

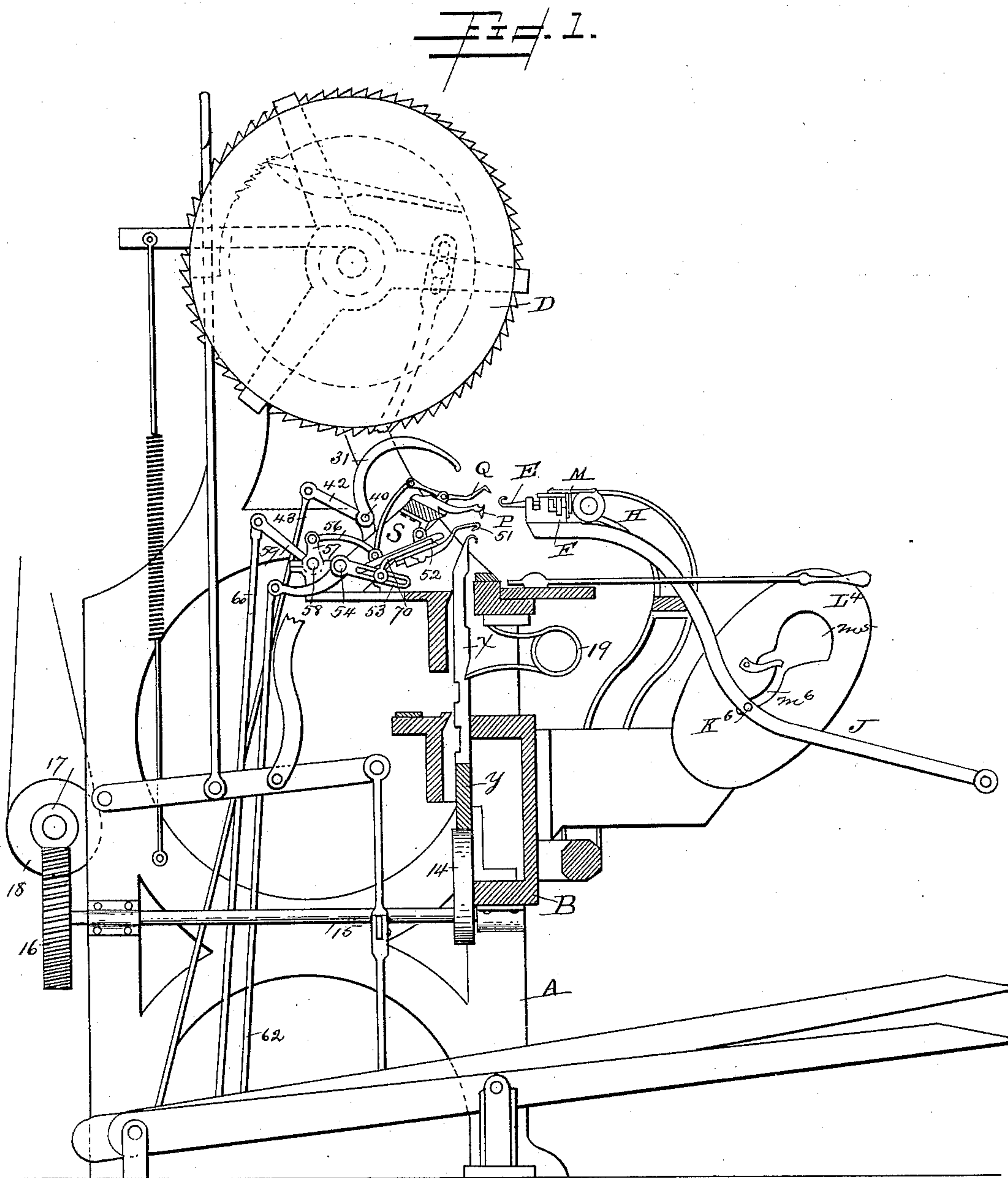
(No Model.)

6 Sheets—Sheet 1.

R. YOUNG.
NETTING MACHINE.

No. 463,116.

Patented Nov. 10, 1891.



Witnesses

Joseph Blackwood
Harry E. Johnson

Inventor
Robert Young
by *Wm. H. Doolittle*
Attorney

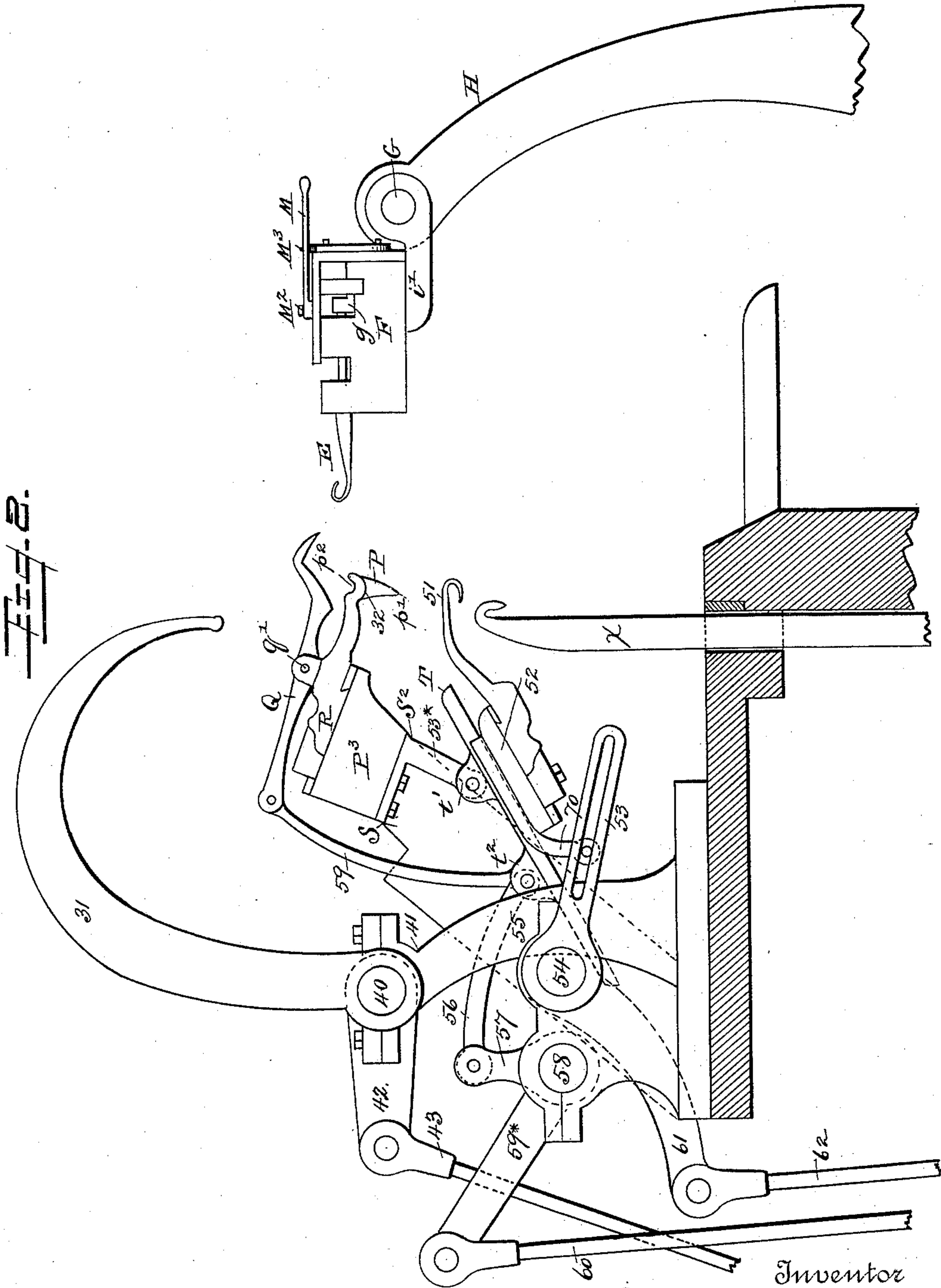
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Fig. 3.

