

(No Model.)

4 Sheets—Sheet 1.

J. BOOTH.

MACHINE FOR PRODUCING KNITTED PILE FABRICS.

No. 447,226.

Patented Feb. 24, 1891.

Fig. 4.

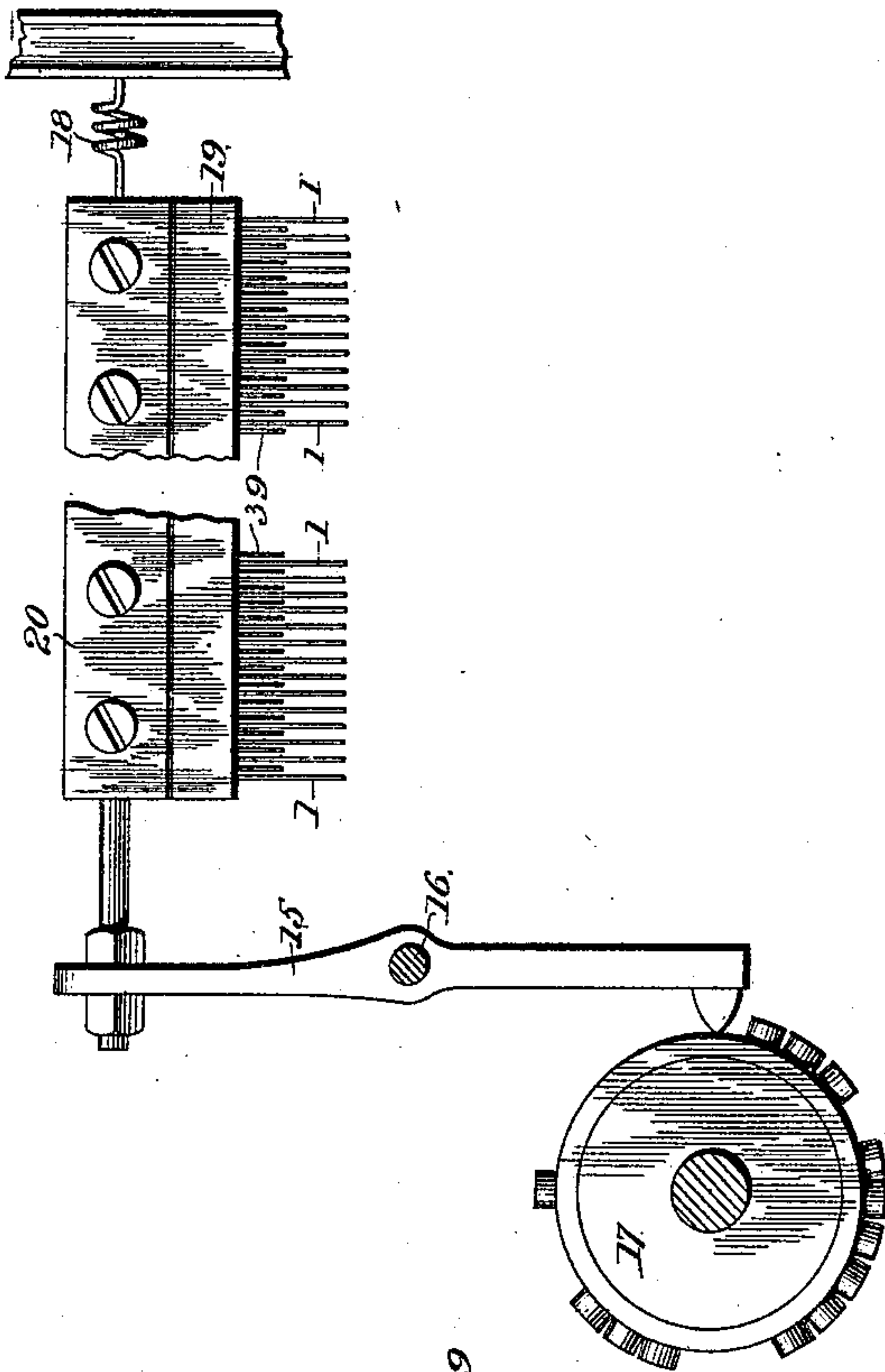


Fig. 1.

