

S. C. LISTER & J. REIXACH.

LOOM FOR WEAVING DOUBLE PILE FABRICS.

No. 282,652.

Patented Aug. 7, 1883.

Fig. 1.

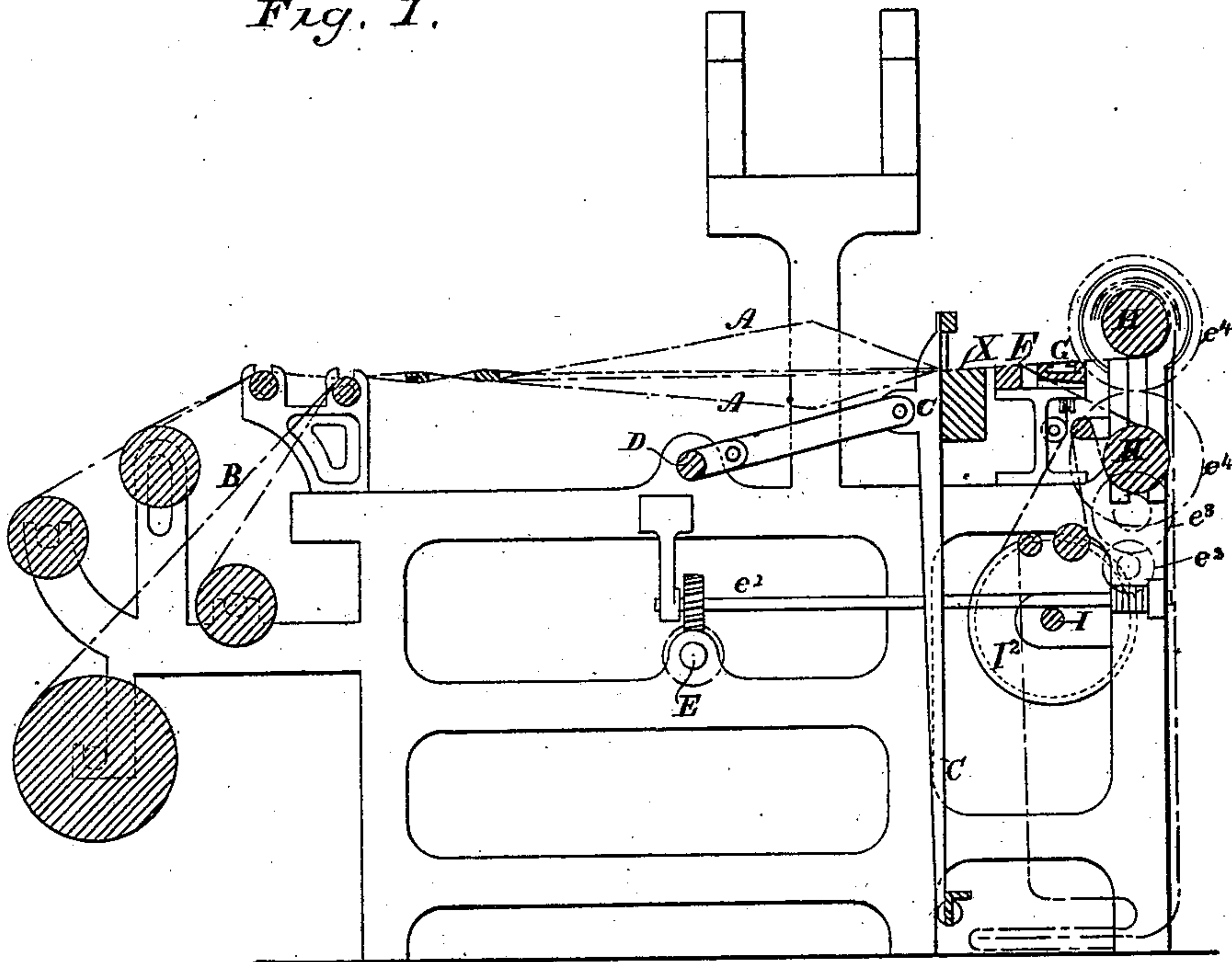


Fig. 6.

