

No. 619,611.

Patented Feb. 14, 1899.

A. PIVETZ.
LOOM.

(Application filed Mar. 17, 1897.)

(No Model.)

3 Sheets—Sheet 1.

Fig: 2.

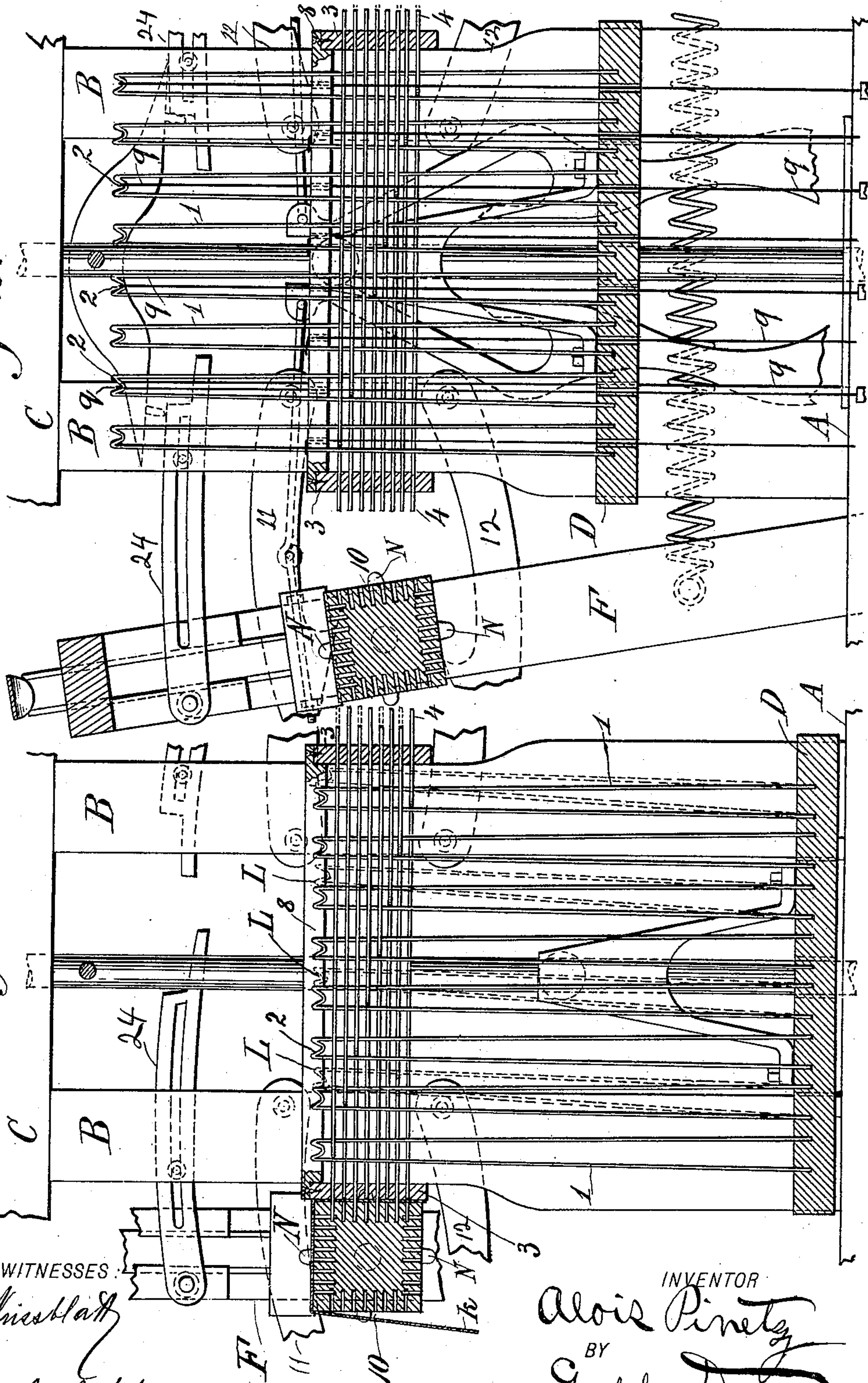


Fig: 1.

