L. FUCHS.

JACQUARD MECHANISM FOR LOOMS.

APPLICATION FILED NOV. 7, 1914.

1,214,449.

Patented Jan. 30, 1917.

4 SHEETS—SHEET 1.

Fig. 1.

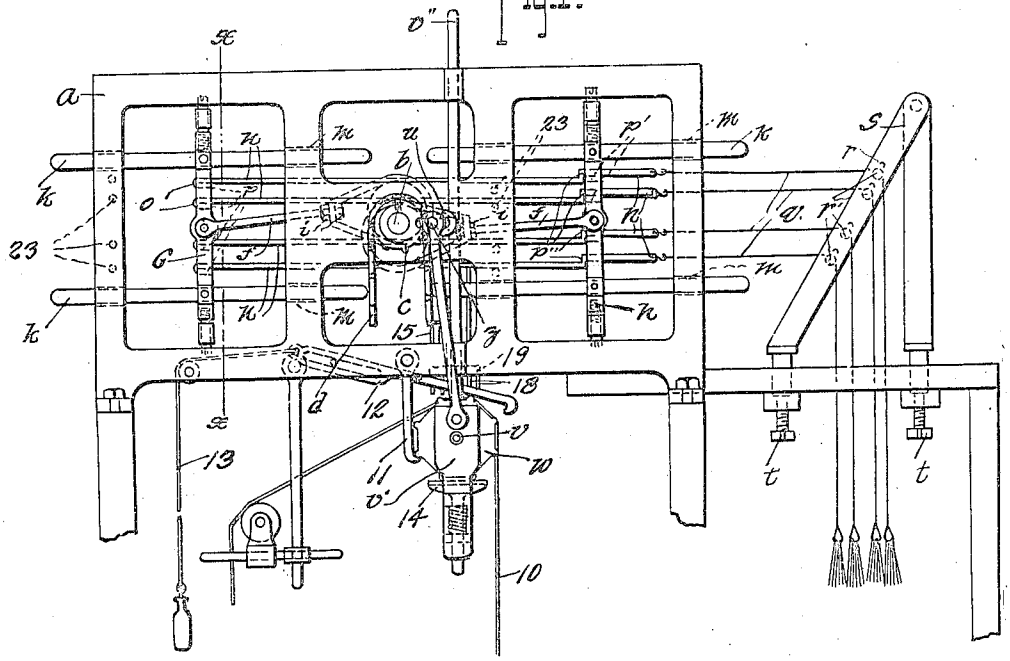
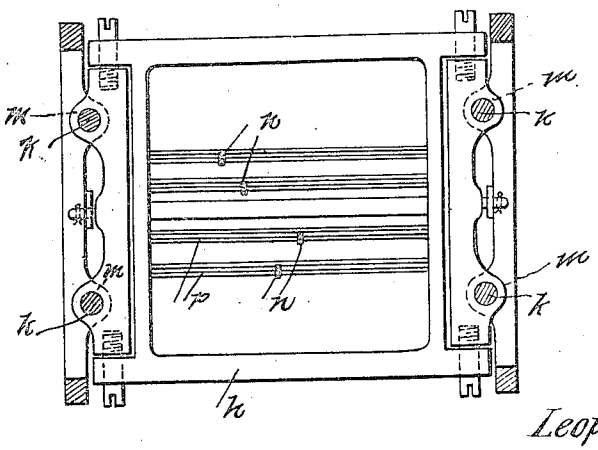


Fig. 2.



Witnesses

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4 SHEETS—SHEET 2.

Fig. 3.

