No. 620,372. Patented Feb. 28, 1899.

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

DOUBLE ACTION JACQUARD MACHINE.

(Application filed June 15, 1898.)

(No Model.) 2 Sheets—Sheet 1.

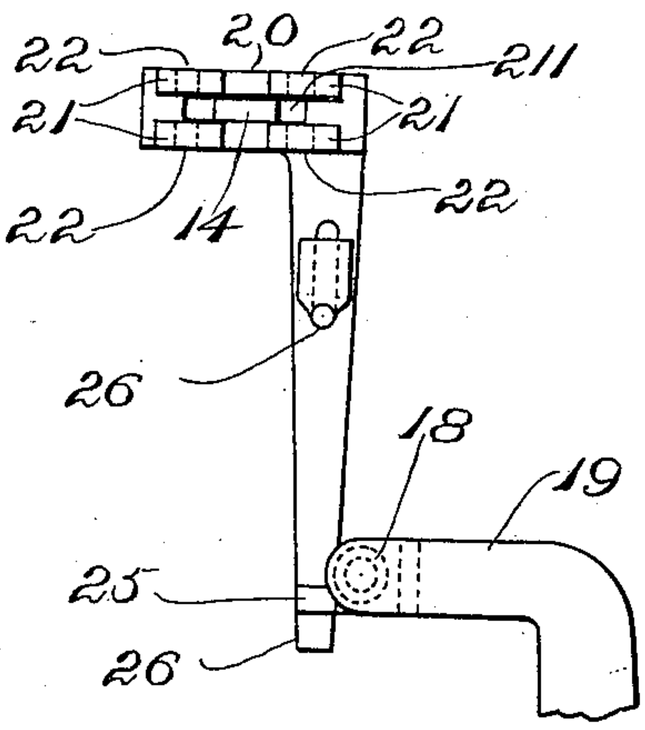

Fig. 3.

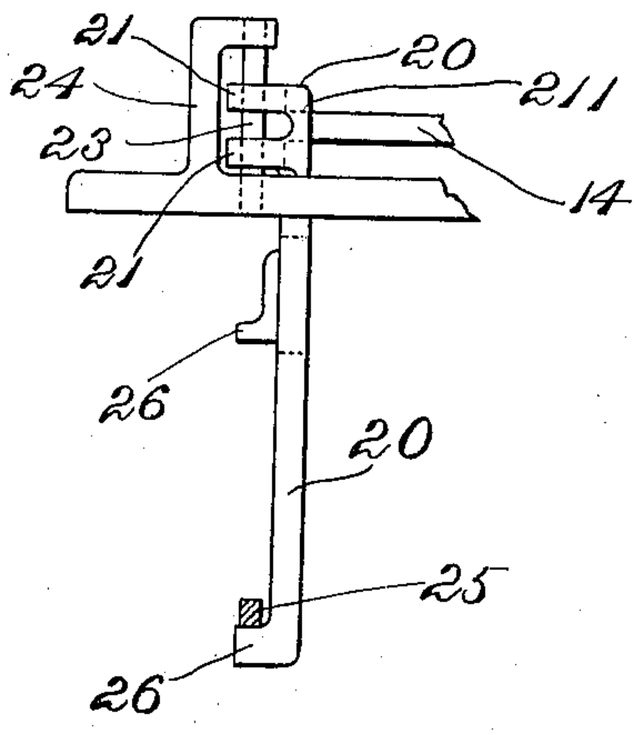

Fig. 4.

