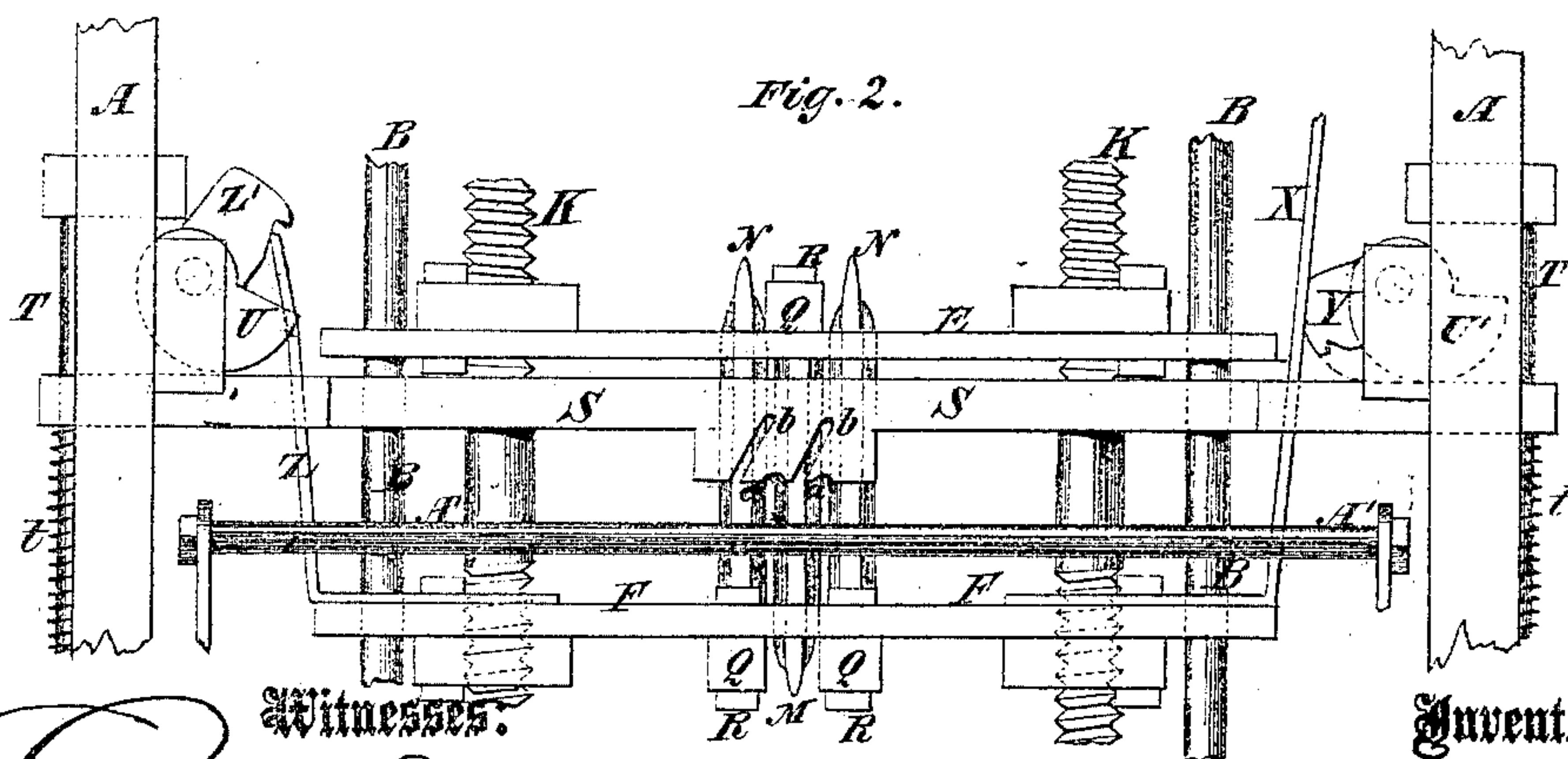