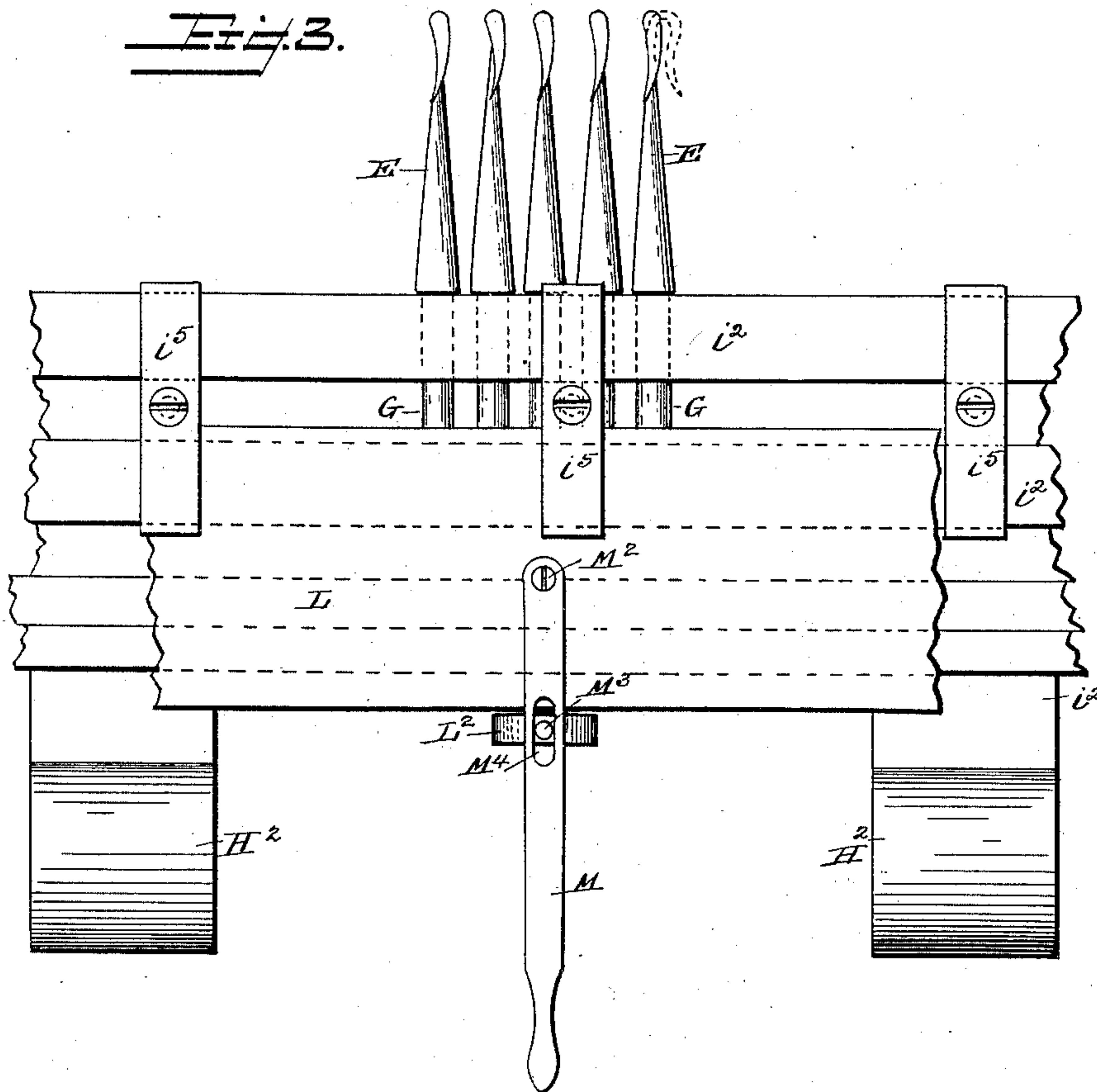
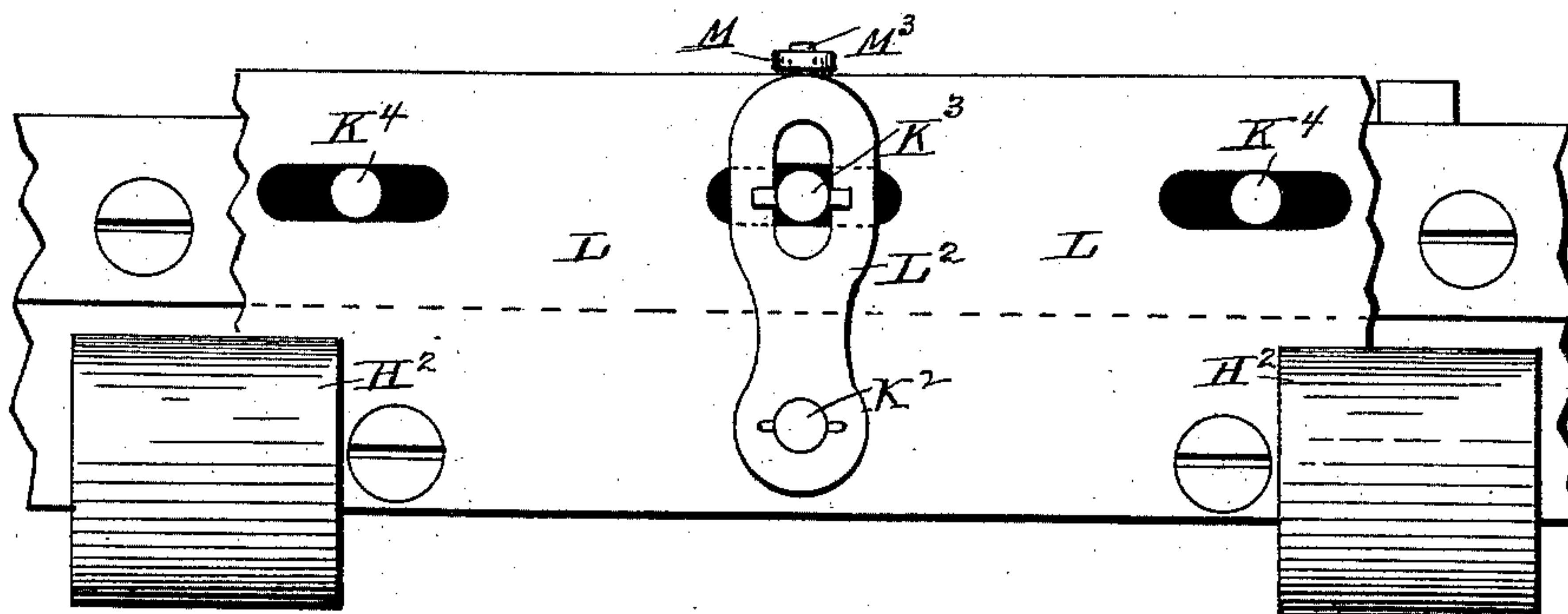


Fig. 4.