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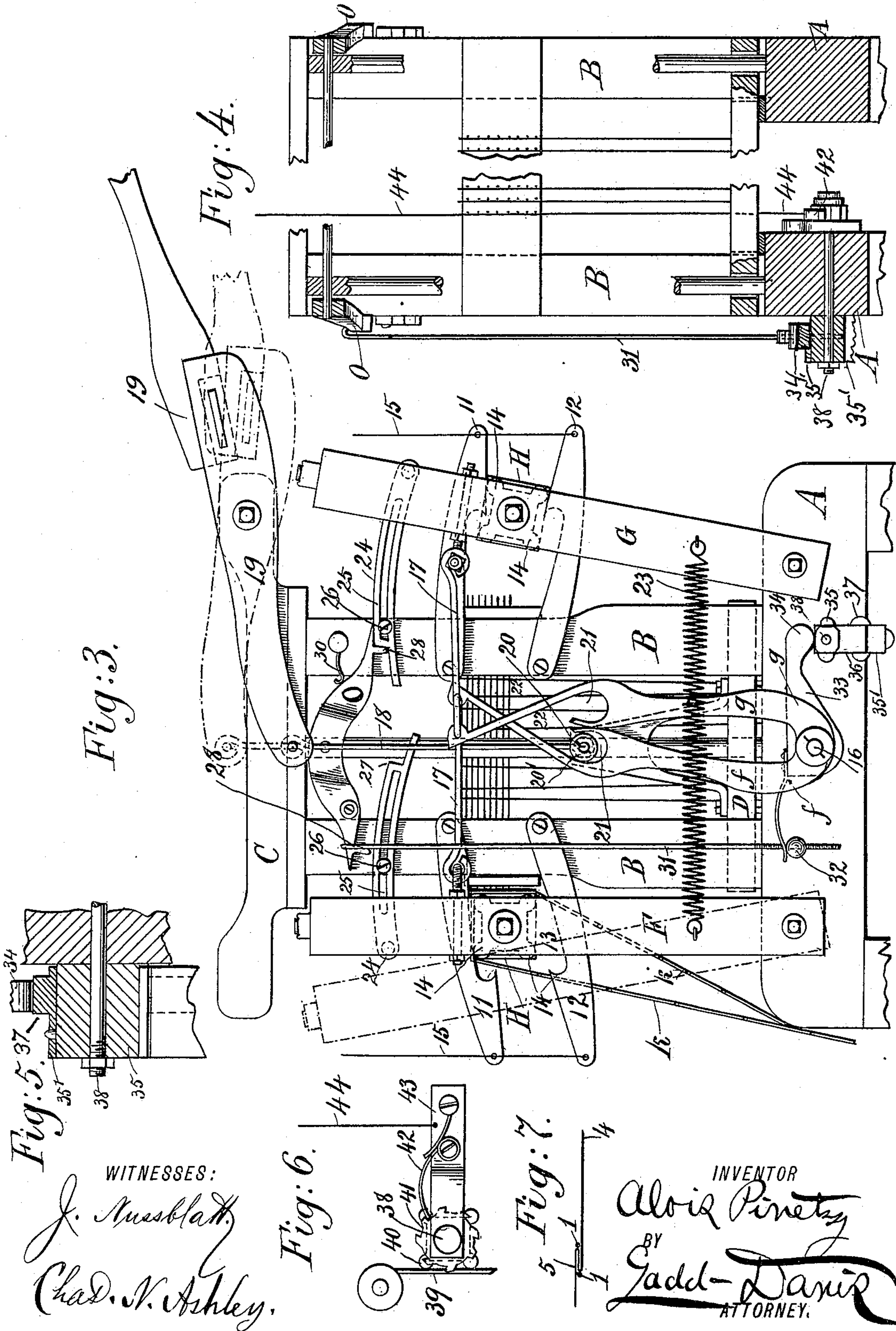
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