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Patented Mar. 28, 1899.

G. W. STAFFORD & A. E. KEMEL.  
OPEN SHED JACQUARD MACHINE.

(No Model.)

(Application filed June 4, 1898.)

2 Sheets—Sheet 1.

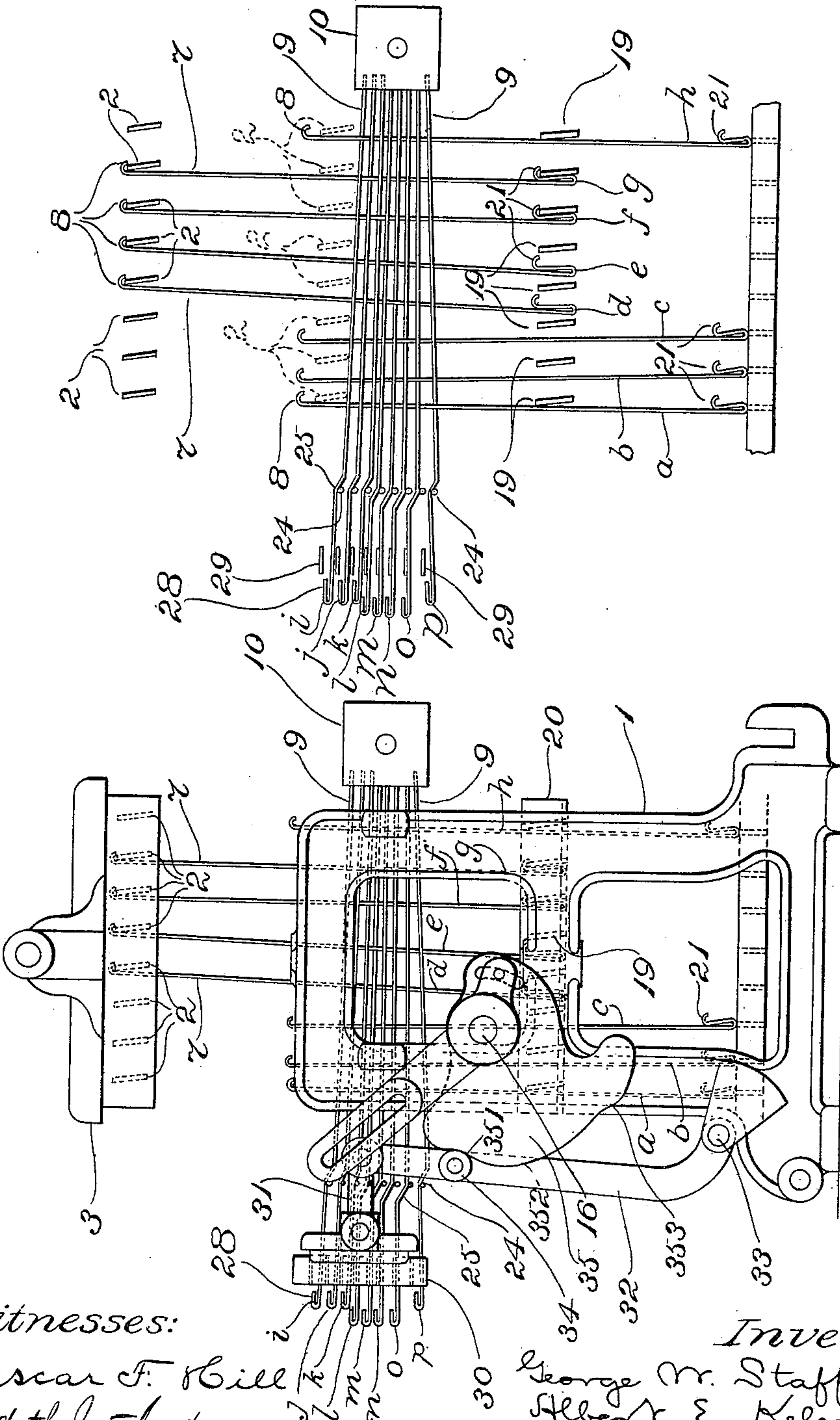


Fig. 2.

Fig. 1.