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(No Model.)

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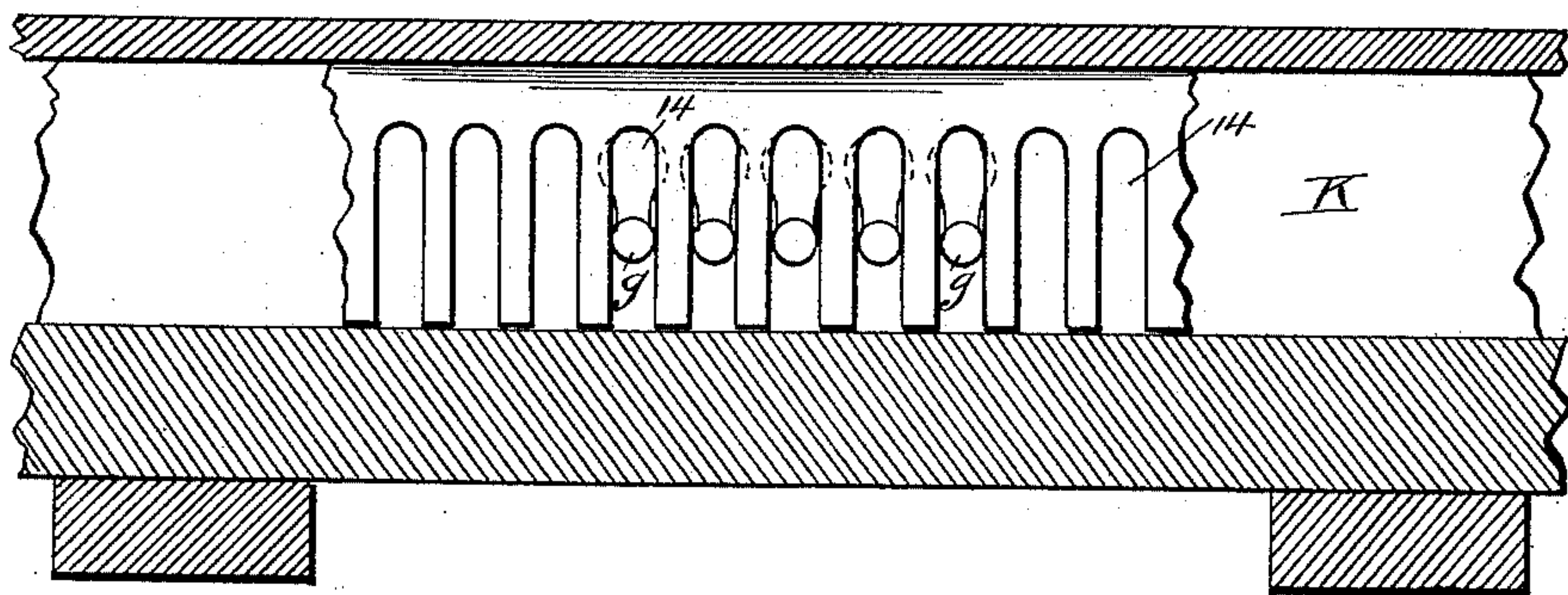
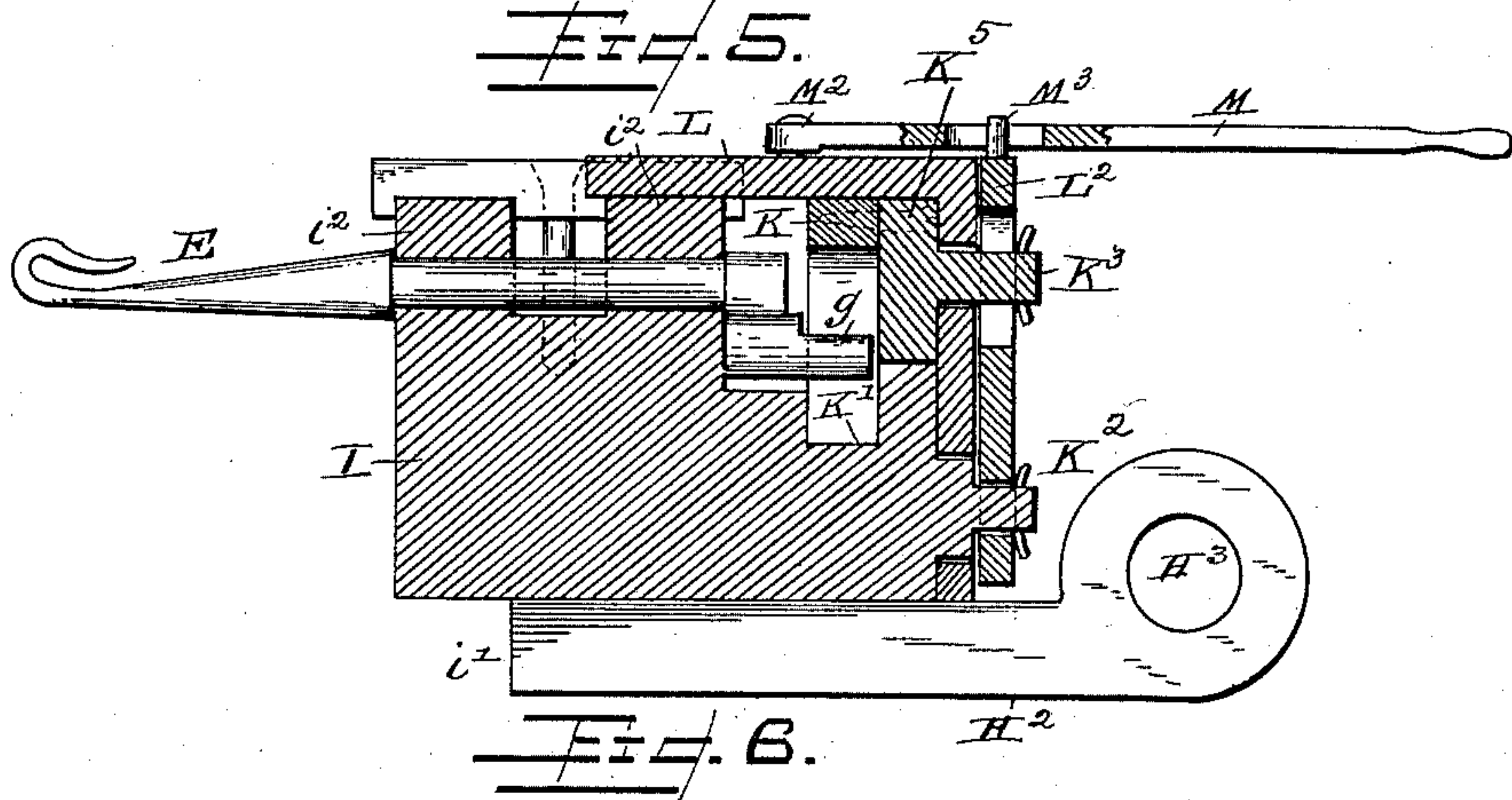


Fig. 7.