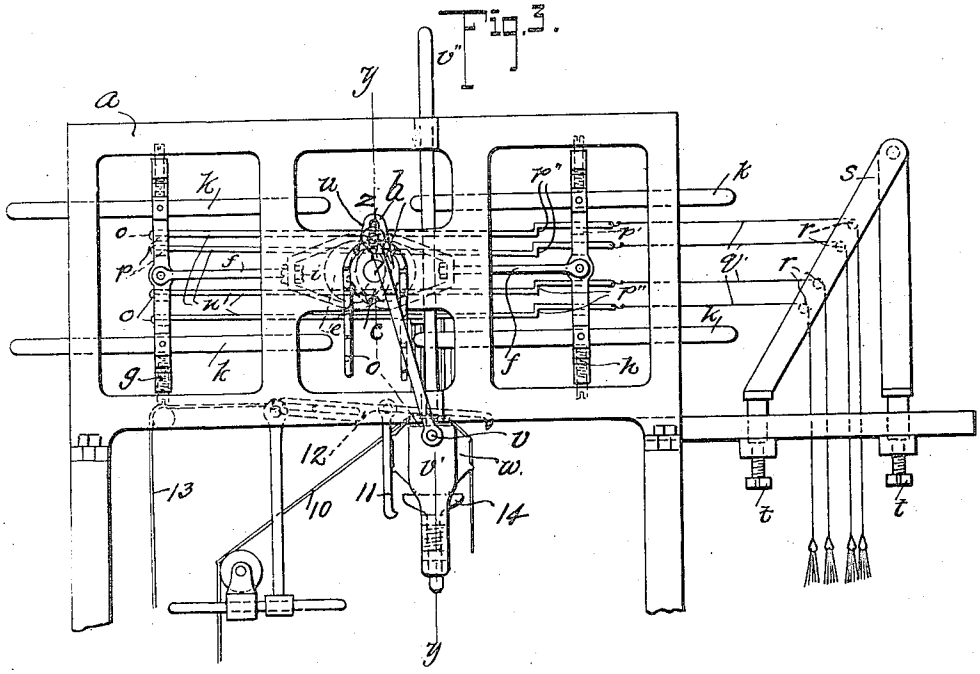
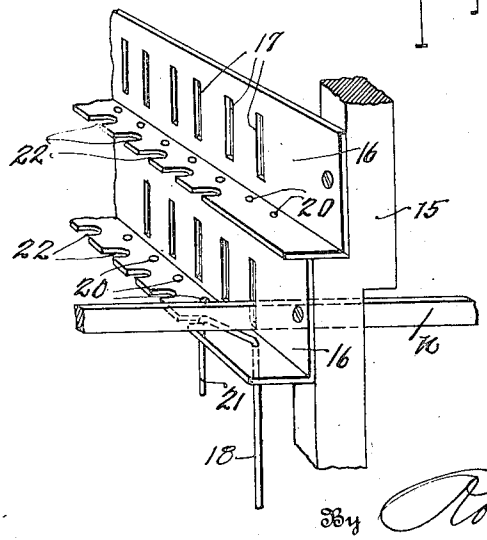


Fig. 6.



Witnesses

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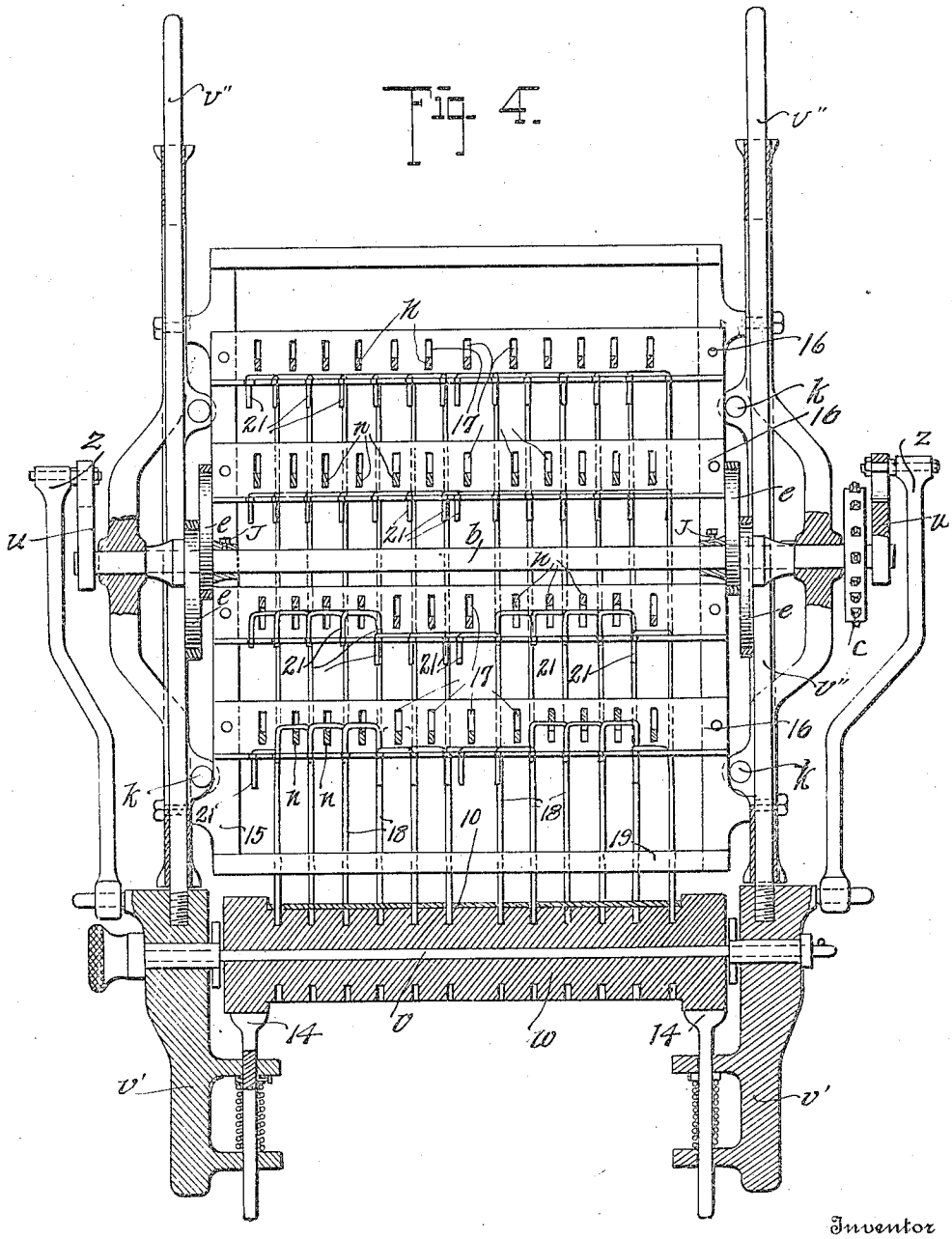
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4 SHEETS—SHEET 3.

Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 5.

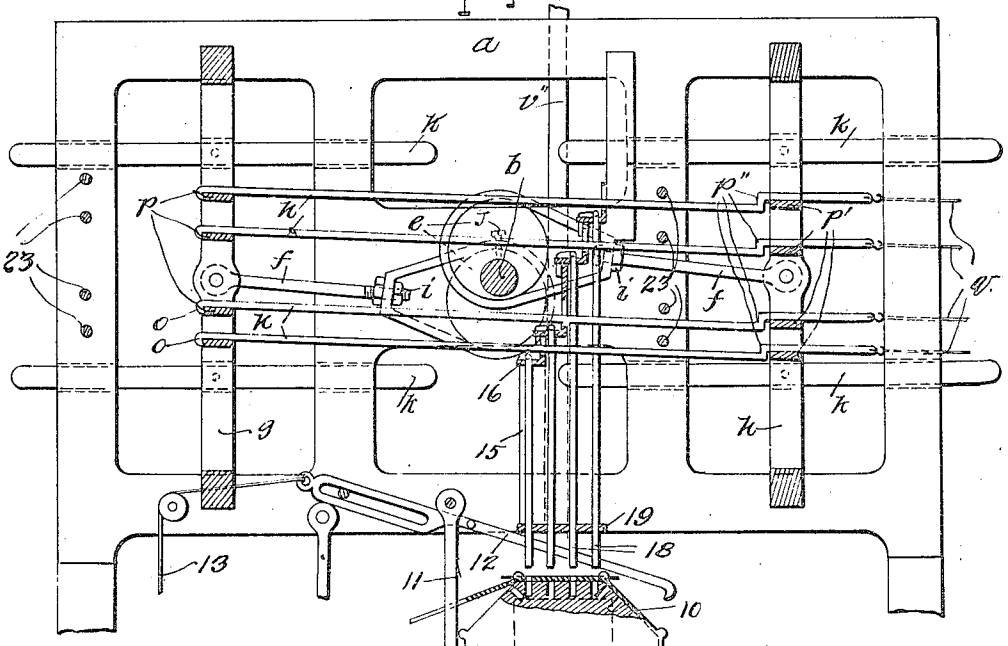
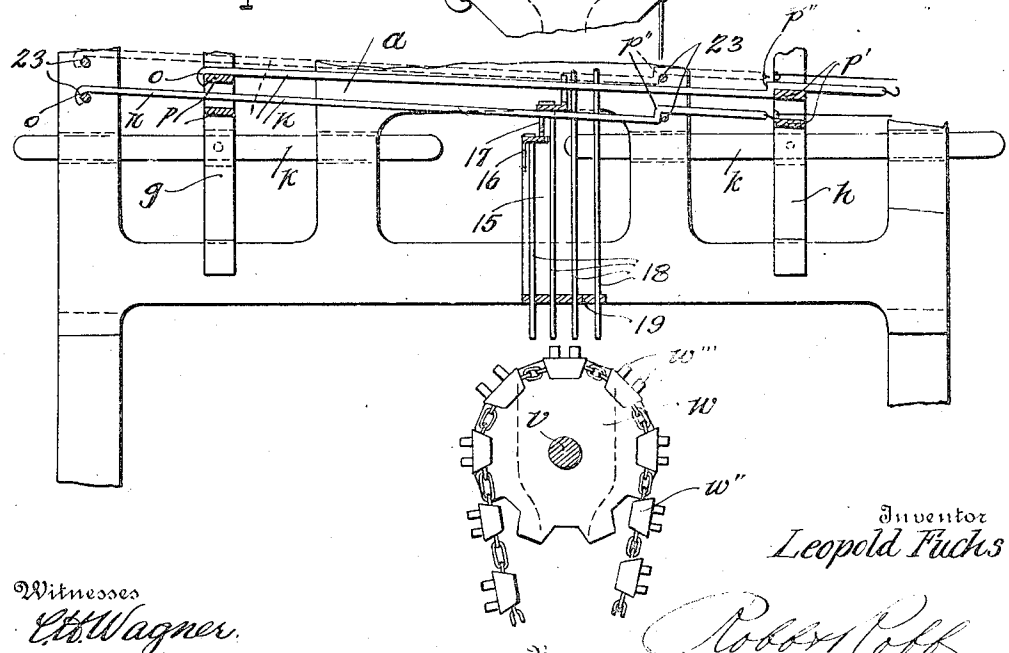