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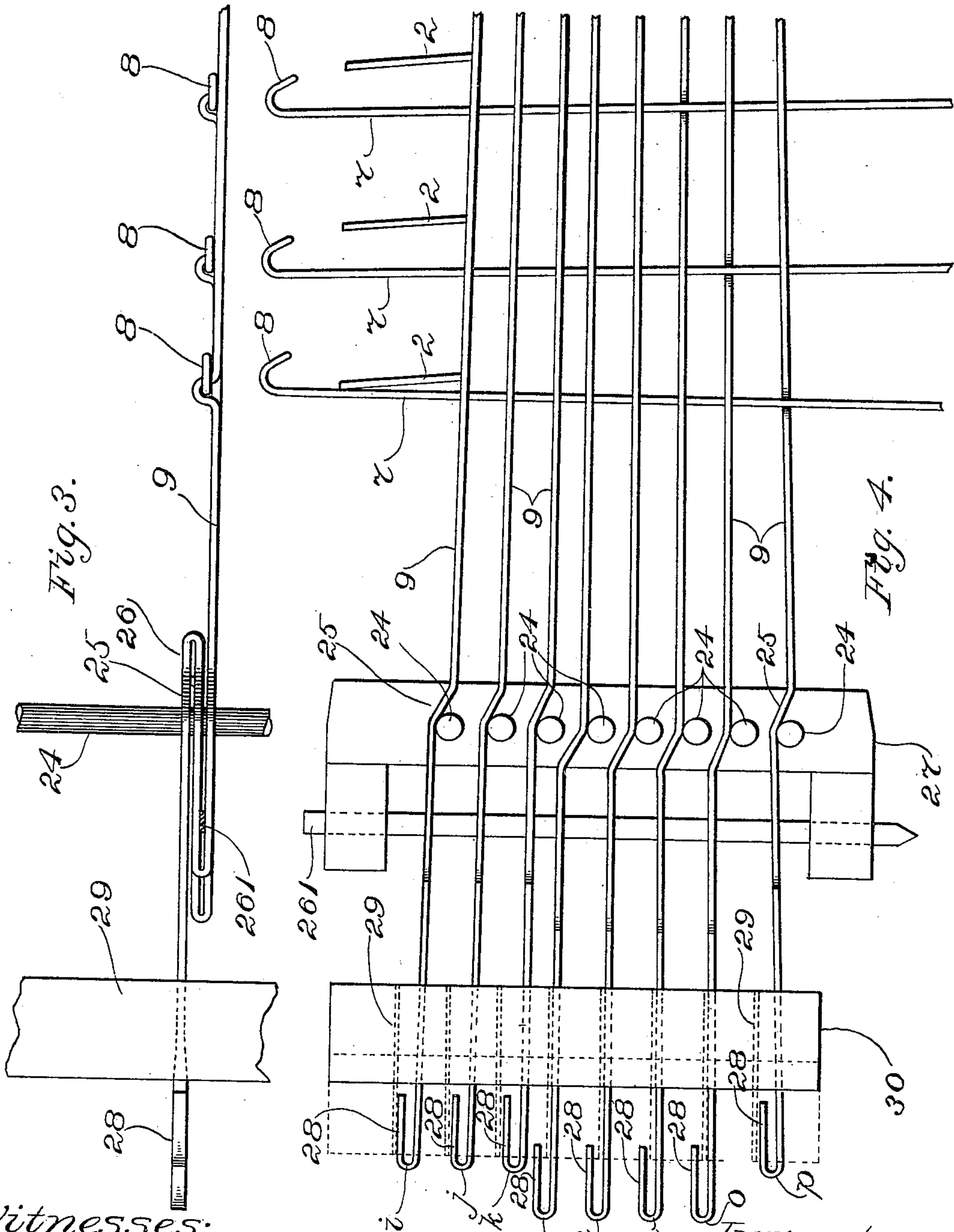
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# UNITED STATES PATENT OFFICE.

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## OPEN-SHED JACQUARD-MACHINE.

SPECIFICATION forming part of Letters Patent No. 621,949, dated March 28, 1899.