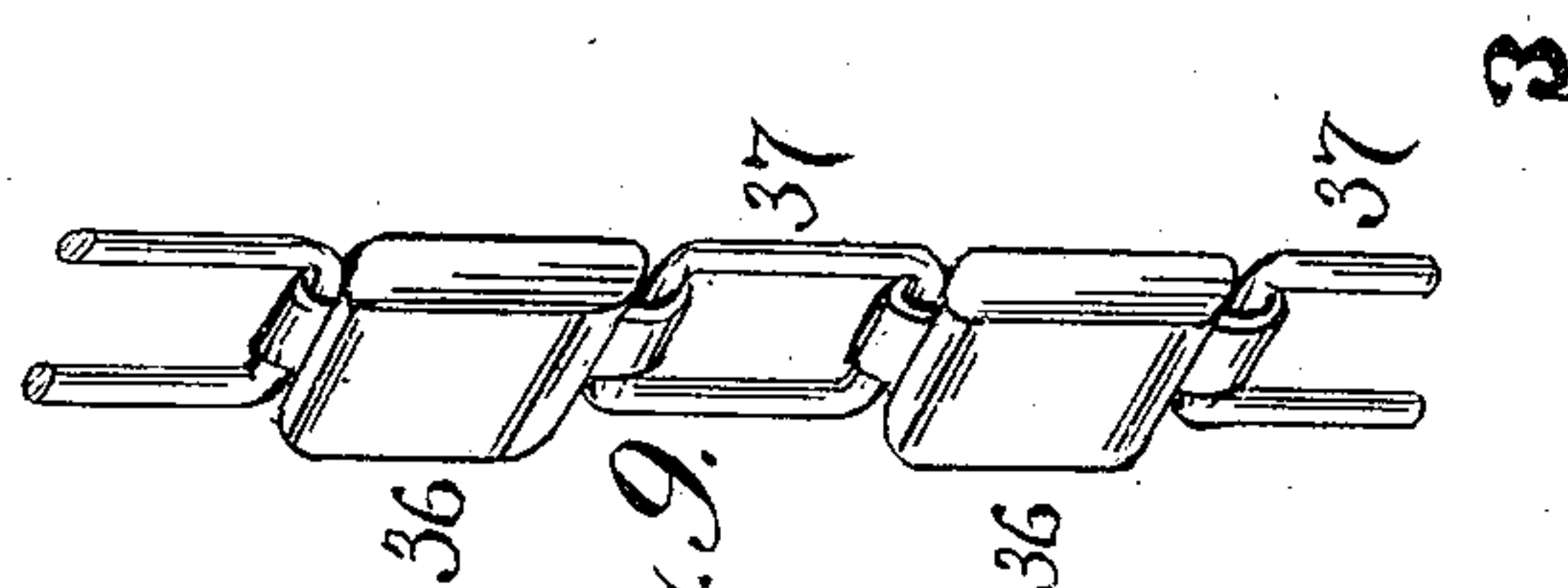
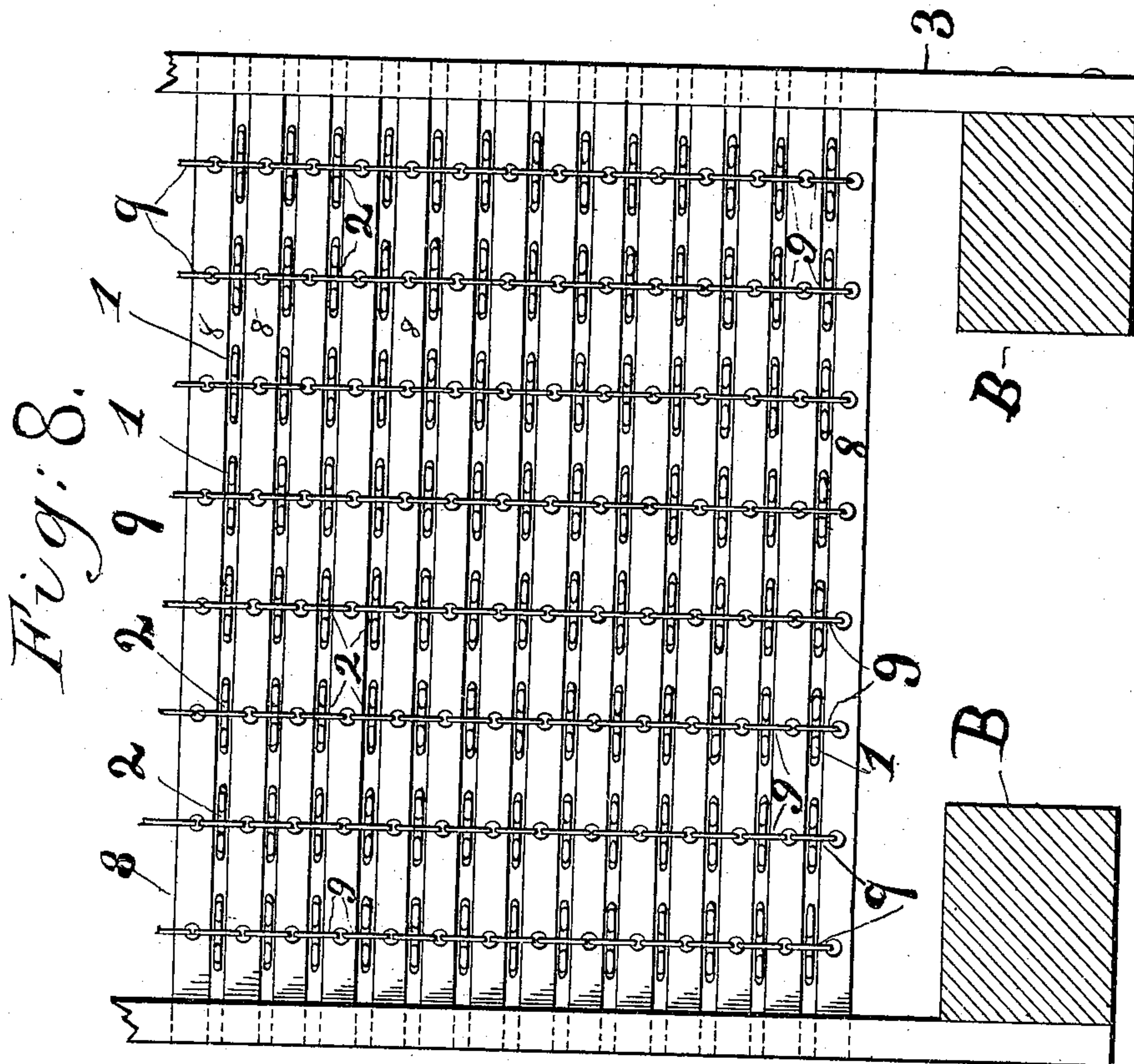
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3 Sheets—Sheet 3.



