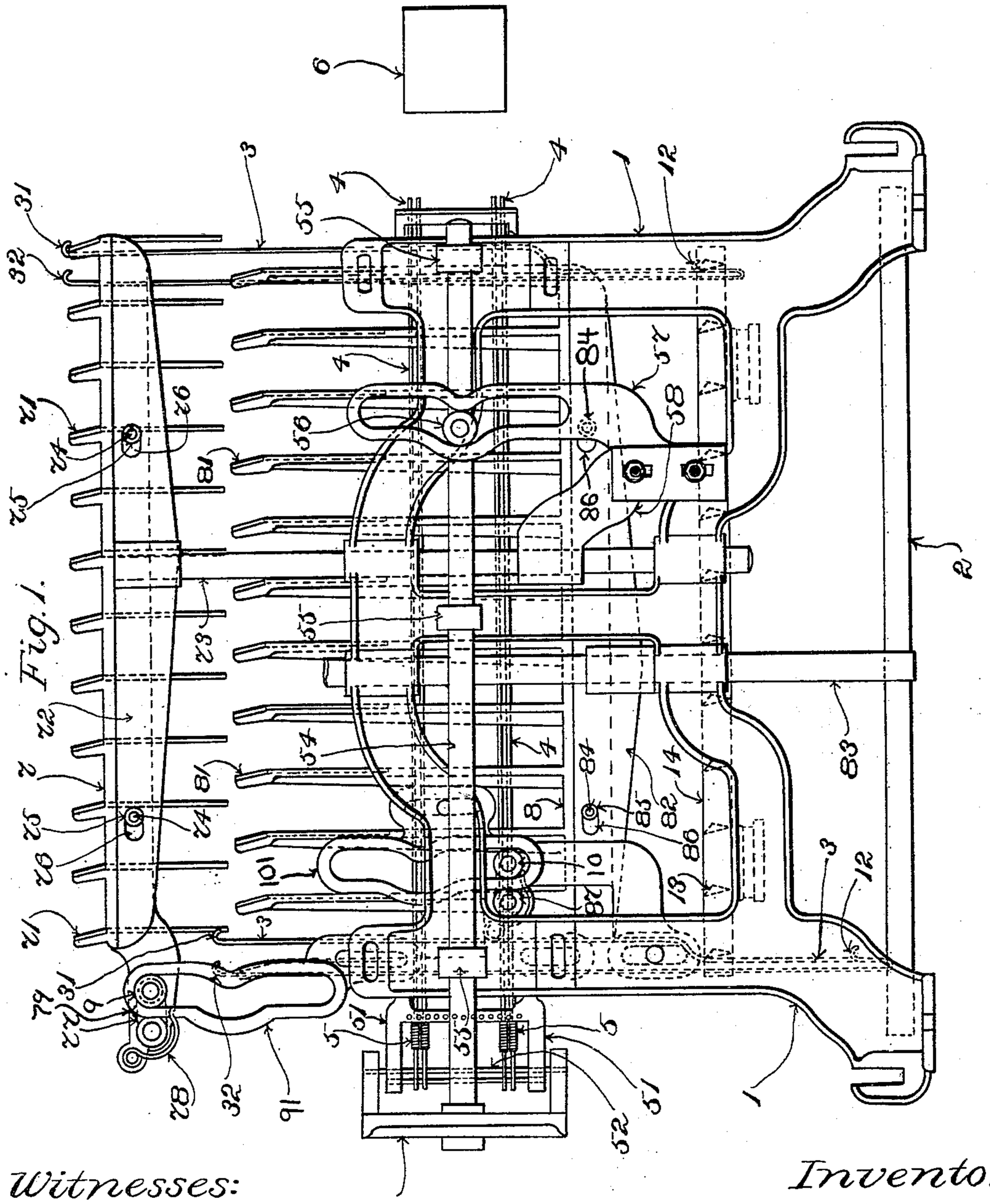
No. 625,563. Patented May 23, 1899.

