No. 625,476. Patented May 23, 1899.

G. W. STAFFORD & A. E. KELMEL.

DOUBLE ACTION JACQUARD MACHINE.

(Application filed Sept. 3, 1898.)

(No Model.) 2 Sheets—Sheet 1.

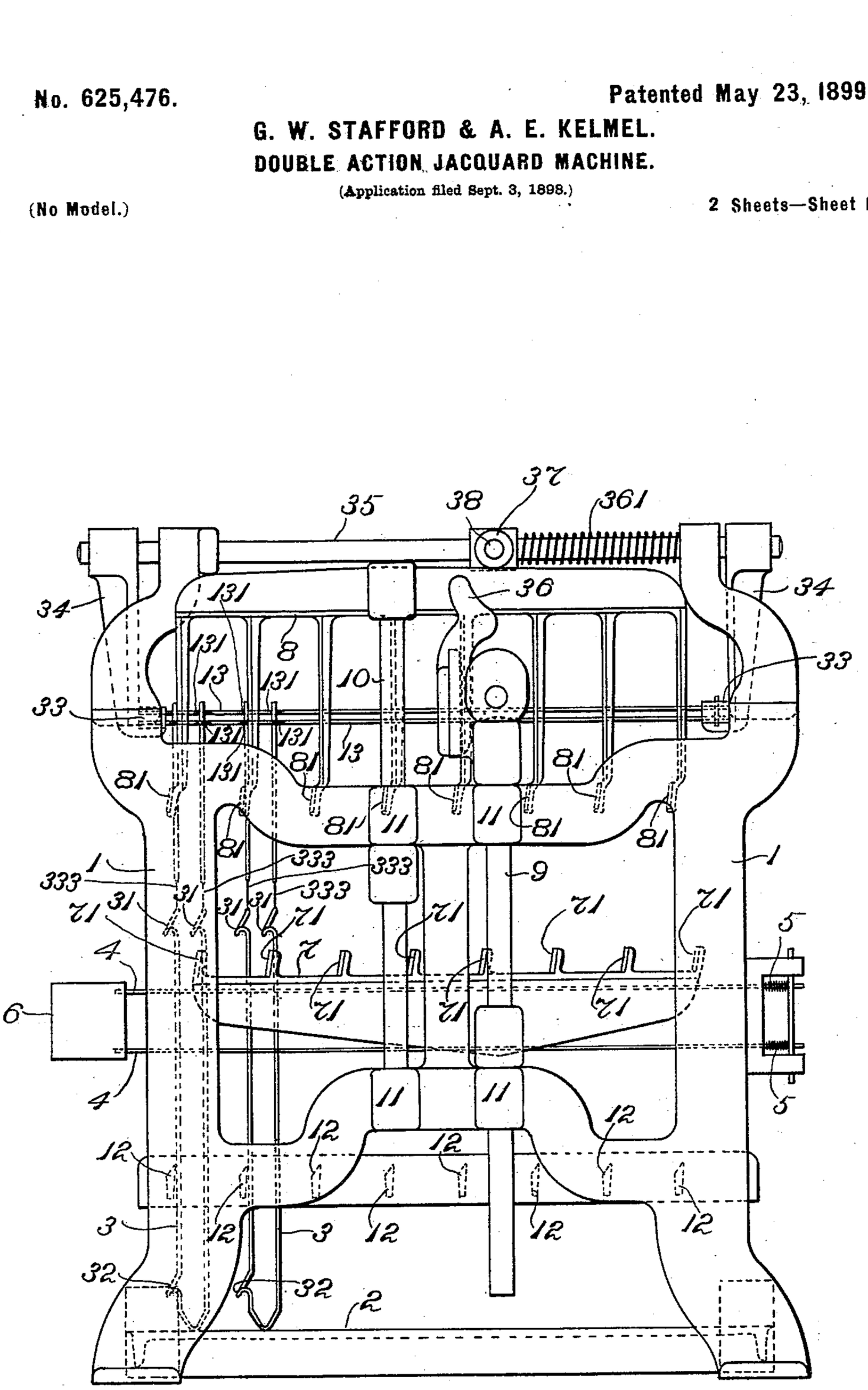


Fig. 1.