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

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JACQUARD MECHANISM FOR LOOMS.

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Application filed November 7, 1914. Serial No. 870,879.

To all whom it may concern:

Be it known that I, LEOPOLD FUCHS, a citizen of Switzerland, residing at Roslyn Heights, in the county of Nassau and State of New York, have invented certain new and useful Improvements in Jacquard Mechanism for Looms, of which the following is a specification.

This invention relates to jacquard mechanism for looms in which a vertically moving card cylinder operates a number of needles to unhook a predetermined number of griff bars or rods and give falling movement to a harness.

The main object in view is to provide adjusting means for the cylinder support whereby the machine may readily be converted from a jacquard to a shaft or plain weaving loom and for this purpose the arrangement is constructed so as to facilitate removal of the card holder or cylinder to enable a different index or chain cylinder to be substituted, thereby converting the machine into a fine, medium, coarse, or plain weaving apparatus.

Another important feature is the provision of a special frame embodying supporting racks so that when it is desired to operate the machine for a plain weave, a number of the griffs or griff bars can be moved out of engagement with the griff frames and disposed on the main jacquard frame, where they are at all times readily accessible, rendering unnecessary, as will be appreciated, the entire displacement of those bars which are not required in one type of weaving operation but maintaining them in their proper position for quick replacement when the machine is converted into the other type.

A still further novel feature of the invention lies in the provision of a rack in the frame of the machine for supporting and guiding the needles used in this mechanism, said frame comprising guide means for the griff bars, and means for maintaining the needles in position for proper coöperation with said bars, the needles being arranged in a vertical line so as to tend to move downwardly to automatically reset themselves when released without the aid of springs or any other intermediary.

To the end of accomplishing the foregoing objects I employ a pair of horizontally moving reciprocating griff frames to alternately engage the griff bars and move them in a rectilinear horizontal reciprocating path to give rising and falling motion to a harness connected to each of the bars and thus form a shed at the loom portion of the machine. Each griff bar is formed with a hook at one end, while the other end is offset so as to form an abutment shoulder, hence when the hooked end is lifted to disengage it from one of the griff frames the bar will move in an opposite direction with the other frame and give falling movement to the harness. Each needle is positioned vertically and is adapted to be lifted by the ascending cylinder in combination with a perforated card, to disengage the hooked end of a griff bar from one of the frames, and thereby allow the bar to move backward and lower that portion of the harness to which the bar is attached. When the pattern cylinder descends the needle gravitates downward a certain distance and is ready for the next succeeding upward movement of the cylinder. The particular griff bar which has been raised by the needle will thus be released and drop downward to again be in a line with and to engage one of the returning griff frames.

