

No. 752,830.

PATENTED FEB. 23, 1904.

C. M. EDOUARD & C. SORLIN.
JACQUARD APPARATUS FOR LOOMS.

APPLICATION FILED APR. 25, 1901.

NO MODEL.

4 SHEETS—SHEET 1.

Fig. 1.

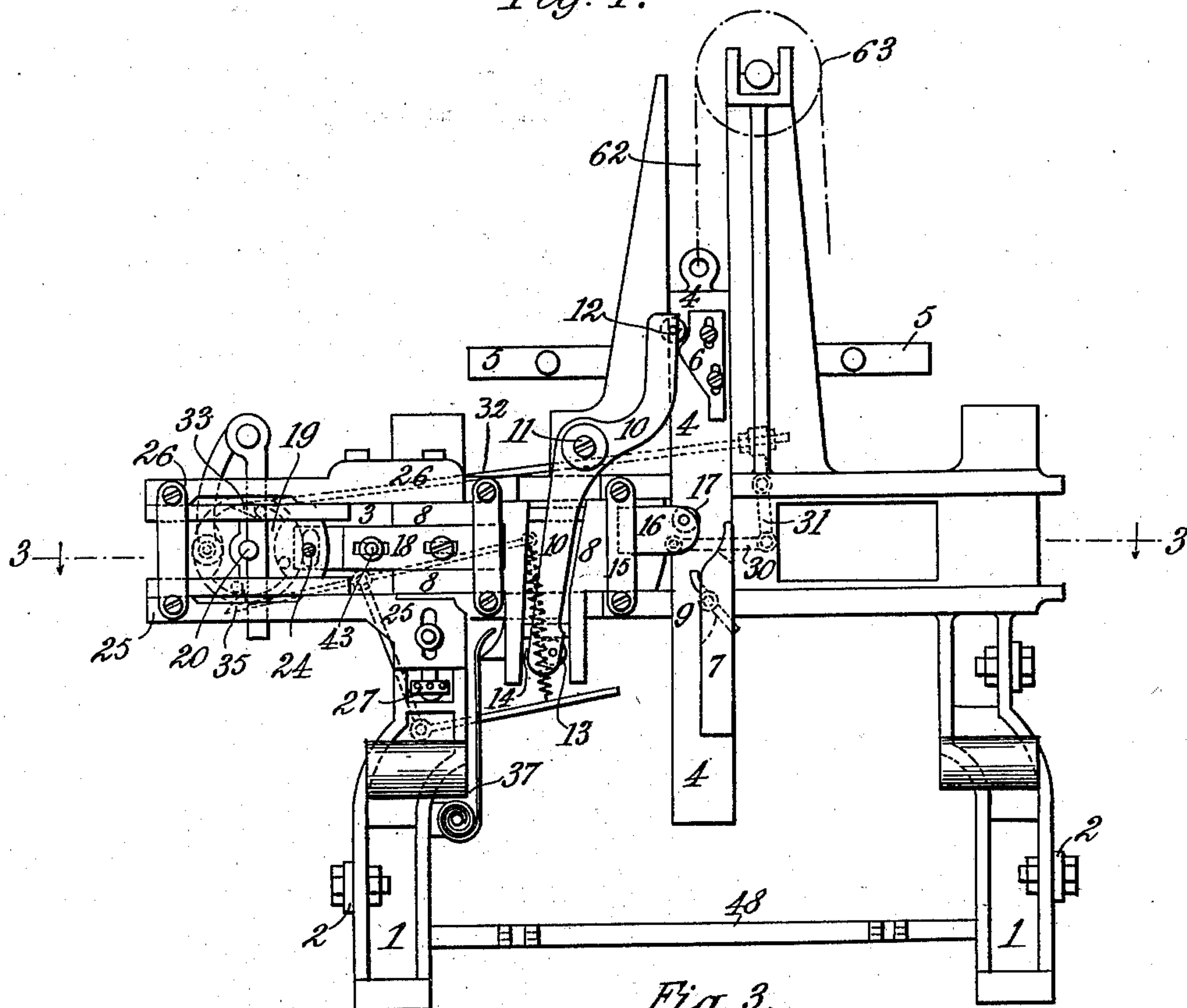
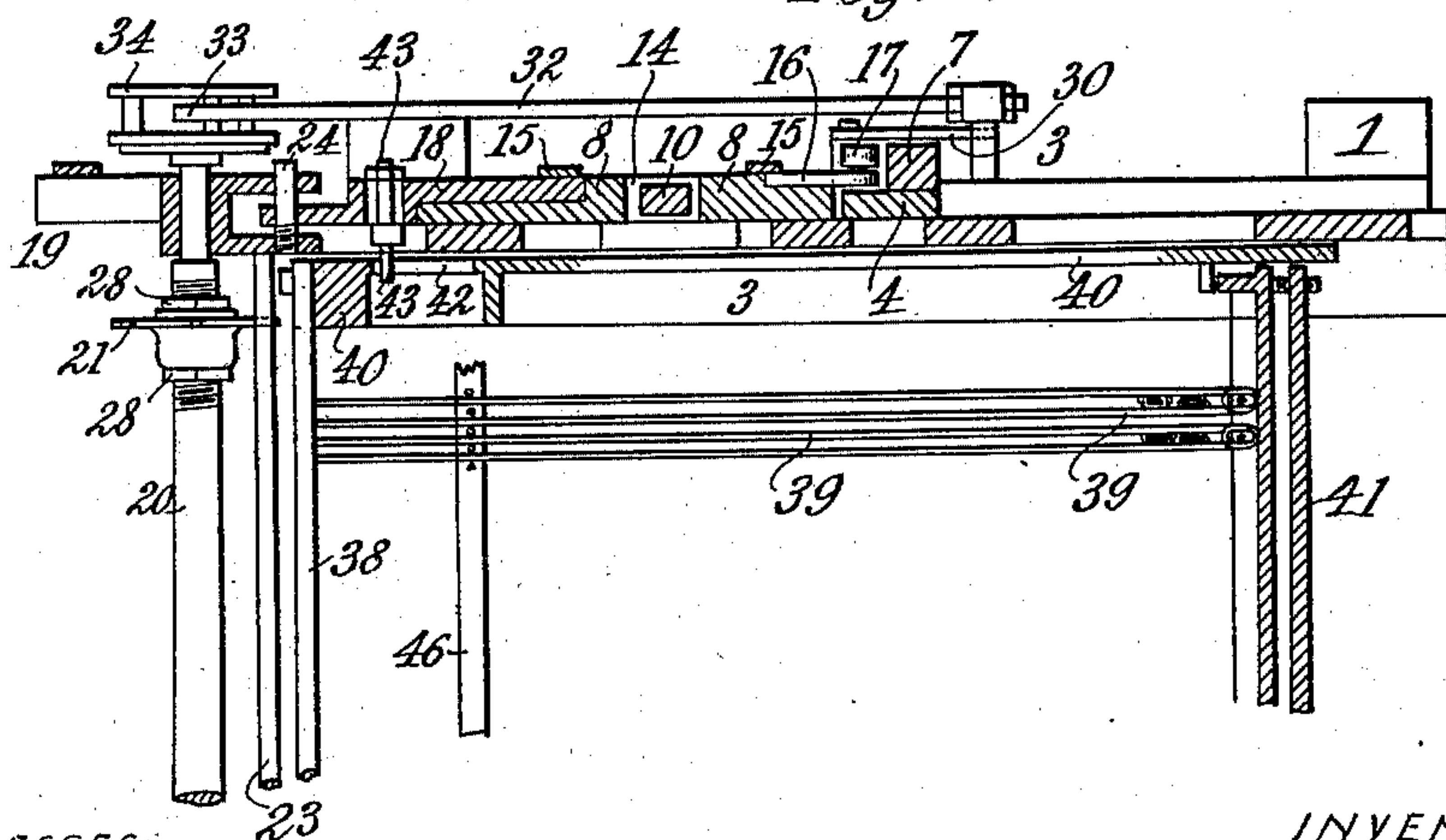