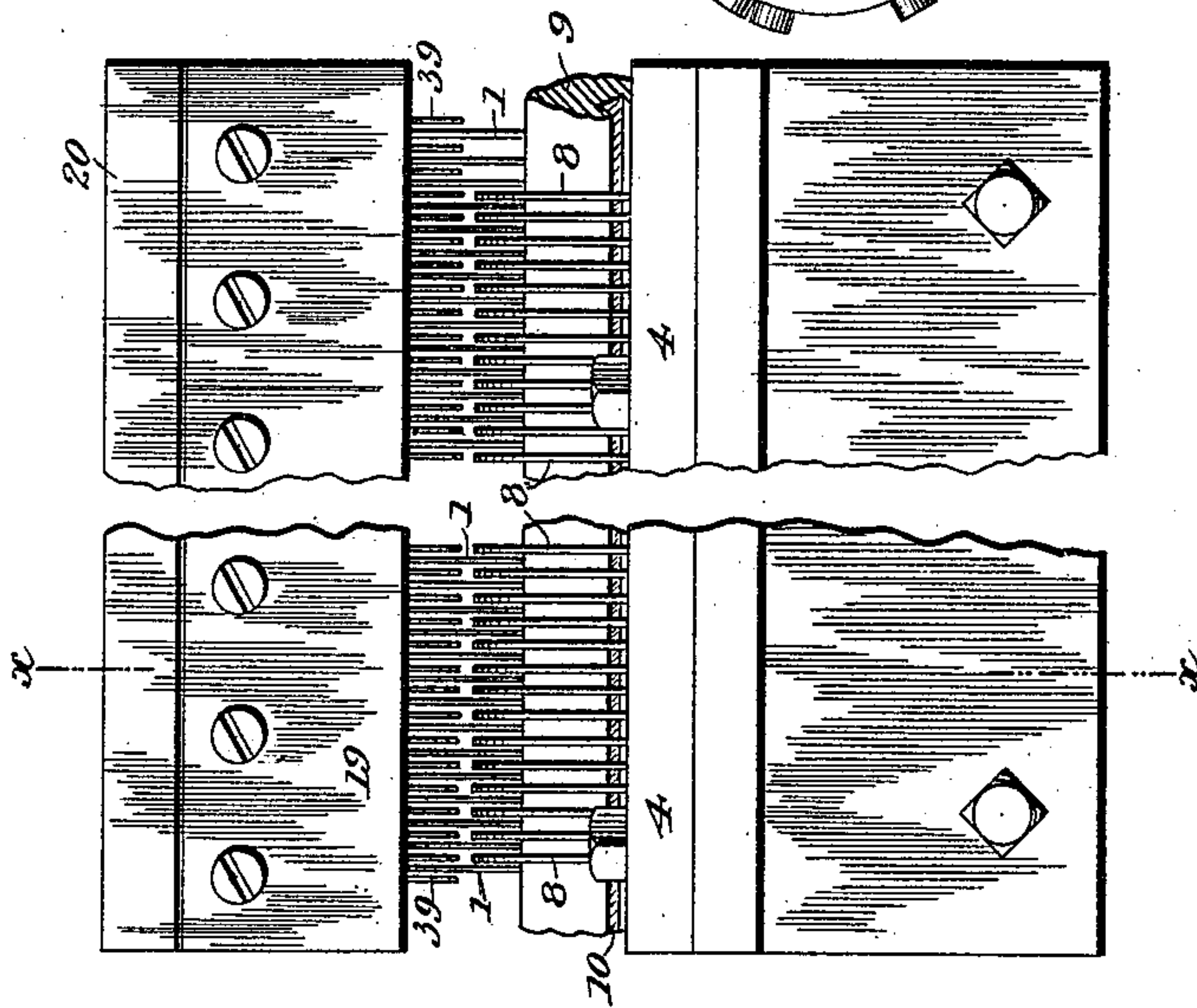
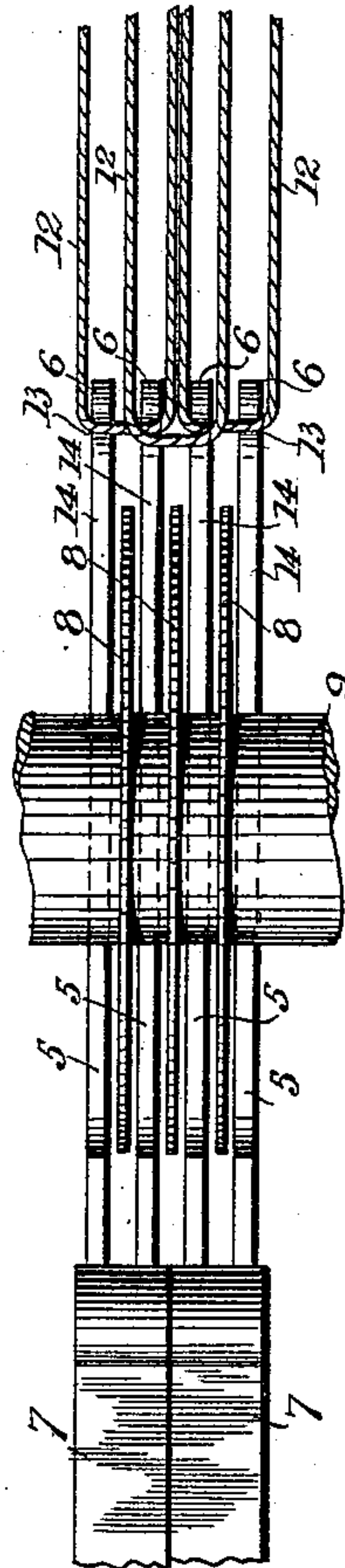


Fig. 5.