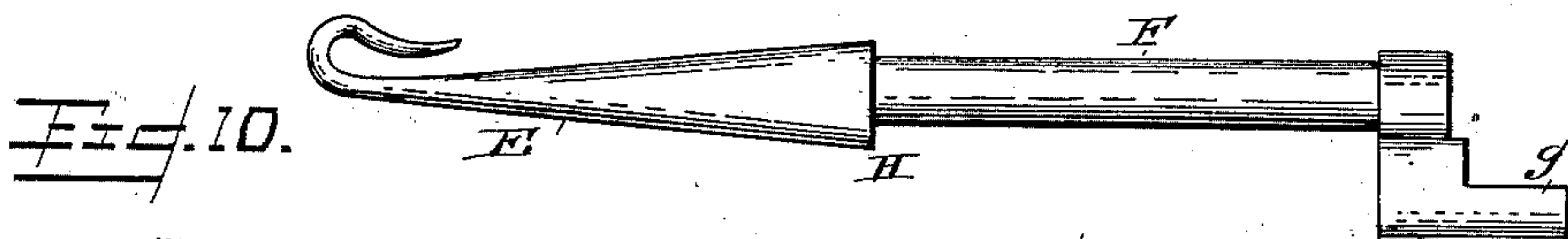


Fig. 8.

Fig. 11.

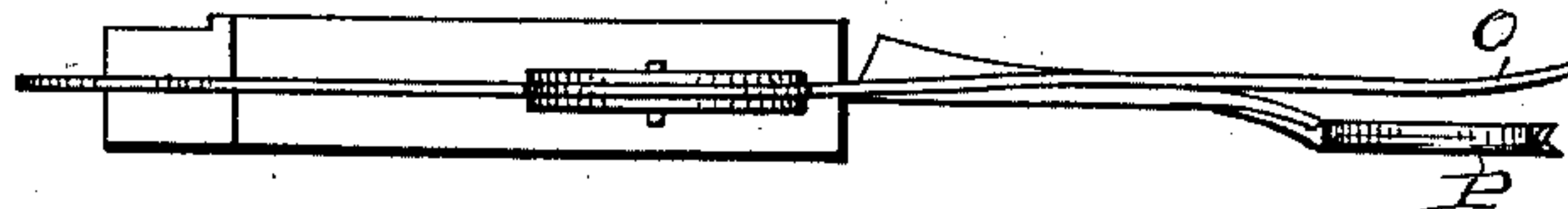
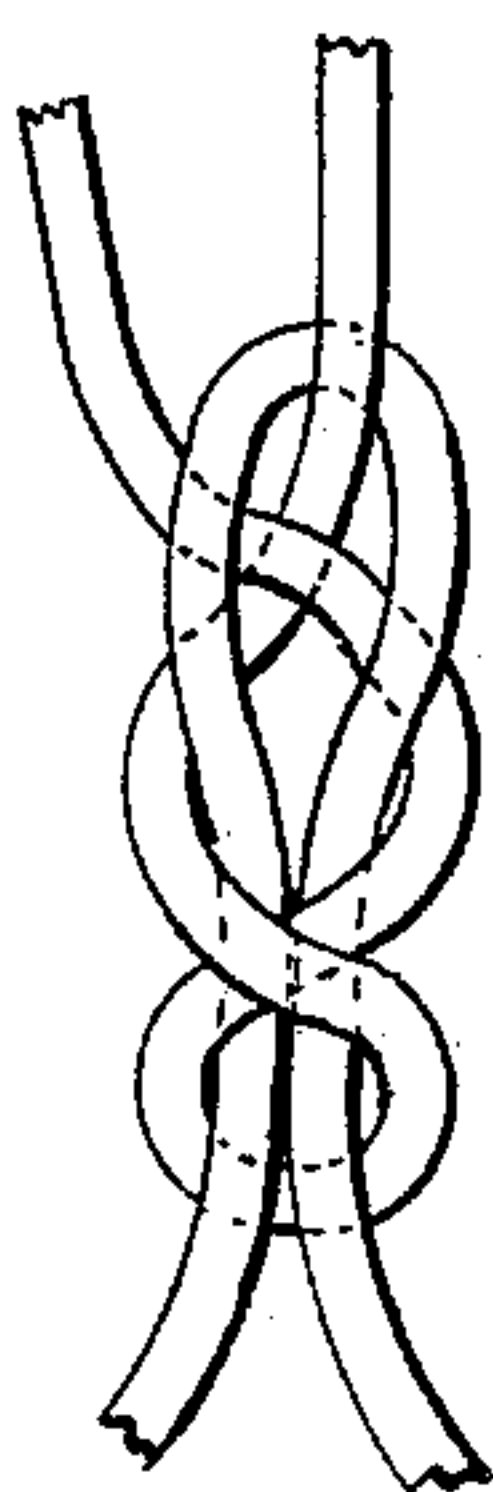
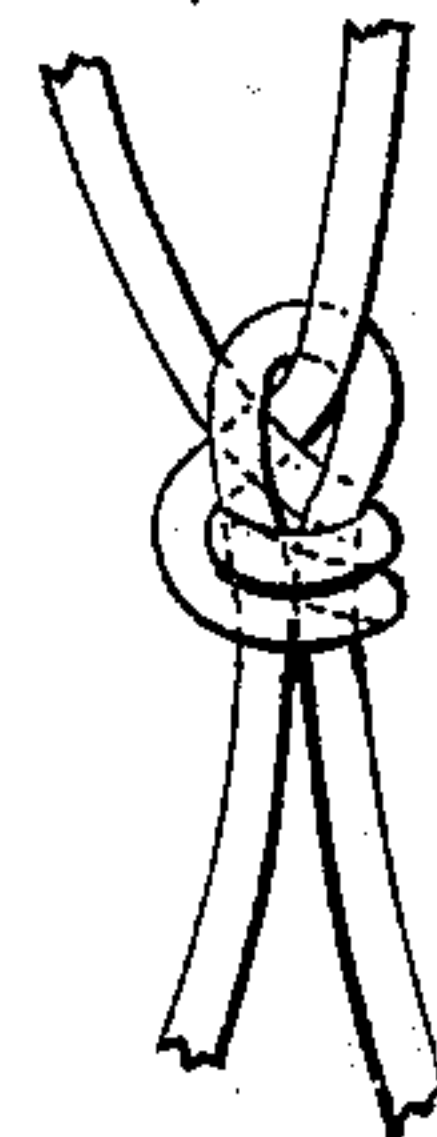
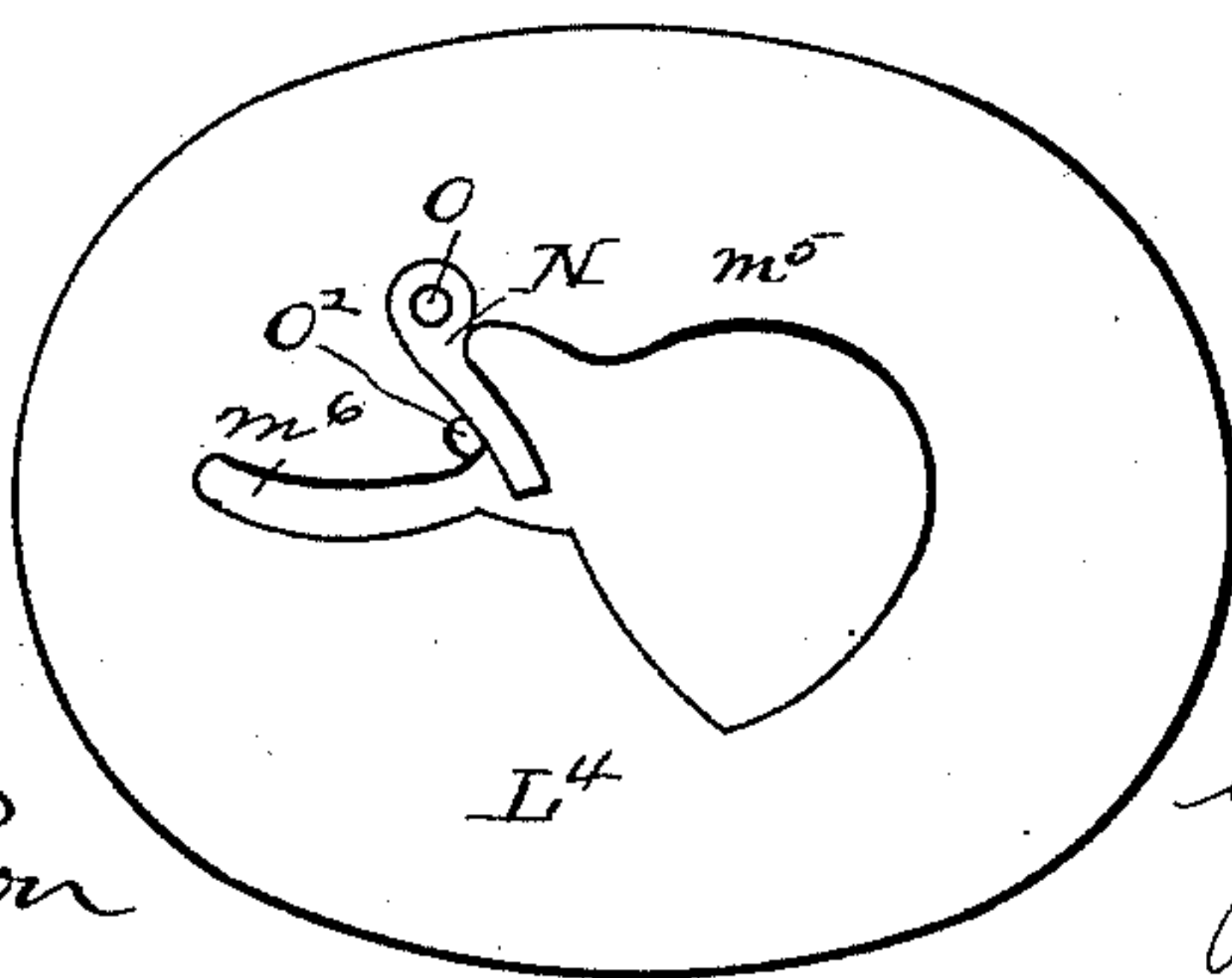