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LOOM.

SPECIFICATION forming part of Letters Patent No. 619,611, dated February 14, 1899.

Application filed March 17, 1897. Serial No. 627,977. (No model.)

To all whom it may concern:

Be it known that I, ALOIS PIVETZ, a subject of the Emperor of Austria-Hungary, residing in the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Looms, of which the following is a specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates more particularly to that form of looms known as "Jacquard" looms; and the object of the same is to provide looms of this character with a new and improved form of heddle-operating device of a simple and cheap form of construction wherein a less number of cards than are now used may be used with equal effect and in which the original cost of construction of the heddle-operating mechanism will be much less than it is at present and the durability thereof will be greater.

To such ends my invention consists in a needle-frame holding double-ended needles, two vibrating or moving card-carrier frames holding card-carriers adapted to be brought one against one end and one against the other end of the needles, a plurality of heddle-lifts—one for each of the needles—formed of spring-wires and secured at the bottom to a suitable support and adapted to be moved in and out of operative position by the movement of the needles, a heddle-lifting wire or string for each of the heddle-lifts connecting with its heddle, and a series of supports through which the heddle-lifting strings or wires pass and by which the same are held in position, means for moving the card-carriers so as to feed the cards, means for vibrating or moving such card-carrier frames to and from the needles, and means for bringing first one card-carrier and then the other into operative connection with the needles, according to the pattern, although it is not to be understood that the invention is limited to a machine necessarily comprising at once all of the devices or mechanisms before mentioned, for the invention consists in certain various combinations and arrangements of such devices and parts and to the construction of such devices and parts, all substan-

tially as hereinafter fully described, set forth, and claimed.