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Fig. 3.

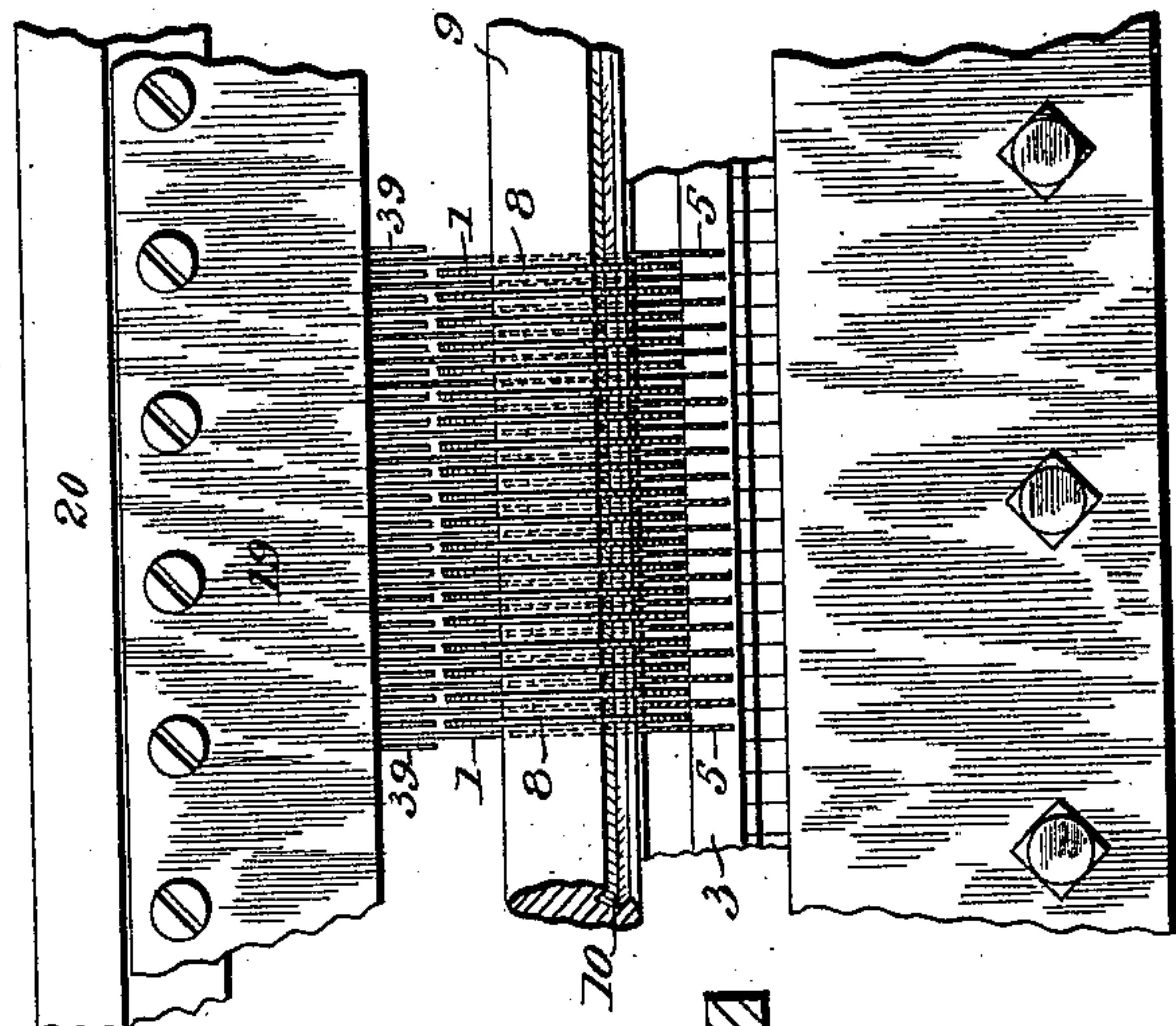
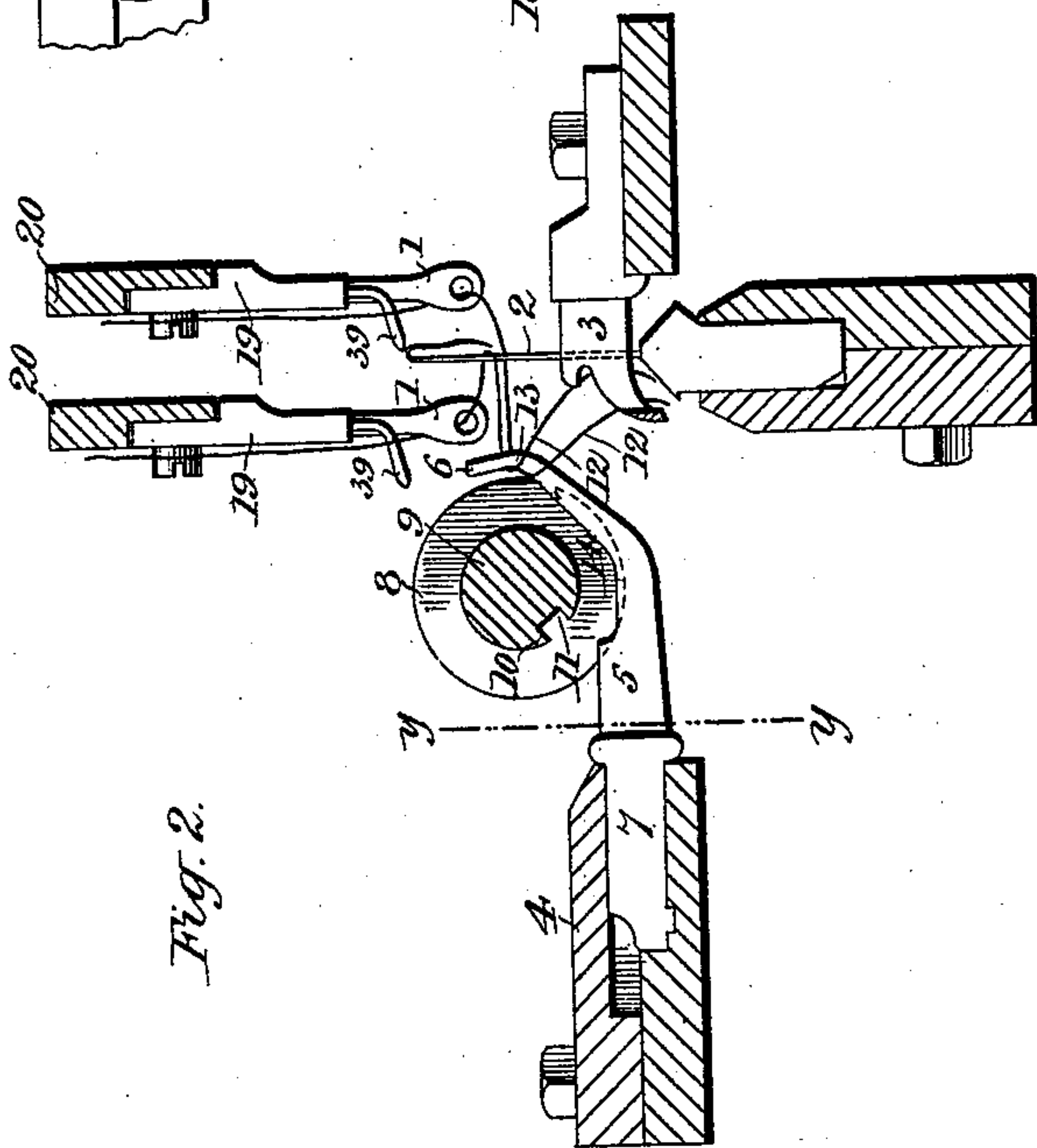


