

C. Miller
Weaving Pile Fabric.

N^o 27,671.

Patented Mar. 27, 1860.

Fig. 1.

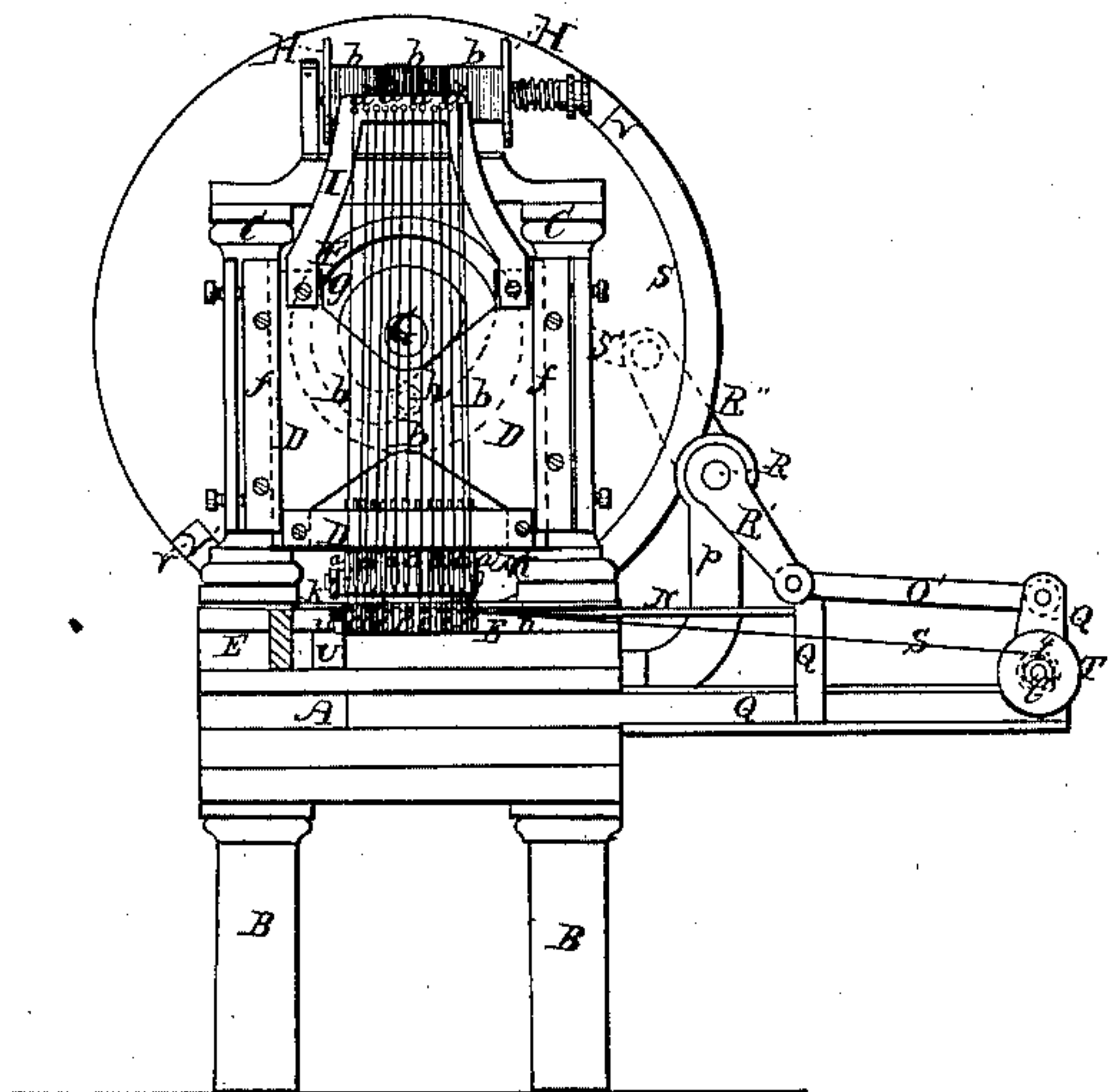


Fig. 2.