Application filed June 4, 1898. Serial No. 682,540. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE W. STAFFORD and ALBERT E. KERMEL, citizens of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Open-Shed Jacquard-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention has relation more especially to open-shed jacquard-machines. There are different classes of open-shed jacquard-machines; but this invention has reference more especially to that class which is termed sometimes "full-open-shed machines." In a machine of this last-mentioned class there is employed a stationary griff or its equivalent and the uprights or hooks are so constructed and operated as that when one of the same after having been engaged by the movable griff and carried into its highest position is desired to remain up for one or more succeeding picks such upright or hook is caused to become engaged with the stationary griff, so that it shall not descend again until after such succeeding pick or picks shall have become completed. It has been customary heretofore in jacquard-machines of this class to occasion two beats of the same pattern-card against the needles for each pick, one of such beats occurring when the movable griff is at its highest point, a given shed being open and being designed to move out of engagement with the stationary griff such of the hooks or uprights which occupy an elevated position for that shed as should be lowered for the next shed formation. The second beat occurs at the completion of the descent of the movable griff and is followed immediately by the rise of such griff for the opening of the said next shed. This mode of working is disadvantageous for several practical reasons. It involves two beats of the pattern cylinder or prism for each pick. The quickly-repeated beats of the pattern cylinder or prism and of the batten carrying the said cylinder or prism, together with the chain of cards passing around the said pattern cylinder or prism, consume power, occasion

great wear and tear on certain parts of the machine, and require such an amount of time as to limit the speed of running of a loom having applied thereto a jacquard-machine operating on the principle which has just been explained. It also occasions great wear of the pattern-cards, so that they are capable of being retained in service for only a comparatively short time. The chief aim of the invention is to obviate these disadvantages and to enable each shed formation to be effected in the working of a full-open-shed jacquard-machine with a single beat only of the card, pattern cylinder or prism, and batten.

The invention first will be described fully with reference to the accompanying drawings, in which latter is represented the best embodiment thereof which we have yet contrived, after which the distinguishing and characteristic features of the invention will be particularly pointed out, and distinctly defined in the claims at the close of this specification.

Figure 1 of the said drawings is a view representing in side elevation a jacquard-machine containing the best embodiment of our invention which we have yet contrived, only such parts being shown as are necessary to make clear the nature of the invention. Fig. 2 is a view on the order of a vertical section. Fig. 3 is a view in plan, on an enlarged scale, showing a needle and certain parts which are adjacent thereto. Fig. 4 is a view in vertical section, on an enlarged scale, showing certain of the parts which are found at the left-hand side in the other figures.

1 designates one of the side frames of a jacquard-machine.

2 2 designate blades of a vertically-moving griff. The said blades are shown in dotted lines in their lowest position in Fig. 2 and in full lines in their highest position.

3 (see Fig. 1) designates the griff-frame in which the said griff-blades 2 2 are mounted. The said griff-frame is operated in practice in any suitable manner, not necessary to be shown or described.

7 7 are upright wires provided with hooks 8 8 for engagement with the griff-blades 2 2,



as usual. 9 9 are needles coöperating with the said hooked uprights 7 7 and disposed, as usual, in horizontal or substantially horizontal position.

10 is the pattern cylinder or prism, around which are passed the usual pattern-cards, (not shown,) the said pattern cylinder or prism being in practice mounted, as usual, in a swinging frame or batten, (not shown,) which is actuated in customary manner, and the said pattern cylinder or prism being rotated intermittently in customary manner.

19 19, Figs. 1 and 2, are stationary griff-blades, which are mounted in a fixed griff-frame 20 or other convenient support.

The uprights 7 7 are furnished or formed each with a second hook 21 in addition to hook 8, mentioned above, this second hook being for engagement with the stationary griff-blades 19 19. The hooks 21 21 become engaged with the said stationary griff-blades 19 19 after the uprights 7 7 have been raised into their highest position, and thereby the said uprights are held in their upraised position until by the working of the mechanism they are caused to descend again. The strain that is transmitted through the cords which in practice are connected with the lower ends of the uprights or hooks 7 7 draws the lower ends of the upraised uprights into position for engagement with the griff-blades 19 19, as in the case of the uprights *f* and *g* in Fig. 2.