Fig. 2.



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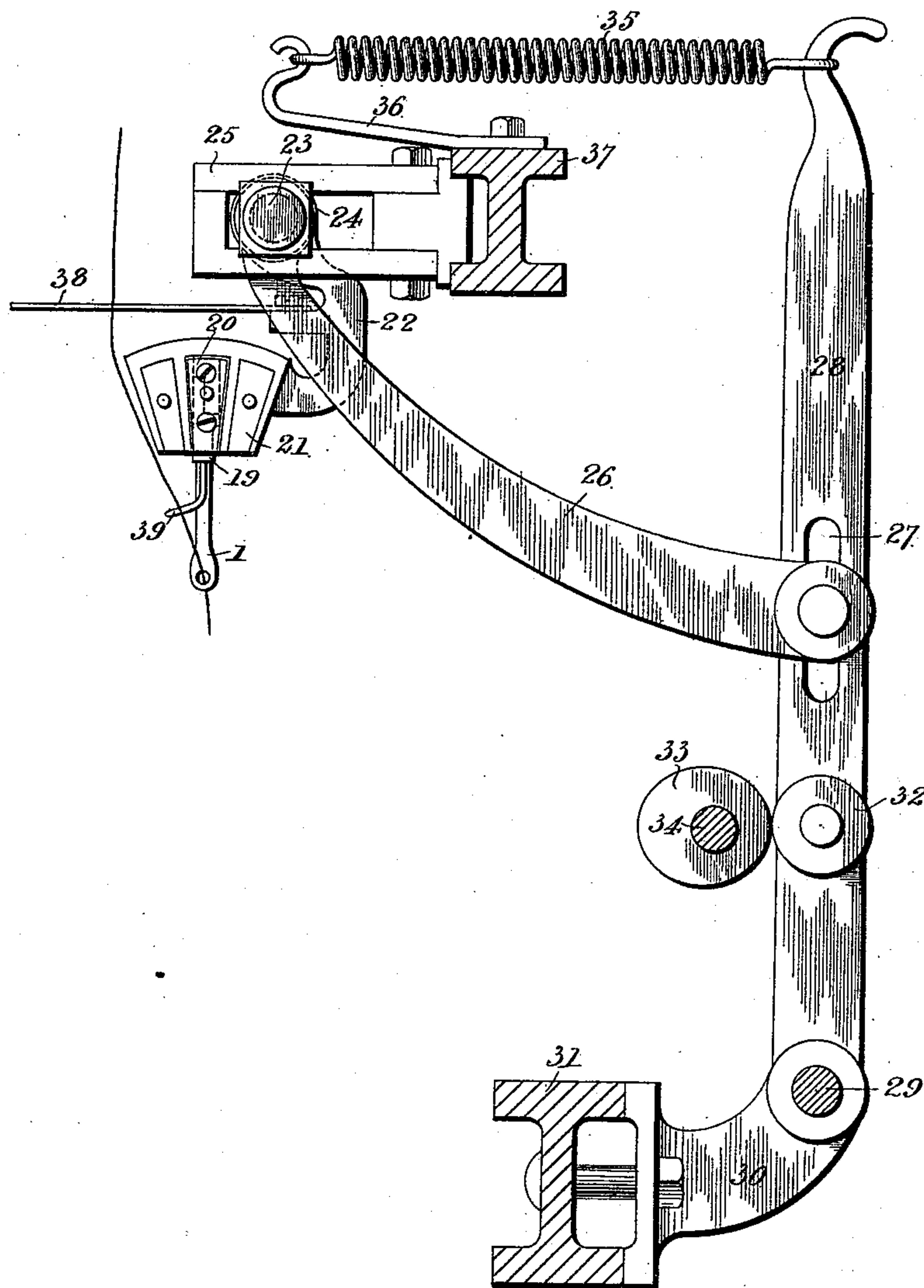
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Fig. 6.