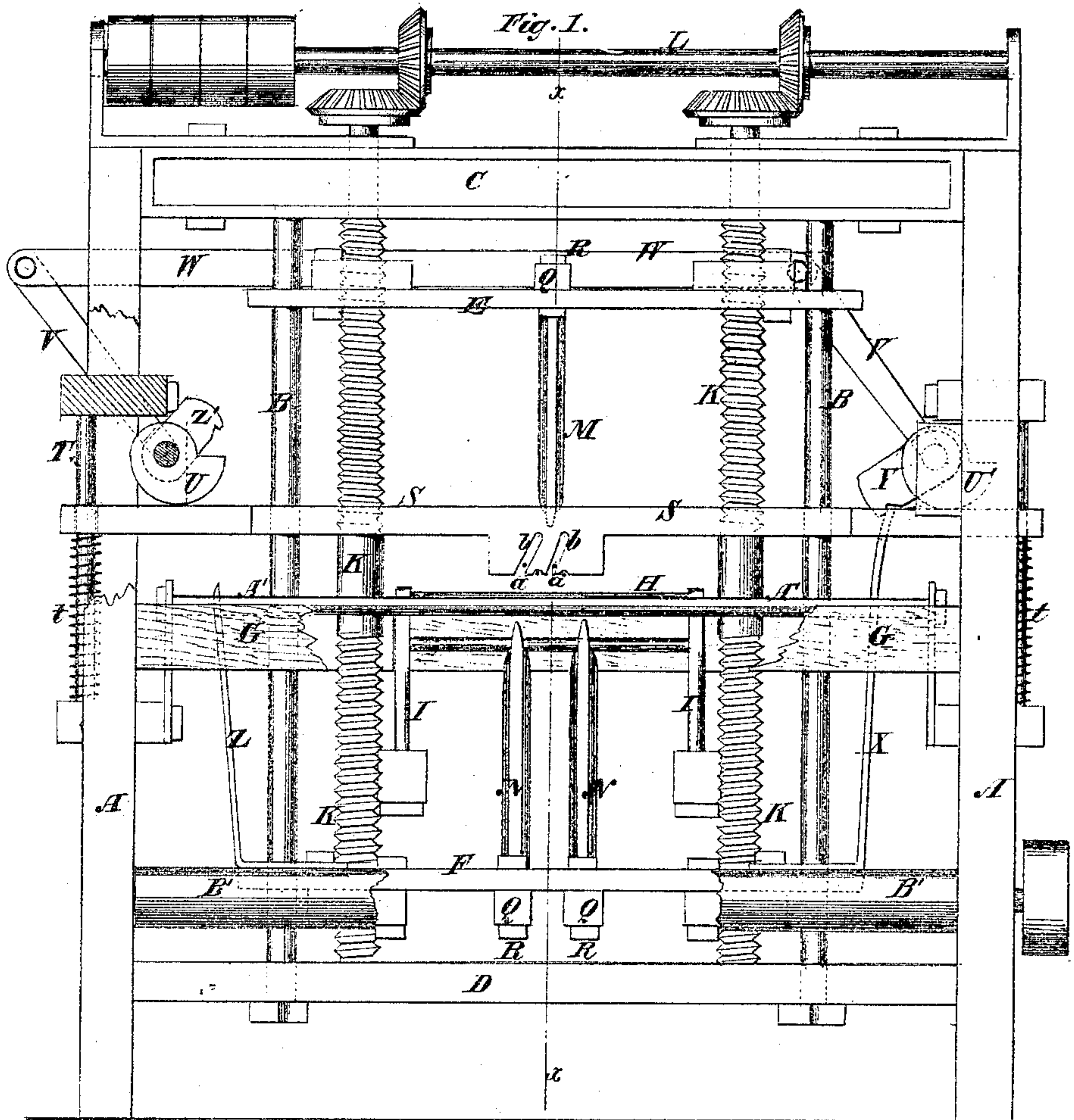