Another novel feature of the invention provides means whereby the harness frame may be raised or lowered to control the lifting action and adjust the neck cords.

The novel features of the invention are more fully described in the following specification and claims and illustrated in the accompanying drawings in which:

Figure 1 represents a side elevation of a machine embodying this invention, and arranged for pattern or jacquard weaving. Fig. 2 is a vertical transverse section taken along the line x—x of Fig. 1. Fig. 3 is a view like Fig. 1 showing the parts in a different position. Fig. 4 is a section along the line y—y of Fig. 3. Fig. 5 is a sectional side elevation of the griff mechanism. Fig. 6 is a perspective view of a needle rack. Fig. 7 is a fragmentary sectional view showing the arrangement of the jacquard mecha-

nism when a plain weave chain cylinder is substituted for the pattern card series cylinder shown in Fig. 5.

In these drawings the letter *a* designates a frame and *b* is a driving shaft journaled in the frame. This shaft is connected to the main driving shaft of a loom (not shown) by any desired means, such operative connection being shown however, as consisting of a sprocket wheel *c* engaged by a chain *d*. At each side of the frame and secured to the shaft *b* is a pair of eccentrics *e*. Each eccentric has a pitman *f* pivoted to the sides of the respective griff frames *g* and *h*. Each pitman has adjusting devices *i* by means of which the length of the pitman in its relation to a griff frame can be regulated. Each eccentric can also be adjusted by means of set screws *j* to vary the time of movement of one griff frame relatively to that of the other. The eccentrics *e* rotate with the shaft *b* and the pitman connections give the griff frames rectilinear reciprocating movement in a horizontal path and both the frames are timed to move in opposite directions simultaneously. The griff frames are provided with rods *k* of suitable construction to slide in lugs *m* fixed to the inner sides of the frame *a* of the machine.

On the griff frames are arranged a number of griffs or griff bars *n* provided with hooks *o* for engagement with transverse blades *p* fixed to the griff frame *g*. The tail portion of each griff bar is offset to form an abutment shoulder *p''* for engagement with blades *p'* of the griff frame *h*. To the offset end of each griff bar is hooked a neck cord *q* which is passed through eyes *r* fixed to transverse bars *r'* of a frame *s*. The neck cords *q* are guided downwardly and are connected to the harness of a loom in the customary way. The harness frame *s* can be raised up or down by means of set screws *t* threaded in the frame of the machine. This adjustment of the frame fixes the relative positions of the neck cords and gives the proper tension to the harness.

Securely fixed to the shaft *b* are a pair of slotted arms *u*, each having an adjustable pitman connection *z* with a spindle *v*. This spindle carries a cylinder *w* of any suitable form but in the drawings it is illustrated as octagonal in shape. The spindle is carried by vertically movable frames *v'* which latter are guided through the instrumentality of vertically disposed rods *v''* mounted in the main frame *a* as shown most clearly in Fig. 4 of the drawings. In some forms of weave it is desirable to employ a different cylinder. The change from one to the other can be readily accomplished by sliding the spindle *v* out of the core of the cylinder and out of the frame. The cylinder can then be removed and any desired shape of cylinder substituted. In shaft or plain weave of the dobby type it is sometimes desirable to use a cylinder without holes in connection with chains, and by means of the removable spindle the change can be easily accomplished. The cylinder is given a rising and falling motion by means of the adjustable pitman connection with the slotted arms aforesaid. This cylinder shown in Figs. 1, 3 and 5 has the customary holes in connection with a perforated pattern card 10 the purpose of which is well known. At every descent of the pattern cylinder it is engaged by a pawl 11 to give it a step by step rotation and thus feed different portions of the pattern card. The cylinder can be given retrograde movement when it is desired to move the pattern card backward for a repick by means of a slotted pawl 12 having cord connection 13 within reach of the operator. The cylinder is prevented from oscillating more than the one step by the action of a spring brake 14 adapted to frictionally engage one of the faces of the cylinder.

Fastened to the inner sides of the frame of the machine is a rack consisting of a pair of stepped uprights 15 having secured thereto a series of angular plates 16 best seen in Fig. 6 and extending across the upright frames. These angular plates have a plurality of vertically located slots 17 each slot being adapted to form a guide for one of the griff bars. These slots space the griff bars a certain distance apart and at the same time prevent lateral displacement of the bars.