Figs. 1 and 2 show the moving griff in its highest position, with the uprights *d e f g* supported thereby, the shed being supposed to be open. It usually happens that at each descent of the vertically-moving griff preparatory to the formation of a new shed certain of the uprights 7 7, which previously were lifted by the said moving griff and allowed to engage by their hooks 21 21 with the stationary griff-blades, are required to descend in unison with the said moving griff. It has been customary heretofore to occasion a selection of the uprights which are required to descend and to provide for their descent in unison with the moving griff by causing the pattern cylinder or prism to beat up when the moving griff is at its highest point, so as to present against the ends of the needles 9 9 the pattern-card corresponding with the next shed which is to be produced in the warp-threads. As will be understood by those who are versed in the art, the blank or unperforated portions of the said card correspond with the uprights which are to occupy their lowermost position when the next shed is open. Consequently when the said pattern-card is carried against the ends of the needles 9 9, the moving griff being in its highest position and engaging with the hooks 8 8 of the uplifted uprights 7 7, at which time the said griff supports the said uplifted uprights with their hooks 21 21 slightly above and free from the stationary griff-blades, (see Fig. 2,) the pressure of such blank or unperforated parts of the said card as come opposite needles pertaining to up-

lifted uprights will carry the said uprights into the position that is occupied by the uprights *d* and *e* of Fig. 2—that is to say, free of the stationary griff-blades—so that in the ensuing descent of the moving griff such uprights will go down with it. At the time of such descent those among the uplifted uprights which are not pressed laterally, as in the case of the uprights *d* and *e*, but which are allowed to remain in the position that is occupied by the uprights *f* and *g*, will settle back onto the stationary griff-blades 19 19 and be held thereby in elevated position.

As stated hereinbefore, it has been customary in machines of the class to which the present invention relates to occasion a second beat of the same pattern-card against the ends of the horizontal needles 9 9 at the end of the descent of the vertically-moving griff and prior to the ensuing ascent of the said griff, such second beat of the said pattern-card being intended to effect the selection of the uprights which, being in their lowest position, are to be elevated for the shed which is to be opened by such rise of the said moving griff. In accordance with our invention we dispense with the necessity for making the second beat of the pattern-card against the needles by providing devices which operate substantially as we shall now proceed to set forth in connection with the needles and uprights and whereby prior to the rise of the moving griff the uprights which the said pattern-card indicates for being left in their lowest position shall be prevented from becoming engaged with the ascending griff.

We will now proceed to describe the parts in which our invention more immediately resides.

In the drawings the rear ends of the needles are shown as supported upon transverse rods 24 24, that preferably are arranged in a vertical series, as shown. Adjacent to each rod 24 the needle 9 which rests thereon is formed or provided with an inclined portion 25. (See more particularly Fig. 4.) Each of the needles is formed or provided with a broadened bearing portion to act against the corresponding supporting-wire 24, this broadened bearing portion being provided in the case of the needles which are shown in the drawings by returning upon itself the wire of which such needle is composed, thereby producing short parallel lengths of said wire, as at 26 in Fig. 3. Vertical flattened strips, as 261, may be passed between the returns of the wire of the needle. The inclined portion 25 of each needle, as will be obvious, coöperates after the fashion of a cam in connection with the corresponding supporting-wire 24, and inasmuch as the said supporting-wire is fixed in a convenient portion of the framework, as at 27 in Fig. 4, it follows that when the needle is moved endwise to the left by pressure of a blank or unperforated portion of the pattern-card, so as to move the inclined portion 25 thereof over and in contact with the said supporting-wire



24, the needle itself is caused to have a slight extent of vertical movement. This is indicated in the case of needles *l*, *m*, *n*, and *o* in Figs. 2 and 4. The rear ends of the needles 9 9 are formed or provided with hooks or other projections, as at 28 28, Figs. 2 and 4, or otherwise are constructed to be engaged with the blades 29 29 of a horizontally-reciprocating griff or equivalent engaging device, the frame-  
 10 work of which last is designated 30. This griff is mounted to move horizontally on suitable supports, not shown herein and of obvious and well-known character. It is connected at each end thereof by a rod 31 to an  
 15 arm 32, the latter being pivoted at 33 and provided with a pin or roller 34, working against a cam 35, fast on a rock-shaft 16. The said griff 30 or equivalent engaging device moves back and forth in a horizontal direction with-  
 20 out engagement of the blades or other engaging portions thereof with the projections or hooks of the needles 9 9 so long as the said needles remain in their normal positions, as in the case of the needles *i*, *j*, *k*, and *p*, the  
 25 blades thereof passing above the said hooks or projections 28 28. When, however, a needle is moved endwise by the pattern-card, as in the case of the needles *l*, *m*, *n*, and *o*, so as by the action of the inclined portion 25  
 30 thereof, in connection with the corresponding supporting-wire 24, to occasion a sufficient extent of vertical movement of the needle to bring its projection or hook into the range of movement of the adjacent griff-blades 29 of  
 35 the griff 30, then in the ensuing outward movement of the said griff the said needle will be engaged by the said adjacent griff-blade and will be carried outward thereby, thus occasioning a lateral deflection of the upright  
 40 which is engaged by the said needle out of the path of movement of the ascending griff.