A. E. KELMEL.

DOUBLE ACTION JACQUARD MACHINE.

(Application filed Jan. 23, 1899.)

(No Model.) 3 Sheets—Sheet 1.



Witnesses:
Oscar F. Hill
Lafine Hall Rice

Inventor:
Albert E. Kelmel
by Macleod Calvert Rundall
his Attorneys.

No. 625,563. Patented May 23, 1899.

A. E. KELMEL.

DOUBLE ACTION JACQUARD MACHINE.

(Application filed Jan. 23, 1899.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

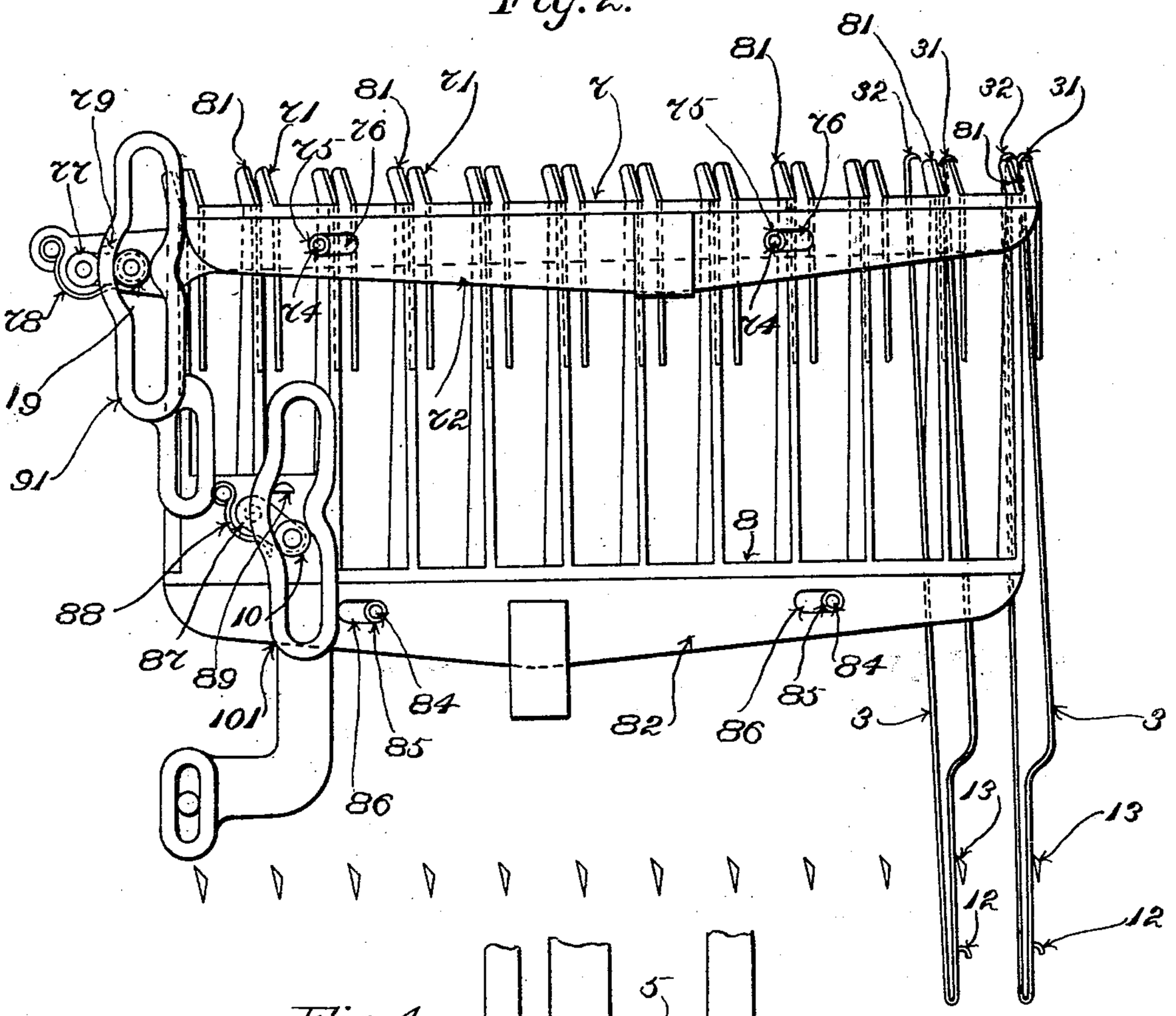
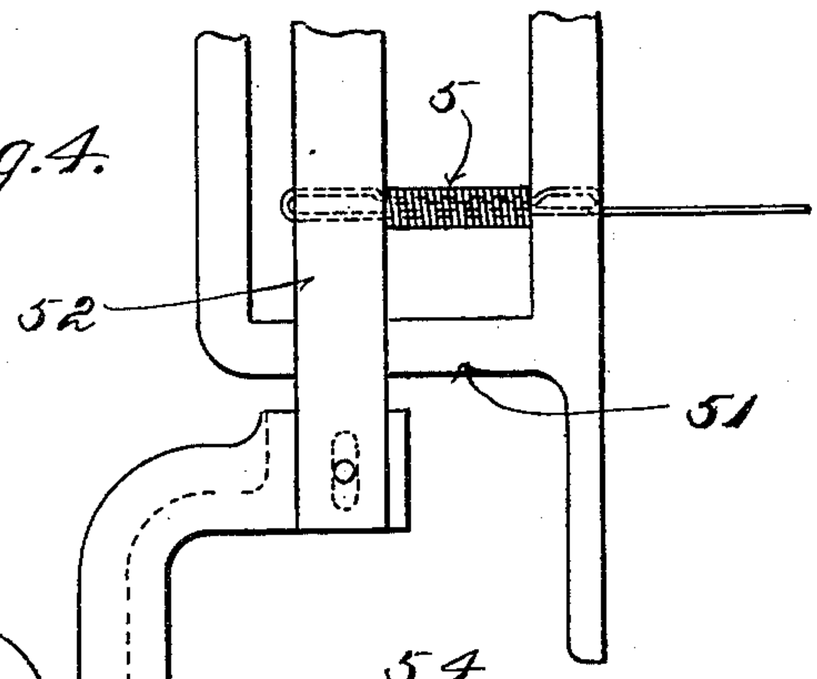


