the grid 7' in the set U on the other hand, move in opposite directions but their respective movements begin at the same time and are similar.

Referring now particularly to Fig. 13, the double-armed lever 10' is provided as described with reference to the lever 10' in Fig. 1, and fulcrumed at 11', with the rod 12' at one end for operating the lever 10', but in this case the griff 5' in the set U and the grid 77' in the set L are connected to arms of the double-armed lever which are of equal length so that the griff and the grid move in opposite directions but perform strokes of equal length. 105' is a link connecting the free end of lever 10' to a pivot 106' on the griff 5', and 177' is a link which is pivotally connected to the lever 10' at a point whose distance from the fulcrum 11' of the lever is equal to the distance of the end to which the link 105' is connected. The other end of the link 177' is connected to the grid 77' at 178'. The bottom board 4' in the set U has a drive of its own, including a lever 400' ful-

crumed at 401', a rod 402' for operating the lever 400' from a jacquard eccentric or the like (not shown) which is connected to one end of the lever, and a link 403' which is connected to the free end of lever 400' and to a pivot 404' on the bottom board 4'. The grid 7' in the set U is operated by the lever 18' as described with reference to Fig. 1. In the present instance, however, the lever 18' has an extension 188' to which is connected a rod 189' for operating the lever 10 through any suitable means (not shown), and the extension 188' is connected to the griff 55' in the set L by a link 155' which is pivoted to the griff at 156'. The arms of the lever 18' and its extension 188' to which the respective links 20' and 155' are connected, are of equal length, so that the griff 55' in the set L and the grid 7' in the set U move in opposite directions but perform strokes of equal length, like the griff 5' in the set U and the grid 77' in the set L. The bottom board 44' in the set L is fixed.

My invention can be applied in connection with looms designed for alternating single and double-shuttle weaving. In this case the fabric of Fig. 11, for example, can be woven, provided the wefts I and II are placed directly opposite each other in order to provide simultaneous picking of these wefts by means of the double shuttle. The wefts III and IV are picked separately since the shed changes between the two. This alternating single and double-shuttle weaving requires only three operations per row of loops. The modifications in the structure of Fig. 13, required to produce this type of weaving are believed to be obvious to those skilled in the art from the previous description.

It will be understood that my novel jacquard machine, by eliminating intermediate positions and abruptly changing the shed as shown at X in Fig. 5, can be operated at a much higher velocity and is therefore more economical and efficient than the machines as designed heretofore. As a rule, a single operation of the card on the prism 3 is required for preparing the catches *u* and *l* for all movements required for weaving a row of piles so that cards, needles and catches are conserved and any unsteadiness of the comparatively long catches is eliminated. Such unsteadiness is the principal cause of defective shedding. If considerations of design, for instance, the type of harness, or other conditions make it desirable, of the catches, griffs, grids, bottom board, etc., of each compartment may be arranged in separate frames, without departing from my invention.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

In the claims affixed to this specification no selection of any particular modification of the invention is intended to the exclusion of other modifications thereof and the right to subsequently make claim to any modification not covered by these claims is expressly reserved.

I claim:—

1. In a jacquard machine, in combination catches arranged in sets, needles for operating the catches of all sets, a jacquard prism for operating said needles, and the following catch moving members per set; a bottom board adapted to engage all catches of its own set, a griff adapted to engage those catches which have been moved into a given position by said needles, and a movable grid adapted to engage those catches which are in a position other than said given position, means operatively connected to one of the mem-



bers in one of the sets, and to another member in another set, for moving the two members together, and means independent of said first-mentioned means for moving another member in each set independently of the member which is connected to said first-mentioned means.

2. In a jacquard machine a set of catches for the upper pile threads, a set of catches for the lower pile threads, needles for operating the catches of all sets, a jacquard prism for operating said needles, and the following catch-moving members per set; a bottom board adapted to engage all catches of its own set, a griff adapted to engage those catches which have been moved into a given position by said needles, and a movable grid adapted to engage those catches which are in a position other than said given position, means operatively connected to the bottom board in said set of upper-pile catches and to the griff in said set of lower-pile catches for moving said bottom board and said griff together in opposite directions and means for moving another member in each set independently of said bottom board and said griff.

3. In a jacquard machine, a set of catches for the upper pile threads, a set of catches for the lower pile threads, needles for operating the catches of all sets, a jacquard prism for operating said needles, and the following catch-moving members per set; a bottom board adapted to engage all catches of its own set, a griff adapted to engage those catches which have been moved into a given position by said needles, and a movable grid adapted to engage those catches which are in a position other than said given position, a double-armed rocking lever whose longer arm is operatively connected to the bottom board in said set of upper-pile catches and whose shorter arm is operatively connected to the griff in said set of lower-pile catches, means for rocking said lever, and means for

moving another member in each set independently of said grid and said griff.

4. In a jacquard machine in combination catches arranged in sets, needles for operating the catches of all sets, a jacquard prism for operating said needles, and the following catch-moving member per set; a bottom board adapted to engage all catches of its own set, a griff adapted to engage those catches which have been moved into a given position by said needles, knives on said griff adapted to engage said catches in a given position, a movable grid, fingers on said grid extending between and beyond the knives of said griff, and knives at the free ends of said fingers adapted to engage those catches which are in a position other than said given position, means operatively connected to at least one member of each set for simultaneously moving said members, and means for moving another member in each set independently of the member which is connected to said first-mentioned means.

5. In a jacquard machine comprising catches arranged in at least two sets, needles and a jacquard prism for deflecting said catches, and the following members for operating said catches in each set; a bottom board adapted to engage all catches of its own set, a griff adapted to engage those catches which have assumed a certain position with respect to said needles and a grid adapted to engage the remainder of said catches; operating means producing relative movement between the members of each of said sets and for correlating the operation of said sets to establish predetermined relationships between the positions of said members.

6. The machine of claim 5 wherein said catches are double-hook catches and wherein one of said members is stationary in at least one of said sets.

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