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Fig. 8.

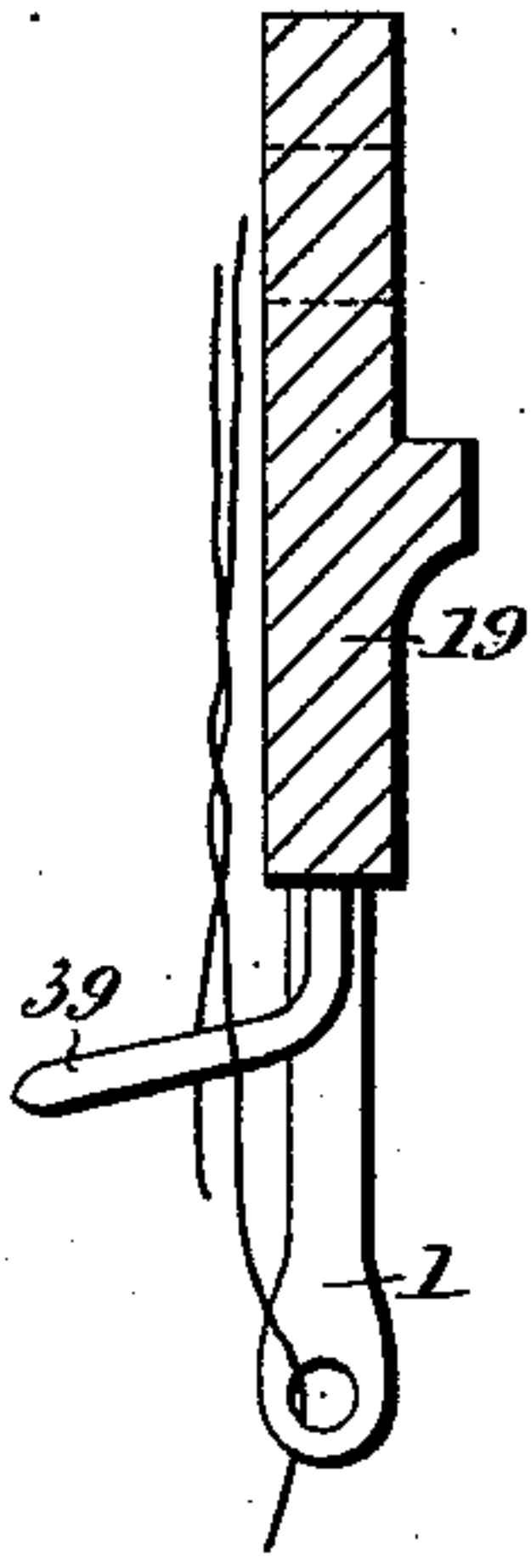


Fig. 9.