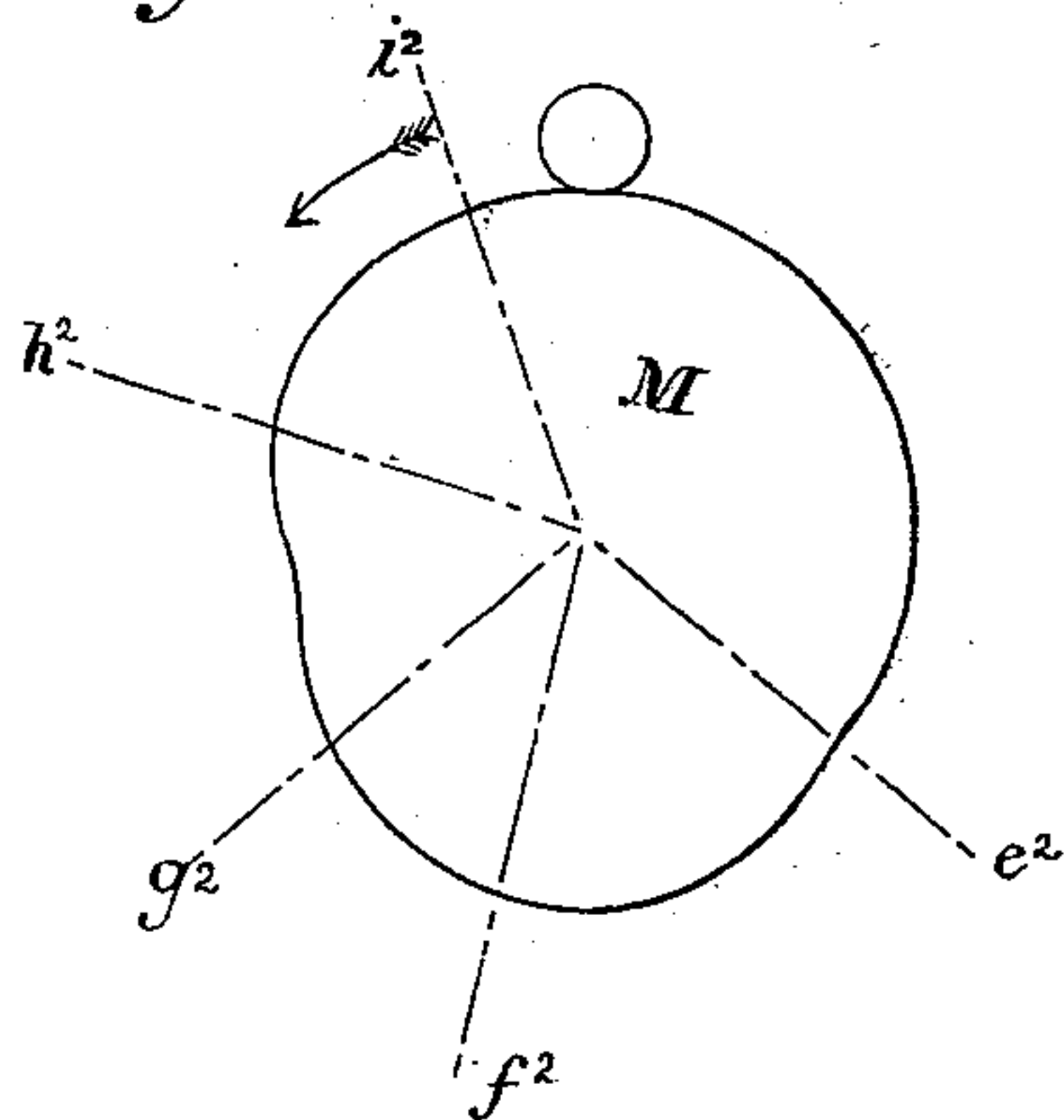


Fig. 7.

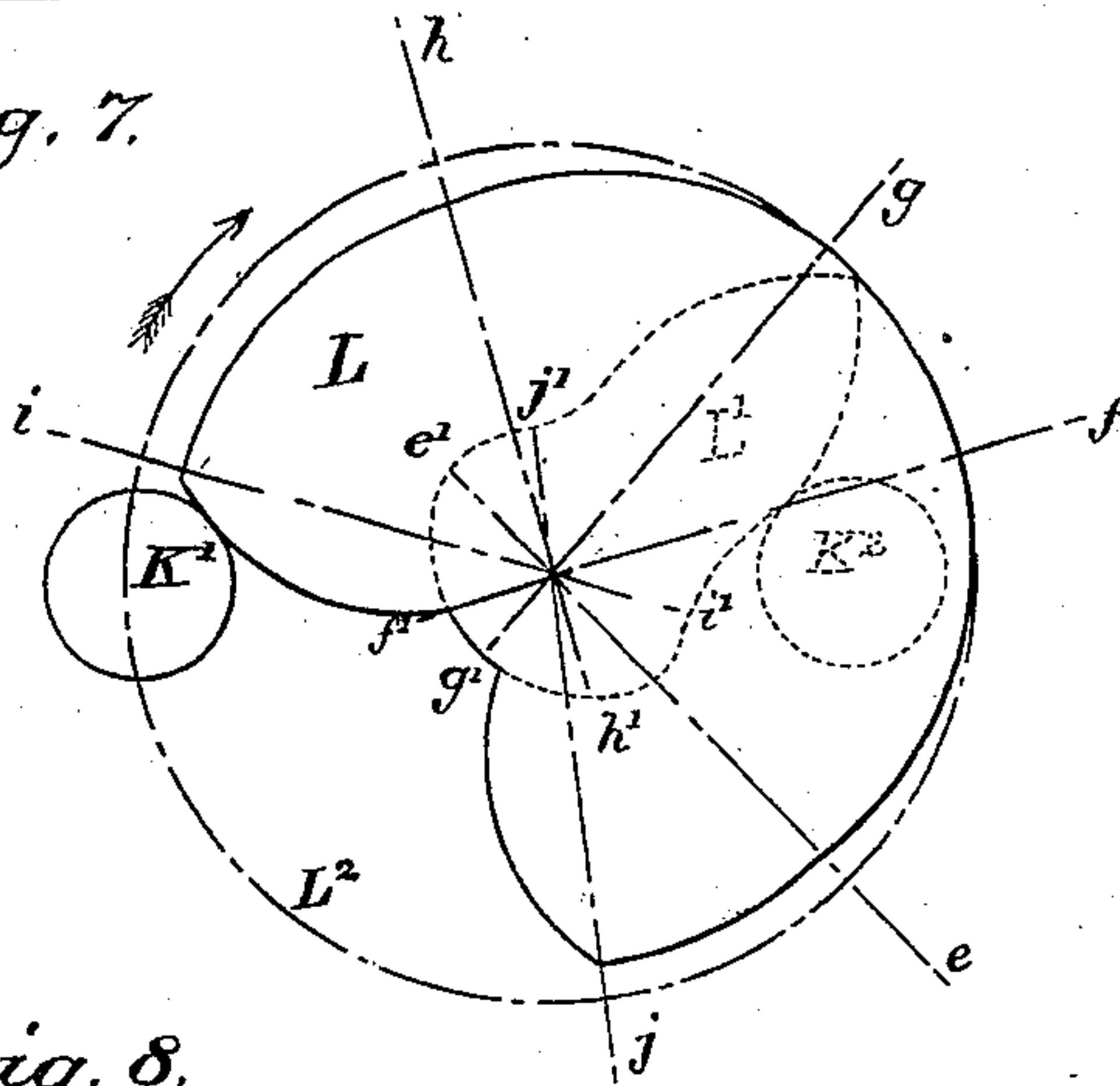
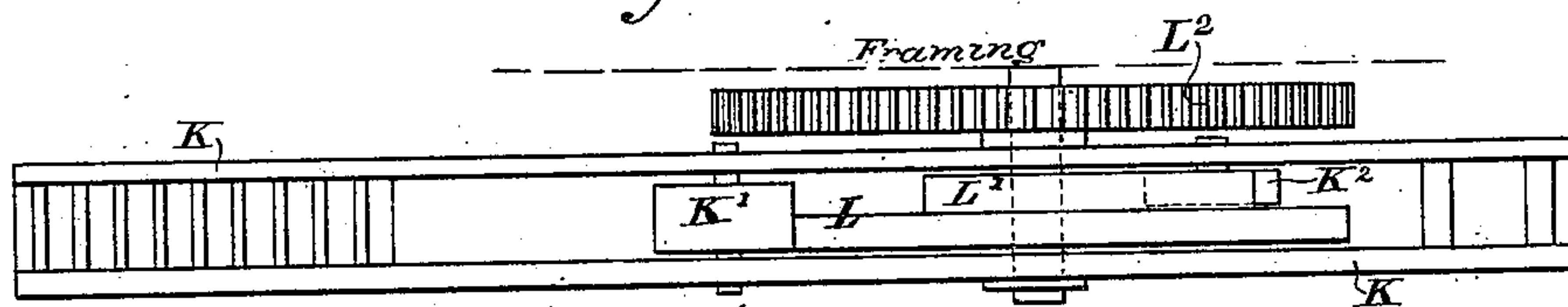