Fig. 3.



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4 SHEETS—SHEET 2.

Fig. 2.

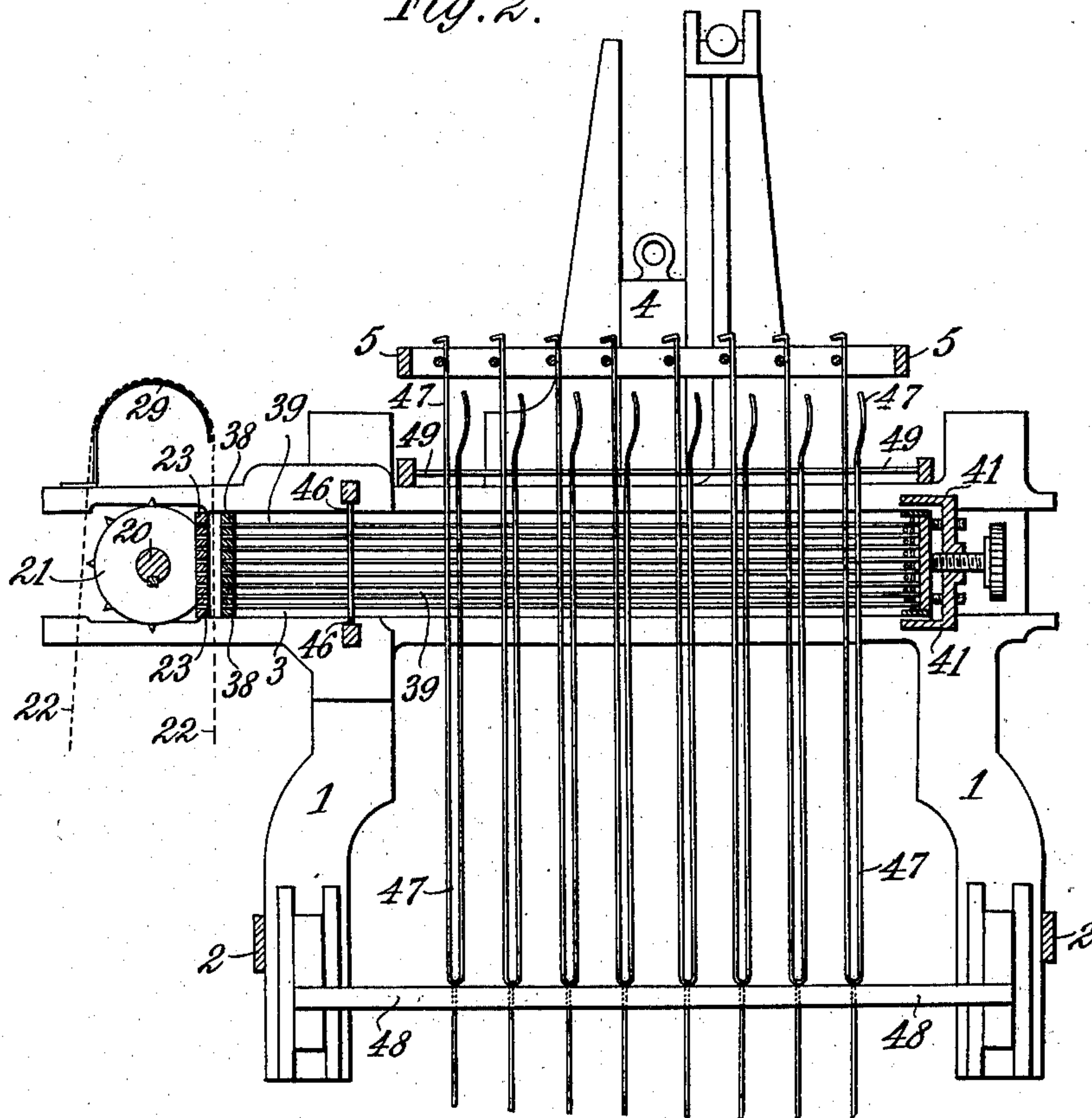


Fig. 14.