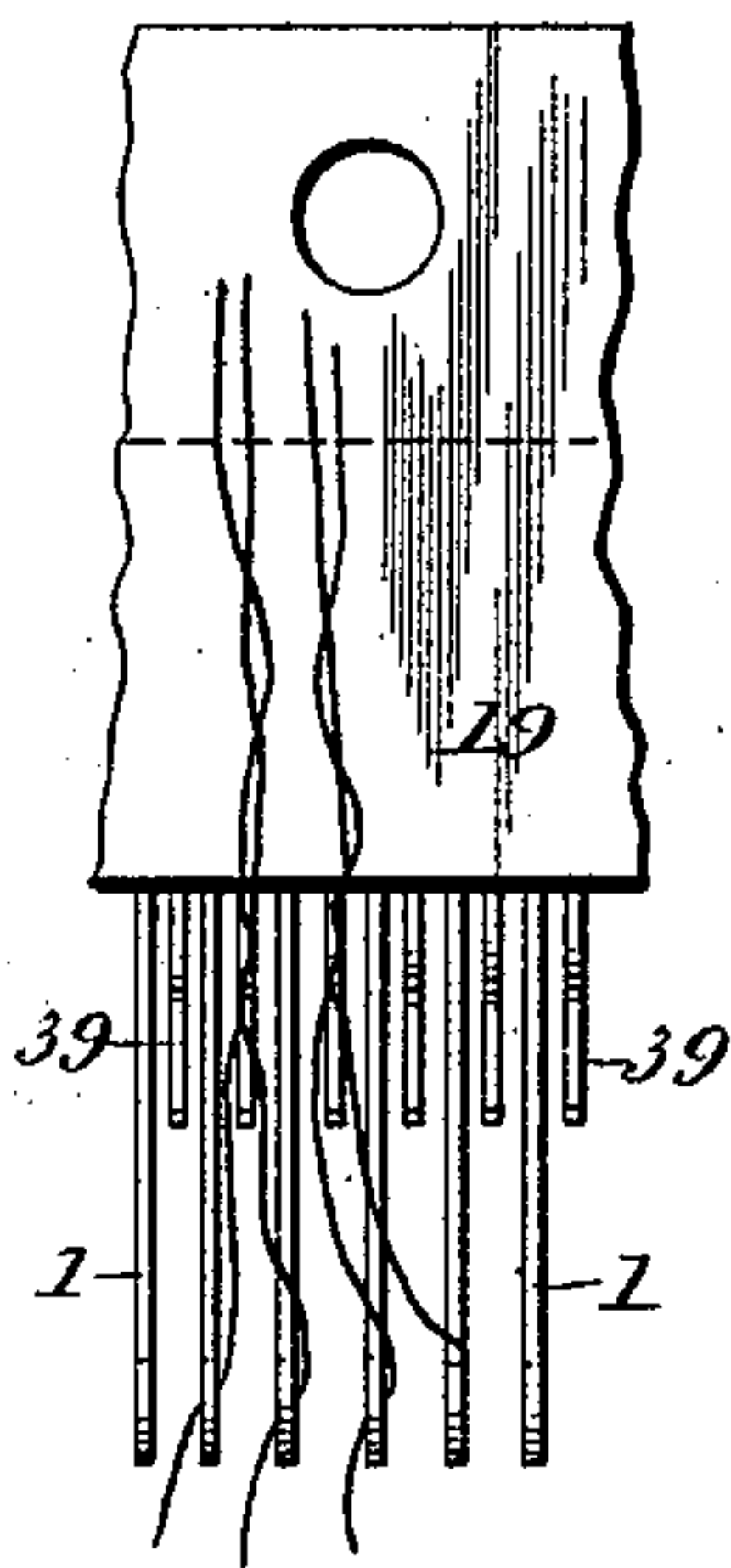
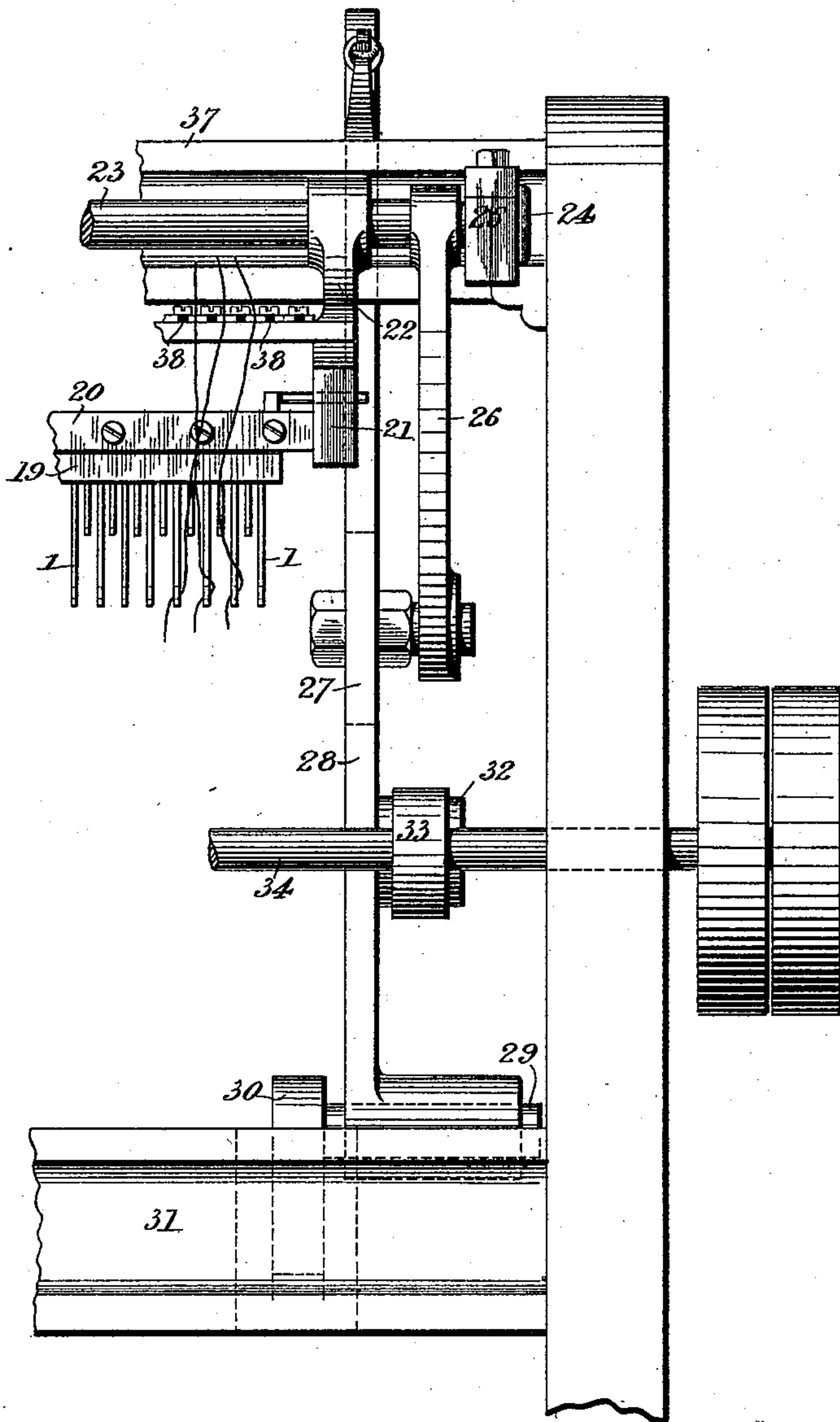