Fig. 8.



WITNESSES

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(No Model.)

4 Sheets—Sheet 2.

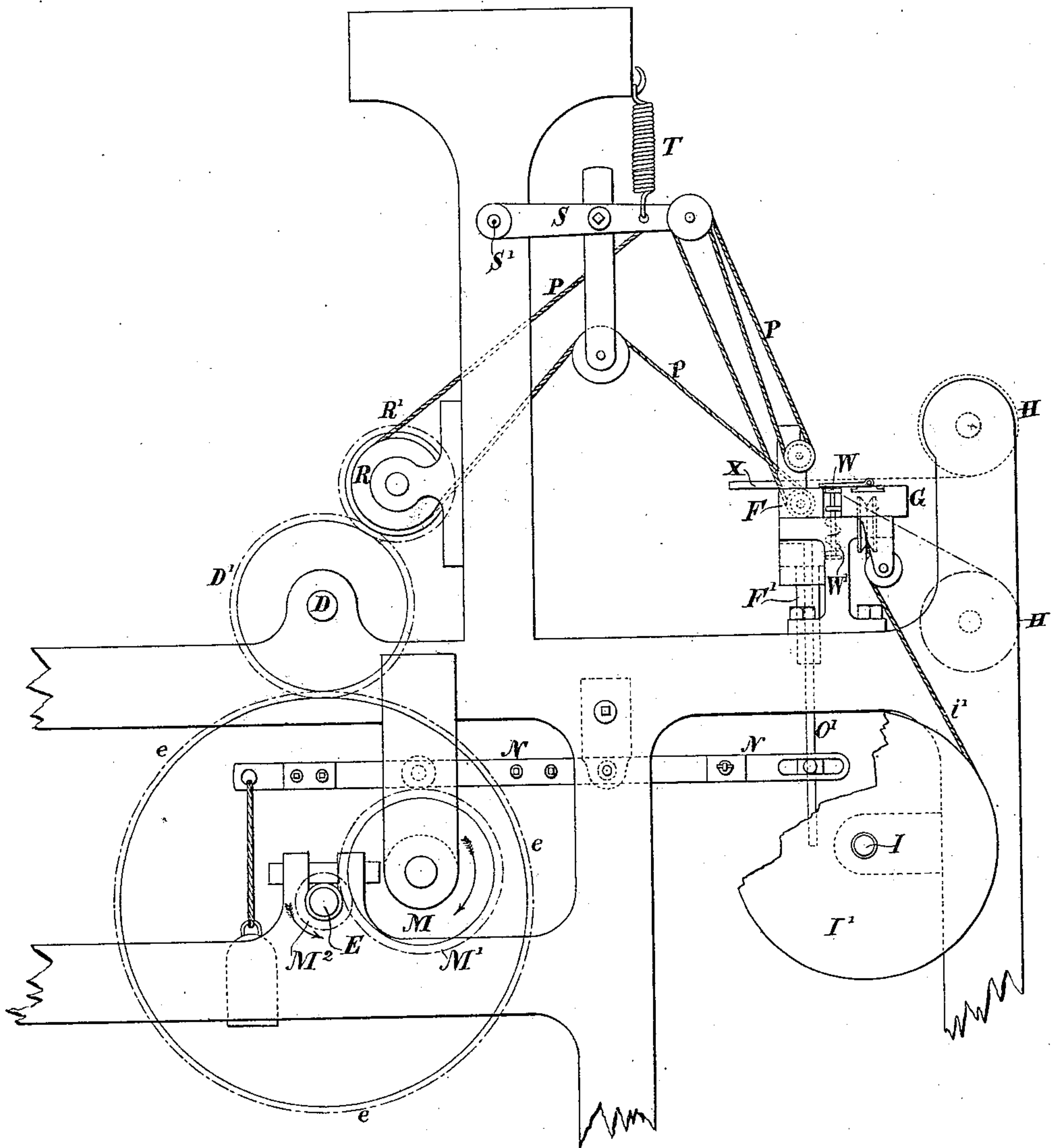
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Fig. 2.



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Fig. 3.