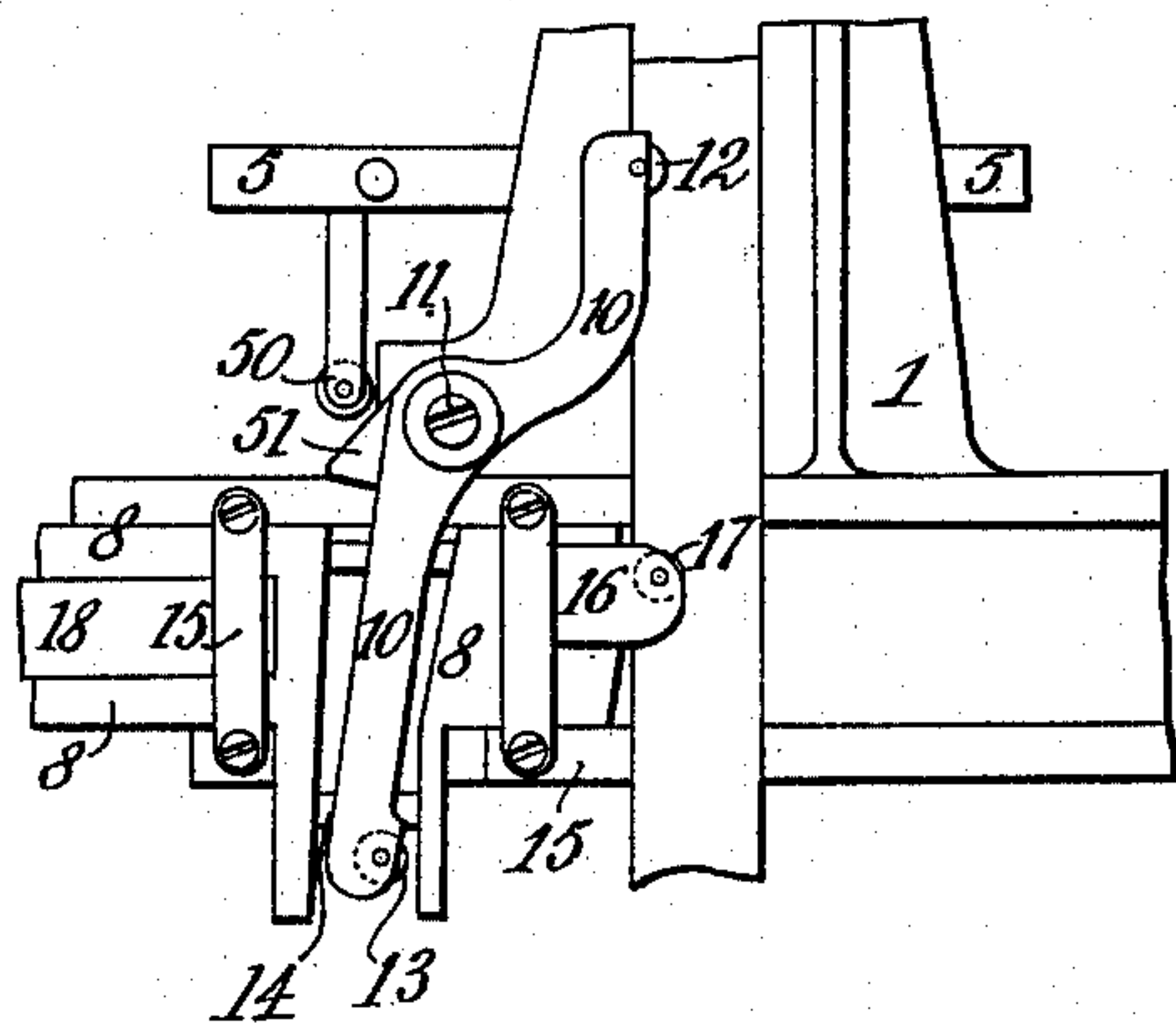


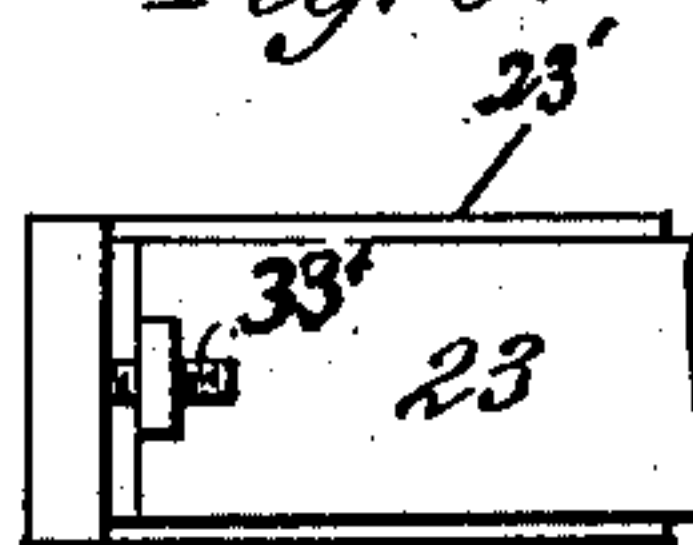
Fig. 7



Fig. 8.



Fig. 6.



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4 SHEETS—SHEET 3.

Fig. 4.