The operation of a jacquard-machine having applied thereto the described embodiment of our invention, so far as the same is modified in consequence of the invention, is as follows: The beat of the pattern-card against the needles 9 9, which takes place when the moving griff is in its highest position, as here-  
 45 inbefore stated, is followed promptly by a slight outward movement of the horizontally-moving griff 30 or equivalent engaging device. This outward movement is sufficient to place its blades in engagement with the hooks 28 28 on those needles 9 9 which have  
 50 been uplifted in consequence of the action of their cam-shaped portions 25 25 upon the rods 24 24. (See dotted lines in Fig. 4.) As here- inbefore indicated, this action results from the endwise movement of such needles, that is  
 55 caused by pressure of blank or unperforated portions of the card against the ends of the needles. This outward movement of the said griff 30 is due to the action of the grade 351 on the cam 35 against the roller 34 on the arm 32,  
 65 which is connected with the said horizontally-reciprocating griff. During the descent of the vertically-moving griff the horizontally-mov-

ing griff remains in engagement with the hooks of the needles 9 9, but without further outward movement. During this time the  
 70 roller 34 bears against the concentric portion 352 of the cam 35. At the time of the completion of the descent of the vertically-moving griff the cam-grade 353 acts against the roller 34 to press the horizontally-reciprocating griff  
 75 outward into its extreme position. In this last part of its outward movement the horizontally-moving griff takes with it all the needles 9 9 which by the beat of the pattern-card against the same were moved or pressed back  
 80 by the blank or unperforated portions of the said pattern-card. Thereby the said horizontally-reciprocating griff operates to occasion the same selection of the uprights which for the time being are in their lowered position  
 85 as ordinarily is effected by the second beat of the same pattern-card.

What we claim is—

1. The combination with the needles and hooked uprights of a jacquard mechanism, 90 and a pattern-card device cooperating with the said needles to effect the selection of the said uprights, of a supplemental needle-actuating device acting after the presentation of a card to the needles by the said pattern-  
 95 card device and producing another movement of the said needles and uprights in conformity with the indications of the said card, substantially as described.

2. The improved full-open-shed jacquard 100 mechanism comprising the vertically-moving griff, the stationary griff to uphold the uprights in an elevated position, the needles, and a pattern-card device and supplemental needle-actuating device acting alternately on the  
 105 needles in determining the raising and lowering of the uprights, substantially as described.

3. The improved full-open-shed jacquard 110 mechanism comprising the vertically-moving griff, the stationary griff to uphold the uprights in an elevated position, the needles, a pattern-card device acting to present a pattern-card against the ends of the needles, a  
 115 needle-actuating griff, and means to actuate said needle-actuating griff, substantially as described.

4. The improved full-open-shed jacquard 120 mechanism comprising the uprights, the vertically-moving griff to raise said uprights, the stationary griff to uphold the uprights in an elevated position, the needles, a pattern-card device operated to present a card to the needles at one extreme of the movement of the  
 125 vertically-moving griff, a needle-actuating griff, and means to actuate the same at the other extreme of the movement of the vertically-moving griff, substantially as described.

5. The improved open-shed jacquard mechanism comprising the hooked uprights, the 130 vertically-moving griff, the stationary griff to uphold the uprights in their elevated position, the needles connecting with the said uprights and having the cam-shaped portions



and also the hooks or projections, a pattern-  
card device coöperating with said needles,  
and the supplemental moving griff engaging  
said hooks or projections to actuate the needles  
5 dles which have been brought into the range  
of action of said supplemental griff by the action  
of said cam-shaped portions, substantially  
as described.

In testimony whereof we affix our signatures  
in presence of two witnesses.

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