HILAND HOWARD.

Improvement in Fringe-Twisters.

No. 114,562.

Patented May 9, 1871.



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Fig. 3.

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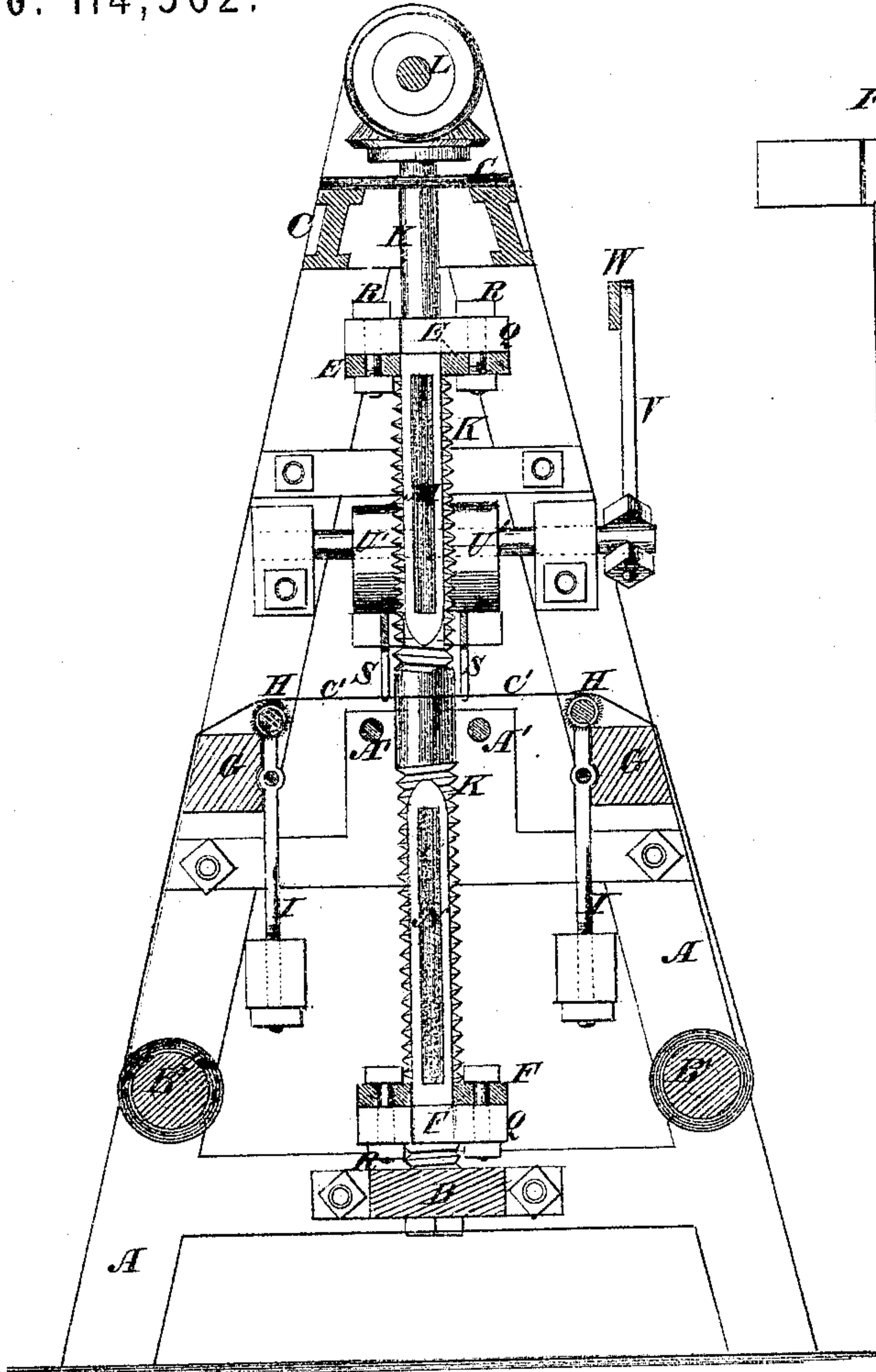


Fig. 4.