The mechanism of such invention is fully shown and described in the following specification, of which the accompanying drawings form a part, wherein similar letters and numerals of reference designate like or equivalent parts wherever found throughout the several views, and in which—

Figure 1 is a view of such invention in cross-section, the card-carrier being shown in its inward or needle-operating position; and Fig. 2 is a like view of said devices with the card-carrier in its non-working position, the heddle-lifts and lifting mechanism being shown in the raised position. Fig. 3 is a side view in perspective of such device, showing the outside mechanism. Fig. 4 is a view of the side portions of the machine in vertical section, showing the shifting mechanism of the card-carriers, while Figs. 5, 6, and 7 are views in detail of various portions of the device. Fig. 8 is a top plan view of one-half of the frame on the line *c c* of Fig. 1, a portion of the mechanism being removed, so as to give a top view of the needle-lifts, needle-cords, and bars which support the needle-cords; and Fig. 9 is a view in detail of the pattern-chain.

As shown in the drawings, A designates a suitable rectangular frame supporting a suitable upwardly-extending framework composed of standards B and suitable top pieces C.

Normally resting upon the support A, but adapted to move freely upward between the uprights B, is a slide-plate or carrier D, and in this carrier D are secured a plurality of heddle-lifts 1, formed, preferably, as shown, of a spring-wire doubled back upon itself and secured firmly at the two ends to the plate D and provided at its upper end with a reversed loop or hollow 2.

Secured upon opposite sides of the frame, adjacent to the top of the heddle-lifts 1 when such lifts are in the lower position shown in Fig. 1, are suitable perforated guide-plates 3, through the perforations of which pass the needles 4 in such manner that said needles project at either end a short distance—say one-half ($\frac{1}{2}$) an inch or so—beyond each of such guide-plates 3. Each of such needles 4

is provided with a suitable lug, adapted to engage with its respective heddle-lift 1, and such lug is preferably of the form shown, made by forming a double bend in such needle-wire 4, as shown at 5' in Fig. 7, wherein the same is shown in position in the heddle-lift 1. The heddle-lifts 1 and wires 4 are of course so arranged that there is no interference one with the other and so that the heddle-lifts when moving upward, as shown in Fig. 2, will move easily by the needles, while at the same time remaining in engagement with the operating lugs or loops 5 of such needles.

The heddle-lifts are arranged upon the slide-plates D in a series of rows which extend from one of the guide-plates 3 to the other, and supported at the ends, preferably on top of the guide-plates 3, as shown, are a series of cross-bars 8, located between each row of heddle-lifts 1, sometimes similar in number to the rows of heddle-lifts, so that one bar will lie between each two rows, and sometimes sufficient in number so that two of such bars will so lie between each two rows, and passing up through suitable holes in the slide-plate D, up through like holes in the bars 8, over the tops of their respective heddle-lifts 1, and down through the plate D again are a plurality of heddle-lifting strings or wires 9.

Pivoted upon the supporting-base A and extending upward therefrom so as to vibrate back and forth toward and from the plates 3, which support the ends of the needles, are card-carriers F and G. These card-carriers consist of a suitable framework, in which is revolvably mounted the bar H, which is preferably of the square form shown and provided on each face with the plurality of perforations or holes 10, similar in number and adapted to register one with each of the needles 4, and also with suitable lugs N, which give positive feed to the card K.