Witnesses:
Oscar F. Hill
Lafine Hall Rice

Inventors.
George W. Stafford
Albert E. Kelmel
by Macleod Calver & Randall
Attorneys

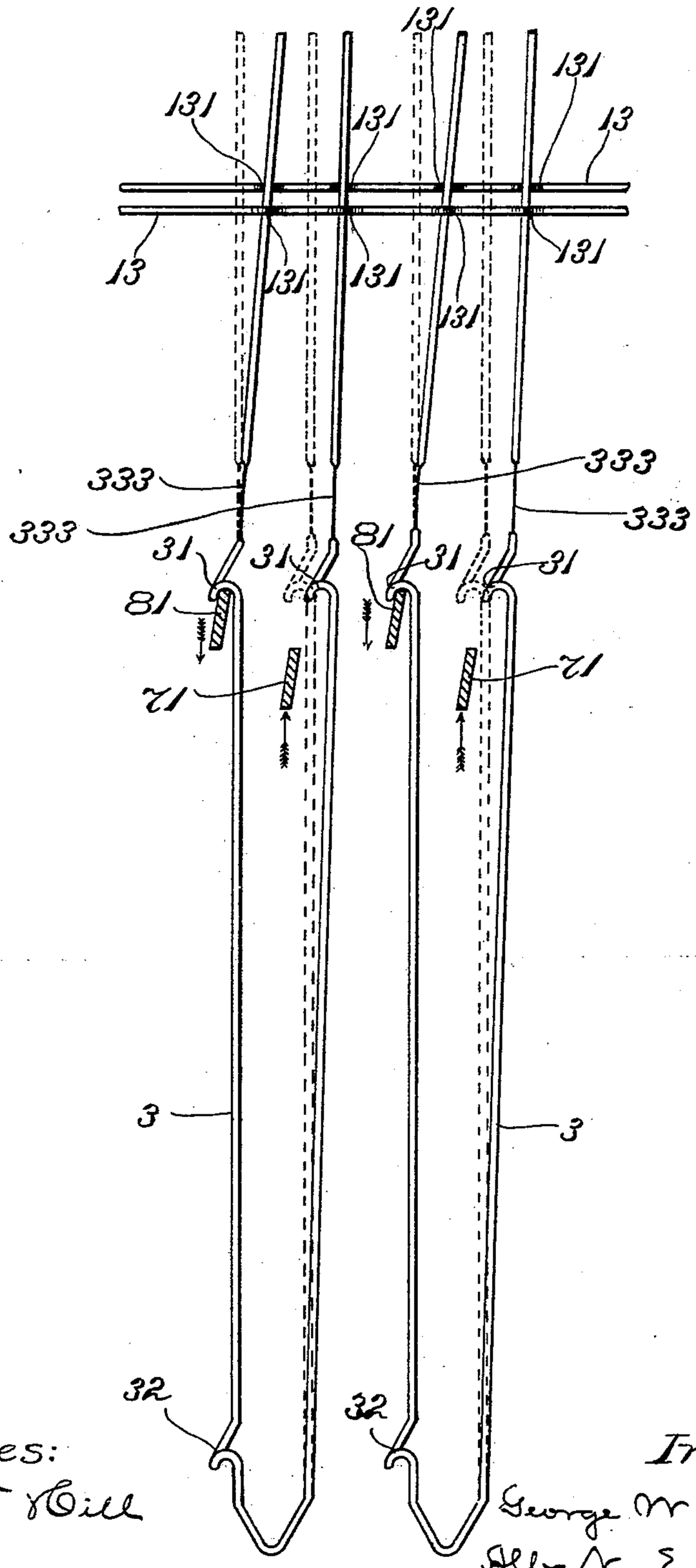
No. 625,476. Patented May 23, 1899.

G. W. STAFFORD & A. E. KELMEL.

DOUBLE ACTION JACQUARD MACHINE.

(Application filed Sept. 3, 1898.)

(No Model.) 2 Sheets—Sheet 2.