Fig. 9.



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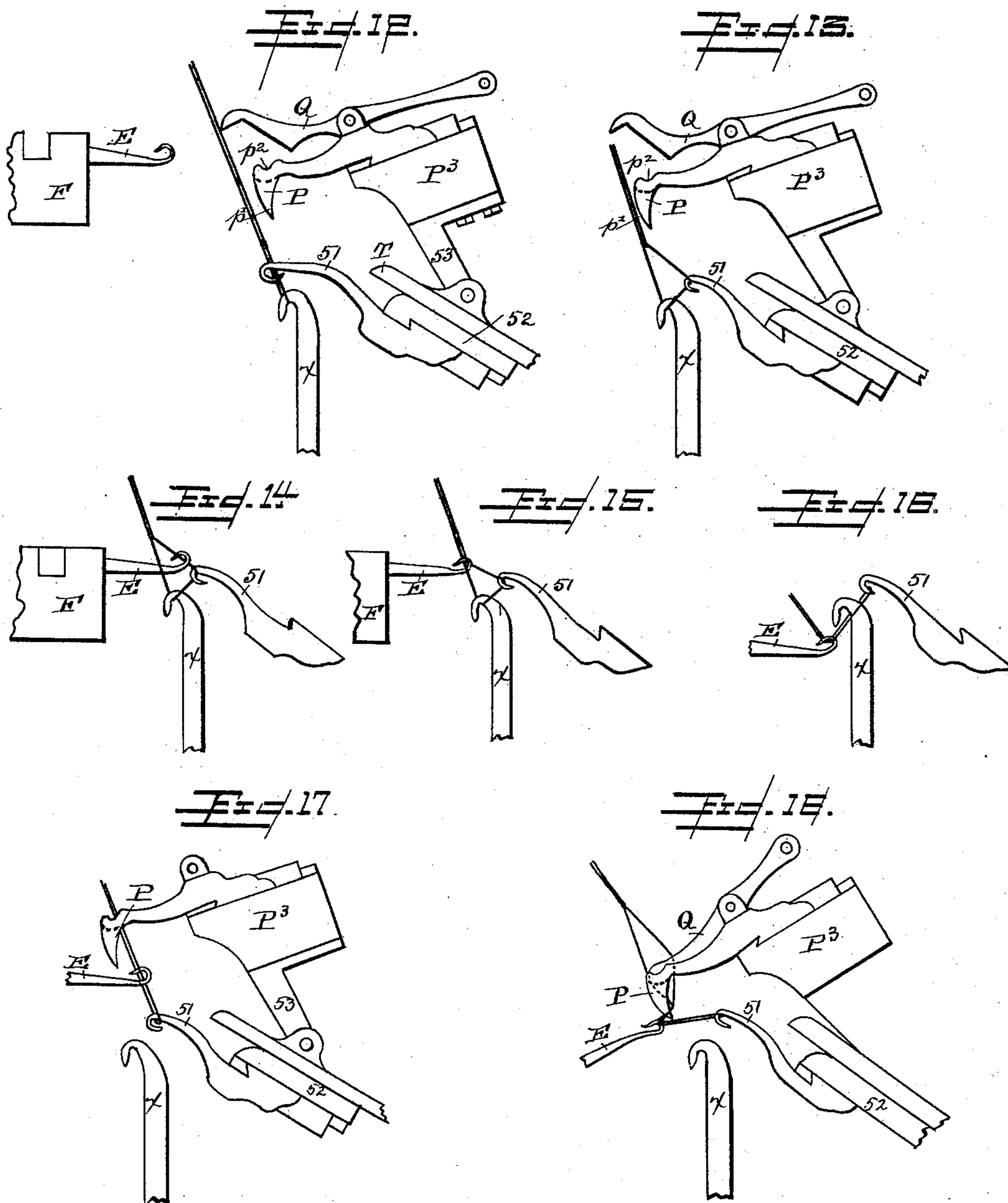
(No Model.)