Fig. 4.



Witnesses:
Oscar F. Hill
Lapine Hall Rice

Inventor
Albert E. Kelmel
by Macleod Calver Lamsall
his Attorneys.

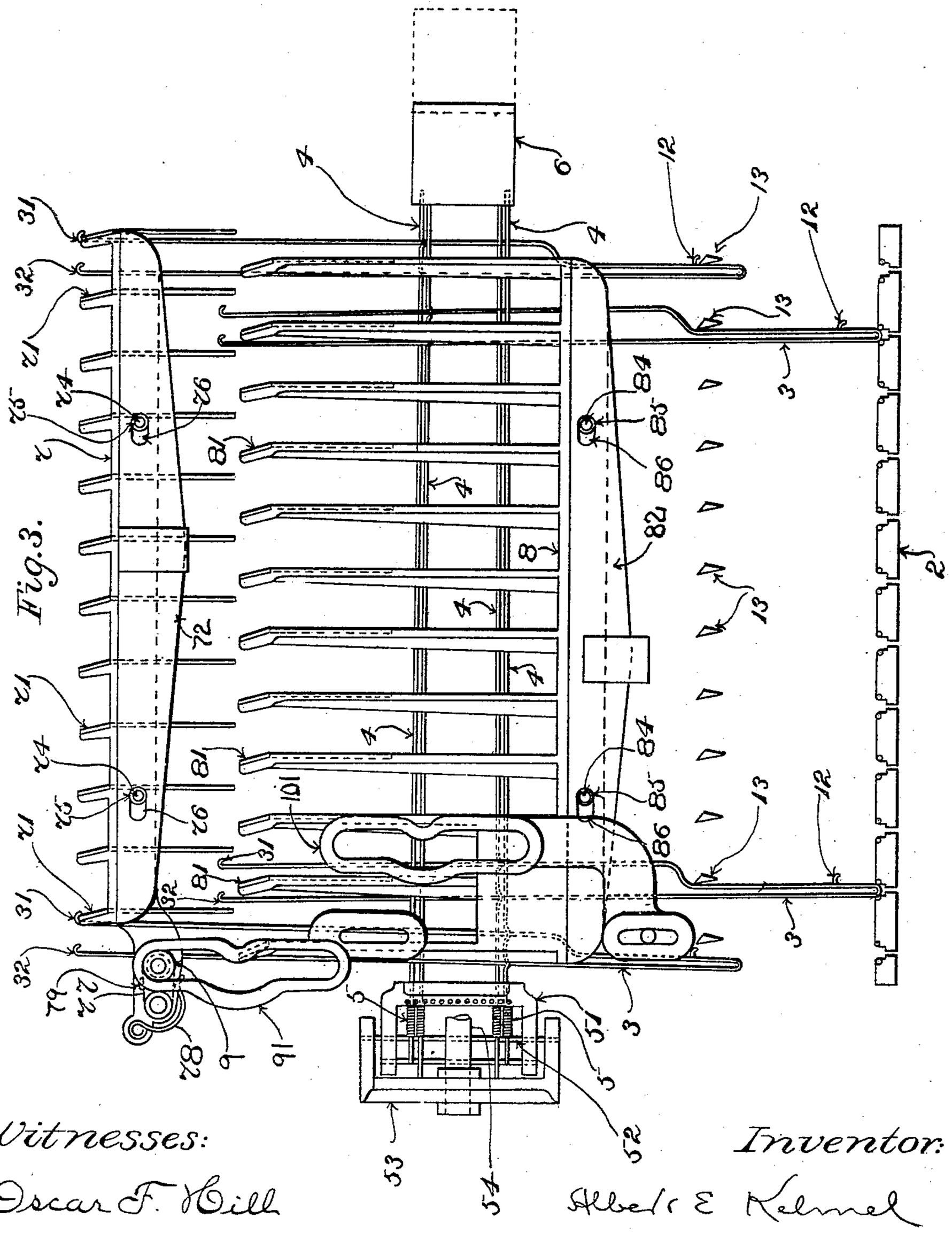
No. 625,563. Patented May 23, 1899.

A. E. KELMEL.

DOUBLE ACTION JACQUARD MACHINE.

(Application filed Jan. 23, 1899.)

(No Model.) 3 Sheets—Sheet 3.



Witnesses:

Oscar F. Hill

Lofine Hall Rice

Inventor:

Albert E Kelmel

By Macleod Baker & Ramsdell

his Attorneys.

UNITED STATES PATENT OFFICE.

ALBERT E. KELMEL, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE CROMPTON & KNOWLES LOOM WORKS, OF SAME PLACE.

DOUBLE-ACTION JACQUARD-MACHINE.

SPECIFICATION forming part of Letters Patent No. 625,563, dated May 23, 1899.

Application filed January 23, 1899. Serial No. 703,075. (No model.)