A series of needles 18 are mounted on the rack and have their shanks guided in a perforated plate 19 secured to the lower portion of the rack uprights 15, as indicated in Fig. 4. Each needle extends upwardly through one of the holes 20 formed in the horizontal portions of the angular plates 16. The upper portion of each needle is provided with a hook 21 for engagement with one of the notches 22 located at the edge of the plate and situated between the holes 20. The head of the needle is positioned diagonally, as indicated in Fig. 6; thus preventing the needle from turning and at the same time gives positive engagement with a lower edge portion of a griff bar.

The frame *a* of the machine is provided with a series of transverse rods 23 to serve as platforms for carrying a number of griff bars when not used in connection with the griff frames as indicated in dotted lines in Fig. 1. The machine thus affords ready means for sliding the bars out of action and avoiding loss of or displacement of the unused griff bars. In this connection it may be stated that for a plain weave some of the griff bars are moved from engagement with the griff frames. This is done by disconnecting temporarily the neck cord attached

to the particular bar, then sliding said bar either forwardly or rearwardly to bring it upon the racks 23 of the main frame and above its normal operative position upon the blades p and again connecting the cord to the bar, or said bar may be slid back far enough to clear the rack at the middle of the frame and then back over and upon the frame racks without necessarily disconnecting said neck cords. A plain weaving cylinder w' is disposed upon the spindle v and said cylinder carries a chain w'' the transverse bars of which are provided with pins w'''. The spindle may be lowered a sufficient distance by adjustment of the connection x so as to bring the plain weaving cylinder and its chain in proper position for coöperation with the needles located thereabove. In this manner only certain of the needles 18 will be actuated upon movement of the cylinder w' upwardly, the remaining needles being rendered inoperative as will be obvious to those skilled in the art to which this invention refers.

It will be readily understood that when the cylinder ascends in the pattern weaving operation first described and a perforation in the pattern card registers with a hole in the pattern cylinder or in the plain weave where pins do not coöperate with needles there will be no movement to the needle and subsequent raising of the griff bar. Consequently the hooked end of the griff bar remains in engagement with the blade p on the griff frame, and the griff bar is carried forward to raise the harness.

When the needle strikes against a portion of the pattern card without any perforation the needle will be lifted a certain distance to raise the hooked end of a griff bar thus disengaging the hook from the bar p see Fig. 1, the other end of the bar being stopped or prevented from rising by the main frame rack bar 23 thereabove. The griff bar in this instance moves backward with the griff frame h and the harness to which the neck cord is attached falls and the formation of the shed is completed. In relation to this it may be stated that when the pattern cylinder again descends the needle gravitates downward and the hook of the griff bar falls into the path of the blade p on the griff frame and is again engaged when the frame reaches it. It will be seen that the card cylinder ascends, and descends, while the griff frames move horizontally back and forth and the pattern cylinder is moved one beat for each formation of the shed. There are four banks of needles shown in the drawing but it should be understood that any number of banks can be used in connection with any number of griff bars.

It may be observed in summarizing the operation of this apparatus whenever a change is made from jacquard to plain weaving, the jacquard cylinder (for pattern cards) must first be removed entirely from the spindle v and in its place a chain cylinder is substituted. I desire it to be understood, at this point that when operating the machine as a dobby it is perfectly feasible to use instead of the pattern chain a pattern card such as is used in the jacquard weaving but I find that the chain provided with pins as hereinbefore described more advantageous for my purposes. Having replaced the cylinder, the jacquard harness, if not entirely dispensed with or disconnected is placed in a box or receptacle provided for this purpose (but not herein illustrated or described) and arranged at a convenient point upon the frame of the loom adjacent to the supporting frame for the neck cords. All of the griff bars except those which are to be retained for operating the heddle frames are now moved into inoperative position upon the racks 23 of the main frame in which position they will be out of operative action by the needles which may all be retained in their original place if desired. For every heddle frame a neck cord is disconnected from the jacquard harness cord, those of the latter disconnected being generally attached to a neck cord of an adjacent row which is inoperative. The heddle frames are now attached to these neck cords which are carried by the bars remaining in operative position, said bars being actuated by the needles which are lifted through the instrumentality of the pins upon the chains of the chain cylinder. In this machine it may be added every row of bars could constitute a dobby inasmuch as every row is independent of the other and it is entirely feasible to weave one, two, three or more separate patterns simultaneously by this arrangement. Furthermore, there are just as many hooks in this apparatus as there are warp threads in jacquard weaving and as a matter of fact in actual construction there would be some thirteen hundred employed but such number is not disclosed in the drawing for the reason that it would render the illustration illegible.