6 Sheets—Sheet 5.

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Patented Nov. 10, 1891.



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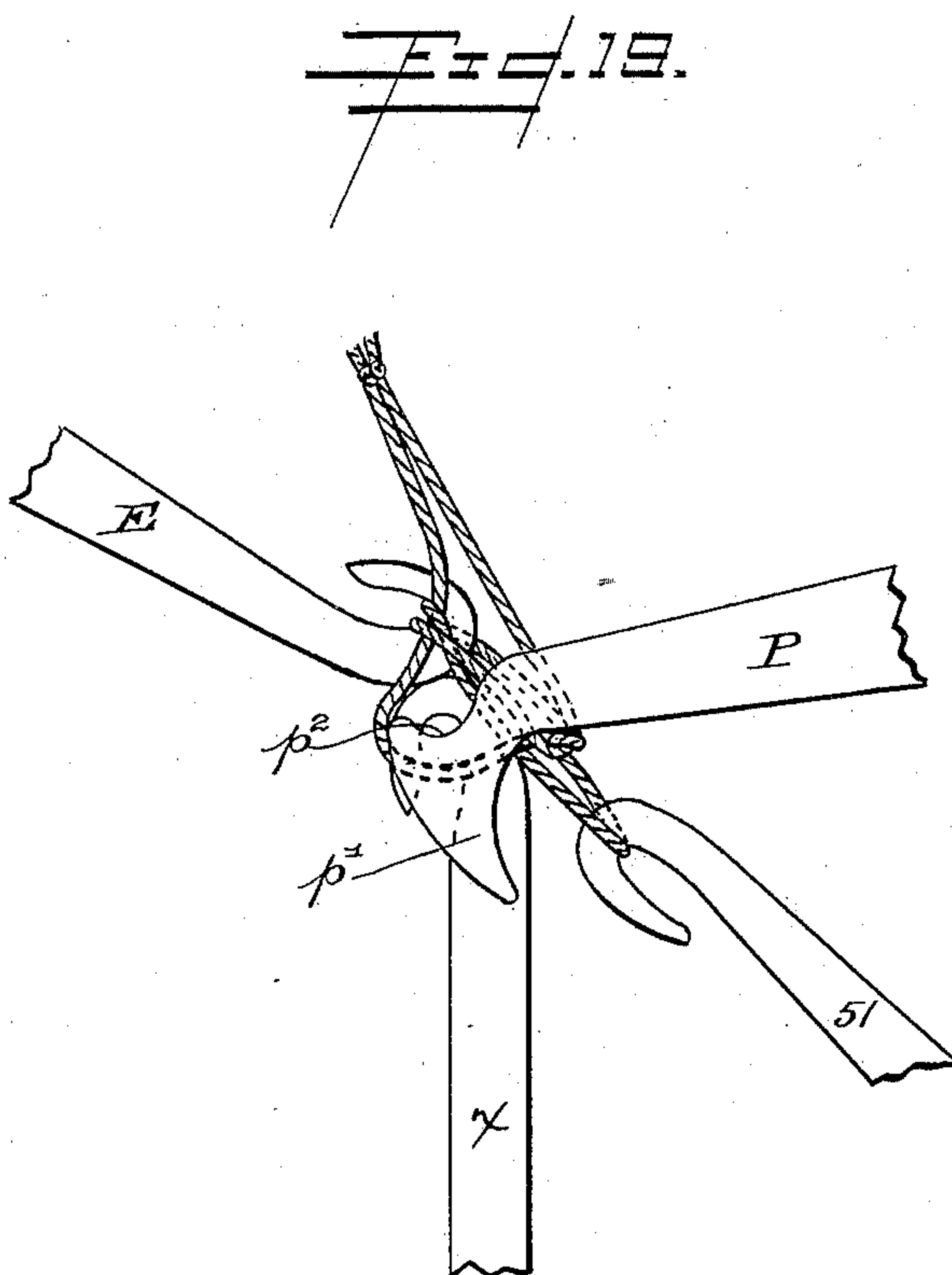
(No Model.)

6 Sheets—Sheet 6.

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No. 463,116.

Patented Nov. 10, 1891.



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UNITED STATES PATENT OFFICE.

ROBERT YOUNG, OF PATERSON, NEW JERSEY, ASSIGNOR TO FRANK BARBOUR, OF LISBURN, IRELAND.

NETTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,116, dated November 10, 1891.

Application filed December 15, 1890. Serial No. 374,808. (No model.)

To all whom it may concern:

Be it known that I, ROBERT YOUNG, a citizen of Great Britain, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Netting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machinery for manufacturing nets.

Its object is the construction of a machine that will make a net the mesh of which is composed of what I call a "double-lock knot." Previous to my invention nets formed with such a knot have been made, so far as I am aware, by hand alone.

My invention consists of certain important and material changes, as hereinafter described and claimed, in that class of netting-machines for making weavers' knots a type of which is illustrated and described in English Patent No. 1,056 of 1859, to J. Stuart and W. Stuart. In a machine as there illustrated I incorporate the mechanism which constitutes my present invention, which also constitutes an improvement on my pending application, Serial No. 369,891. Much, therefore, of the general mechanism and construction beyond what is necessary to illustrate the construction and operation of my improvements is not herein set forth; but reference is made to the said English patent for such description.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is an end view in elevation, partly in section; Fig. 2, an enlarged detail view in side elevation; Figs. 3, 4, 5, 6, 7, 8, and 9, details of the mechanism. Figs. 10 and 11 show the form of knot made before and after it is drawn tight; and Figs. 12 to 19 are diagrams showing the different positions of the parts forming the knots at each successive step of the operation.

The framing of the machine, as in the patent referred to, consists of open standards A, which are connected by a transverse frame B, to which some of the principal actuating portions of the mechanism are attached.