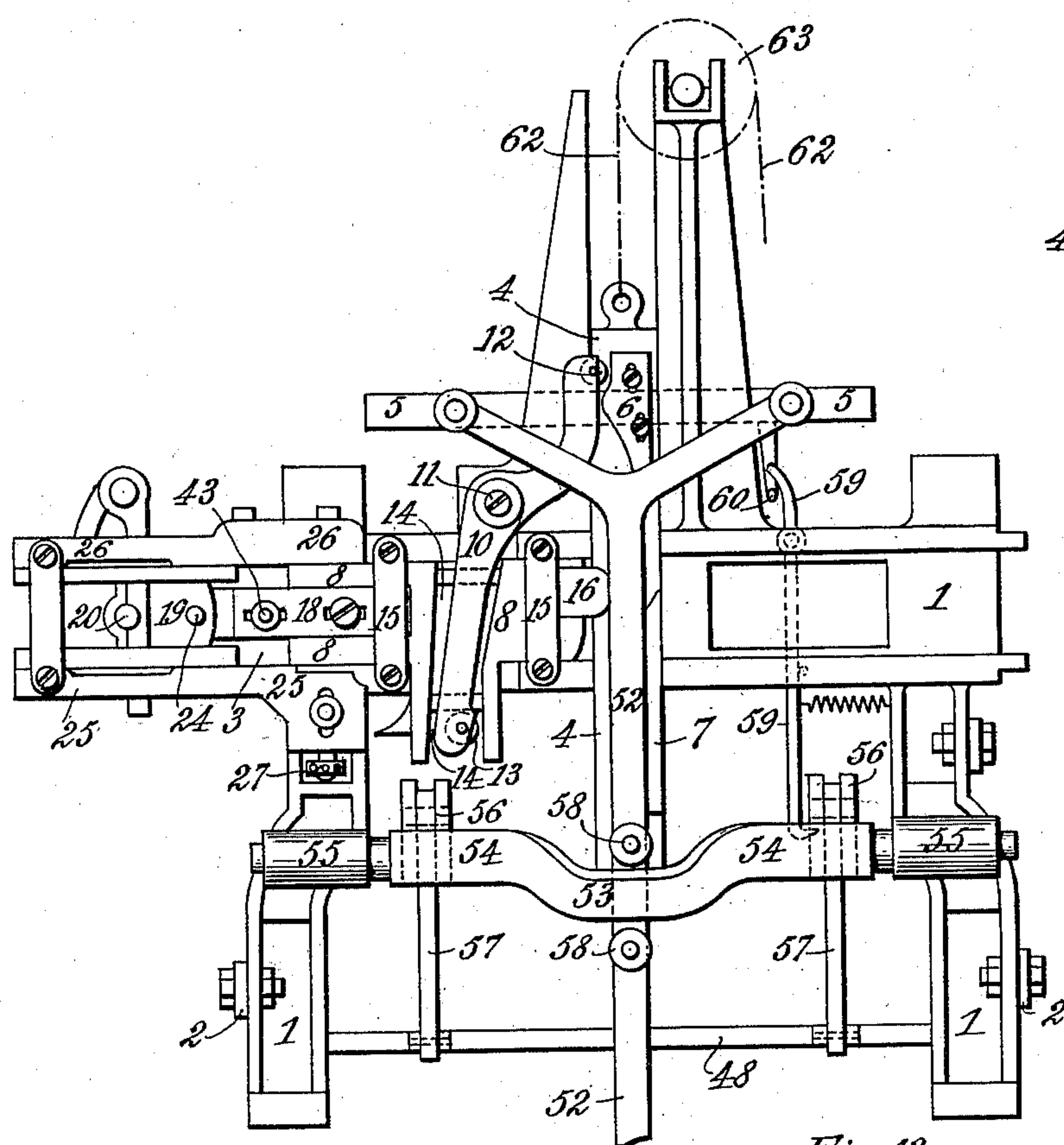


Fig. 9.

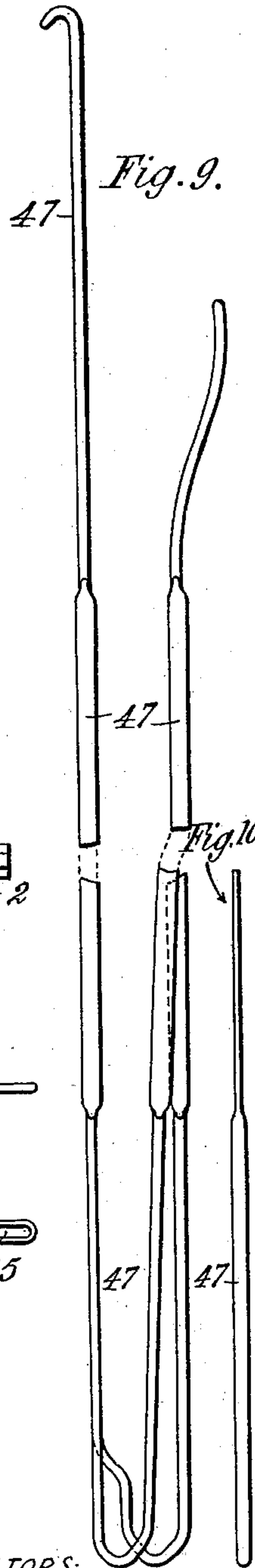


Fig. 12.