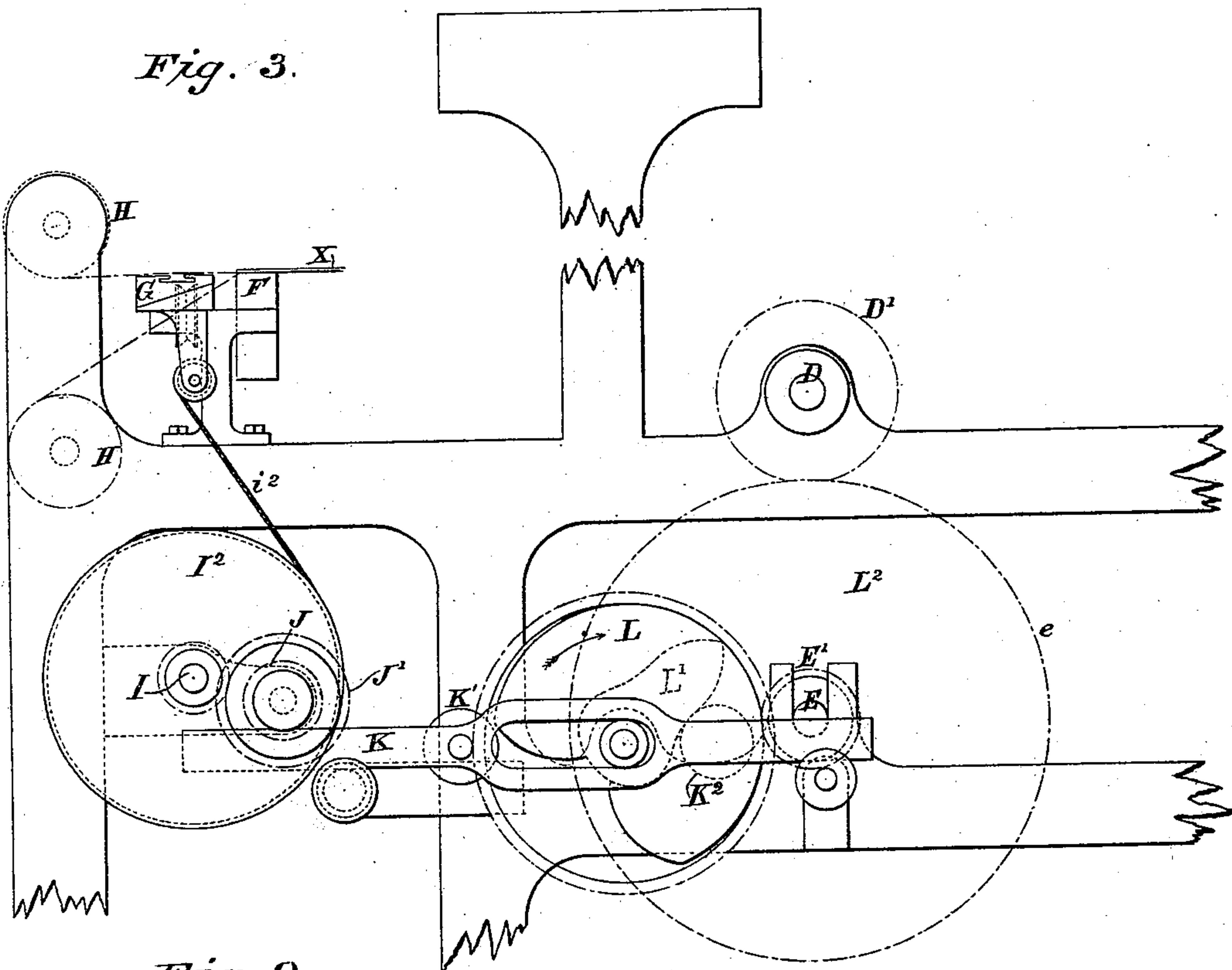


Fig. 9.

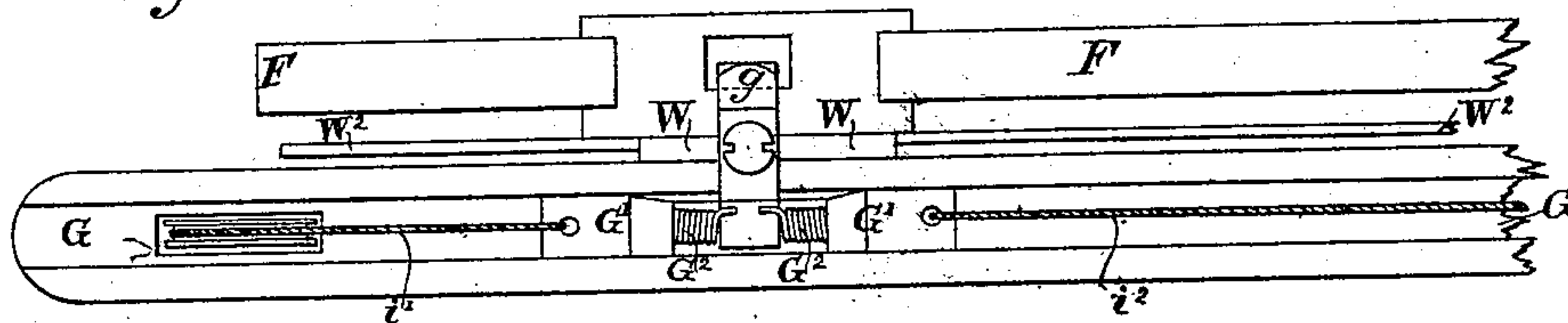
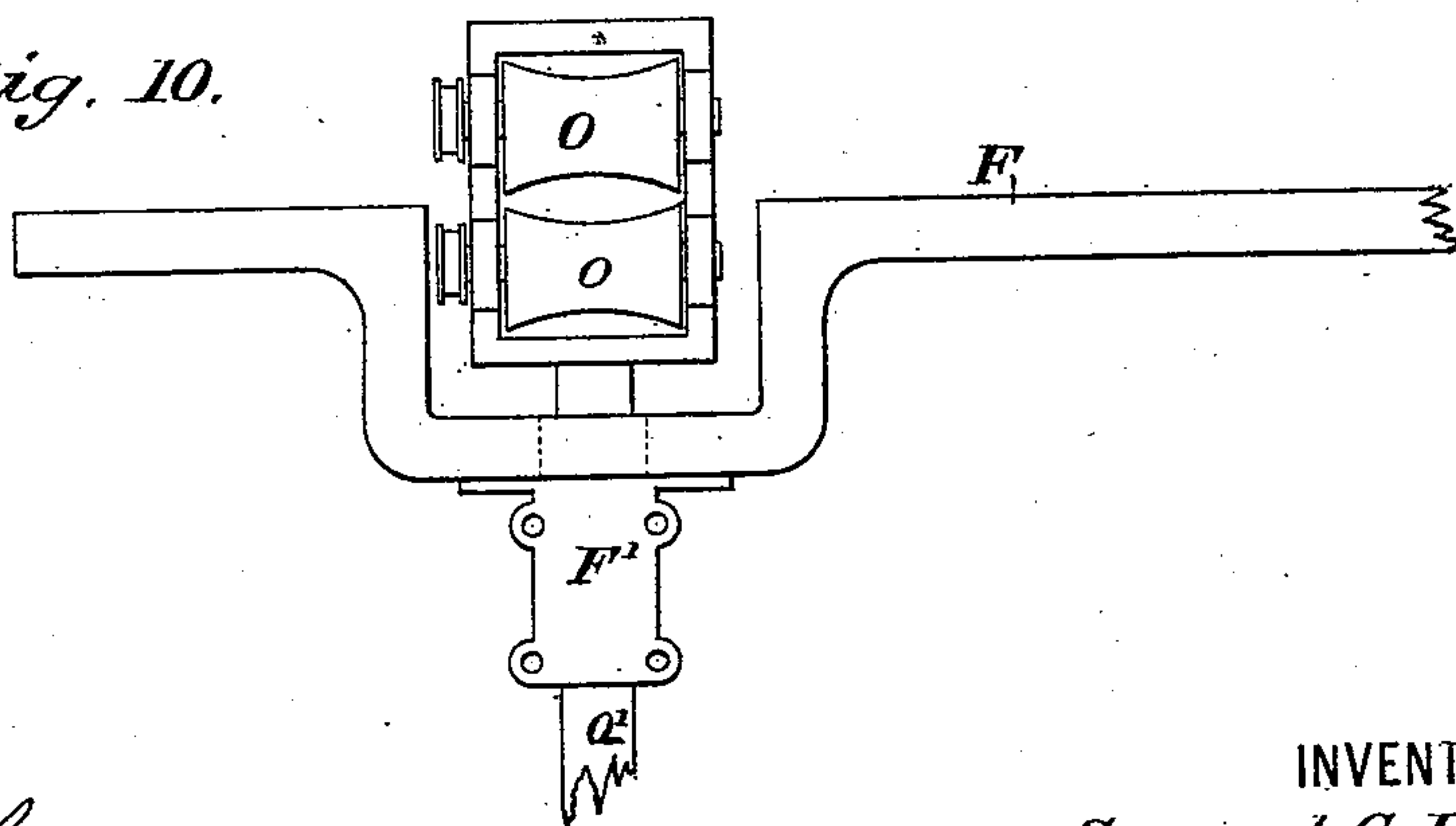