D is the cylinder on which the net as manu-

factured is wound, and which is provided with a series of pins (not here shown) corresponding in number to the meshes of the net to be made.

E represents a front hook, a series of which extend in a row across the machine, the function of which hooks is to catch the loops at the lower end of the net and give them a turn, as hereinafter described. The form of this hook is shown in Fig. 7. They are preferably made of steel. The hook portion swells backward until it terminates in a shoulder H, from which point extends a spindle F. This spindle extends from the shoulder H and carries at its opposite end a crank-arm G.

I is a longitudinal bar secured to an arm i' of the rocking frame H^2 , mounted on shaft H^3 in said arm. The bar I is provided with two strips i^2 , through which and the bar a series of holes is made, composed of half a circle on the strips and on the bar, bored to receive the spindle portion of the hooks E. The strips i^2 are movable, and are secured to the bar after the hooks are put in place by clamp-plates i^3 , and the clamp-plates are secured to the bar by screws, which are passed through the space or slot between the strips and into the bar.

K is a sliding comb-bar provided with a series of slots 14, into each of which slots is placed a crank-arm G of the hooks E. The bar K is adapted to slide in a groove K' of the bar I. Bar K is mounted on the bar K^5 , which extends across and slides on bar I, and is provided with a central stud K^3 and smaller end studs K^4 .

L is a plate having a vertical side secured to the bar I and a horizontal top extending over and resting on the bars I and K. The plate on its vertical face is provided with oblong horizontal slots, into which the studs K^3 K^4 project.

L^2 is a rocking arm having a lower hole, by which it is hung on the lower stud K^2 , also passing through the lower part of plate L, and an upper slot, by which it is hung and rocks on the upper stud K^3 . The stud K^2 may be made integral, as shown, with the bar I, and the stud K^3 with the bar K^5 , situated between the bar K and the plate L.

M is a handle pivoted to a pin M^2 , rising

from the center of the top plate L, and slotted so as to bear on projection M^3 of the rocking arm L^2 . By giving the handle movement either to the right or left the comb-bar K, through the rocking arm L^2 , is slid in a corresponding direction, and this movement of the bar K turns the crank-arms G of hooks E, thus giving these hooks a quarter-turn. This quarter-turn of the hooks has the effect to first engage one side of a loop and then the other side in the operation of forming the loops, as hereinafter described, or to give the loops what is called a "double turn."

The hook-bar F is moved to and fro in the required direction by means of the hand-lever J to present the hooks E in proper position in relation to the fallers and needles for the operation hereinafter described. This direction is given by a guide-plate L^4 , provided with a slot m^5 , in which enters a pin K^6 , projecting from the lever J. The plate L^4 is an elliptically-shaped iron plate supported at right angles to the machine on an outwardly-projecting bracket that is secured to the front part of the frame B, as shown in Fig. 1.

In my pending application, Serial No. 369,891, and in English Patent No. 1,056 of 1859, on which the devices herein claimed are improvements, the same form of plate is used; but the form and extent of the slot in said plate herein used is materially different. In said patent and application the slot or groove is of the extent of an entire elliptical path with a further extension beyond the ellipse for the purpose of giving not only the to-and-fro sidewise movement of the hooks, but to carry them through the needles, whereas in my present device I do not carry the hooks E through the needles nor approach them; but I simply give the hooks a to-and-fro movement below the needles to place the loops of the net in proper position for forming the knots. Consequently I form the groove m^5 of different shape and about one-half the extent of the groove in the cases mentioned.

To the face of the plate L^4 is fixed a stud O, on which is hung a pawl N, which is prevented from falling too far back by a stop O' , fixed behind it. The form of guide-plate and the course taken by the guide-pin are indicated in Fig. 9.

I dispense with means for fixing the guide-pin in any one position in the plate L^4 to lock the lever at a given point.

The object in my application above mentioned of fixing the lever J at a given point was to prevent the hooks E from falling onto the stationary needles; but as in the present case the hooks E are below said needles, the use of such a holding device is unnecessary. The whole work of the hooks in forming the double knot in this specification is done below the needles. In said prior application pusher-needles were employed, and it was necessary in order that the hooks E should enter the grooves in the pusher-needles that the pin on the lever J be allowed to run down to

the end of the slot in the guide-plate; but, as in this specification, the pusher-needles are dispensed with, the only object of letting the pin on lever J run down the extension m^6 of the slot is to hold the hooks when carrying the thread above the needles, so as to permit the shuttle to be thrown between the hooks and the needles.

The respective arrangement of the needles, hooks, and fallers is shown in Figs. 1 and 2. In the process of making a net the hook-bar I, carrying the front hooks E, has to be moved alternately to the right or left, so as to cause the hooks to enter the fallers, one faller to the right or left, according to the position it was in at the formation of the previous half-mesh.

The form of the needles and their location are shown in Fig. 2 and in detail view, Fig. 8.

P is a brass needle, the outer extremity of which is bent in a lateral direction, and is turned downward to form a triangular blade p' , as shown. A concavity p^2 is formed in this part of the head of the needle. Each needle having this concavity, a horizontal groove is formed for the passage of the shuttle when a series of the needles are arranged together. The inner ends of these needles have a leaden shank R cast thereon, which have dovetailed indentations, by which they are fitted to the needle-bar P^3 . The needle-bar is secured to the stationary supports S.

Q is a hooked arm pivoted directly above the needle P in a split stud q' , which projects up from the shank R. The arm Q may be regarded as a second part of the needle P. Its outer extremity is hooked and downwardly directed and laterally deflected, so that when that end is pushed down a triangular space is formed between the heads of P and Q, as shown in plan detail view, Fig. 8. The inner end of arm Q is secured to a link 59, which is connected to a lug t^2 on back of a rocking plate T.

51 are back hooks mounted on a sliding and rocking frame 52, connected by links 70 to rocker-arms 53, slotted and mounted on a shaft 54, having bearings in brackets 55, and which shaft is rocked by arm 61 and vertical rod 62 by a treadle.

S^2 is a bracket bolted to the under side of needle-bar P^3 and having a downwardly-extending arm 53*, having an eye at its extremity.

T is a plate having lugs $t' t^2$. By lugs t' the plate T is pivoted by a bolt to the end of arm 53 of bracket S^2 . By lugs t^2 , near the other end of the plate, the plate is pivoted to a link 56, the other end of which link is secured to an arm 57, which rocks on shaft 58. Frame 52 slides on the plate T, which has its edges beveled to engage the inner sides of oppositely-beveled plates on the back of frame 52. The shaft 58 is rocked through connecting-arm 59*, and vertical rod 60 by a treadle controlled by the foot of the operator. By operation of shaft 54 and the connecting-treadle the frame carrying the back hooks is

given an upward angular sliding movement, and by the action of shaft 58 and the connecting-treadle and link 56 the sliding frame gets its forward and back or oscillating motion.