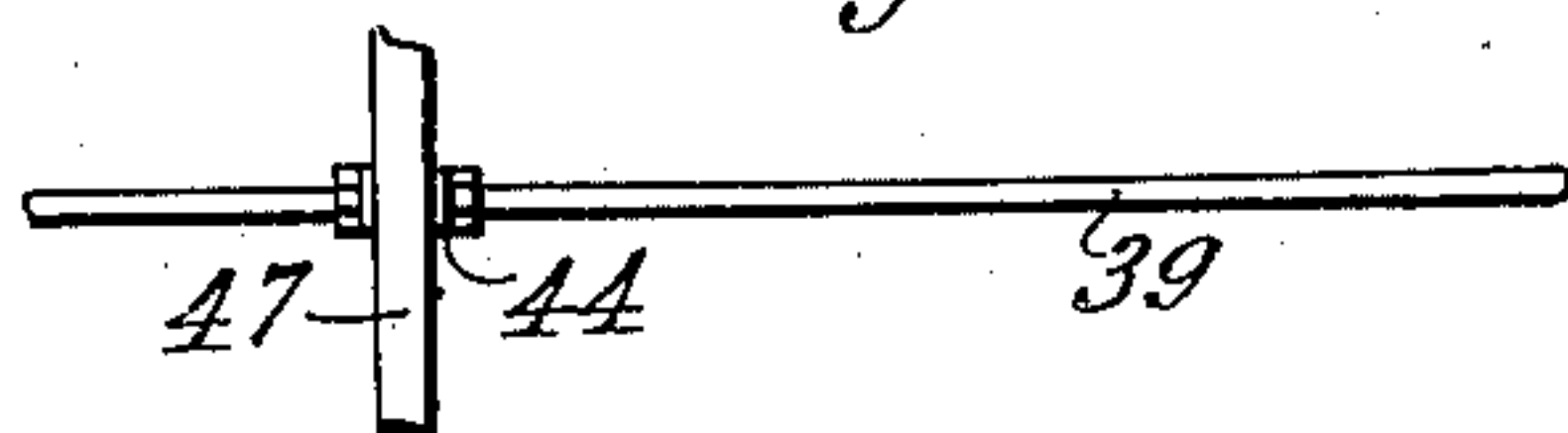
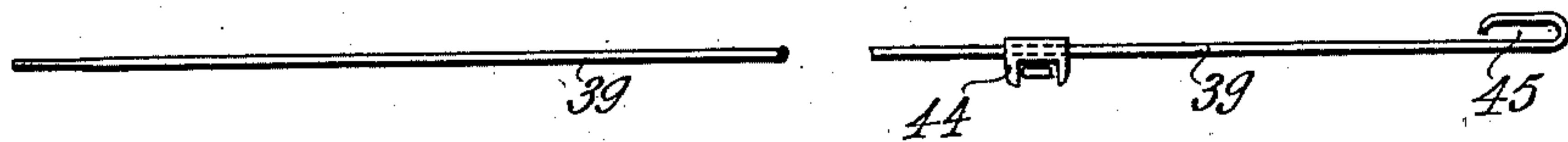


Fig. 13.



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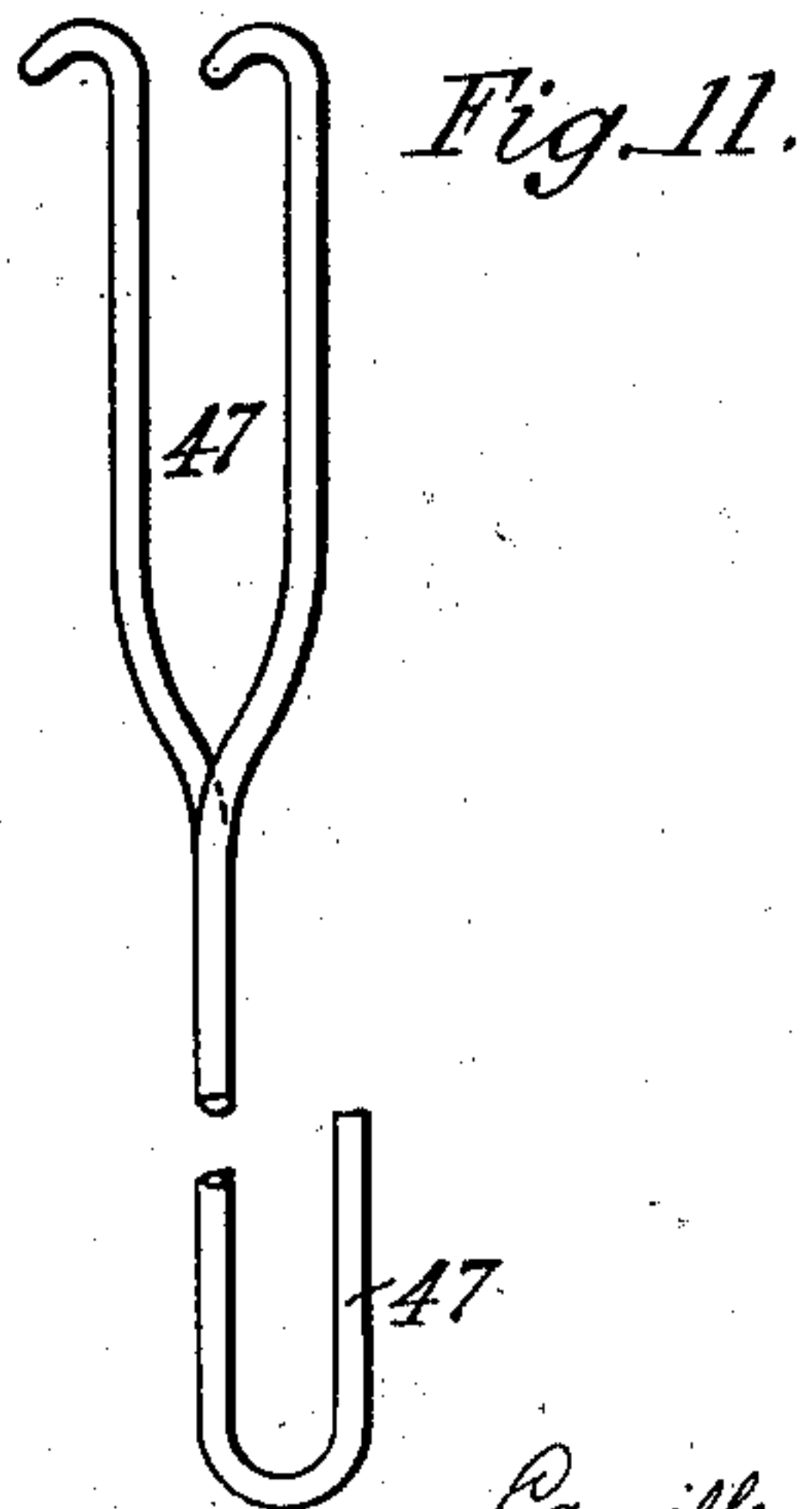
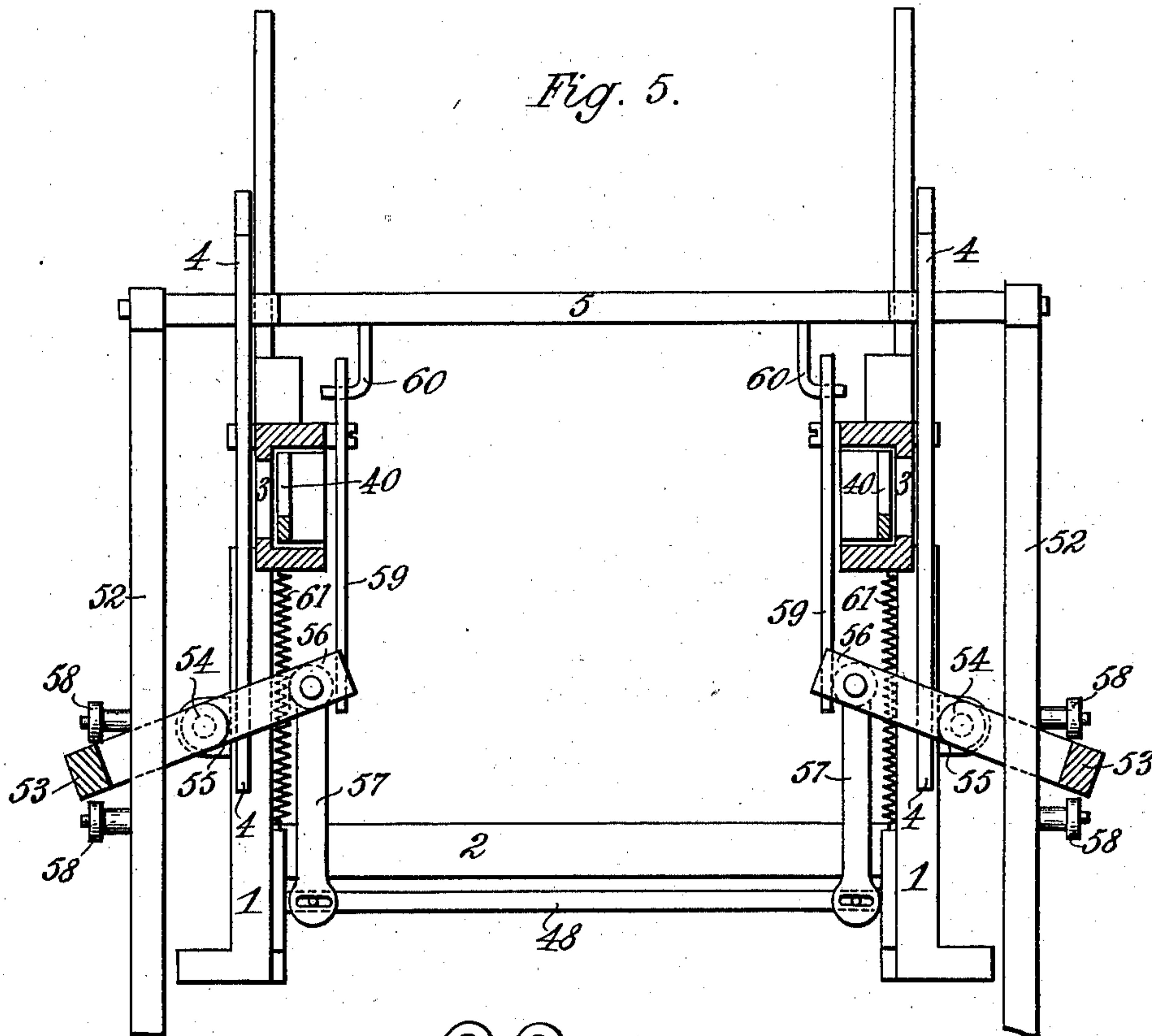
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JACQUARD APPARATUS FOR LOOMS.