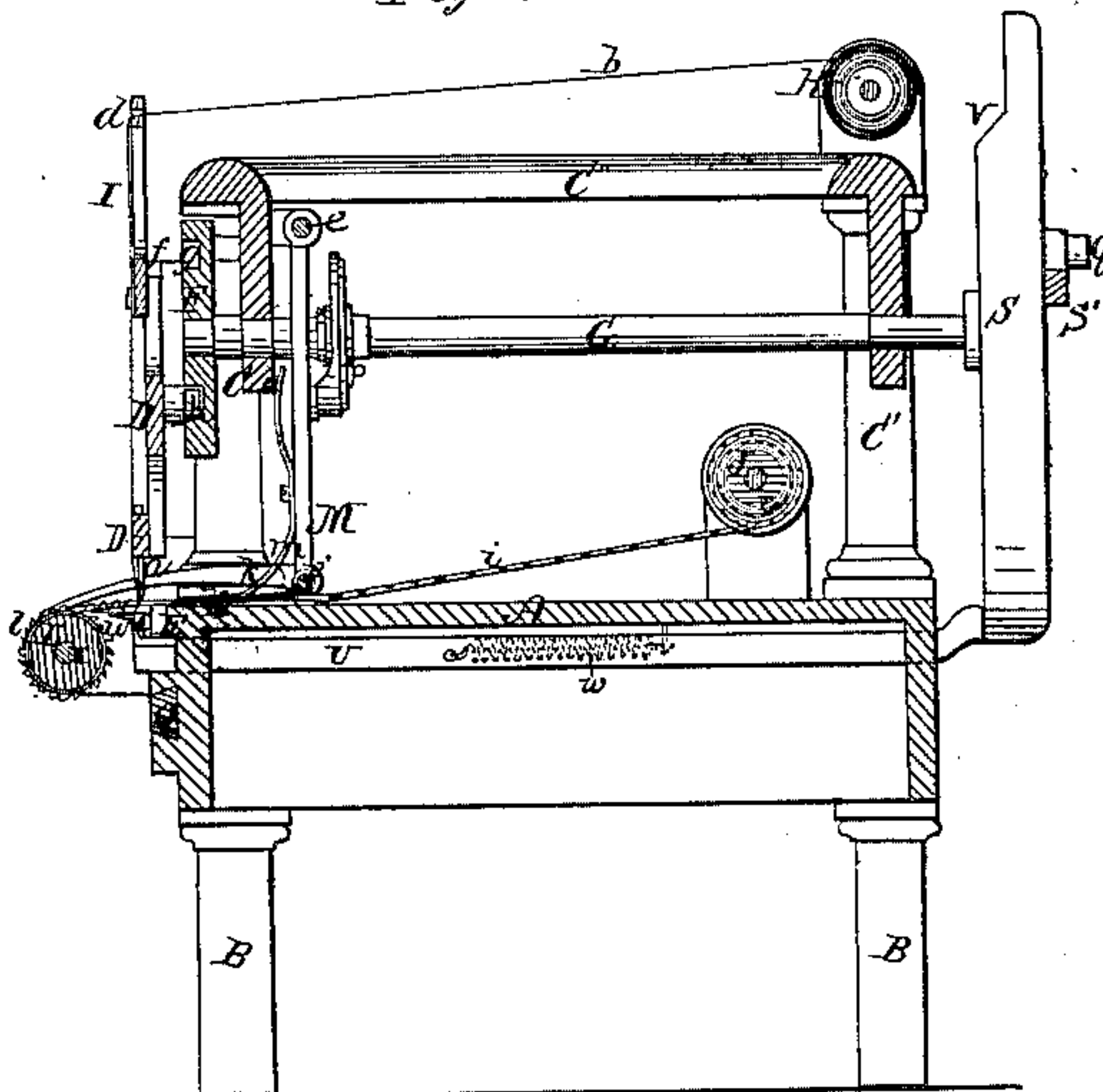


Fig. 3.