Fig. 7.



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# UNITED STATES PATENT OFFICE.

JAMES BOOTH, OF HALIFAX, ENGLAND.

## MACHINE FOR PRODUCING KNITTED PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 447,226, dated February 24, 1891.

Application filed March 18, 1890. Serial No. 344,379. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES BOOTH, a subject of Her Majesty the Queen of Great Britain, residing at Halifax, in the county of York, England, have invented certain new and useful Improvements in Machines for Producing Knitted Pile Fabrics, of which the following is a specification.

My invention relates to machines heretofore employed solely for the manufacture of knitted looped fabrics; and it consists in combining with same certain appliances for receiving and holding the loops in position and for cutting same while being so held for the purpose of producing pile fabrics—such as plush, seals, and the like—which have hitherto only been produced on machines specially adapted for the production of pile fabrics.

It further consists in combining therewith devices for varying the length of the pile (or loop in the case of a looped fabric) and in an improved guiding device for separating the several threads or yarns on their passage to the guide-eyes, thereby preventing breakage and entanglement of the yarn.

The class of machine employed is what is known as a "straight-bar knitting-machine;" but clearly to explain the nature of my invention, reference will be now made to the accompanying drawings, in which—

Figure 1 is a broken front elevation of a part of a straight-bar knitting-machine having my improved loop holding and cutting device applied thereto. Fig. 2 is a sectional elevation of the same on the line  $x x$ , Fig. 1. Fig. 3 is a view of the same from the plane  $y y$ , Fig. 2. Fig. 4 shows in elevation, on a smaller scale, the guides with the means for giving the to-and-fro lateral motion to the same. Fig. 5 is a plan on an enlarged scale of some of my loop-holding devices and cutters. Fig. 6 is a side elevation, on a different scale, of my improved appliances for operating the longitudinal bar carrying the guides and varying the length of the loop or pile. Fig. 7 is a front elevation of the same at one end, showing so much of a straight-bar knitting-machine as is necessary to illustrate this part of my invention. Fig. 8 is an enlarged end view of a portion of the guide-bar and

guide, showing the device for guiding and separating the threads or yarns; and Fig. 9 is a front view of the same.