To all whom it may concern:

Be it known that I, ALBERT E. KELMEL, a citizen 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-cord a hooked upright having a plurality of griff-engaging hooks or nibs and the machine has two moving griffs which alternate with each other in their working, both griffs being capable of engaging with the said upright, but not both at the same time, the one griff ascending at one pick while the other griff is descending, and vice versa for the next pick, and so on. In consequence of the fact that the upright has two griff hooks or nibs, one for engagement with each moving griff, it follows that when the upright after having been raised for one or more given shed formations is descending with a griff-blade pertaining to the descending griff in order to occupy a lowered position for the next shed formation the disengaged hook or nib on said upright tends to project into the path of movement of a griff-blade of the ascending griff, and hence the said ascending griff-blade will engage with such hook or nib unless such engagement is provided against, and it will in consequence, by arresting the descent of such upright and carrying it back into its upper position, produce a false indication and cause a mispick. Usually heretofore in practice it has been undertaken to prevent improper engagement of a descending upright with the ascending griff 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. This mode of operation has presented, among other serious disadvantages, the important drawback that a slowing down of the operation of the loom very much 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.

The objects of the present invention are to provide in improved manner for preventing undesired engagement of a descending upright by the ascending griff and to obviate the necessity of making a second or extra beat of the card cylinder or prism for the same purpose. These objects I attain by means such as I now will proceed to describe with the aid of the accompanying drawings.

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 causing the descending uprights to be pressed back, in manner substantially as hereinafter described, out of the reach of the ascending griff the present invention makes it possible to run a loom having a double-action jacquard-machine applied thereto at a higher rate of speed than heretofore has been known to be possible.

The invention consists in the novel features and combinations which now will be described with reference to the accompanying drawings, in which latter are illustrated the best embodiments of the invention that have yet been 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 end elevation a jacquard-machine having the said embodiments of the invention applied thereto. Only such portions of the machine are shown in the various views of the drawings as are necessary in order to make clear the character, relations, and working of the invention. Fig. 2 is a view showing certain of the parts of Fig. 1 in positions which are different from the positions in which the parts are represented in Fig. 1, this figure being intended

mainly to illustrate the mode of operation of the griffs. Fig. 3 is a view showing certain of the parts that are shown in Fig. 1 and representing them in the positions which are occupied by them at the moment when the pattern cylinder or prism beats up against the ends of the needles. Fig. 4 is a detail view in plan showing certain parts which are concerned in relieving the spring-pressure on the needles.

The framing and certain fixed parts which are applied thereto are designated 1 1, the usual bottom board being designated 2, the uprights being designated 3 3, the usual needles which coöperate with the said uprights being designated 4 4, the springs which are applied to the said needles being designated 5 5, the spring-box being designated 51, and the usual card cylinder or prism being designated 6. The two moving griffs are designated 7 and 8, respectively, the blades applied thereto being designated, respectively, 71 and 81. The griffs 7 and 8 are mounted upon griff-frames 72 and 82, respectively, the said griff-frames being supported, as usual, upon vertically-sliding rods 73 83, which are mounted in the machine and actuated in usual manner, the power connections being in practice of any suitable or known character and being unnecessary to be shown or described herein. It is deemed sufficient to state herein that in the operation of the machine the griff-frames and griffs are operated to move vertically simultaneously and in opposite directions with respect to each other. In practice the card cylinder or prism 6 will be supported and operated by devices of usual character and construction, (not necessary to be shown herein,) and thereby will be caused to make one beat against the ends of the needles 4 4 for each shed formation, this last corresponding usually with one pick of the loom to which the jacquard-machine is applied. The two hooks or nibs with which each upright is provided for engagement with the blades of the moving griffs are designated, respectively, 31 and 32, the hook or nib 31 of each upright being that which engages with a blade 71 of the griff 7, and the hook or nib 32 of each upright being that which engages with a blade 81 of the griff 8, one of such griffs 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 designates a hook or nib with which each upright 3 also is provided, the said hook or nib 12 being designed to engage with one of the blades 13 of a fixed or stationary griff 14, such as 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.

Features of the general character of those which have been described thus far are common to preëxisting jacquard-machines. Various forms and arrangements thereof have been employed in practice heretofore, and it should be understood at the outset hereof that the invention is not limited in its application to the particular embodiment of the said features that is represented herein and also that the invention itself is capable of being variously combined and embodied.