Pivoted on one or both sides of the frame, adjacent to the needle-supporting plates 3, one above and one below the card-carrying bars H, are catch-levers 11 and 12, the catch-lever 11 being above and the catch-lever 12 below the bars H, and these catch-levers are each provided, the one 11 with a downwardly-extending and the one 12 with an upwardly-extending lip, tooth, or catch 13, adapted to engage at the proper times with suitable lugs or teeth 14, rigidly secured to the ends of the card-carrying bars H. Secured to each of these catch-levers, at their outward ends, are lifting wires or rods 15, by which each pair thereof are simultaneously lifted upward, as shown in Fig. 3, at the right side of such figure, or allowed to drop downward until the top one 11 rests upon the bar H, as shown in Fig. 3, and by this arrangement it will be seen that when the frames F and G, carrying the bars H, are vibrated back and forth, when the catch-levers 11 and 12 are in their lower position, the catches 13 thereof will catch upon

the lugs 14, and thus rotate the card-carrying bar H to the right upon the backward movement of the bars H, and that, on the contrary, when the catch-levers 11 and 12 are lifted by the wires 15 into the upward position shown in Fig. 3 the catch or hook 13 of each of the upper catch-levers 11 will be out of engagement with the lug 14 and the catch 13 of the lower bar 12 will be brought into engagement with such lugs 14, so that when in such elevated position, if the vibration of the frames F and G be continued, the card-carrying bars H will be rotated to the left, and by this arrangement, according to the pattern it is desired to weave, the cards K may be moved first in one direction and then in the other.

Pivotally supported upon the end of a stud or pivot 16 are two upwardly-extending cam-levers *f* and *g*, preferably of the shape shown, to which are connected at their upper ends, respectively, the cam-lever *f* with the frame F and the cam-lever *g* with the frame G by suitable rods 17, and secured to the slide-plate D, carrying the heddle-lifts 1, is a shifting rod or rods 18, connected at the upper end to a lever 19, which is vibrated up and down by any suitable mechanism, (not shown,) and upon the rod 18 is a cam-pin 20, preferably provided with a suitable antifriction-roller 20', which cam-pin and roller are adapted to enter the cam-pockets 21 of the cam-levers *f* and *g*, being directed into the same by the working faces 22 thereof when brought into contact therewith.

Secured at the ends to the frames F and G is a suitable spiral spring 23, and pivoted to the said frames F and G, near the tops thereof, are the slide-catches 24, provided with a central slot 25 to receive the pins 26, which are secured to the standards B. Pivoted at the center so as to vibrate up and down, so that the upwardly-extended lugs 28 thereof may be brought into connection first upon the one side and then the other with the catches 27 of the slides 24, is a lever O, preferably of the form shown, normally kept in one position by the spring 30 and connected at the other end with a rod 31, connected at its lower end, preferably by means of a suitable regulating and adjusting screw device 32, with a lever 33, which is loosely mounted upon the stud or pivot 16, as are the cam-levers *f* and *g*, and adjacent to the outer end 34 of the lever 33 is a rotating rectangular chain-carrier 35, which is in actuating connection with the pattern-chain 35', which is provided with lug-links 36, alternated with plain links 37, adapted to actuate the lower rounded end of the lever 33, as shown in Fig. 9.

The rotating rectangular chain-carrier 35 is rigidly mounted upon the shaft 38, which passes through the frame, and rigidly secured thereto, on the interior side of the frame, as shown in detail in Fig. 6, is a ratchet-and-pawl device for intermittently rotating the carrier-shaft, which device consists, prefer-

ably, of a stop-spring 39, a rectangular stop-wheel 40, in engagement therewith, and a ratchet-wheel 41, the wheels being rigidly secured to such shaft 38 and provided with a suitable pawl 42, preferably of the spring form shown, and this lever 42 is vibrated at the desired intervals, regularly or irregularly, as the case may be, by suitable mechanism connected with an operating rod or wire 44.

Usually the cam-levers *f* and *g*, the double lever *O*, and accompanying mechanism are duplicated upon the farther end of the machine, opposite to that shown in Fig. 3; but this is not absolutely essential, as in many cases and unless the cards are of great length one set of such shifting mechanism upon one end of the machine will be found to be amply sufficient.