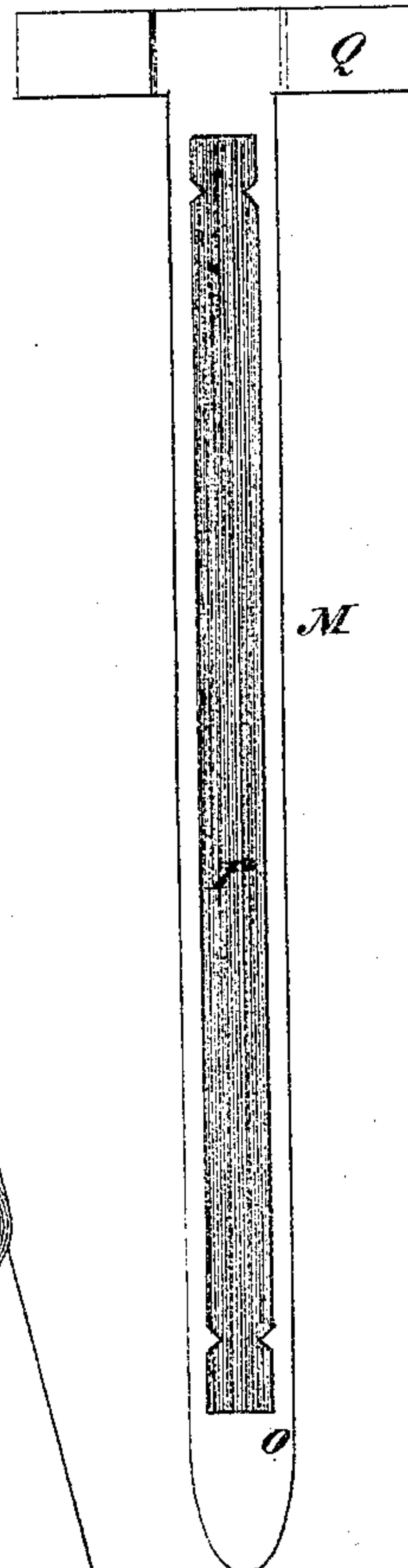


Fig. 5.

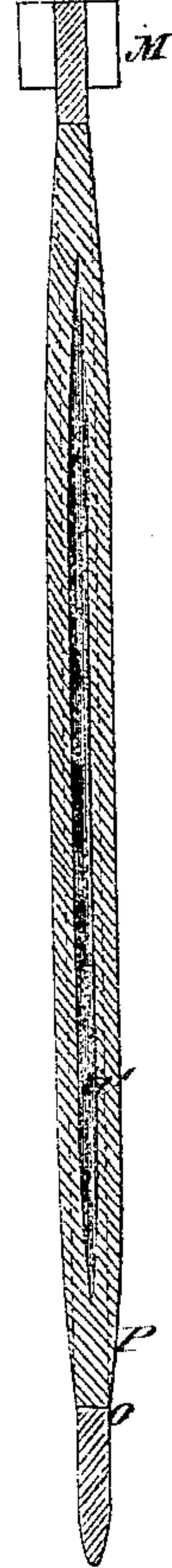
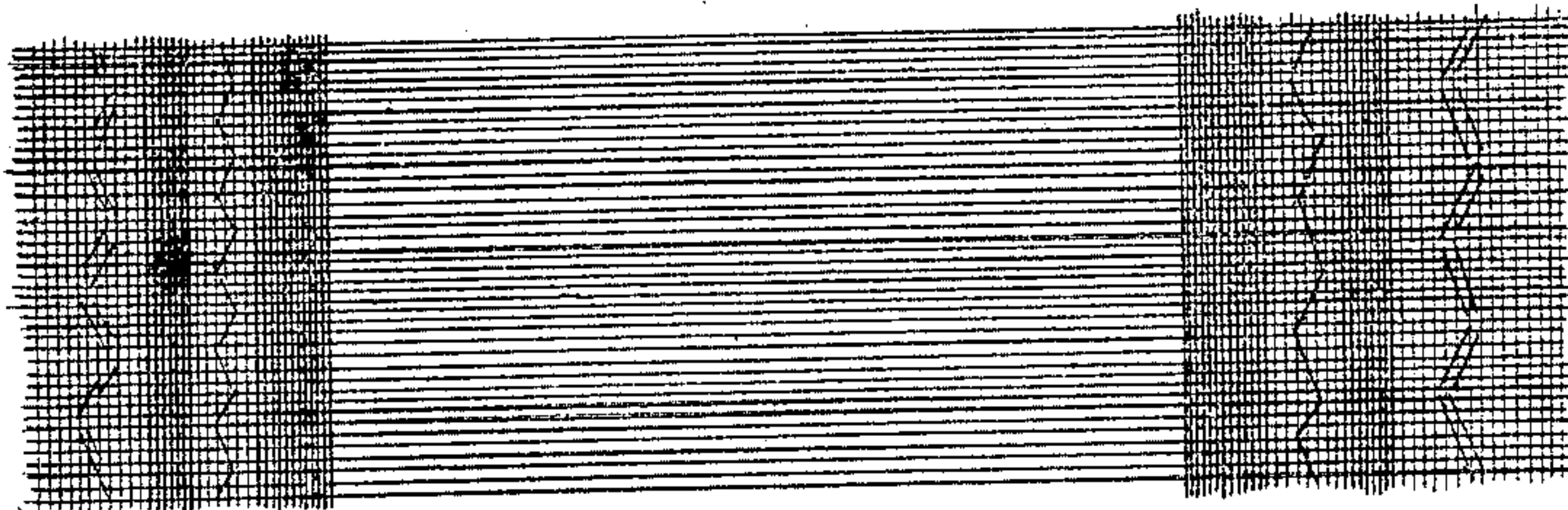


Fig. 6.