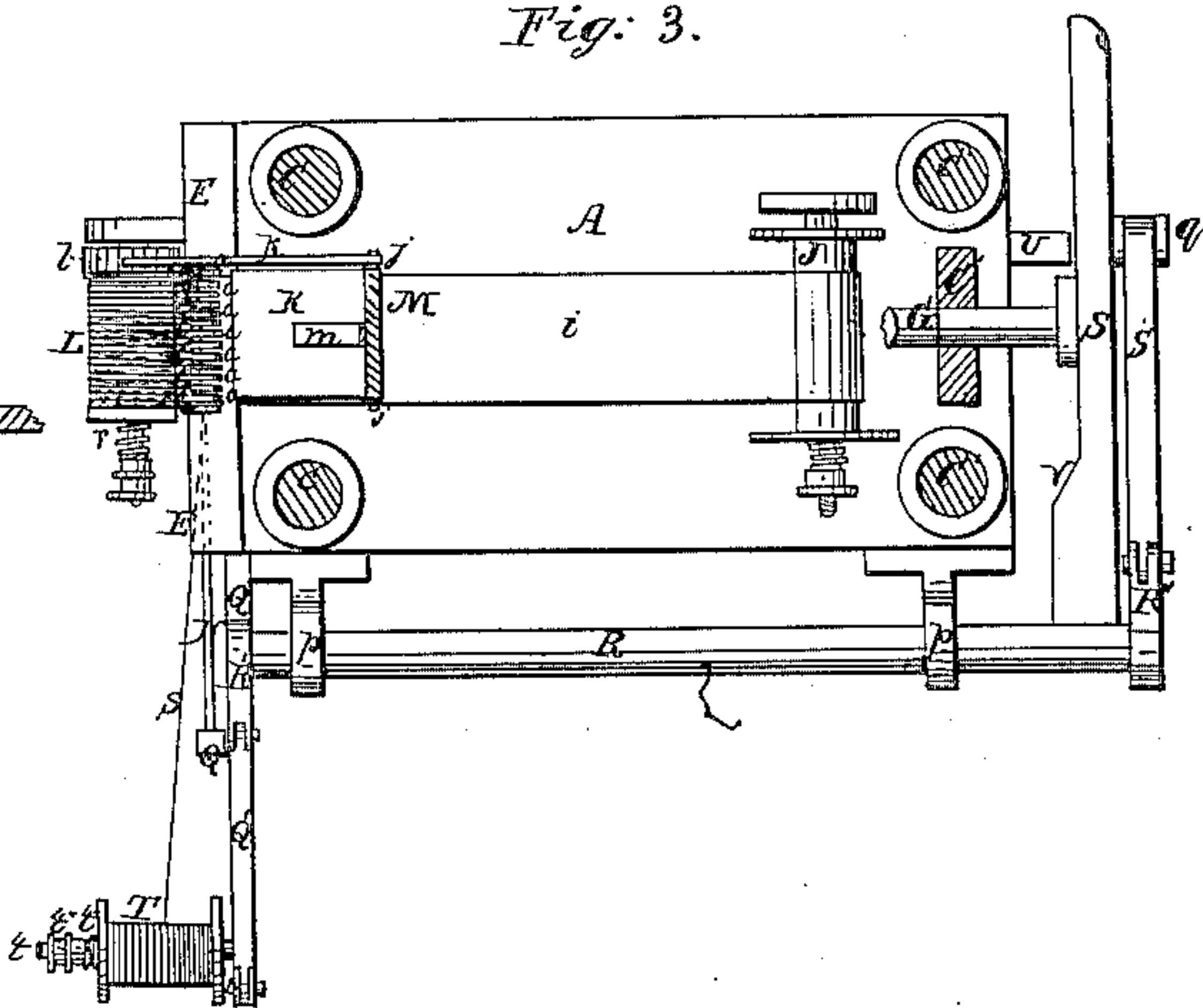


Fig. 4.

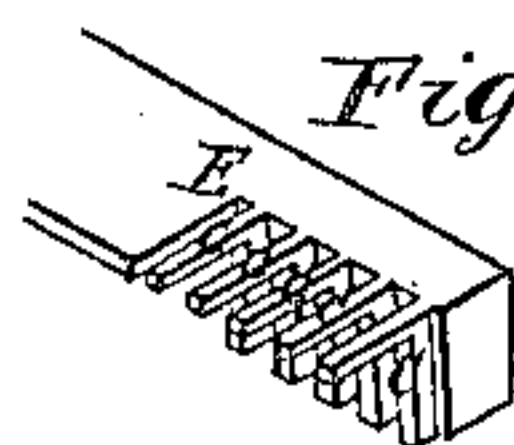
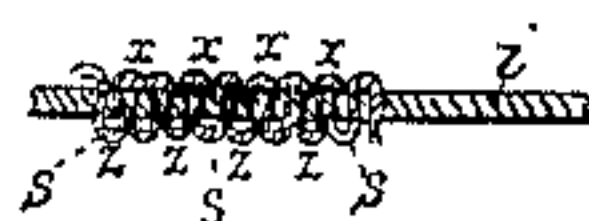


Fig. 5.



