

(No Model.)

4 Sheets—Sheet 1.

B. H. GLEDHILL.
JAQUARD MECHANISM FOR LOOMS.

No. 526,365.

Fig. 1. Patented Sept. 18, 1894.

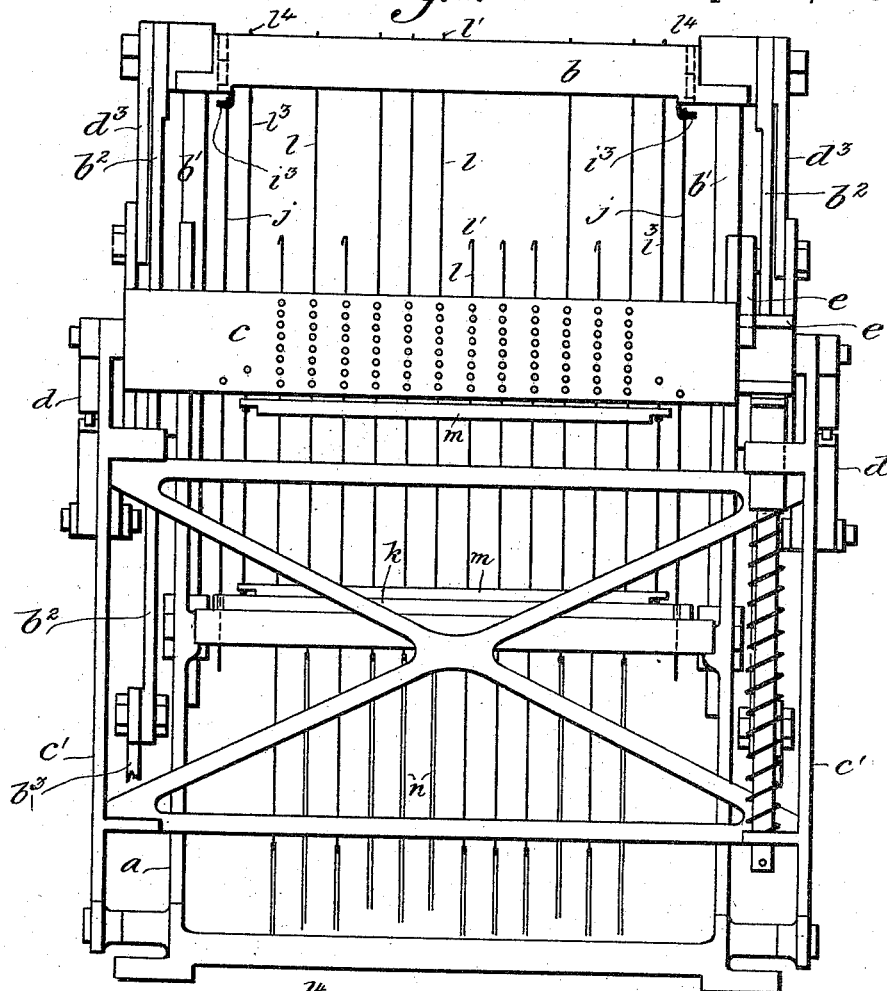


Fig. 3.

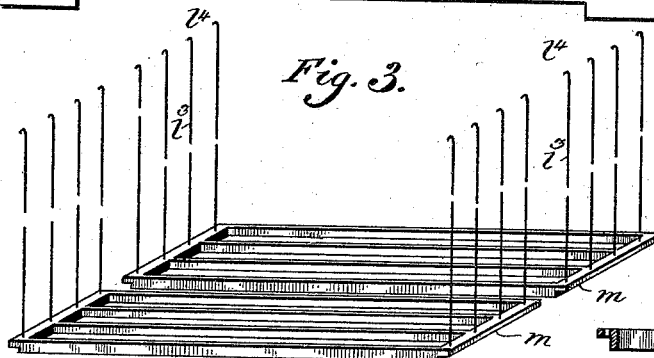


Fig. 4.