Fig. 10.



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Fig. 4.

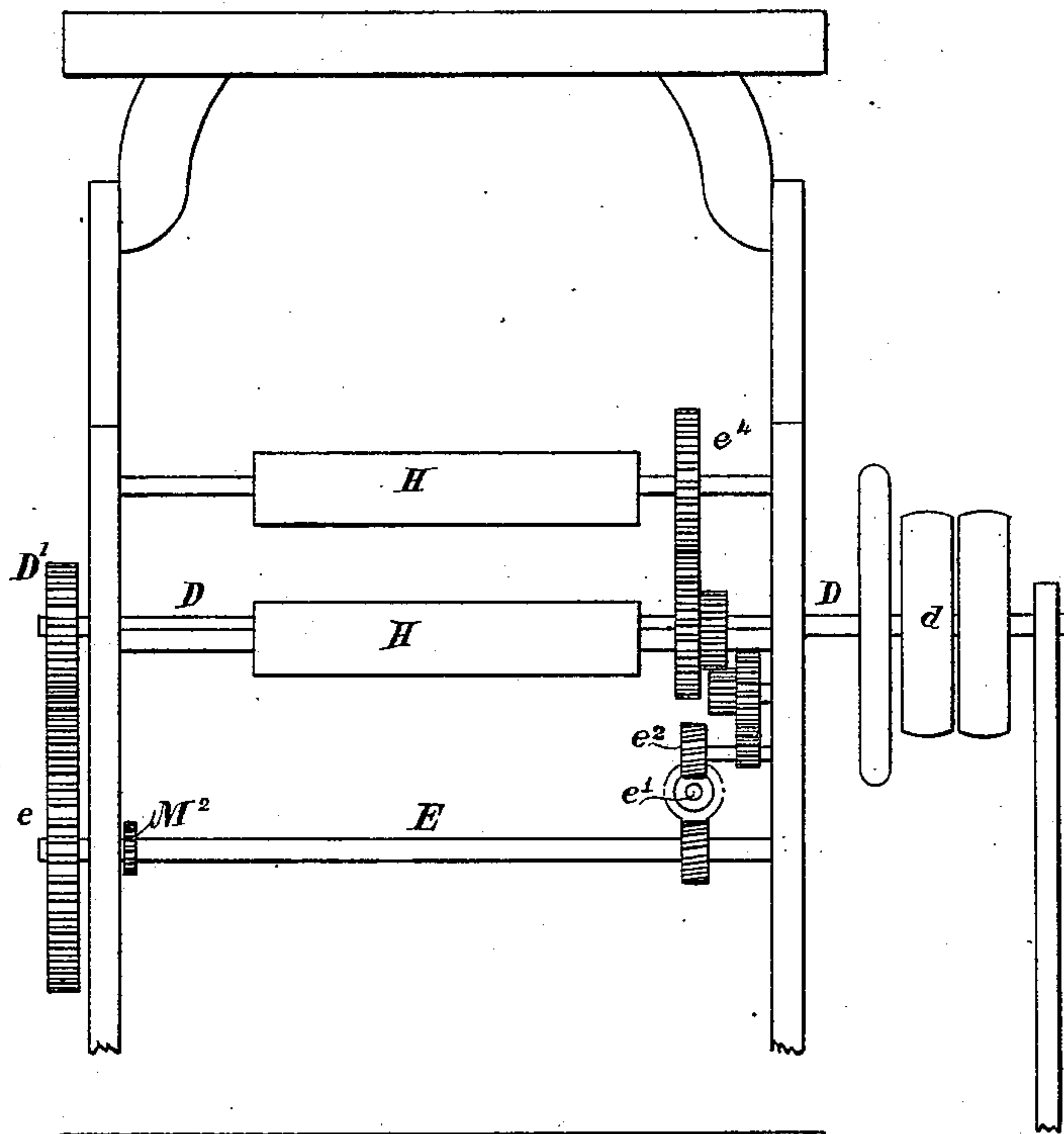
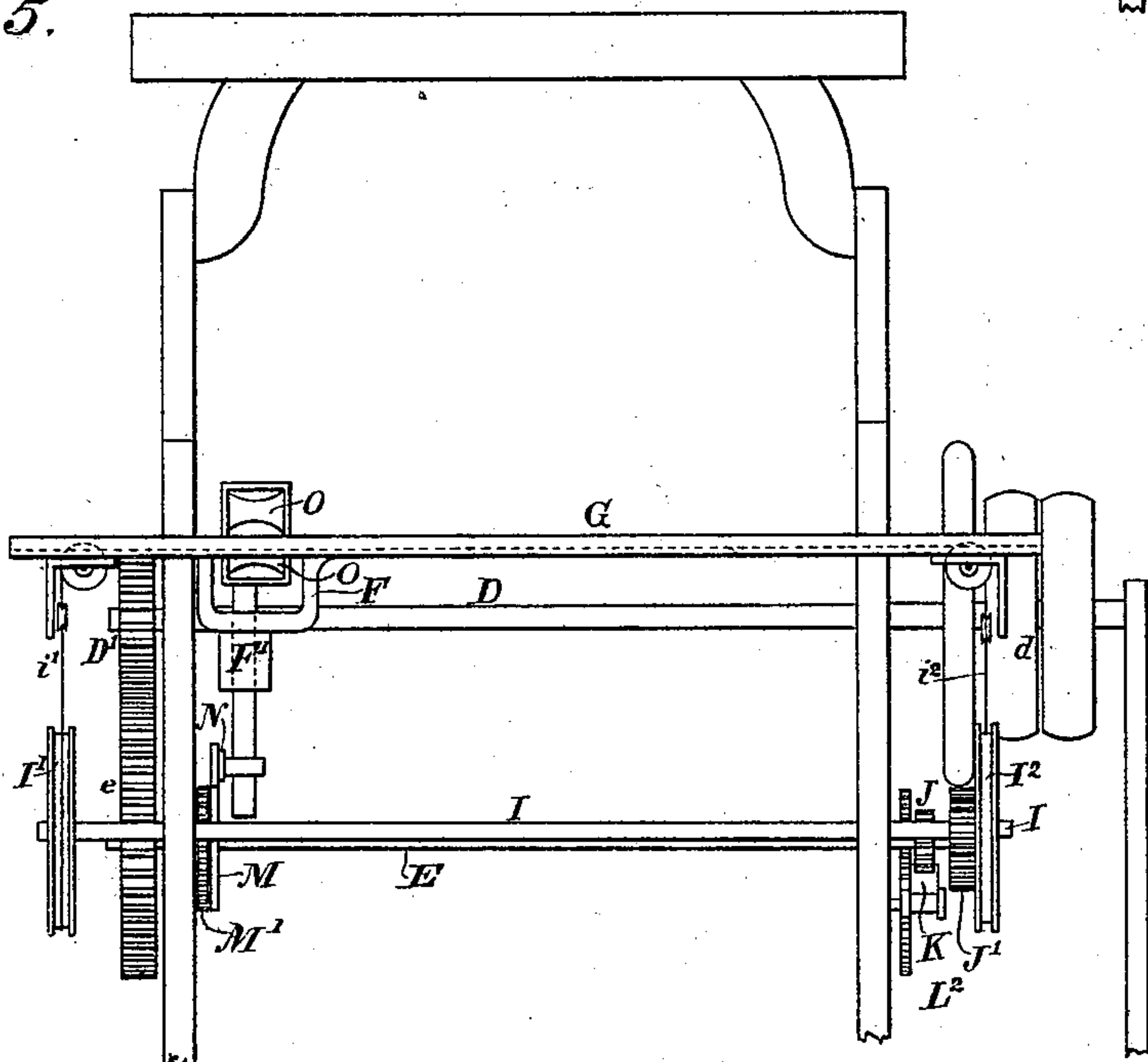


Fig. 5.



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UNITED STATES PATENT OFFICE.

SAMUEL C. LISTER AND JOSÉ REIXACH, OF MANNINGHAM, COUNTY OF YORK, ENGLAND.

LOOM FOR WEAVING DOUBLE-PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 282,652, dated August 7, 1883.

Application filed March 30, 1883. (No model.) Patented in England April 27, 1871, No. 1,117, and in France October 27, 1871, No. 93,124.

To all whom it may concern:

Be it known that we, SAMUEL CUNLIFFE LISTER and JOSÉ REIXACH, subjects of the Queen of Great Britain, residing at Manningham, near Bradford, in the county of York, England, have invented certain new and useful Improvements in Looms for Weaving Double-Pile Fabrics, (for which we have received Letters Patent in England No. 1,117, dated April 27, 1871, and in France No. 93,124, dated October 27, 1871,) of which the following is a specification.

This invention relates to improvements in machinery employed for operating and sharpening the knife used for cutting asunder two pieces of velvet or other pile fabric woven together, face to face, at one operation in a loom, the said pieces being connected together by means of the pile-threads, upon severing which two separate and distinct pieces of pile fabric are produced, as is well understood. Machinery of this class is shown by English Patents No. 2,429 of November 1, 1858; No. 470 of February 11, 1868; and No. 2,549 of August 27, 1869. The cutting knife or blade employed for severing the pile is mounted upon a carriage working in a transverse slide, and is drawn backward and forward by means of cords. When the knife comes to rest at one end of the slide, it enters between suitably-constructed sharpening-rollers, one above and the other below it. The rollers are mounted so that they can be raised and lowered. First one roller is brought into contact with, say, the upper side of the knife-edge, and then the other with the under side of the knife-edge. We make the sharpening-rollers longer than the knife-blade, and, in accordance with the improvements to which the present invention is limited, during the time that the knife is being sharpened we cause it to move endwise of the rollers, the knife-blade being caused to travel slowly from one end to the other of the roller first brought into action, and then back again from one end to the other of the second roller. The sharpening-rollers are also made concave—that is, of larger diameter at their ends than at their middles—so as to

give to the cutting-edge of the knife-blade a somewhat curved form, in order that the blade may be rounded off instead of being square-ended.