Witnesses:
Oscar F. Hill
Lefine Hall Rice

Inventors:
George W Stafford
Albert E Kelmel
by Macleod Calver & Ramsay
Attorneys.

Fig. 2.

UNITED STATES PATENT OFFICE.

GEORGE W. STAFFORD AND ALBERT E. KELMEL, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS TO THE CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS.

DOUBLE-ACTION JACQUARD-MACHINE.

SPECIFICATION forming part of Letters Patent No. 625,476, dated May 23, 1899.

Application filed September 3, 1898. Serial No. 690,164. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. STAFFORD and ALBERT E. KELMEL, 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 Double-Action Jacquard-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates more particularly to what are known as "double-action" or "double-acting" jacquard-machines. In certain forms of machines of this class there is employed for each neck and tail-cord a double hook or hooked upright, and the machine has two moving griffs working alternately and both intended to engage with the said double hook or hooked upright, but not both at the same time, the one griff ascending while the other is descending for one pick, and vice versa for the next pick, and so on. In consequence of the fact that the double upright has a plurality of griff-hooks, one for engagement with each moving griff, it follows that when one griff is descending, carrying with it an upright which previously was raised, but which should occupy a lowered position in the next shed formation, the disengaged hook on said upright projects into the path of movement of the ascending griff, and hence the latter will engage with the said hook of the descending upright unless such engagement is provided against, and by arresting the descent of such upright and carrying it back into an upper position will make thereby a false indication and cause a mispick. With the objects in view of preventing undesired engagement of a descending upright by the ascending griff and at the same time obviating the necessity of making a second or extra beat of the card-cylinder or prism for the same purpose we have invented certain mechanism which is presented in our applications for United States Letters Patent, filed June 15, 1898, Serial No. 683,512, and September 3, 1898, Serial Nos. 690,163 and 690,165. The mode heretofore adopted in practice of providing against such undesired engagement of the descending upright by the ascending griff—namely, by occasioning a second extra beat of the card-cylinder or prism—is seriously disadvantageous. When it is undertaken to prevent such engagement by causing such second or extra beat of the card-cylinder or prism to take place at the time when the two moving griffs are passing each other in order to present again to the needles the same card which was last presented thereto, a slowing down of the operation of the loom below the speed that otherwise would be attainable is necessitated, inasmuch as such additional movement of the card-cylinder or prism renders it necessary to occasion two complete beats or movement of the cylinder or prism for each pick of the loom. For instance, if it were desired to run a loom at the rate of one hundred and fifty picks per minute the card-cylinder or prism would be required to make three hundred beats against the needles per minute. By obviating the necessity of making the second or extra beat of the card-cylinder or prism for the purpose of preventing improper engagement of the ascending griff with the descending upright and by providing devices to press back the descending uprights out of the reach of the ascending griff, as fully disclosed in our applications, Serial Nos. 683,512 and 690,163, aforesaid, we are enabled to run a loom having a double-action jacquard-machine applied thereto at a higher rate of speed than we heretofore have known to be possible. In our said applications just mentioned we have presented and claimed certain press-back wires or needles and devices for operating the same in the proper relations with the uprights and moving griffs.

Our present invention consists in an improved combination of devices providing for the actuation of the press-back wires or needles and in certain provisions for preventing accidental disengagement, through the action of the press-back devices, of the hook of a descending upright from the griff with which it is moving.

The respective features of the invention will be fully explained, with reference to the accompanying drawings, after which the invention will be particularly pointed out and dis-

tinctly defined in the claims at the close of this specification.

Figure 1 of the drawings shows in side elevation certain portions of a double-action jacquard-machine having certain embodiments of our invention applied thereto, only such old parts being shown as are necessary in order to make clear the relations and mode of operation of our new devices. Fig. 2 is a view in transverse vertical section of Fig. 1, showing certain of the parts which are represented in Fig. 1.

The framing and certain fixed parts which are applied thereto are designated 1 1 in both views or figures of the drawings, the usual bottom board being designated 2, the double hooks or uprights being designated 3 3, the usual needles coöperating therewith being designated 4 4, the springs which are applied to the said needles being designated 5 5, and the usual card-cylinder or prism being designated 6.