The reverse of the foregoing operation takes place when converting the apparatus back to jacquard weaving, so as to bring all of the bars back into operative relation and disconnecting the heddle frames for substitution of the jacquard harness.

It is the primary and main object of my invention to provide an apparatus which is susceptible by reason of its construction of change from one type of weaving to the other for so far as I am aware no such advantageous arrangement has heretofore been proposed.

Having thus described my invention, what I claim as new is:

1. Weaving mechanism for fancy or plain

weaving comprising harness operating means including griff bars adapted to be connected to jacquard harness or heddle frames according to the type of weaving operation desired, pattern means for controlling the operation of said bars, and means for holding certain of said bars operative or inoperative according to which of the types of weaving is being performed.

2. Weaving mechanism for fancy or plain weaving comprising harness operating means including griff bars adapted to be connected to jacquard harness or heddle frames according to the type of weaving operation desired, pattern means for controlling the operation of said bars, means for holding certain of said bars operative or inoperative, and means for adjustably supporting the pattern means for actuating the griff bars according to which of the types of weaving is being performed.

3. In weaving mechanism of the class described, the combination with a griff frame, of driving mechanism for actuating said frame, harness operating means controlled by said frame and including hook bars arranged on the frame, a series of needles for lifting certain of said bars to give movement to the harness in weaving, a cylinder support connected with the frame actuating means for carrying interchangeably a pattern card series and an appropriate cylinder or a pattern chain and an appropriate cylinder, and means for adjusting the support toward or from the needles according to the type of cylinder utilized.

4. In weaving mechanism of the class described, the combination with a griff frame, of driving mechanism for actuating said frame, pattern controlling cylinders adapted to be interchangeably connected to the griff frame driving means for coöperation with card or chain needle actuating elements, a support therefor, harness supporting means controlled by the frame and respective cylinder and including griff bars arranged on the frame, a set of needles adapted to be controlled by the cylinders for lifting certain of said bars to give movement to the harness, means for adjusting the cylinder support for raising or lowering the cylinder carried thereby for enabling coöperation of the latter with certain of the needles only, and means on which certain of the griff bars are adapted to be mounted to render the same inoperative with respect to certain of the needles.

5. In weaving mechanism of the class described, the combination with a griff frame, of driving mechanism for actuating said frame, a cylinder connected to the griff frame driving means, a support therefor, harness operating means controlled by the frame and cylinder and comprising griff bars arranged on the frame, a set of needles controlled by the cylinder for lifting certain of said bars to give movement to the harness in pattern or plain weaving, means intermediate the cylinder and needles for controlling actuation of predetermined needles according to the weave aforesaid desired, means for adjusting the cylinder support for enabling coöperation of the cylinder with said needles, a main frame carrying the griff frame, and rack members on said main frame on which certain of said griff bars are disposed when not in operation.

6. In weaving mechanism of the class described, the combination of a pair of griff frames arranged in spaced relation, a main frame in which said griff frames are mounted, driving mechanism common to and interposed between the frames for simultaneously imparting reciprocatory movement thereto in opposite directions, a pattern device, guide members extending from said griff frames and coöperating with the main frame for guiding the reciprocation of the frames aforesaid, and harness operating means controlled by the frames and said pattern device.

7. In weaving mechanism of the class described, the combination of a pair of griff frames arranged in spaced relation, a main frame in which said griff frames are mounted, driving mechanism common to and interposed between frames for simultaneously imparting reciprocatory movement thereto in opposite directions, a pattern device, horizontal guide means extending from the griff frames and coöperating with the main frame for guiding reciprocation of said griff frames, guide members extending from the pattern device and likewise co-acting with the main frame, and harness operating means controlled by the frames and said pattern device.

8. In weaving mechanism of the class described, the combination of a pair of griff frames, alined griff blades carried by said frames, driving mechanism for imparting movement to said frames in opposite directions, a pattern device, and harness operating means including griff bars controlled by said frames and resting on the alined griff blades of the frames, and means for actuating said bars controlled by said pattern device whereby certain of said bars are adapted to follow one frame to give lifting movement to the harness and others follow the other frame to provide falling movement to the harness for the formation of the shed.