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# UNITED STATES PATENT OFFICE.

HILAND HOWARD, OF LEEDS, NEW YORK, ASSIGNOR TO HIMSELF, JAMES FOWKS, AND GEORGE HOWARD, OF SAME PLACE.

## IMPROVEMENT IN FRINGE-TWISTERS.

Specification forming part of Letters Patent No. 114,562, dated May 9, 1871.

*To all whom it may concern:*

Be it known that I, HILAND HOWARD, of Leeds, in the county of Greene and State of New York, have invented a new and Improved Fringe-Twister; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in machines for twisting the fringe of shawls, quilts, and the like; and it consists in a novel combination of apparatus for separating the threads and twisting-fingers, whereby, the shawl or other article being stretched between cloth beams or rollers, the threads will be separated uniformly for forming the strands, and the strands will be twisted separately, then doubled and twisted together simultaneously throughout the whole breadth of the shawl, all as hereinafter more fully described.

Figure 1 is a front elevation of the machine with some parts broken out, showing the position at the beginning of the operation. Fig. 2 is a partial front elevation, showing the position at the completion of the twisting of the separate strands. Fig. 3 is a sectional elevation taken on the line *x x* of Fig. 1. Fig. 4 is a side view of one of the twisting-fingers. Fig. 5 is a section of the same; and Fig. 6 is a plan view of two sections of shawls or other goods connected together by the warp-threads as they leave the loom to be twisted for making the fringe before separating them, showing how the fringe of one edge of two shawls may be twisted at once.

Similar letters of reference indicate corresponding parts.

A represents a wide frame of any suitable kind, having two guide-rods, B, extending from the upper cross-beam, C, to the lower one, D, which rods are as wide apart as the widest goods to be acted upon. These rods have vertically-reciprocating finger-bars EF—the one above and the other below the front beams, G—which are about midway of the height of the machine, and on which oscillat-

ing whip-rolls H are mounted by vertical weighted supports I. These finger-bars are moved toward and from each other by the long right-and-left-threaded screws K, mounted vertically in the beams C and D, passing through the said bars and gearing with a driving-shaft, L, on the top of the machine, having driving-gear for driving in either direction and shifting from one to the other quickly. Each finger-bar carries a series of twisting-fingers arranged side by side, with spaces between a little greater than their thickness, those of the upper bar, M, pointing downward and those of the lower bar, N, pointing upward, and each set being arranged to work in the spaces between the others. These fingers consist of long, narrow, flat, and thin plates, O, of metal, with a long slot through each, in which is fitted a soft india-rubber strip, P, thicker than the plate, so as to project beyond the surface each side, which rubber strips are split through the broadest diameter nearly from end to end, as shown in Fig. 5, for inserting strips *a'*, of pasteboard, leather, or the like, to spread them out from time to time as they wear them. The fingers have T-heads Q, and are clamped to the finger-bars by bolts R in slots which admit of adjusting them toward or from each other. They are pointed at the ends which enter between the threads of yarn.

S represents dividing plates or bars extending across the machine, one on each side of the rows of twisting-fingers, close to them, being mounted on the vertical guides T, and having spiral springs *t* under them constantly lifting them upward. These bars have two sets of notches, *a* and *b*, in the lower edges, arranged alternately, the ones, *a*, being shallow, and the others, *b*, being deep and so inclined that the bottom of each is vertically above a notch, *a*.

U U' represent a pair of cams at each end of these dividing-plates, or near the ends, for forcing them down when required. Said cams have a lever, V, attached to their shafts, which levers are connected together at their free ends by the bar W, by which they are caused to move alike. Each cam-shaft has



an arm projecting toward the center of the machine, to be acted on by a spring-bar attached to the lower finger-plate, a long one, X, being arranged to act on the arm Y of cam U', and a short one, Z, being arranged to act on arm Z' of cam U. The arms of these cams are so adjusted that when arm Y of the cams U' ranges downward at about forty-five degrees the arm Z' of cam U ranges upward at about the same inclination.

A' represents a yarn-supporting rod extending across the machine, one on each side, parallel with the dividing-bars, just outside of the vertical planes in which they traverse.

B' represents cloth beams or rollers, one on each side near the bottoms, on which the shawls are wound for stretching the threads under the dividers and fingers, as shown by the line C', Fig. 3.

The whip-rolls H are to be covered by card-clothing, as indicated in Fig. 3, to prevent the goods from shifting lengthwise of the rolls. They are mounted on tilting and weighted supports, to yield as the tension caused by the twisting-fingers varies by the shortening of the thread in twisting.