In accordance with one part of the present invention both of the griffs 7 and 8 are made capable of movement transversely—that is, in the direction of the length of the needles 4 4—and with the said griffs are combined shifting devices which operate to shift the griffs alternately, the said devices being arranged to act as the griffs approach the middle portions of their vertical traverses and operating to occasion a clearance between the descending uprights and ascending griff-blades, which is sufficient in extent to provide against the engagement of the disengaged hooks or nibs of the descending uprights with the ascending griff-blades. This result is capable of being attained in different ways without departure from the principles of the invention. In the present embodiment of the invention the devices which impart transverse movement to the griffs are arranged to shift the descending griff, and each time such griff is shifted sufficiently to impart enough movement to the descending uprights to carry the disengaged hooks or nibs of the said uprights out of the way of the ascending griff-blades and insure that the said disengaged hooks or nibs of the descending uprights shall not be taken up by the said ascending griff-blades. A simple construction and arrangement of parts providing for the horizontal shift of the griffs is shown herein. Thus each griff 7 or 8 is mounted on its griff-frame 72 or 82 with capacity for slight horizontal movement thereon, the extent of such movement being limited by pins or studs 74 and 84, respectively, projecting from the ends of the respective griffs, the said pins or studs carrying antifriction-rolls 75 and 85, respectively, working in slots 76 and 86, respectively, in the griff-frames 72 and 82. To each griff is pivoted an arm, the arms being designated 77 and 87, respectively, the said arms being acted upon by springs, (designated 78 and 88, respectively,) and thereby being held pressed up against stops 79 and 89, respectively, upon the griffs. These stops prevent the arms from swinging upward beyond a given point, while the springs yield when sufficient downward pressure is exerted against the arms and allow the latter to swing downwardly. Studs on the said arms carry antifriction-rolls 9 10, respectively working in the slots of the cams 91 101, respectively, the said cams being supported on fixed portions of the machine-framing, as shown most clearly in Fig. 1. As will be obvious, in the ascent of a griff the arm 77 or 87 pertaining thereto will swing downward freely under the action of the cor-

responding cam 91 or 101 without any transverse movement being communicated to the griff. As a griff descends the arm pertaining thereto will be borne upward into engagement with its stop 79 or 89 by the action of its cam, and as the roller 9 or 10 is carried down along the slot of the said cam the cam will act to impart transverse movement to the griff. The cams 91 and 101 are shaped to occasion this transverse movement as the griffs reach the middle of their vertical traverses, so that as the disengaged hooks or nibs of the uprights which are descending with one griff pass blades of the ascending griff the descending uprights are shifted transversely sufficiently far to clear the ascending griff-blades. This action is illustrated clearly in Fig. 2. The two griffs are shifted alternately, each in the descent thereof. It will be perceived in the case of the illustrated application of the invention to use in connection with double uprights, the hook or nib 31 being on one limb of an upright and the hook or nib 32 being on the other limb thereof, that when the movable griff on which either of said hooks or nibs is hung is shifted the two limbs of the double upright will both be carried in the same direction.

At the time when the uprights are moved transversely, as described above, to prevent the disengaged hooks or nibs of the descending uprights from being taken up by the ascending griff-blades it is desirable that the needles 4 4 should be rendered quite free to move lengthwise slightly in order to facilitate the adjustment thereof in accordance with the transverse shift of the uprights and relieve the pressure and friction of the uprights within the eyes of the needles, so as to obviate the consequent wear of such eyes, as well as to render it easier thus to move the uprights. A second part of the invention consists, accordingly, in means of enabling the needles to adapt themselves to the transverse movement of the uprights occurring as pointed out hereinbefore. This part of the invention is not necessarily restricted to use in connection with the particular type of means of bearing the uprights transversely which has been described herein, but is to be understood as equally capable of being employed in combination with other types of means for the latter purpose. Herein this part of the invention is represented as embodied in devices by means of which to relieve the needles 4 4 of the pressure and restraint of their springs 5 5 as the moving griffs approach the middle of their vertical traverses and the other devices operate to bear the uprights transversely. Thus the wires 52 52, against which the outer ends of said springs 5 5 bear, the said wires constituting backing or abutments for the said springs, are mounted in a frame 53, that is carried by slide-rods 54. These slide-rods (only one of which is shown) are mounted to slide in guides 55 55 in the machine-framing, and each thereof carries a roller 56, working in the slot of a cam 57, fixed to a bracket 58, fast on the slide-rod 73 of one of the moving griffs. Thereby each time the moving griffs approach the middle of their vertical traverses the frame 53 is moved outwardly, so as to relieve the springs 5 5 of compression, which renders the needles free to adapt themselves to the lateral movement of the uprights.