It will be seen upon an examination of Fig. 3 of the drawings that as the outer end of the lever 19 is pulled downward this will carry upward the inner end of such lever, which is connected with the rod 18, which carries at its lower end the cam-pin 20, provided with the antifriction-roller 20', and that when the parts are in the position shown in full lines in Fig. 3 as this cam-pin and roller are moved straight upward the impingement of the roller against the working slide-face 22 of the lever *f* will force such lever *f*, and consequently the card-carrying frame *F*, back into the position shown in dotted lines in said Fig. 3, while the card-carrying frame *G* will remain stationary, and that upon the downward movement of such cam-pin 20 as the same descends along the working face 22 of the lever *f* the frame *F* will be drawn back into the position shown in full lines by the tension of the spring 23, and also that when the dog 28 of the lever *O* by the operation of the lever 33 is released from the slide 24, attached to the frame *G*, the first upward movement of the cam-pin 21 will force the frame *F* to its extreme rearward position, when the action of the spring by which the rod 31 is connected to the lever 33 will force the dog 28 upon the left end of the lever *O* down past the end 27 of the slide 24, which is attached to such frame *F*, when such frame *F* will be locked in the extreme outward position, as is the frame *G* in said Fig. 3, and that the action of the spring 23 will then be such that the first downward movement of the cam-pin 20 after such frame *F* has been locked in position will cause the roller 20' thereof to impinge against the working slide-face 22 of the lever *g* instead of that of the lever *f*, whereby such cam-pin will then be directed into the pocket 21 of such lever *g* instead of the pocket 21 of the lever *f*.

The operation of the device is as follows: The parts being in position shown in Figs. 1 and 3 and the end 34 of the lever 33 resting on one of the plain links 36 of the chain 35' on the chain-carrier 35, those of the heddle-lifts 1 the actuating-needles of which are in registry with the holes or perforations of

the card-carrier *K* on the bar *H* of the frame *F*, will remain in their normal central operating position, as shown in full lines in Fig. 1, inasmuch as the ends thereof extend through the card into the perforations provided to receive them in the bar *H*, while those needles which are in registry with the unperforated portions of the card *K* will be pushed back toward the right, so as to carry the heddle-lifts 1 into the non-working position shown in dotted lines in said Fig. 1, and the lever 19 being actuated so as to carry the cam-pin 20 upward upon the same movement of such lever the plate *D* will be started upward, carrying with it such heddle-lifts 1, and the heddle-lifts 1 which are in the position shown at *L* in dotted lines in said Fig. 1 will pass by their respective heddle-lifting strings or wires 9, leaving the same in their normal depressed position, while those heddle-lifts not actuated by the needles 4, which have remained in their normal central position, will impinge against the loops of their respective lifting wires or strings 9, so as to catch the same in the reversed loops 2 thereof, and when they have moved up sufficiently far to have firm hold upon such loops the lever *F* is by the cam-pin 20 pressing against the working slide-face 22 of the same started backward, so to release the needles 4 from the pressure of the cards, when such heddle-lifts as have not the strings 9 are forced by their natural resiliency back into their normal upright position, and as the upward movement continues the plate *D* is carried up into position shown in Fig. 2, and the frame *F* has been forced back farther and farther, so as to cause the carrier-bar *H* to be rotated to the right by the action of the catch-lever 11, so as to bring another one of the cards *K* into actuating position on the bar *H*, and when the lever 19 is operated in the reverse direction this will return the parts to the position shown in full lines in Fig. 3, and if immediately upon the first downward movement of the mechanism the chain-carrier 35 is rotated so as to bring one of the lug-links 37 of the chain 35' into contact with the end 34 of the lever 33 this will draw down the left-hand end of the double dog or lever *O*, so as to release the frame *G* from engagement with the tongue 28 of such lever *O*, and upon this movement the spring 23 will draw the frame *G* inward and the cam-lever *g* will be forced forward, so that the cam-pin 20 will impinge upon the slide-face 22 thereof, and as the cam-pin 20 is forced down farther this will draw the frame *G* forward, so that the card *K* on the bar *H* thereof will be brought into contact with the needles upon that side in the same manner as was the card-carrier by the frame *F*, as shown in Figs. 1 and 3, and as the operation is repeated (according to the rapidity of the movement of the chain-carrier 35) first one and then the other of the frames *F* and *G* will be operated alternately, either regularly or irregularly, as may be desired, according to the pattern

which is in process of weaving, and during all this time, according to the manipulation of the catch-levers 11 and 12 by movement of the rods or wires 15, the movement of the cards K is regulated as may be desired.