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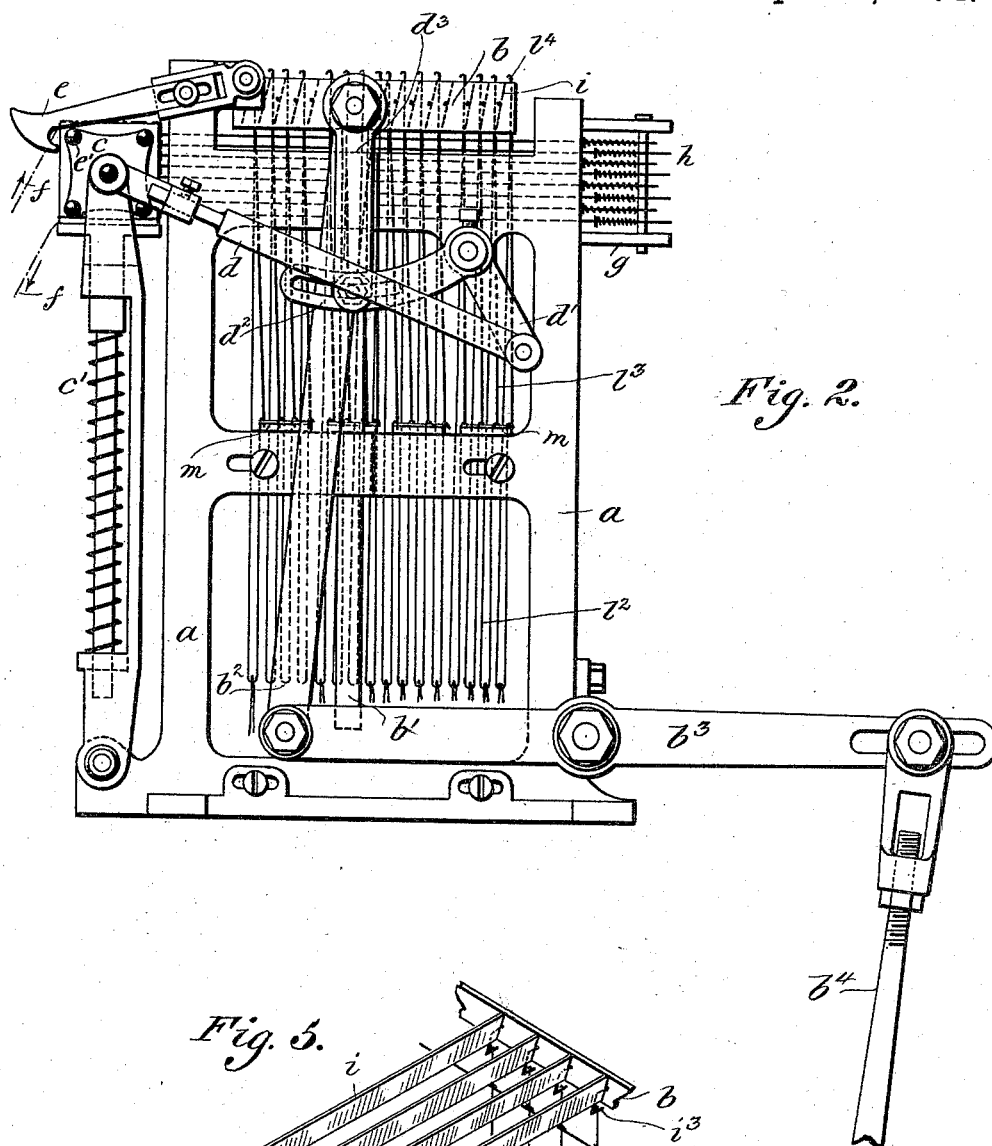


Fig. 2.

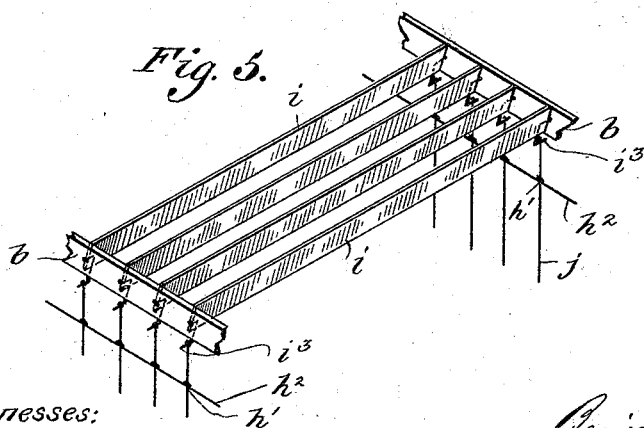


Fig. 5.

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Fig. 6.