The two moving griff-frames are designated 7 and 8, respectively, the blades applied thereto being designated, respectively, 71 and 81 and being arranged in alternating succession, as shown. The two griff-frames 7 and 8 are shown as mounted, respectively, on the slide-rods 9 and 10, as usual, the said slide-rods being fitted to move in guides 11 11 on the fixed framework of the machine, all as usual, and the griff-frames being in practice actuated through suitable power connections, but not necessary to be shown or described herein, and thereby being caused to move simultaneously in opposite directions with respect to each other.

The card-cylinder or prism 6 in practice will be supported and operated by devices of usual character and construction (not herein shown) and thereby will be caused to make one beat for each shed formation, this usually corresponding with one pick of the loom to which the jacquard-machine is applied.

The uprights 3 3 are double, as shown, each limb of each of such uprights having a hook, as 31, for engagement with the actuating-griff. One limb of each upright is designed for cooperation with a griff-blade 71, and the other limb thereof is designed for coöperation with the adjacent griff-blade 81, one of such griff-blades being designed to be uplifted for one shed formation and the other thereof being designed to be uplifted for the succeeding shed formation, and so on in regular alternation.

12 12 designate the blades of a stationary griff, such as sometimes is employed—that is to say, in full open-shed jacquard-machines—when it is desired that an upraised upright shall remain in its elevated position for several picks in succession without being caused to descend meanwhile.

32 32 designate hooks that are formed on the uprights 3 3 for engagement with the stationary griff-blades 12 12.

The devices which have been described thus far are common to preëxisting jacquard-machines.

With the foregoing devices we combine means whereby as each of the moving griffs in turn descends the disengaged hooks of the uprights which are engaged and descending therewith are pressed back, so that the said hooks thereof shall be out of the path of the ascending griff. Thereby we prevent the ascending griff from picking up a descending upright and raising it at a time when it should be lowered into a depressed position. We use by preference wires, which are arranged to engage with the respective limbs of the uprights 3 3 and are moved transversely with relation to the griffs at the proper moment in the working of the jacquard-machine, so as to press the disengaged hooks on the said uprights out of the path of the ascending griff-blades. The said wires or their equivalents may be variously constructed, arranged, and applied. We have shown them herein as constituting a set of supplemental needles, the same being designated 13 13 and having eyes or the equivalent thereof where they engage with the limbs of the uprights 3 3, as at 131 131. When these wires are moved toward the right in the drawings, they press the limbs of the uprights to the right also, thereby carrying laterally clear of the ascending griff-blades those hooks 31 31 which are not in engagement with either the ascending griff-blades or the descending griff-blades.

The press-back wires 13 13 are mounted in a movable carrier, herein shown as consisting of cross-bars 33 33, to which the opposite ends of the wires 13 13 are applied, supporting-arms 34 34, by which the said cross-bars are upheld, and slide-rods 35 35, to which the supporting-arms 34 34 are attached. With the carrier for the press-back wires is combined means for reciprocating the said carrier horizontally in proper timing with reference to the movements of the two moving griffs, whereby each time the said moving griffs pass each other the carrier and press-back wires are operated to bear the uprights laterally in order to move the hooks of the disengaged descending uprights laterally clear of the blades of the ascending griff and thereby prevent the engagement of such hooks with the said blades. Preferably we arrange for operating the carrier from one of the moving griffs or a part connected and moving in unison therewith. Thus we have shown in the drawings a cam to engage with a pin or roller, one of the said parts being connected to move with one of the moving griffs and the other being connected with the carrier. In the present embodiment of the invention the cam (herein designated 36) is attached to the slide-rod 9 of the griff-frame 7, while the roller which is engaged by the said cam, the same being designated 37 herein, is mounted on a pin 38, which is attached to a slide-rod 35. 361 is a spring surrounding the slide-rod 35 between

the collar to which pin 38 is applied and one of the bearings for said slide-rod 35. The cam 36 is shaped, as shown, to occasion a complete reciprocation of the said carrier in each complete vertical movement of the cam up or down. Thereby each time the moving griffs pass each other at an intermediate point in their vertical traverse the carrier, with the press-back wires mounted therein, is moved toward the right, so as to carry the disengaged hooks of the uprights out of the path of movement of the ascending griff-blades.