The fallers, which are represented by the letter X, are thin steel bars, the upper end of each of which terminates in a hook. The lower ends of the fallers rest upon a transverse bar *y* when they are in their lowest position. 14 is a cam-disk to give the faller its upward movement, and is mounted on a shaft 15, which is journaled in bearings secured to the frame. The outer end of shaft 15 carries a pinion 16, engaging with a worm-shaft 17, driven by a pulley 18. The faller is kept in contact with the cam by means of a double coiled spring 19, one end of which is secured to the frame B, while the other end rests in a notch in the faller.

31 is a swinging bar, which is also known as a "relieving" or "chapping" bar, the functions of which are to force the mesh off the front hooks E and push the thread into a slot 32 of the stationary needle P Q. It is mounted on shaft 40, which has its bearings in brackets 41. Said shaft has connected thereto an arm 42, connected to a link and rod 43, which in turn is secured to one of the bottom treadle-levers.

The operation of the machine is as follows: About half a yard of netting is first secured on the cylinder or beam D. The lower row of loops is first placed by hand on the series of fallers X, in the position shown in Fig. 12. The sliding and rocking frame 52 is then moved forward, carrying the back hooks 51 forward to engage one side of the loops, as shown in Fig. 12. Frame 52 is then slid back, thus opening the loop, as shown in Fig. 13. The hooks E are then rocked on their shaft from the guide-plate or "fair-leader" by the lever J and given a forward movement over the top of the fallers, and which movement also brings the hooks E under the needles P. The mesh being held between the beam and the fallers, the hooks E by this movement take hold of the same side of the mesh as back hooks 51, as shown in Fig. 14, and are then moved back and take hold of the other side of the mesh, as shown in Fig. 15, by which operation the double twist is formed. To perform this operation it is only necessary by reason of the peculiar formation of the hooks E, as shown in Fig. 3, to give the hooks a slight turn, as also indicated in dotted lines in said figure. Then the hooks E are lowered by the lever mechanism and far enough to disengage the loops from the fallers X, (shown in Fig. 16,) the fallers at the same time being also raised. Then the fallers are lowered and the hooks E are moved up and under needles P and above back hooks 51, as shown in Fig. 17. The hooks E are then pulled back and the back hooks 51 moved up and forward, as shown in Fig. 18, so as to carry the loops between needles P, the needles Q having been raised

above the needles P when the fallers are raised to permit the mesh to be introduced between the two needles, and as the back hooks are withdrawn the plate to which they are attached is oscillated so as to bring the back hooks in a nearly perpendicular position, and thus at the same time carrying the mesh between needles P, the hooks E being pushed forward by the same movement for that purpose. At the same time the needle Q is lowered. The object of having the needle Q thus constructed and operated is to obviate the necessity of carrying the hooks E above the needles and lowering them between the needles, and also the employment of pusher-needles. The next movement is to bring the relieving-bar 31 down, which pushes the thread of the mesh held by the hooks E into slot 32, formed in the under side of the head of needle P. Then the lever J is pulled down, which raises hooks E over the needles P and so as to permit the shuttle carrying the spool-yarn to be thrown between the same and along the track formed by the head of the needles P. The fallers are raised to their full extent at the same time the hooks E are raised and before the shuttle goes through. After the shuttle is thrown the fallers are forced down by the spring 19 and carry the spool-thread with them. As soon as the fallers are down the relieving-bar, which has been returned to its former position, is again brought down to relieve the thread from the hooks E, which it does by striking the face of the threads and throwing them off the hooks. The beam D is then given a slight turn by means of the treadle mechanism which tightens the thread and draws the knots taut, and thus is completed a row of meshes.

The chief advantages produced by my present improvements are to greatly lessen the expense of construction by reducing the number of parts and simplifying, quickening, and rendering more efficient the operation of the machine by dispensing with the pusher-bars and all its connections, by changing the form of fair-leader, the form and operation of the front hooks, the movements and operation of the frame carrying the back hooks, and by also dispensing with the mechanism hitherto employed for relieving the beam.

I find by my present improvements the amount of work turned out is increased nearly fifty per cent. over methods hitherto employed with which I am acquainted. Again, this machine thus provided with the oscillating and sliding frame-work for the back hooks is capable of making a double or single knot of any-sized mesh without any alteration.

Having thus described my invention, what I claim is—

1. In a netting-machine, the series of front hooks for catching the loop at the lower end of the net, said hooks each composed of a hook portion, a spindle, and a crank-arm, in combination with a longitudinal bar, a rocking frame, and a sliding comb or slotted bar with

which the cranks of said arm are connected, substantially as described.

2. In a netting-machine, the front hook E, provided with a hook portion, a spindle portion, and a crank on the end of the spindle, substantially as and for the purpose set forth.

3. In a netting-machine, the front hooks E, each provided with the spindle and crank, in combination with a plate provided with slots in which said cranks are placed, a bar in which said plate slides, and mechanism for giving said plate a to-and-fro lateral motion, whereby the hooks are rotated, substantially as described.

4. In a netting-machine, in combination with front hooks, the longitudinal bar for holding the front hooks, said bar provided with removable strips v^2 , both bar and strips grooved to form holes for the reception of the said hooks, and clamps for holding the said strips to the bar, substantially as described.

5. In a netting-machine having front hooks, in combination with a longitudinal bar I for holding said hooks, a comb-bar K, adapted to slide laterally in a groove in the hook-bar, a supporting-bar on which the comb-bar is mounted and which slides on the hook-bar and is provided with studs on its face, a slotted covering-plate to fit over said studs and resting on top of the hook-bar, a rocking lever on the comb-bar, and a handle pivoted to the covering-plate and bearing on the rocking lever for giving the comb-bar its sidewise movement, substantially as described.

6. In a netting-machine, a stationary needle, in combination with a movable needle pivoted to the top of the stationary needle, substantially as described.

7. In a netting-machine, the combination of the stationary needle P, the movable needle Q, pivoted to the top of the stationary

needle, in combination with a rocking back-hook frame, back hooks, and operating mechanism therefor, substantially as described.

8. In a netting-machine, the back hooks, the sliding angular bracket on which said hooks are mounted, a to-and-fro oscillating frame, and lever mechanism, whereby said hooks are given alternately both a vertical angular movement and a forward rocking movement, substantially as described.

9. In a netting-machine, in combination with the needles, the needle-bar P^3 , the bracket S^2 , bolted to the under side of the needle-bar and having a downwardly-extending arm 53^* , the rocking plate T, to which said arm is connected, a link connecting said plate to a rocker-shaft, said shaft, and treadle mechanism, substantially as described.

10. In a netting-machine, the back hooks, in combination with a sliding frame to which said hooks are secured, a plate T, in which said frame slides, slotted rocker-arms to which the said frame is connected by links sliding in the slots of said rocker-arms, a shaft 54 , to which said rocker-arms are secured, and a treadle mechanism for operating said shaft, substantially as described.

11. A netting-machine comprising, in combination, the series of front hooks, rocking mechanism for giving said hooks a turn, needles P Q and their rocker and actuating mechanism, back hooks and sliding frame set in an angular direction, the fallers, relieving-bar, and actuating-treadle mechanism, substantially as described.

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

ROBERT YOUNG.

Witnesses:

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