The machine being in the position indicated in Fig. 1, the shawls arranged as in Fig. 3, and motion being imparted to the driving-shaft to move the finger-bars toward each other, the dividing-bars will be moved down by the cams, which are set in motion by spring-bar X, acting on arm Y, that the points *d*, between the notches *ab*, will separate the threads about equally into strands, each alternate one of which will be received in a notch, *a*, and the other in a notch, *b*. These alternate strands will be separated vertically by those in notches *b* being forced up to the bottoms thereof by their tension, while the others are pressed down on the rods A' by the shallow notches, and those in the notches *b* will be vertically over the others, and they will be kept separate during the downward movement of the upper fingers and the upper movement of the lower ones, which, by their action one with the other upon the strands between, twist the said strands, as clearly indicated in Fig. 2. Each finger of one set acts on both sides with others of the other set, so that the strands on each side of it are twisted in opposite directions. The spring-bar X escapes from the arm Y after it has turned the cams sufficiently to force the dividing-bars S down as far as or a little farther than the yarn-supporting rods A', which is accomplished about the time the fingers of each set begin to act upon the yarn, and the said dividing-bars remain in this position a short time, during which the twisting of the strands goes on; but before the movements of the finger-bars toward each other cease, the short spring-bar Z comes in contact with arm Z' of cams U, and during the balance of the said movement of the finger-bars raises the cams, so that when the said finger-bars have ceased

moving toward each other the said dividing-bars will be lifted above the strands, allowing them to run together and double. Then the motion of the driving-shaft is shifted, the fingers are moved back again, and the strands are twisted together in the opposite direction to that in which they were twisted singly, thereby completing the operation, after which the shawls are removed and separated by cutting the twisted fringe in the middle. The alternate strings of fringe are also twisted in the opposite direction, and the ornamental appearance much improved by it. If the shawls have already been separated, the ends of the warp-threads are hooked onto a piece of cloth for stretching between the cloth-rollers, and for holding the weft-threads for twisting the fringe forward. Thereby I weave a narrow selvage of warp into the weft, at some distance from the principle selvage, to hold the threads by hooking onto the above-mentioned cloth which is wound on the roller.

Heretofore the fringe has been twisted by raising a few bunches of yarn at a time above the horizontal plane in which it was stretched, and separating the said bunches by raising some above the others, also by spreading laterally, and then passing the twisting-fingers between and over and under the strands; but this is of necessity a slow and tedious operation, as only a few strands can be acted on at a time, as it is impossible to raise the strands high enough for many fingers to work at once. It will therefore be seen that by moving the twisting-fingers perpendicular to the plane of the goods a very great advantage is gained over the present mode, for it admits of twisting all the strands of one side of the shawl at one operation, and all are acted on exactly alike, whereas in the other way some of the strands have greater tension than others, on account of being lifted higher.

I may of course effect the separation of the threads into bunches for strands in like manner by causing the dividing-plates to move upward against the yarn as well as downward. I may also make the fringes of plates with a recess in each side, and place an india-rubber or it may be a leather strip in each, employing a separate strip for each side. In this case the paper employed for setting out the strips will be placed between them and the bottom of the recess.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The arrangement of the twisting-fingers with the cloth-supports for working through the yarn perpendicular to the plane in which the shawl or other article is stretched, substantially as specified.
2. The arrangement of the fingers of each set with the other, as herein shown, whereby each finger acts on each of two sides, and the alternate strands are twisted in opposite directions, substantially as specified.



3. The dividing - bars provided with the shallow notches *a* and the deep notches *b*, and the latter arranged obliquely for holding the upper strands vertically above the lower ones, substantially as specified.

4. The combination of the two sets of fingers N M, bars E F, the right-and-left-threaded screws, and the guides B, substantially as specified.

5. The combination, with the twisting-fingers, arranged and operating substantially as described, of the dividing plates or bars S, substantially as specified.

6. The combination, with the dividing-bars, of the spring *t*, cams U U', and the spring-bars

X Z, the said cams being connected together, and the spring-bars attached to the finger-bars F, all substantially as specified.

7. The twisting - fingers consisting of the slotted metal bars and the divided india-rubber strips P, substantially as specified.

8. The combination, with the twisting-fingers and the rolls B', of the whip-rolls H and the yarn-supporting rods A', substantially as specified.

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Witnesses:

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