APPLICATION FILED APR. 25, 1901.

NO MODEL.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

CAMILLE MARIE EDOUARD AND CHARLES SORLIN, OF LYONS, FRANCE.

JACQUARD APPARATUS FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 752,830, dated February 23, 1904.

Application filed April 25, 1901. Serial No. 57,468. (No model.)

To all whom it may concern:

Be it known that we, CAMILLE MARIE EDOUARD and CHARLES SORLIN, both citizens of the Republic of France, and residents of Lyons, France, have invented certain new and useful Improvements in Jacquard Apparatus for Looms, of which the following is a specification.

In some constructions of jacquard apparatus for looms it has been usual to employ instead of the ordinary separate perforated pattern-cards that actuate the needles perforated continuous paper, with the object of cheapening the manufacture thereof. With this arrangement, however, it has heretofore been necessary to employ supplementary needles in combination with pushers or similar complicated devices for transmitting the pattern of the endless paper to the jacquard-hooks carrying the warp-threads, thereby materially increasing the cost of working.

According to our present invention we retain the use of the continuous perforated pattern-paper, but we obviate the use of the said supplementary devices, the jacquard-needles being made to act directly on the hooks. For this purpose we construct the jacquard apparatus as we will describe with reference to the accompanying drawings, in which—

Figure 1 shows a side view of the apparatus with the driving-gear removed. Fig. 2 is a vertical section; Fig. 3, a horizontal section. Figs. 4 and 5 show, respectively, a side view and cross-section of the actuating mechanism. Fig. 6 is a back view showing a modification permitting the regulation of the perforated matrix-plate. Figs. 7 and 8 show the connecting plate or device actuating the matrix-plate. Fig. 9 shows a front view of the construction of hooks which we employ. Fig. 10 is a side view of one of the hooks. Fig. 11 shows a modified form of the hooks. Figs. 12 and 13 show an elevation and plan of the horizontal needles. Fig. 14 shows an additional mechanism to be used when it is desired to cause the needles to actuate the hooks both at the ascent and at the descent of the knife-frame.

The apparatus consists of two parallel side frames 1 1, stayed by transverse bars 2. The

upper part of each frame carries horizontal guide-pieces 3, in which move all the mechanisms of the needles and the frames, as also a vertical guide, in which works a slide 4, fixed to the knife-frame 5, which has a vertical up-and-down motion, as usual. On the slides 4 are adjustably fixed two cam-plates 6 and 7, which serve to actuate the sliding piece 8, that works in the horizontal guide 3. The lower cam-plate 7 also carries a pivoted finger 9, which serves to prevent the perforated paper from coming in contact with the needles before the hooks have been raised from their knives. The said cam-plates serve to impart to the sliding piece 8 a to-and-fro motion through the medium of an elbow-lever 10, pivoted at 11 and carrying two contact-rollers 12 and 13. The upper roller 12 is actuated by the upper cam-plate 6, and the lower one is engaged in a groove 14, formed in the sliding piece 8, which it thus actuates.