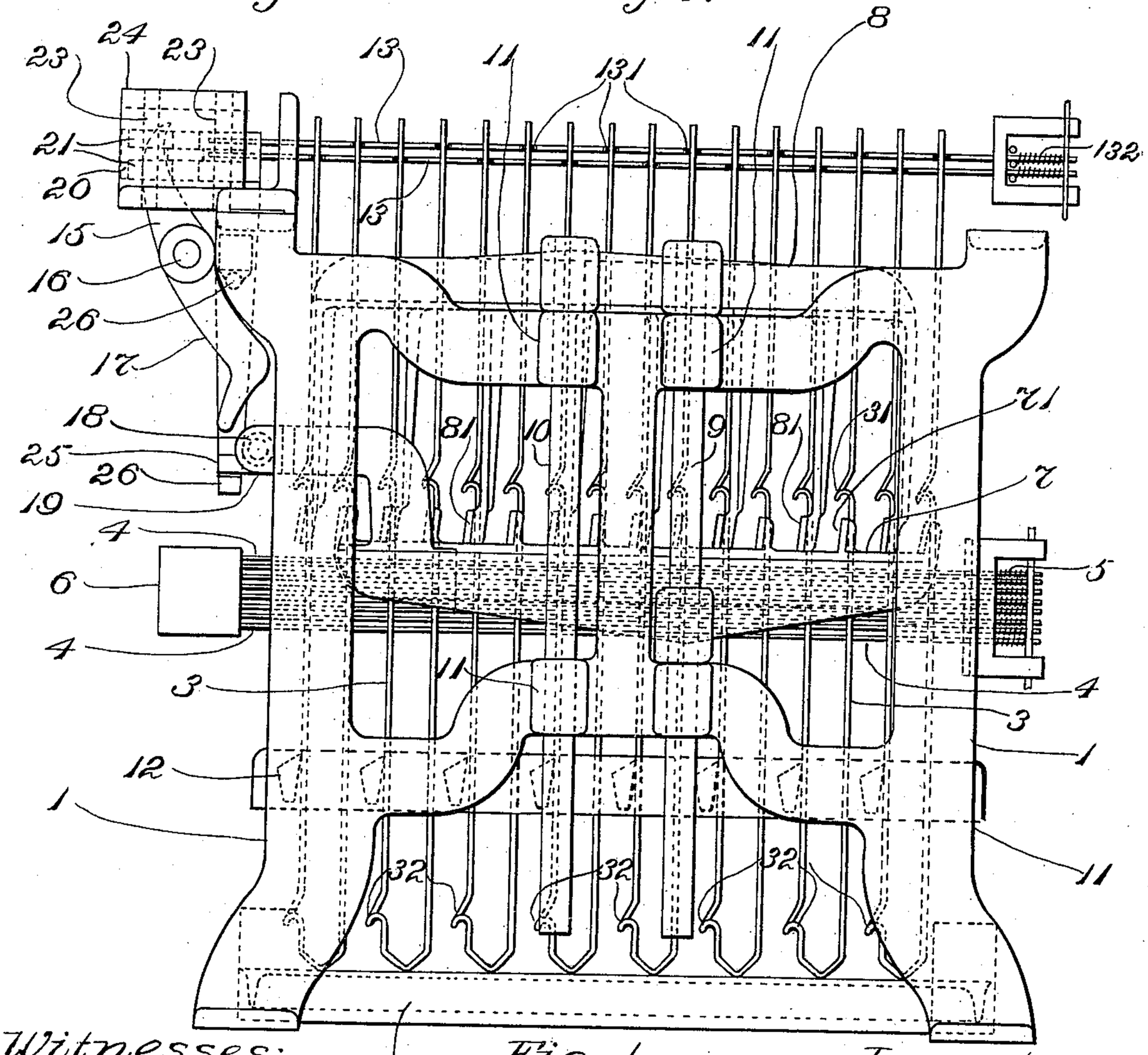

Fig. 1.