Each engagement of the cam and roller, this engagement occurring each time the two moving griffs are about to pass each other, occasions a movement of the carrier and press-back wires to the right in the drawings. This operates to carry toward the right, also clear of the ascending griff-blades, all the hooks which are not in engagement with moving griff-blades. Those limbs having the hooks thereof engaged with such griff-blades will ordinarily bend under the pressure which is exerted against them by the press-back wires or needles, and it is not intended that the hooks of such limbs should become dislodged from the griff-blades on which they are seated. However, in order to guard against the liability of such dislodging we provide in connection with the uprights springs which shall yield under the pressure of the press-back wires or needles, thereby relieving the strain at the hooks, which would tend to dislodge the same from the griff-blades. This is effected very conveniently by providing the limbs of the uprights themselves with springs located between the points at which the hooks are formed or provided on such limbs and the points at which the press-back devices take bearing against such limbs. The said springs may be formed variously and are of such strength that so long as the hooks of the uprights are disengaged from the griffs the springs shall not yield under the pressure of the press-back devices, the latter and the uprights operating the same as if the springs were not present. However, a hook being engaged with a moving griff-blade the action of the press-back devices against the upright occasions a yielding of the spring, thereby relieving the hook from strain, which might operate to dislodge the same, and obviating the tendency to the production of faults in the weaving. In the drawings we have shown the springs produced at 333 333 just above the hooks which engage with the moving griffs by flattening the uprights for a portion of their length.

We do not claim, broadly, herein the carrier for the press-back wires or needles, since the same is made the subject of claim in our application for United States Letters Patent filed September 3, 1898, Serial No. 690,163.

We claim as our invention—

1. The combination with the double uprights, and the oppositely-moving griffs, of the press-back wires engaging with the stems of the respective limbs of such uprights and operating to prevent engagement of a descending upright with an ascending griff, the carrier for the press-back wires, the spring to move said carrier in one direction, and the cam and pin or roller acting in opposition to the spring to move the carrier in the other direction, substantially as described.

2. The combination with the uprights provided with springs to yield under the action of the press-back wires and thereby obviate forced disengagement of the hook of an upright from the griff wherewith it is engaged, and the oppositely-moving griffs, of the press-back wires to prevent engagement of a descending upright with an ascending griff, the carrier for the press-back wires, the spring to move said carrier in one direction, and the cam and pin or roller acting in opposition to the spring to move the carrier in the other direction, substantially as described.

3. The combination with the oppositely-moving griffs, of the uprights, and press-back devices to prevent engagement of a descending upright with an ascending griff, the said uprights provided with springs to yield under the action of the press-back devices and thereby obviate forced disengagement of the hook of an upright from the griff wherewith it is engaged, substantially as described.

4. The combination with the oppositely-moving griffs, of the uprights formed with springs adjacent to the hooks thereof, and press-back devices engaging with the said uprights and operating to prevent engagement of a descending upright with an ascending griff, the uprights bending at the spring portions thereof to obviate forced disengagement of the hook of an upright from the griff wherewith it is engaged, substantially as described.

5. The combination with oppositely-moving griffs, of the uprights flattened adjacent to the hooks thereof to produce springs, and press-back devices engaging with the said uprights and operating to prevent engagement of a descending upright with an ascending griff, the uprights bending at the flattened spring portions thereof to obviate forced disengagement of the hook of an upright from the griff wherewith it is engaged, substantially as described.

6. The upright having a hook for engagement with an actuating-griff, and having the stem thereof adjacent to the said hook constructed with an elastic portion of increased flexibility to promote the bending of the stem, substantially as described.

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

GEORGE W. STAFFORD.
ALBERT E. KELMEL.

Witnesses:
E. F. GREENE,
F. E. ROBBINS.