9. In weaving mechanism of the class described, the combination of a pair of griff frames, driving mechanism for imparting movement to said frames in opposite directions, a pattern device operatively connected to the driving mechanism for actuation thereby, griff bars engaging at one end with

one of said frames for movement therewith and supportingly carried by the second frame, and means controlled by the pattern device for actuating certain of said bars to disengage the first mentioned end whereby to permit the said disengaged bars to follow the second frame for forming the shed.

10. In weaving mechanism of the class described, the combination of a pair of griff frames, driving mechanism for imparting movement to said frames in opposite directions, a pattern device operatively connected to the driving mechanism for actuation thereby, a harness, a row of griff bars carried on said frames and to which said harness is connected, said bars having engagement with one of said frames to impart lifting movement to a portion of said harness, and means controlled by the pattern device for lifting certain of said bars in the row whereby to permit the lifted bars to follow the movement of the other frame and effect relative lowering movement of another portion of the harness for formation of the shed.

11. In weaving mechanism of the class described, the combination of a pair of griff frames, driving mechanism for imparting movement to said frames in opposite direction, a pattern device operatively connected to the driving mechanism for actuation thereby, a harness, a row of griff bars carried on said frames and to which said harness is connected, said bars having engagement with one of said frames to impart lifting movement to a portion of said harness, means controlled by the pattern device for lifting certain of said bars in the row whereby to permit the lifted bars to follow the movement of the other frame and effect relative lowering movement of another portion of the harness for formation of the shed, a main frame in which the griff frames are mounted, and means carried by said main frame for supporting a number of the griff bars when not operative.

12. In weaving mechanism of the class described, the combination of a pair of griff frames, driving mechanism for imparting movement to said frames in opposite direction, a pattern device operatively connected to the driving mechanism for actuation thereby, a harness, a row of griff bars carried on said frames and to which said harness is connected, said bars having engagement with one of said frames to impart lifting movement to a portion of said harness, means controlled by the pattern device for lifting certain of said bars in the row whereby to permit the lifted bars to follow the movement of the other frame and effect relative lowering movement of another portion of the harness for formation of the shed, a main frame in which the griff frames are mounted, and means carried by said main frame for supporting a number of the griff bars when not operative, said means constituting stop means for preventing disengagement of the bars from one of the griff frames.

13. In weaving mechanism of the class described, the combination with a pair of griff frames, of mechanism for moving the frames in a rectilinear, reciprocating, horizontal path, griff bars having one end hooked for engagement with one of the frames and formed at the other end with an offset portion for engaging the other frame, a pattern cylinder having vertical reciprocating movement linked to the griff frame mechanism, needles operated by the cylinder for unhooking a number of the blades, and a harness connected to the offset ends of the blades and controlled by the frames for moving the harness.

14. In weaving mechanism of the class described the combination with a griff frame, of mechanism for moving the frame reciprocally, griff bars positioned horizontally on the frame and operated thereby, neck cords connected to the bars, and an adjustable supporting frame for guiding and controlling the lifting movement of the cords.

15. In weaving mechanism of the class described the combination with a griff frame, of mechanism for moving the frame in a horizontal rectilinear path, griff bars arranged horizontally on the frame and operated thereby, neck cords connected to the bars, and a vertically adjustable frame for raising or lowering the cords and guiding the same.

16. In weaving mechanism of the class described the combination of a main frame, a griff frame carried thereby, means for moving said frame, harness operating means comprising longitudinally movable griff bars, and vertically disposed needles having diagonally disposed hooked terminals on which the bars normally rest, and means for actuating the needles to impart lifting movement to the griff bars, and a rack having slots therein through which the bars extend and notches with which the terminals of the needles are engaged whereby to guide said bars and maintain the needles in coöperation therewith.

17. In weaving mechanism of the class described, the combination of a main frame, a griff frame carried thereby, means for reciprocating said frame, harness operating means comprising griff bars arranged on the griff frame, and lifting members having bent terminal portions adapted to impart lifting movement to the griff bars, means for lifting the lifting members aforesaid, an auxiliary frame disposed in the main frame and comprising stepped uprights and angular plates secured thereto, said plates being provided with a plurality of slots for guid-

ing the griff bars and maintaining the same in spaced relation and also having notches with which the lifting members are engaged to hold their terminals in a diagonal position with respect to their coöperating griff bars.

In testimony whereof I affix my signature in presence of two witnesses.

LEOPOLD FUCHS.

Witnesses:

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ALFRIED ADERENTE.