The sliding piece 8 is held in place in the guide 3 by straps 15, fixed to the framing, and it is provided on the side near the vertical slide 4 with a bracket 16, carrying a roller 17. On the opposite side the sliding piece 8 is connected in an adjustable manner to a connecting-piece 18, (shown separately at Figs. 7 and 8,) which at its other end is connected to a carriage 19, carrying the axis 20 of the disks 21, which feed forward the perforated paper 22, as also the matrix-plate 23, over which the paper passes.

As will be seen at Figs. 1, 3, and 7, the screw 24, which secures the connecting-piece 18 to the carriage 19, is situated in a slotted hole of 18, which itself has a considerable amount of transverse play in the carriage in order to render more certain the movements of the mechanism, notwithstanding the play between the parts thereof during its action.

The carriage 19 is guided horizontally between two guide-bars 25 and 26, of which the lower one, 25, is movable vertically by means of a screw 27, while the other, 26, is fixed to the framing 1, being provided with screws for adjustment to allow for wear.

The disks 21, which serve to feed forward the perforated paper 22, are mounted on a shaft 20, screw-threaded at each end and hav-

ing a groove with which engages a feather on the disk 21, so that this cannot shift round on the shaft, and it is held in position by the screw-nuts 28 on each side thereof. This arrangement insures the accurate adjustment of the disks to compensate for the variations in the width of the paper due to variations of temperature, &c.

Above the feed-disks of the paper is arranged a curved plate 29, which facilitates the engagement of the teeth or pins of the disks with the perforations of the paper. The disks 21 can be actuated in any suitable manner, such as that shown at Figs. 1 and 3. A small connecting-rod 30, fixed to the horizontal sliding piece 8, communicates its to-and-fro motion to a pivoted rocking beam 31, whose motion is transmitted to an adjustable rod 32, the hooked end 33 of which engages with the bars of a lantern-wheel 34, mounted on shaft 20, so as to impart a step-by-step rotary motion thereto. Below the shaft 20 is provided a similar mechanism, but operating in the contrary direction, the hook 35 of which effects the rotation of the lantern-wheel and shaft when the upper hook is disengaged. The lantern-wheel is prevented by a suitable catch or pawl from moving through more than one division at a time.

The plate 23 may be stationary, as in Fig. 3, or it may be made adjustable, as in Fig. 6. In the latter case the plate 23 slides in a frame 23' and is moved by means of an adjusting-screw 33', screwing in a nut formed in one with the plate 23, the end of the screw being made to bear upon the frame.

Against the sliding piece 8 bears a blade-spring 37, Fig. 1, which assists in the pressure thereon, but whose effect is limited by the fact that its end acts upon an incline so arranged that although the spring acts at varying angles, according to the position of the sliding piece, its pressure is practically always the same.

The movements of the several parts being by sliding contacts, the action of the described apparatus is very smooth and not liable to wedging.

The needle plate or frame 38, in which are arranged the horizontal needles 39, is fixed to two guides 40, which slide in grooves formed in the inner side of the framing 1. These guides serve at the same time to release the resetting-plate 41 for the purpose of rendering the needles free a moment before they are brought in contact with the perforated paper. In these guides is formed a groove 42, Fig. 3, in which is engaged an adjustable finger 43, serving to bring the needle-frame back to the required distance from the matrix-plate. The resetting-plate 41, which serves to bring the needles back to their original position after operating and is actuated in one direction by the guides 40, can receive its backward motion by any suitable means, such as a spring.

The needles 39, of which one is shown separately at Figs. 12 and 13, are formed with a cylindrical point, part of the length being reduced to a small diameter. The usual loops for the reception of the hooks are replaced by small grooved pieces 44, fixed thereon, into the grooves of which fit the vertical hooks. The part of the needle on which is the grooved piece 44 can be formed flat in order to prevent the piece from turning. The loops 45 at the ends of the needles can, if necessary, be flattened and are threaded onto rods carried by the resetting-plate, which thus support the several rows of needles. Within the needle-frame is a vertical grid 46, through which the needles pass and which prevents them from getting out of position and also the hooks from getting out of their grooved pieces 44.

Fig. 9 shows two hooks 47 for the first two rows of the harness-plate 48. The first one has a simple bend at its lower end, while the second has a double bend of S form. This difference of form between the two bends enables the upper parts of the hooks to be in line with each other, while the bends form a zigzag line. By this means all the hooks offer the same resistance to the action of the perforated paper and resetting-plate. The hooks are of circular section at their ends, while the middle portions are flattened, so as to enable them to work freely through the needle-frame. The various rows of hooks are held in position by being passed through a horizontal grid 49.

Fig. 11 shows a modified form of hook, in which the upper end is formed with the S-bend instead of the lower end, whereby, for example, eight knives may be made to do the duty of sixteen knives with ordinary hooks.

Should it be desired to make the perforated paper operate the needles a second time when the frame descends, the latter would be provided with a roller 50, Fig. 14, acting on an incline 51, fixed on the elbow-lever 10. If with the mechanism arranged in this manner it should be desired to revert to the simple action, it would be sufficient to remove the roller 50. This arrangement is provided for, enabling the mechanism to operate both in rising and in falling—that is to say, for opening the shed in raising those warp-threads that are to cover the weft and lowering at the same time the threads which remain below. For this purpose the knife-frame 5 is connected to two vertically-movable bars 52, which engage with the cranked parts 53 of two shafts 54, which can rock in bearings 55, fixed on the framing 1. Each shaft 54 has arms 56, to which are pivoted the one end of rods 57, the other ends of which are pivoted to the harness-plate 48, which has to descend slightly when the knife-frame begins to rise. The bars 52 carry rollers 58, between which the cranked parts of the shaft 54 are situated,

so that as the knife-frame rises and falls the bars 52 impart a to-and-fro motion to the cranks 53 of the shafts 54, whereby the up-and-down motion of the harness-plate 48 is effected.