What is claimed as the invention is—

1. The combination with the two oppositely-moving lifting-griffs, and the uprights having each a plurality of hooks or nibs whereby each upright is lifted by either of the said griffs in turn, of means whereby the said two lifting-griffs are shifted horizontally alternately in their vertical traverses to prevent the disengaged hooks or nibs of the descending uprights from being taken up by the ascending griff, substantially as described.

2. The combination with the two oppositely-moving lifting-griffs, and the uprights having each a plurality of hooks or nibs whereby each upright is lifted by either of the said griffs in turn, of means whereby each lifting-griff in its descent is shifted horizontally to insure clearance between the descending hooks or nibs and the ascending griff, substantially as described.

3. The combination with the two oppositely-moving lifting-griffs, and the double uprights having on each limb thereof a hook or nib, of means whereby each lifting-griff in its descent is shifted horizontally to insure clearance between the disengaged hook or nib of the free limb of the upright descending with such griff and the blade of the ascending griff, substantially as described.

4. The combination with the oppositely-moving griff-frames, and the lifting-griffs respectively mounted upon the respective griff-frames with capacity to move transversely thereon, of cams coöperating with both lifting-griffs for occasioning horizontal shift of the griffs alternately as they pass each other, to prevent the disengaged hooks or nibs of the descending uprights from being taken up by the ascending griff, substantially as described.

5. The combination with the oppositely-moving griff-frames, and the lifting-griffs respectively mounted upon the respective griff-frames with capacity to move transversely thereon, of the arms mounted to swing freely in one direction, and the cams engaging with the said arms, whereby each griff in its movement in one direction is shifted transversely as the lifting-griffs pass each other, to prevent the disengaged hooks or nibs of the descending uprights from being taken up by the ascending griff, substantially as described.

6. The combination with the needles, the uprights having each a plurality of hooks or nibs, and the two oppositely-moving griffs to engage said hooks or nibs and raise said uprights, of means to bear the uprights transversely as the descending hooks or nibs and

the ascending griff pass each other, to insure clearance between the same, and means providing for the adjustment of the needles to the transverse shift of the uprights, substantially as described.

7. The combination with the needles, their springs, the uprights having each a plurality of hooks or nibs, and the two oppositely-moving griffs to engage said hooks or nibs and raise said uprights, of means to bear the uprights transversely as the descending hooks or nibs and the ascending griff pass each other, to insure clearance between the same, and means whereby the spring-pressure upon the needles is relieved in order to enable the needles to adjust themselves to the transverse shift of the uprights, substantially as described.

8. The combination with the needles, their springs, the backings or abutments to the said springs, the uprights having each a plurality of hooks or nibs, and the two oppositely-moving griffs to engage said hooks or nibs and raise said uprights, of the cams acting in connection with the respective griffs to insure clearance between the descending hooks or nibs and the ascending griff, and the cam operating in connection with the said backings or abutments to relieve the spring-pressure and facilitate the adjustment of the needles to the transverse shift of the uprights, substantially as described.

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

ALBERT E. KELMEL.

Witnesses:

E. F. GREENE,

W. G. ANTHONY.