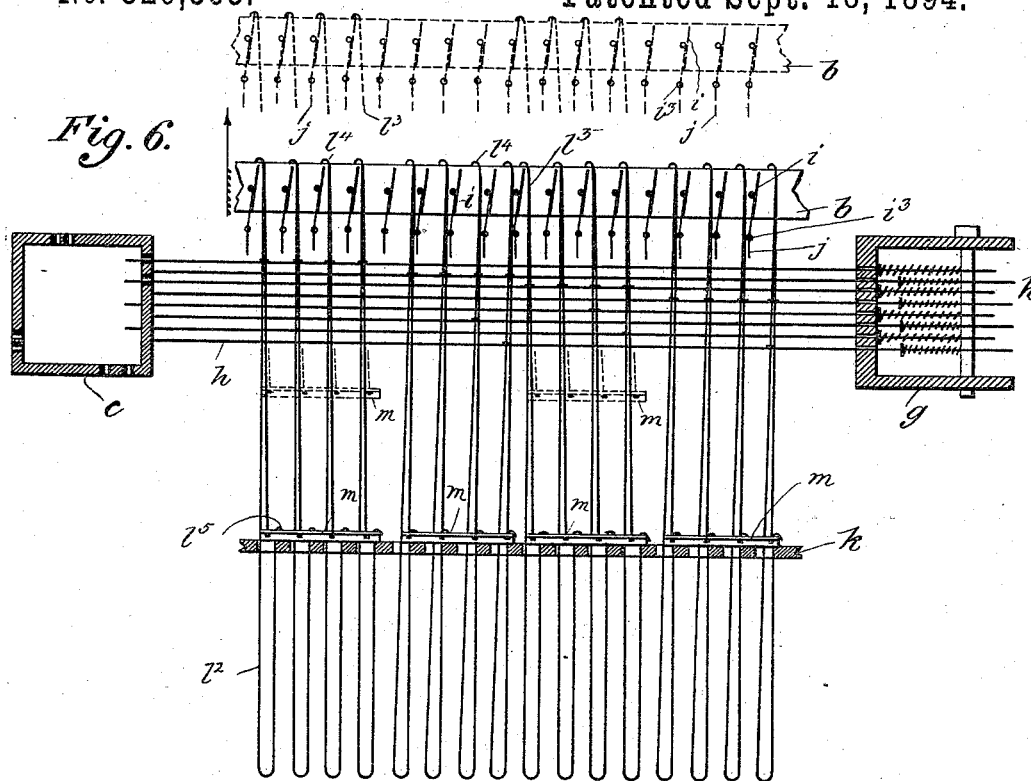


Fig. 7.

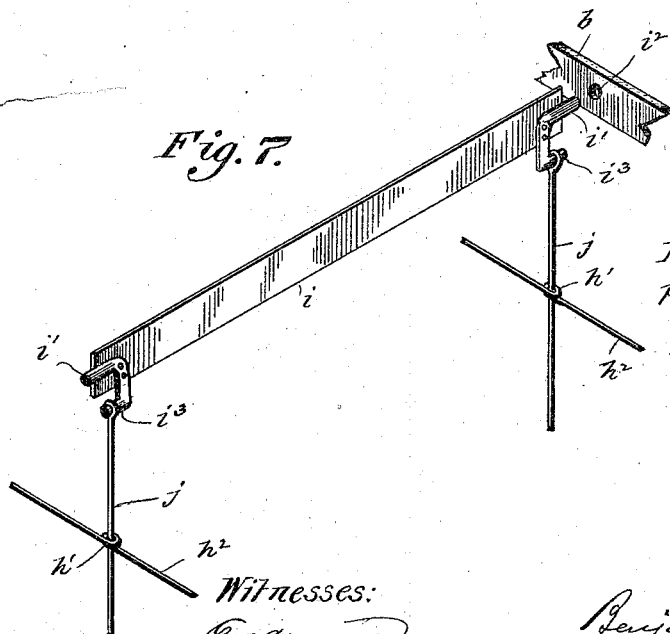
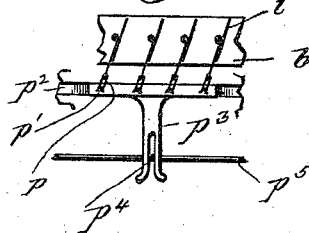


Fig. 11.