The harness-plate 48, which is guided in the frame 1, only begins to descend when the knife-frame has risen slightly, for which purpose the lower rollers 58 are so arranged as not to come immediately in contact with the cranked parts 53. The harness-plate 48 is kept in the position of rest by means of pawls 59, which are disengaged at the requisite moment by means of rods 60, fixed to the knife-frame 5. Springs 61 may be arranged within the framing for aiding the upward motion of the plate 48 when the bars 52 descend. The downward motion of the plate 48 can be prevented by removing the rollers 58 and their axes and securing the plate by screws. The motion might also be imparted to the mechanism by ordinary means—such as by bands 62, secured to the slides 4 at one end and passing over pulleys 63 actuated by the driving-gear of the loom. In this case the knife-frame would produce the necessary motion for the vertical displacement of the plate 48.

The above-described mechanism operates as follows: The bars 52 in rising actuate the slides 4, fixed to the knife-frame 5. During this motion the upper cam-plate 6 bears against the roller 12 of the elbow-lever 10, which in turning bears with its roller 13 on the sliding piece 8 and moves this inward. The sliding piece 8 carries with it by means of connecting-piece 18 the carriage 19, which carries the matrix-plate 23. This plate first causes the needle-frame 38 to recede and then the resetting-plate 41 in order to free the needles 39. The perforated paper 22 is then caused by the matrix-plate to bear against the needles, of which those are pushed back that do not face perforations, the others remaining stationary, and consequently leaving the corresponding hooks in position. These are then raised by the knives of the knife-frame 5. At this moment the pawls 59, which held the harness-plate 48, are disengaged, the lower rollers 58 of the bars 52 raise the cranked shafts 54, which by means of the rods 57 cause the plate 48 to descend, together with the disengaged hooks which rest thereon, while the other hooks are raised by the knife-frame 5. As the upward motion continues the lower cam-plate 7 acts upon roller 17, and in thereby pushing back the sliding piece 8, connecting-pieces 18, and carriage 19 causes the matrix-plate 23 to recede, so as to disengage the perforated paper from the needles. The stud 43, fixed to the connecting-piece 18, then causes the needle-frame 38 and the parts 40, fixed thereto, to recede. The perforated paper is then fed forward by the action of the hooked rod 32, while at the same time the reset-

ting-plate 41 brings the pushed-back needles into their original position. During the downward motion of the slides 4 the cam-plate 6 bears against the roller 12 of the bar 10, which turns without having any action. At this moment the pivoted finger 9 holds in position the connecting-piece 18 and prevents the pressure from taking place until the hooks have left their knives. At the same instant also the upper rollers of the bars 52 in acting on the cranked shafts 54 cause the harness-plate 48 to rise again. In continuing the descent the roller 50, if attached to the knife-frame 5, Fig. 14, acts on the incline 51 of lever 10 and causes the perforated paper to strike a second time against the needles.

Having thus described the nature of this invention and the best means we know of carrying the same into practical effect, we claim—

1. In a jacquard apparatus adapted for the use of perforated paper, the combination with a knife-frame, of vertical slides fixed to said frame, inclines or cam-plates carried by said slides, pivoted elbow-levers actuated by said inclines, horizontal sliding pieces, means whereby the sliding of said pieces serves to move the needle plate or frame and the resetting-plate and also to bring the perforated paper against the needles so as to operate those that do not face perforations for detaching the corresponding hooks from their knives, the said sliding pieces being actuated by the lower parts of such elbow-levers, and means whereby the sliding of said pieces serves also to separate the paper from the needles again to allow of the forward feed of the paper, while at the same time it causes the needle-frame to be brought back to its original position and the resetting-plate to bring back the pushed needles, substantially as described.

2. In a jacquard apparatus adapted for the use of perforated paper, the combination with a knife-frame, of pivoted elbow-levers, means for causing the perforated paper to act upon the needles in the usual way, and a roller or equivalent appliance operatively connected to said knife-frame and arranged to act upon said elbow-levers so as to cause the perforated paper to act upon the needles a second time as the knife-frame descends, a plate for supporting the jacquard-hooks, bars on said knife-frame, and mechanism, operated by said bars as said knife-frame rises, to effect the lowering of said plate, substantially as described.

3. In a jacquard apparatus adapted for the use of perforated paper, the combination of a horizontally-sliding piece carrying a roller on each side of the mechanism, vertical slides having inclines on their lower parts arranged to act on said rollers, a matrix-plate, means whereby the action of said incline on said roller causes the matrix-plate, together with the perforated paper, to recede, and means whereby after such recession the needle-frame is also

moved back to bring the needles back to their flush position and thereby to allow the paper to be freely fed forward by the feeding mechanism, substantially as described.

5 4. In a jacquard apparatus adapted for the use of perforated paper, the combination of a knife-frame, vertical bars fixed thereto, cranked shafts, a harness-plate supporting the hooks, and connecting-rods connecting said
10 cranked shafts with said harness-plate, said cranked shafts and knife-frame being actuated by said vertical bars, substantially as described.

15 5. In a jacquard apparatus adapted for the use of perforated paper, the combination of horizontal needles, separate grooved pieces thereon, and jacquard-hooks engaged in said pieces, each of said needles being formed with a cylindrical end of small diameter and being
20 flat at the point on which the said grooved

piece is mounted so as to prevent said piece from turning, substantially as described.

6. In a jacquard apparatus adapted for the use of perforated paper, the combination of a sliding piece, a carriage carrying the matrix-plate, an adjustable connecting-piece connecting said sliding piece and carriage, and a
25 finger on said connecting-piece adapted to bring back the needle-frame over the needles that have not been pushed back, substantially
30 as described.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

CAMILLE MARIE EDOUARD.
CHARLES SORLIN.

Witnesses:

MOREAU FRANÇOIS,
GABRIEL GROS.