For holding the loops and cutting the same for the purpose of producing a pile fabric I employ, in connection with the guide-eyes 1, needles 2, and sinkers 3, a longitudinal bar or carrying-frame 4, which is placed opposite the sinkers, and is adapted to clamp and hold a series of hooks or holders 5, the points 6 of which are free. Said hooks are secured in pairs in blocks of lead or spelter 7, placed side by side and held in the longitudinal bar 4, as shown in Fig. 2. In place of blocks 7 the whole of the hooks 5 may be embedded in a bar which is clamped in the bar 4 in the same manner as the blocks. Within the space between each two of the hooks 5 is a circular cutter or knife 8, all of said cutters being carried on a longitudinal shaft 9, on which they are free to slide laterally, so as to insure substantially correct position for the cutters between the hooks 5. The cutters are, however, caused to rotate with the shaft 9 by means of a key-slot 10 therein, there being a corresponding key-piece 11 left on the cutters to engage therewith. The shaft 9 may be driven from any suitable moving part of the machine by gearing or other means.

The action of these loop holders and cutters is as follows: As the loops 12 are formed, they are passed by the guides 1 over the points 6 of a pair of the hooks 5, as shown clearly in Fig. 5. To effect this the guides 1 have a to-and-fro lateral motion given them by the lever 15, which is pivoted at the point 16 and is caused to rock by the peg-wheel 17, a spring 18 giving the requisite motion in the opposite direction. The hooks 5 are so bent and shaped that it is not until a series or several loops are deposited on them that the first loop of the series will be cut, the accumulation of several loops beyond the range of action of the circular cutters 8 being designed to secure the effectual "tying-in" and securing together of the pile loops and the knitted ground fabric before severance, the loops being held in the bend 13 of the hooks until so much of the piece is knitted and "taken up" that the loops are drawn by the "taking-up" action down the incline 14 of said hooks and



are so brought into contact with the cutters 8, which cut them, while as the first or leading loops of the series are being severed a proportionate number of new loops are being added behind.

In the operation of knitting the guide-eyes 1 are given a movement laterally of the machine in addition to the movement before mentioned as derived from the lever 15 and peg-wheel 17, and these movements effect the laying of the yarns upon the needle and pile-forming hooks. In order to vary the length of the pile, it is only necessary to vary the distance between the hooks 6 and the needles by adjusting the bar 4 to or from the needles and by varying accordingly the lateral movement of the eyes; and for the purpose of giving the eyes this movement and varying it I employ the arrangement shown in Figs. 6 and 7 of the drawings, by which a backward and forward motion is given to the longitudinal bar 19, carrying the guide-eyes 1.

The bar 19 is secured in a bar 20, as shown in Fig. 2, said bar being attached to the part 21, Figs. 6 and 7, which is attached to the arm 22, the end of which is secured to the shaft 23. This shaft is carried in a bearing 24 at each end and can move to and fro in the slide-bed 25 and a corresponding one at the other end. The shaft 23 is moved by an arm 26, attached to the same at one end and adjustably secured at the other in a slot 27 of a rock-lever 28, which is pivoted on a stud 29, carried by the bracket 30, which is bolted to a cross-rail 31 of the frame-work of the machine. The rock-lever 28 carries a roller 32, which bears against a cam 33, secured to the main driving-shaft 34 of the machine. The upper end of the lever 28 is hooked and is attached to a spring 35, which serves to draw it back when forced out by the cam. The other end of said spring is secured to an arm 36, fixed to a cross-rail 37, to which the slide-bed 25 is also attached. It will be seen that by replacing the operating-cam 33 with one of different size the movement of the rock-lever 28 and arm 26 can be adjusted, and consequently the movement of the shaft 23 and the length of the loops formed by the guide-eyes 1 be controlled, the arrangement of parts, including the adjustment of the

arm 26 within the slot 27, enabling the machine to be adjusted to a great nicety, so that an even loop or pile of the determined length can be woven in the fabric.

The arm 22 carries the guide-rods 38 for separating the yarns as they pass down to the guide-eyes 1, said rods being made of sufficient length to allow for the backward and forward movement of the arm 22. For the purpose of further separating the threads or yarns before reaching the guide-eyes I provide, however, curved fingers 39, which are attached to the bar 19 between each two of the guide-eyes 1. Each of the threads or yarns passes between two of these fingers, so that they are well separated, and breakage and entanglement (especially in the case of mohair and other clinging yarns) is avoided.

What I claim is—

1. In a straight-bar knitting-machine adapted for making looped fabrics, the combination, with the needles, sinkers, and guide-eyes, of a shaft carrying cutters and a longitudinal bar carrying hooks or holders, said cutters working between said hooks, which latter are adapted to hold a series of loops and allow those first laid on to be brought first in contact with the cutters, substantially as described.

2. In a straight-bar knitting-machine, the combination, with the guide-eyes 1, of shaft 23 and slide-bed 25, connections between said guide-eyes and shaft, and means for giving said shaft a backward-and-forward motion in the slide-bed, said means having provision for adjustment and including the cam 33, substantially as described.

3. In a straight-bar knitting-machine and in combination, the guide-eyes 1, the fingers 39, extending between them to separate the yarns, and the supporting means for the fingers and guide-eyes, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES BOOTH.

Witnesses:

WALTER BRIERLEY,  
J. BRIERLEY HOWARD.