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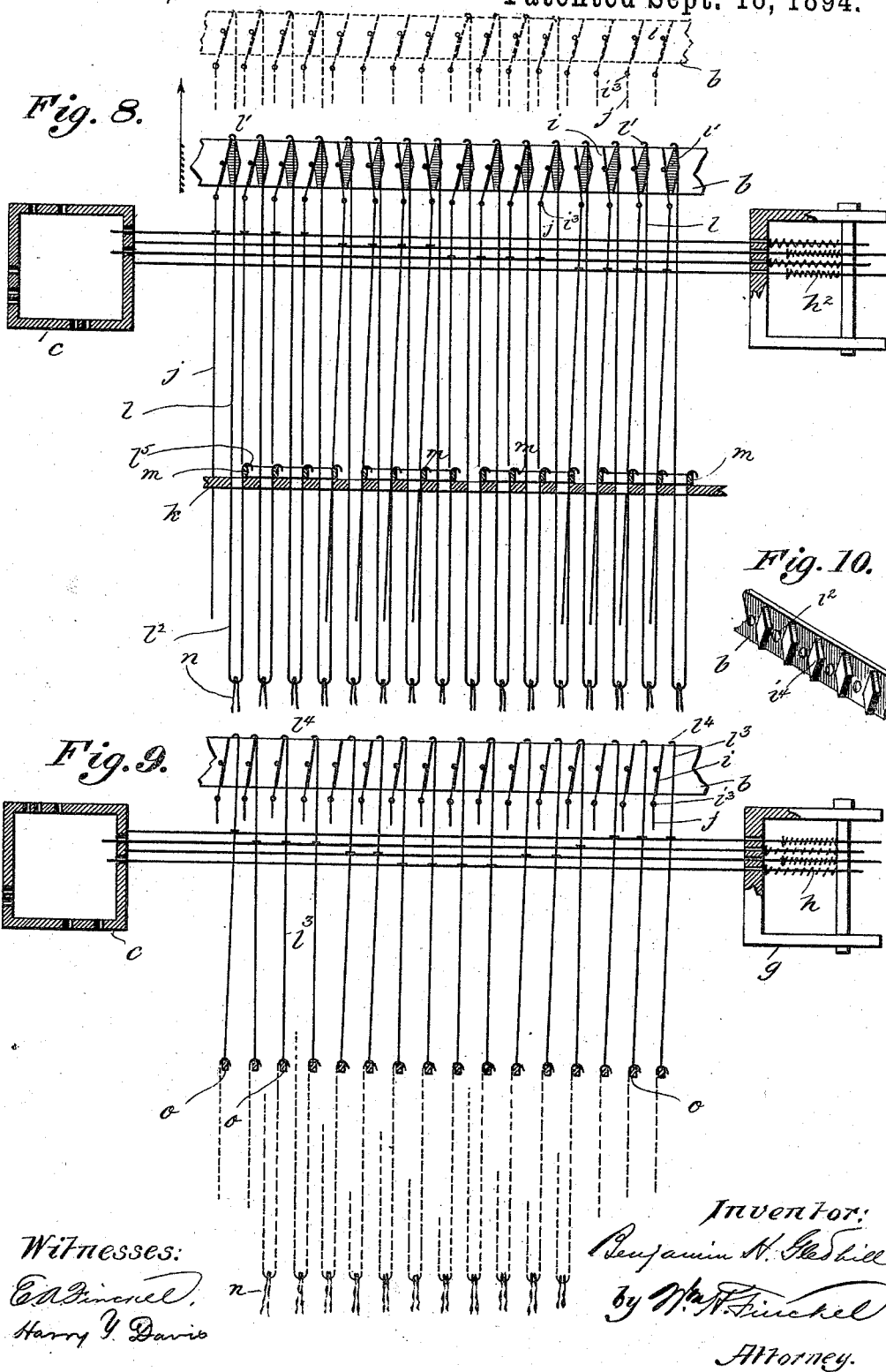
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B. H. GLEDHILL. 4 Sheets—Sheet 4.
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UNITED STATES PATENT OFFICE.

BENJAMIN H. GLEDHILL, OF PHILADELPHIA, PENNSYLVANIA.

JACQUARD MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 526,365, dated September 18, 1894.

Application filed February 14, 1894. Serial No. 500,141. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN H. GLEDHILL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Jacquard Mechanism for Looms, of which the following is a full, clear, and exact description.

This invention relates more particularly to those Jacquard mechanisms which are specially designed for looms for weaving ingrain and other like carpet.