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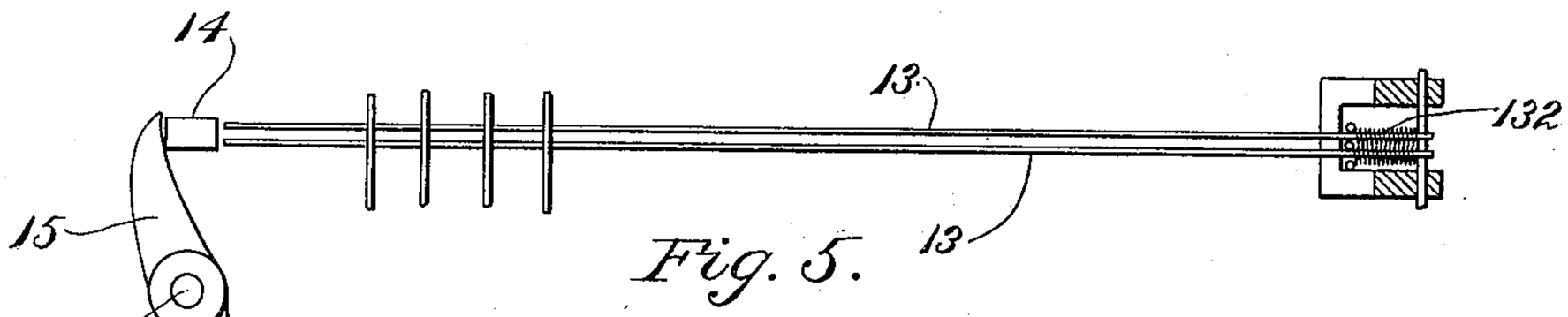

Fig. 5.