It is evident that many modifications in the construction, combination, and arrangement of the several parts of said device herein shown and described may be made without departing from the scope of my invention, and I do not intend to limit myself to the particular form of construction of the whole or any of the various parts thereof; but,

Having herein particularly shown and described my said invention and the manner of operating the same, what I claim, and desire to secure by Letters Patent, is—

1. In combination, the heddle-lifts, and needle-wires, the two frames F, G, carrying pattern-cards, means for operating the frame, the slides 24 and the locking-lever O with means for operating the same, substantially as described.

2. In combination, the spring-wire heddle-lifts, the lifting-wires *q* to be engaged at their upper ends by the upper ends of the said heddle-lifts, and the double-acting needles to press the heddle-lifts in either direction with means for operating the needles, substantially as described.

3. In a device of the class described, the combination with a plurality of double-ended needle-wires 4, of a like number of heddle-lifts 1 in actuating connection with the needle-wires 4, two vibrating frames F and G each carrying rotating pattern-card carrier-bars H, two cam-levers *f* and *g* in actuating connection with the frames F and G, a cam-pin for moving the levers *f* and *g*, and means for automatically putting the cam-pin into operative connection first with one and then the other of said levers *f* and *g*, substantially as shown and described.

4. In a device of the class described, the combination with suitable heddle-lifts and needle-wires, of two moving frames F and G each carrying pattern-cards, two cam-levers *f* and *g* each having a pocket 21 ending in a working face 22 connected one to the frame F and one to the frame G, a cam-pin for actuating such levers, and means for automatically bringing such cam-pin into operative connection first with one lever and then with the other, substantially as shown and described.

5. In a device of the class described, the combination with suitable heddle-lifts and needle-wires, of two moving frames F and G each carrying pattern-cards, cam-levers *f* and *g*, connected one to the frame F and one to the frame G a cam-pin for actuating the levers *f* and *g*, means for actuating the cam-pin

so as to move the levers *f* and *g*, a double dog or lever O and means for automatically bringing such dog or lever O into and out of connection with the frames F and G, substantially as shown and described and for the purposes set forth.

6. In a device of the class described, the combination with suitable heddle-lifts and needle-wires, of two moving frames F and G each carrying pattern-cards, cam-levers *f* and *g* connected one to the frame F and one to the frame G, a cam-pin for actuating the levers *f* and *g*, means for actuating the cam-pin so as to move the levers *f* and *g*, a double dog or lever O, a lever 33 connected with such dog or lever O, and means for automatically actuating the lever 33, substantially as shown and described and for the purposes set forth.

7. In a device of the class described, the combination with heddle-lifts 1 of resilient spring-wire reversed upon itself so as to form an elongated loop, of a plate D to which the heddle-lifts are firmly secured at the lower end thereof, substantially as shown and described and for the purposes set forth.

8. In a device of the class described, the combination with heddle-lifts 1 formed of resilient spring-wire reversed upon itself so as to form an elongated loop, of a plate D to which such heddle-lifts are secured at the lower end thereof, and double-ended needle-wires 4 in operative connection with the heddle-lifts 1 so as to move the same in two directions, substantially as shown and described and for the purposes set forth.

9. In a device of the class described, the combination with a suitable reciprocating lifting-board D, of heddle-lifts of resilient material firmly secured at one end to said board D, needle-wires for moving the heddle-lifts, and means for moving the needle-wires so as to move the heddle-lifts, the construction being such that the natural resiliency of the heddle-lifts will keep such heddle-lifts and their respective needle-wires normally in position, substantially as shown and described and for the purposes set forth.

10. A heddle-lift for use in devices of the class described, consisting of a resilient spring-wire bent into an elongated-U form provided at the bow end of the loop with a reversed loop 2, the legs of the elongated U being of substantially equal length, substantially as shown and described and for the purposes set forth.

Signed in the city and county of New York, in the State of New York, this 15th day of February, A. D. 1896.

ALOIS PIVETZ.

Witnesses:

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