The object of the invention is to provide a mechanism whereby I may produce a fabric in which the pattern and the weave, that is to say, the combination of face and back binding warps, are produced expeditiously and accurately, and without the use of the cumbersome lifting journals heretofore commonly employed in this class of looms.

In my invention, as already indicated, I dispense with the lifting journals, and I operate the warps by a pattern cylinder in sets equivalent to what are commonly known as journal sets, and without the necessity of cutting the pattern cards to form the weave. The pattern is formed by operating the needles from the pattern cards, and the lower face of weave by employing a griff frame having tilting knives, which knives are tilted by means of rods to such an angle that the upper edges of any number of said knives may be placed out of the path of the lifting crooks of the pattern hooks, the upper face of weave being formed by means of lifting frames or bars operated from cylinder and cards by needles and hooks. By thus forming the upper and lower face of weave, I am enabled to dispense with pattern cards having a large number of indexes and one hook to a needle by placing any number of hooks to a needle and operating them variously. By my invention, also, it is possible to change quickly and easily from one to another system or combination or rotation of sets of warp threads.

Having thus stated generally the principle of my invention, I will proceed now to set forth the best mode in which I have contemplated applying that principle, and then will particularly point out and distinctly claim

the part or improvement which I claim as my invention.

In the accompanying drawings illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a front elevation of a Jacquard mechanism, with the griff frame in its elevated position. Fig. 2 is a side elevation, the griff frame being in its lowered position. Fig. 3 is a perspective view of two of the lifting frames. Fig. 4 is a mutilated sectional elevation of one of the lifting frames. Fig. 5 is a perspective view of portion of the griff frame with attached knives and the knife-operating devices. Fig. 6 is a sectional side elevation of a portion of the Jacquard mechanism, showing in full lines all of the griff knives inclined in one direction to engage the hooks of the lifting frames, and showing in dotted lines two of such frames lifted. Fig. 7 is a perspective view of one of the knives and a part of its griff frame and operating mechanism. Fig. 8 is a sectional side elevation of a portion of the Jacquard mechanism, showing the modified form of griff-frame shown in Fig. 10, and illustrating in full lines the movement of the griff-knives so as to miss or clear two sets of the pattern hooks, the dotted lines showing the griff-frame raised. Fig. 9 is a sectional elevation of portion of a Jacquard mechanism in which individual lifting bars are substituted for the lifting frames and also showing a modification in the connection of the needles with the lifting hooks of such lifting bars. Fig. 10 is a perspective view of a portion of the modified griff frame shown in Fig. 8, and Fig. 11 is a side elevation of portions of a Jacquard mechanism showing a modification of the means for operating the knives in sets.

The Jacquard mechanism illustrated in the drawings is what is commonly known as "single lift" having only one means of operating the harness by raising the griff frame, but the invention is applicable with equal advantage to a "rise and fall" jacquard in which the resting frame is lowered; and it is also applicable to a "double lift" jacquard, in which two griff-frames which raise one of two hooks attached to the harness cord; and finally, the invention is applicable also

to any Jacquard mechanism in which hooks and griff-frames are capable of being used in the manner hereinafter set forth.

In one old and common construction of 5 Jacquard mechanism, the griff frame has a vertical motion only and the knives are permanently fixed in one position in the griff frame so that when the griff frame is elevated the knives catch and lift all those hooks 10 which have not been pushed back by the uncut portion of the pattern card on the cylinder, and those hooks which are pushed back are not raised because they are out of the path of the knives. In using this form of 15 jacquard, only those portions of the hooks and harness are operated for which the pattern card is cut to allow the needles to enter the cylinder and thus bring the lifting crooks of the hooks over the upper edges of the 20 knives; and, therefore, a pattern is formed only in the fabric, the weave, that is to say, the face and back binding of weft by warp, being obtained by the use of lifting journals arranged immediately over the warp. Among 5 the disadvantages of this old form of jacquard I may mention that the lifting journals are necessarily of a very cumbrous nature; it is impossible to operate the mechanism, excepting in one determined order; many 30 combinations of weave effects are obtainable only with great difficulty, and, finally, there is excessive wear on the harness and great straining of the warp. To overcome these disadvantages and to dispense with the lifting journals, I construct my Jacquard mechanism as follows:

The frame *a* may be of any usual or approved construction, and the griff frame *b* is mounted thereon by means of the guide- 40 rods *b'* so as to be capable of a vertical motion therein; and this motion is obtained through a connecting rod *b²* jointed to a lever *b³*, which may be pivoted to the frame, the said lever having a connected operating rod 45 *b⁴*, which may derive motion in any suitable manner from the main shaft of the loom.

c is the pattern cylinder of any approved construction, and which may be arranged to rotate in and be held by the frame *c'*, which 50 is pivoted to the frame *a*.

d is a connecting rod, leading from the cylinder to a crank lever *d'* which is pivoted to the frame *a* and has a slotted member *d²* for adjustable connection with an arm *d³* rigidly 55 affixed to the connecting rod *b²* and moving with it.

e is a hook, adapted to engage pins *e'* on the pattern cylinder to rotate said pattern cylinder as it is vibrated upon its frame *c'* 60 by the vibration of the lever *b³* and the connecting mechanism just described.

f is the pattern card.

g is a frame in which a number of needles *h* are supported in horizontal position and 65 transversely of the frame *a*.

The griff frame *b* is provided with a number of knives *i* which may be arranged therein

in sets. The preferred form of arranging these knives in the griff frame is shown in detail in Figs. 5 and 7, wherein the knives 70 are provided with lugs or journals *i'*, projecting from their ends, which are fitted in holes or bearings *i²* in the griff-frame; and from the ends of these knives there depend lugs *i³* by means of which the vertical rods *j* are con- 75 nected to said knives. These rods *j* pass through eyes *h'* in the needles *h²*, so that, by the longitudinal movement of the said needles, the rods *j* are given lateral movement, and thereby the knives are tilted or rocked 80 upon the journals within the griffe frame so as to present their upper edges in planes on one side or the other of their journals for a purpose presently appearing. This movement of the knives may be limited by means 85 of stops *i⁴* on the griff-frames, as shown in Figs. 8 and 10. The lower ends of the vertical rods *j* pass through holes in the resting plate *k*, of ordinary construction, as clearly shown in Fig. 1.

l are the lifting pattern hooks, which may be arranged in sets or otherwise, as desired, and are provided with the crooks *l'*, which are adapted to engage the upper edges of the knives as the said knives may be tilted into 95 the planes in which the hooks move. These hooks *l* have the return bends *l²* to receive the harness cords to operate the warps.

l³ are lifting-hooks applied to warp-lifting frames *m* and provided with crooks *l⁴*, which 100 can be placed in the path of the upper edges of the knives when the griff-frame is at its lowest point. As shown in Figs. 1, 2, 3 and 6, these frame-lifting hooks *l³* may be secured in sets to the lifting frames *m*. These frames 105 are made in the form of grids, and are mounted above the resting plate *k*, and their bars receive the resting crooks *l²* of the return bends of hooks *l* which in turn receive the harness cords *n*, so that when the hooks *l* are not 110 raised by the griff knives, they rest on the bars of lifting frames *m*.

As shown more in detail in Figs. 6 and 9, the hooks *l³* are connected with the needles *h* in sets, so that as the said needles come into 115 operative conjunction with the pattern cylinder and cards, the various sets of hooks may be thrown into or out of alignment with the knives in the griff frame to cause some of said hooks and their lifting frames to be lifted, 120 while others are at rest.

As shown in Fig. 6, by the dotted lines, and reading from the right toward the left, the second and fourth sets of lifting-frame hooks are in position when lifted, while the 125 first and third sets of lifting frame hooks *l³* are not affected by that particular elevation of the griff frame.

As illustrated in Fig. 9, the lifting hooks may be connected with individual or inde- 130 pendent lifting bars *o*, and the said lifting hooks are arranged in sets, or otherwise, for operation by the needles under the action of the pattern cylinder and cards.

In Fig. 11, a modification of the knife-tilting mechanism is shown, and this consists in arranging the knives in sets and providing them with depending forks p , which engage pins p' on a bar p^2 , and these bars are provided with depending forks p^3 , which engage pins or offsets p^4 on a needle p^5 , which corresponds with the needle h^2 .

As illustrated in Fig. 9, the lifting hooks h^3 are susceptible of a variety of combinations with their needles and the knives of the griff frame for controlling various yarns or combinations of yarns in the production of the pattern or weave, and therefore, it is obvious that the invention is not limited to any particular arrangement or combination of hooks and knives for that purpose.