Our invention, hereinafter in detail described, does not relate to the weaving of the fabric, and does not consist, broadly or exclusively, either of means for imparting to-and-fro traversing movement to the knife to cut the fabrics asunder after they have been woven, nor means for sharpening the knife, but consists in an organization of mechanism involving the combination of means for giving the cutting movement to the knife, with means for giving it the additional reciprocating sharpening movement along the rollers when they are respectively acting upon it.

The drawings annexed show our improvements as embodied in connection with mechanism such as that shown and described in our application No. 23,907, filed January 13, 1881, and also, as shown in said application, so much of a loom for weaving two pieces of pile fabric face to face as is necessary to show in what position the cutting mechanism is placed in the loom to allow of its cutting the two fabrics asunder after they have been woven.

Figure 1 shows a longitudinal vertical section of an ordinary loom used for weaving two pieces of pile fabric face to face, the position of the knife-slide in the loom being represented. There is nothing new in the construction of any of the parts shown in this figure. Fig. 2 is a side view on a larger scale of that side of the loom at which the sharpening-rollers are situated, and shows the way in which the sharpening-rollers are caused to revolve, and also the way in which they are raised and lowered for the purpose before mentioned. Fig. 3 is an opposite side view of the loom, showing the way in which the slide which carries the cutting-knife receives its to-and-fro movement. Fig. 4 is a front view of the mechanism, showing the position of the wheels by which the take-up rollers receive their motion. Fig. 5 is a similar front view, with these parts removed to show the

kniveslide-bar, and also the mechanism which causes the knife to traverse to and fro along this bar. Fig. 6 is a face view of the cam by which the sharpening-rollers are raised and lowered, and Fig. 7 a similar view of the double cam by which the to-and-fro traverse is given to the knife. Fig. 8 shows a plan view of this double cam and of the slide which it moves to and fro. Fig. 9 shows a plan view, on an enlarged scale, of that end of the velvet-rail and knife slide-bar at which the sharpening-rollers are mounted. The sharpening-rollers are not shown in this figure. Fig. 10 shows a front view, on the same scale, of this end of the velvet-rail to show how the sharpening-rollers are carried by it.

In Fig. 1, A A are the two sets of ground-warps, and B is the pile-warp. These warps are raised and lowered by heddles actuated in any ordinary manner to produce a double-pile fabric, as is well understood. X is the double-pile fabric. C is the batten, moved to and fro by cranks on the crank-shaft D in the ordinary manner. E is the picker-shaft driven from the crank-shaft, and by which the picker-staffs are actuated in the manner common in all ordinary looms. F is the velvet-rail or breast-beam over which the fabric passes as it is woven. G is the kniveslide-bar along which the cutting-knife is slid to and fro to sever the two fabrics as they are woven. This knife slide-bar is in the same position as described in the English patent before mentioned, granted to George Davies on the 1st of November, 1858, No. 2,429. H H are the take-up rollers for conveying away the two fabrics as they are severed one from the other. In this figure is also shown the way in which we prefer to give motion to the take-up rollers; but they may be caused to revolve in any ordinary manner at a suitable speed for conveying away the fabrics as they are woven.

The crank-shaft D (see Figs. 4 and 5) is driven by a driving-belt passing over a driving-pulley, *d*, fixed upon it. From the shaft D motion is transmitted by a toothed wheel, D', upon it to a toothed wheel, *e*, fixed upon the picker-shaft E. From the picker-shaft motion is transmitted by a train of gearing to the take-up rollers H. (See Figs. 1 and 4.) The shaft E has upon it a "skew gear-wheel." (See Figs. 1 and 4.) This gears into a corresponding skew gear-wheel on a shaft, *e'*, and at the opposite end of the shaft *e'* is a worm which drives a worm-wheel, *e''*. A toothed pinion on the worm-wheel drives a toothed wheel, *e'''*, and a pinion fast with this toothed wheel gears with a toothed wheel on the axis of the lower take-up roller, H. The upper and lower take-up rollers are also geared together by toothed wheels *e''*, and thus both of the take-up rollers over which the upper and lower fabrics are passed, respectively, as is usual, and as is shown in the drawings, are continuously driven.

The knife *g* (shown in plan view at Fig. 9) is carried by a slide, G', which can move to and fro along a groove in the knife slide-bar G, and has, as heretofore, a cord attached to each end of it. One cord, *i'*, after being led over a guide-pulley at one end of the bar G, is attached to one side of a wheel, I', at one end of a shaft, I, and the other cord, *i''*, is similarly led over a guide-pulley at the other end of the bar G, and attached to the opposite side of another wheel, I'', at the other end of the shaft I. At that end of the shaft I which is shown at Fig. 3 this shaft has upon it a toothed pinion which gears with a toothed wheel, J', which is mounted upon a fixed stud carried by a bracket from the frame of the machine, as shown at Fig. 3. Fast with the toothed wheel J' is also a pinion, J, which gears with a toothed rack on a bar, K, which is supported on guide-rollers which turn on fixed pins carried by the frame of the machine, as shown, so that it may be moved to and fro. It has an endwise to-and-fro motion given to it by a double cam, L L'. (Shown separately at Fig. 7.) On the bar are two trucks or rollers, K' K''. The roller K' always bears against the division L of the cam, and the other roller, K'', against the other division, L', of the cam. The two divisions L L' of the cam are side by side fast with one another, as shown at Fig. 8, and they turn on a fixed pin carried by the framing of the machine, as shown at Figs. 3 and 8. Fast with the double cam L L' is also a toothed wheel, L''. This gears with a toothed pinion, E', on the shaft E, which is driven continuously, as hereinbefore described. The double cam, in place of being formed so as simply to move the knife to and fro along its guide-bar to cut the double-pile fabric asunder and to keep the knife at rest at one end of the bar during the time that the sharpening-rollers are acting upon it, is formed, as hereinafter explained, to first bring the knife to rest, and then (as one of the sharpening-rollers is brought into position to act upon it) to give to it a slight further endwise motion to cause it to travel slowly along the sharpening-roller, then again to keep the knife at rest while the other sharpening-roller is being brought into position to act upon it, and then to move the knife slowly back along this second sharpening-roller and again bring the knife to rest after this sharpening-roller has ceased to act upon it, and before the knife is again caused to travel along the bar G to sever the pile of the double-pile fabric.