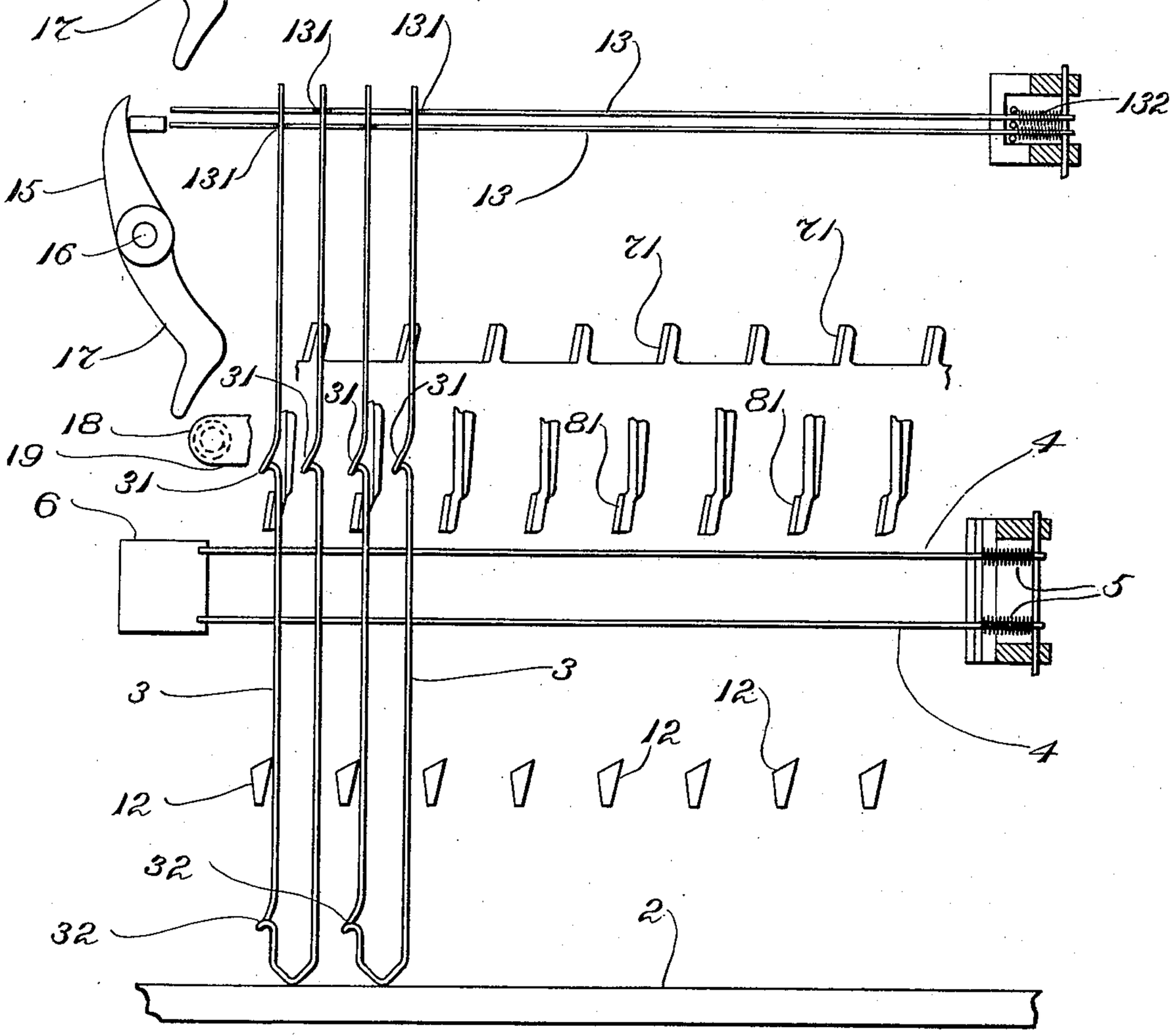

Fig. 2.

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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. 620,372, dated February 28, 1899.

Application filed June 15, 1898. Serial No. 683,512. (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 hooked upright having a plurality of griff-engaging hooks or nibs, and the machine has two moving griffs working alternately and both intended to engage with the said upright, but not both at the same time, the one griff ascending at one pick while the other is descending, and vice versa for the next pick, and so on. In consequence of the fact that the upright has two 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 into an upper position make a false indication and cause a mispick.

The object of the present invention is to provide a means of preventing undesired engagement of a descending upright by the ascending griff which shall obviate the necessity of making a second or extra beat of the card-cylinder or prism for the same purpose. When it is undertaken to prevent improper engagement of a descending upright by the ascending griff at the time when the two griffs are passing each other by causing an additional movement of the card-cylinder or prism 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, since such additional movement of the card-cylinder or prism renders it necessary to occasion two complete beats or movements 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 reach of the ascending griff we are enabled to run a loom having a double-action jacquard-machine applied thereto at a higher rate of speed than we have heretofore known to be possible.

The invention consists in the novel features and combinations which we will now proceed to describe with reference to the accompanying drawings, in which latter we have illustrated the best embodiments of our invention that we have yet contrived.

The distinguishing and characteristic features of the invention are particularly pointed out and distinctly 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 one embodiment of our invention applied thereto, only such old parts being shown as are necessary to make clear the relations and mode of operation of our new devices. Fig. 2 is a view in transverse vertical section of the parts which are represented in Fig. 1. Figs. 3 and 4 are views in elevation at right angles to each other showing certain parts which coöperate in raising and lowering the press-bar of Figs 1 and 2. Fig. 5 is a view in vertical section corresponding with a part of Fig. 2, but showing a modification.

The framing and certain fixed parts which

are applied thereto are designated 1 1 in the various views or figures of the drawings, the usual bottom board being designated 2, the 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.

7 and 8 respectively designate the two moving griff-frames, 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 each provided with two hooks, as 31 31, for engagement with the respective moving griffs, and in the present embodiment of the invention the said uprights are double, as shown, each limb of each of such uprights having a hook 31. One hook 31 of each upright is designed for coöperation with a griff-blade 71, and the other hook 31 thereof is designed for coöperation with the adjacent griff-blade 81, one of such griff-blades being designed to be uplifted for one shed and the other thereof being designed to be uplifted for the succeeding shed, 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 said 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 31 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 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 uprights 3 3, as at 131 131. Springs, as at 132 132, may be employed to press the wires or needles 13 13 toward the left in the drawings. 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 mode of operating the wires 13 13 or their equivalents and of arranging and connecting the same with their actuating devices may be varied. In Fig. 5 we show a press-bar 14, arranged to act against the ends of all the wires 13 13, so that when movement is given to the said press-bar 14 toward the right in the said figure all the limbs of all the uprights 3 3 shall be pressed in the same direction. This will operate to carry toward the right clear of the ascending griff-blades all the hooks which are not in engagement with moving griff-blades. The movement will not be sufficient to disengage from the moving griff-blades the hooks which are in engagement therewith, and the limbs on which such hooks are formed will simply bend under the pressure which is exerted against them by the wires 13 13. For the purpose of operating the press-bar 14 at the proper times I provide an arm or arms 15 on a rock-shaft 16. The said rock-shaft is shown provided with a cam-shaped arm 17, against which latter acts a roller 18, carried by a projection 19 from one of the moving griff-frames, as 8. The roller 18 acts against the cam-shaped portion of the arm 17 in both the upward movement and the downward movement of the griff-frame 8, so that the wires 13 13 are operated in proper season every time the respective griff-blades 71 and 81 pass each other.