Referring now to the form of the invention shown in Figs. 3, 4 and 6, it will be seen that when it is desired to lift up any set or sets of warp threads to form the face binder, the cylinder and cards being perforated to register with the appropriate needle or needles, the crooks of the lifting-frame hooks h^3 of that particular set or those sets are brought over the complementary knives of the griff frame and when the griff frame is raised, all of the hooks of that set or those sets are raised, with their lifting frames, and thus the face warp binder is formed over the face of the fabric.

The lifting frames, such as shown in detail in Fig. 3, made with a number of united bars, enables the lifting simultaneously of all of the pattern hooks in a given row or number of rows, without regard to the control of such pattern hooks by the pattern cylinder and card. In a Jacquard mechanism supplied with my lifting frames and knives, the loom may be run at greater speed than a loom employing lifting journals, because the parts are few, simple, small and easy of operation. In the case of the individual bars, Fig. 9, the knives and needles contribute to enable me to make up various combinations.

The use of the needles to control the movements of the lifting frames and knives enables me to change the combination or rotation of the sets of warp threads readily and quickly, by cutting the cards for any desired change; and thereafter this change is repeated in the pattern automatically as often as the card containing such change of cutting reappears.

The purpose of tilting the knives is to place the upper edges of any desired number of knives out of the path of the lifting crooks of the pattern lifting hooks, thus allowing all of the hooks in a set or sets to remain down to form the binder on under face of the fabric, notwithstanding whatever position the hooks may have assumed by reason of being under the control of the needle and pattern cylinder and cards.

By means of my invention, I am enabled to produce a fabric having a combination of

pattern and weave without the use of lifting journals or lifting comber boards, and without the necessity of cutting the weave in the pattern portion of the pattern cards; and, obviously, a fabric may be produced having one or more plies or planes or combinations of plies or planes without the necessity of cutting the pattern portion of the pattern cards to form the weave. As a result of this construction, two or three ply ingrain carpets or any combinations of such, may be readily and economically produced without the elaboration of the pattern cards in the manner heretofore common.

What I claim is—

1. In a Jacquard mechanism, a griff-frame, knives pivoted therein and adapted to be tilted to one side and the other of their axes, rods vertically depending from such knives for tilting them, a pattern cylinder and cards, and needle connections between the said rods and pattern cylinder for moving the said rods and thereby tilting the said knives, in combination with means to raise and lower the griff-frame, pattern-lifting hooks adapted to be engaged by the knives and having return bends terminating in crooks, lifting devices, such as frames or bars with which such crooks are engaged, lifting hooks on such lifting devices, and needles connecting such last named hooks with the pattern cylinder and cards, substantially as described.

2. The combination, in a Jacquard mechanism, of a griff-frame having tilting knives, a pattern cylinder and cards, means for raising and lowering the griff-frame, a resting plate, lifting frames provided with lifting hooks, needles connecting said hooks with the cylinder and cards and adapting said hooks to be engaged by the knives as the said griff-frame is raised, rods applied to the tilting knives, and needles connecting said rods with the cylinder and cards, substantially as described.

3. The combination, in a Jacquard mechanism, of a griff-frame, knives pivoted therein, operating rods for said knives, needles connecting said rods in sets, a cylinder and pattern cards by which said needles are operated, lifting frames, pattern hooks having return bends terminating in crooks to engage said frames to lift the harness, lifting hooks for said frames adapted to be engaged by the griff knives, and needles connected with said hooks and themselves operated by the pattern cylinder and cards, substantially as described.

4. In a Jacquard mechanism, the combination of a griff-frame and means to lift it, knives having journals pivoted in said griff frame and adapted to be tilted so as to present their upper edges to one side or the other of their axes, lugs extending from such knives, rods depending from said lugs, needles attached to said rods, harness-lifting devices comprising lifting hooks adapted to be engaged by the said knives, and a pattern cyl-

inder and cards adapted to operate the knife-rod operating needles, substantially as and for the purpose described.

5 In a Jacquard mechanism, a griff-frame and means to raise and lower it, knives pivoted in said griff-frame, needles corresponding in number with the desired number of sets of knives, rods depending from such knives and connected with the needles in
10 sets, and a pattern cylinder and cards for operating the said needles and thereby tilting the knives to one side or the other of their

axes, in combination with lifting hooks with which the harness cords are connected and having crooks, extending above the knives 15 when the griff-frame is in its lowermost position, substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand this 9th day of February, A. D. 1894. 20

BENJAMIN H. GLEDHILL.

Witnesses:

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