The rising and falling motion is given to the frame which carries the sharpening-rollers by means of a cam, M, mounted at the side of the loom. (Shown at Fig. 2.) The cam turns upon a stud carried by a bracket of the frame of the machine, as shown, and has fast with it a toothed wheel, M', which gears with a toothed pinion, M'', on the shaft E, and is driven by it at the same speed as the double cam L L'. They both make one turn for every three revolutions of

the shaft E. A roller on one arm of a weighted lever, N, rests upon the top of the cam M, (see Fig. 2,) and the other arm of this lever is coupled to a rod, O', which passes downward from the small frame that carries the sharpening-rollers O. The rod O' passes down through a vertical slot in the velvet-rail F, and through a guide, F', fixed to the bottom of this rail, as shown at Fig. 10, and is thereby guided in its upward and downward movement. The sharpening-rollers are caused to revolve continuously by an endless cord, P, which, as shown at Fig. 2, passes over a small grooved pulley on the axis of each sharpening-roller, and also over a grooved driving-pulley, R, the axis of which is carried by a small bracket from the frame of the machine, as shown. The driving-cord P is kept uniformly in tension by being passed over guide-pulleys on a frame, S, which at one end can turn on a pin, S', carried by the frame, and at its other end is drawn upward by the action of a spring, T.

The grooved driving-pulley R has upon its axis and on the outer side of the frame a toothed wheel, R', which gears with a toothed wheel, D', on the crank-shaft D, and is thereby caused to revolve continuously and to impart a continuous revolving motion to both of the sharpening-rollers.

The action of the cams for giving motion to the knife and to the frame which carries the sharpening-rollers is as follows, and will be readily understood by reference to the separate views of the cams shown at Figs. 6 and 7: While the roller K' on the rack-bar K is kept against that part of the cam-division L which is between the radial dotted lines $i j$, and the roller K² is kept against that part of the cam-division L' which is between the radial dotted lines $i' j'$, Fig. 7, the rack-bar is moved endwise, first in one direction and then in the opposite direction, and the knife is thereby caused to travel along the knife-bar first in one direction and then back again in the opposite direction to its former position, in which position it is between the sharpening-rollers, one roller being above it and the other below it. Next, during the time the portions of the cam-divisions between the lines j and e and $j' e'$ pass the rollers K' and K², respectively, the knife is brought to rest, as these parts of the double cam are concentric with the cam-axis. Next, when the parts of the cam-divisions between the lines $e f$ and $e' f'$ pass the rollers K' and K², respectively, the knife will have a slight further endwise motion given to it, and at the same time the portion of the cam M between the corresponding lines, $e^2 f^2$, on Fig. 6 is acting upon the lever N, depressing the frame which carries the sharpening-rollers, and bringing the upper sharpening-roller into contact with the top side of the knife. Next, when the portions of the double cam L L' between the lines $f g$ and $f' g'$ are passing the rollers K' K², the knife remains at rest, as these parts of the cam are

concentric, and the portion of the cam M between the corresponding lines, $f^2 g^2$, (marked upon it,) acts upon the lever N, raising the frame carrying the sharpening-rollers, and bringing the lower sharpening-roller against the under side of the knife. The portions of the cams L L' M between the lines $g h$ and $g' h'$ and $g^2 h^2$ next come into action, and the knife is thereby caused to travel back to the position from which it was moved when acted upon by the top roller, and during this return movement the lower sharpening-roller is kept against the bottom of the knife. The portions of the cams L L' M between the lines $h i$ and $h' i'$ and $h^2 i^2$ next come into action. The knife is now held at rest, as these portions of the cam L L' are concentric, and the frame which carries the sharpening-rollers is held in its central position, so that neither sharpening-roller touches the knife. The knife, by its reciprocation in contact with the rollers, has now been sharpened and is ready to be drawn along the knife bar-slide to cut the pile of the double fabric.

As will be seen at Figs. 9 and 10, the sharpening-rollers are made longer than the width of the knife, and they are also made somewhat concave, as before stated.

As will be seen at Figs. 2 and 9, the knife when about to be sharpened is resting upon a small bar, W, upheld at each end by a light spring, W', so that when the upper sharpening-roller is brought down onto the knife the bar W may yield slightly and keep the knife pressed with a uniform pressure against the roller. Similarly when the bottom sharpening-roller is brought against the bottom of the knife the knife can turn upward, and is held against the roller with a uniform pressure by the small coiled springs G², which bear upon the top of the knife and tend to turn it downward.

W² is a fixed bar or straight-edge, which serves as a guide for the knife to rest on and keep it at the required level as it moves away from the sharpening mechanism to the edge of the pile fabric.

We do not herein claim subject-matter such as covered by the claims of our aforesaid application, No. 23,907, but restrict our present claims to mechanism including means whereby the knife is caused to move endwise of the sharpening-rollers while being acted upon by them.

We claim as of our own invention—

1. The combination of the knife and mechanism for actuating it to sever the fabric with the sharpening-rollers, means by which they are actuated to bring them alternately into contact with the opposite sides of the knife, and means by which the knife is caused to move slowly endwise of and in opposite directions along said rollers respectively, substantially as and for the purpose hereinbefore set forth.

2. The combination of the take-up rollers
for drawing forward the double fabric and con-
veying away the fabrics as severed, and mech-
anism for giving motion to said rollers, with
5 the knife, the knife-actuating mechanism, the
sharpening-rollers, means for rotating them
and presenting them in turn to the knife when
brought to rest after each actuation to sever
the fabrics, and means for moving the knife
10 along the rollers as respectively presented to
it, substantially as and for the purpose here-
inbefore set forth.

In testimony whereof we have hereunto sub-
scribed our names.

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JOSÉ REIXACH.

Witnesses:

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ARTHUR TETLEY PARKINSON,
*Clerks to Messrs. Killick, Hutton & Vint, So-
licitors, Bradford.*