The arrangement that is shown in Fig. 5 is intended to press back all the limbs of the double uprights at every action of such bar. In some cases it may be desired to press back only one-half of the said limbs at a time in order to reduce the strain on the parts which operate the press-back devices as well as in order to lessen the danger of accidental dislodgment of the hook of an upright from the griff-blade with which such upright is descending. To this end the wires 13 13 or their equivalents may be divided into two sets, and the operating devices may be so contrived as to operate the said sets alternately, so that

at each action of the parts only those wires shall be pressed back which correspond with the limbs that normally coöperate with the particular griff which for the time being is rising. In Figs. 1 to 4, therefore, the press-bar 14 is arranged to operate only a part of the wires 13 at each movement of the same toward the right, the remaining part of such wires being operated at the next movement of the press-bar to the right, and so on. In these figures we have arranged the wires or needles in two sets one above the other and have combined with the press-bar 14 means of shifting the same vertically, so that when in one position it shall act against the upper set of wires 13 or the equivalent thereof and when in the other position it shall act to move the other set of wires 13 or the equivalent thereof. Each end of the said press-bar is supported by a carrier 20, the said carrier having therein a horizontal slot 211, which receives the said end of the press-bar and along which the said end is free to be moved toward and from the ends of the wires 13 13 by means of the actuating devices which have been described. The upper part of the carrier 20 is formed with lugs 21 21, having holes therethrough, as indicated in dotted lines at 22, (see more particularly Fig. 3,) the said holes receiving guide-pins 23, which are applied to a stand 24, which is connected with a fixed part of the framework. A pin or the like, as at 25, projecting from the arm or bracket 19, operates the carrier 20 by striking against the lugs 26 26, respectively, as the griff-frame 8 with which such projection 25 is connected nears the respective ends of its vertical reciprocation, thereby shifting the said carrier and with it the press-bar, so that the said press-bar shall be placed in position to operate one set of the wires 13 during the descent of griff-frame 8, and then placed in position to operate the other set of wires during the rise of griff-frame 8. Sufficient friction between the carrier 20 and the guide-pins 23 is provided for in order to enable the carrier to remain in its elevated position after being raised by contact of projection 25 with the upper lug 26 in the ascent of griff-frame 8 until it is depressed positively by the engagement of the pin 25 with the lower lug 26 in the descent of the griff-frame 8.

We claim as our invention—

1. The combination with the griffs moving oppositely with relation to each other, and the double uprights, of wires engaging with such uprights, and means to operate said wires to press the descending uprights out of the path of the ascending griff.

2. The combination with the griffs moving oppositely with relation to each other, and the uprights, of separate sets of press-back devices engaging with such uprights, and means to operate such sets alternately, whereby as each griff descends the free hooks of the uprights descending therewith shall be moved out of the path of the ascending griff.

3. The combination with the griffs moving oppositely with relation to each other, and the uprights, of the two sets of wires engaging with such uprights, and means to operate the said two sets of wires alternately, whereby as each griff descends the free hooks of the uprights descending therewith shall be moved out of the path of the ascending griff.

4. The combination with the griffs moving oppositely with relation to each other, and the uprights, of the wires, the press-bar, and means to operate the said press-bar.

5. The combination with the griffs moving oppositely with relation to each other, and the uprights, of the two sets of wires, the press-bar, means to move said press-bar to actuate the said wires, and means to cause the said bar to operate the said sets alternately.

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

GEORGE W. STAFFORD.
ALBERT E. KELMEL.

Witnesses:
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EMMA NISBET.