Fig. 6.



Witnesses

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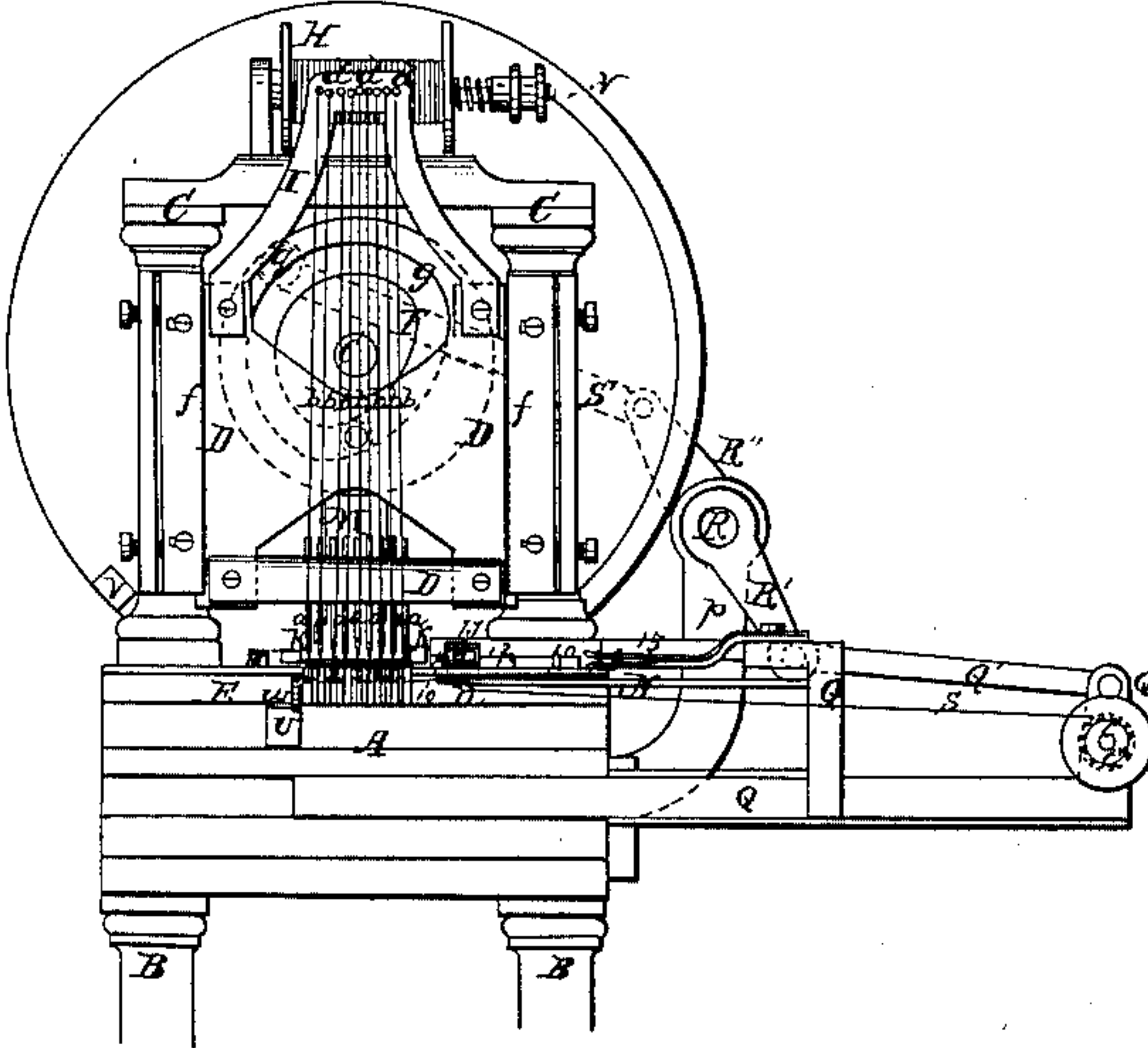


Fig. 2.

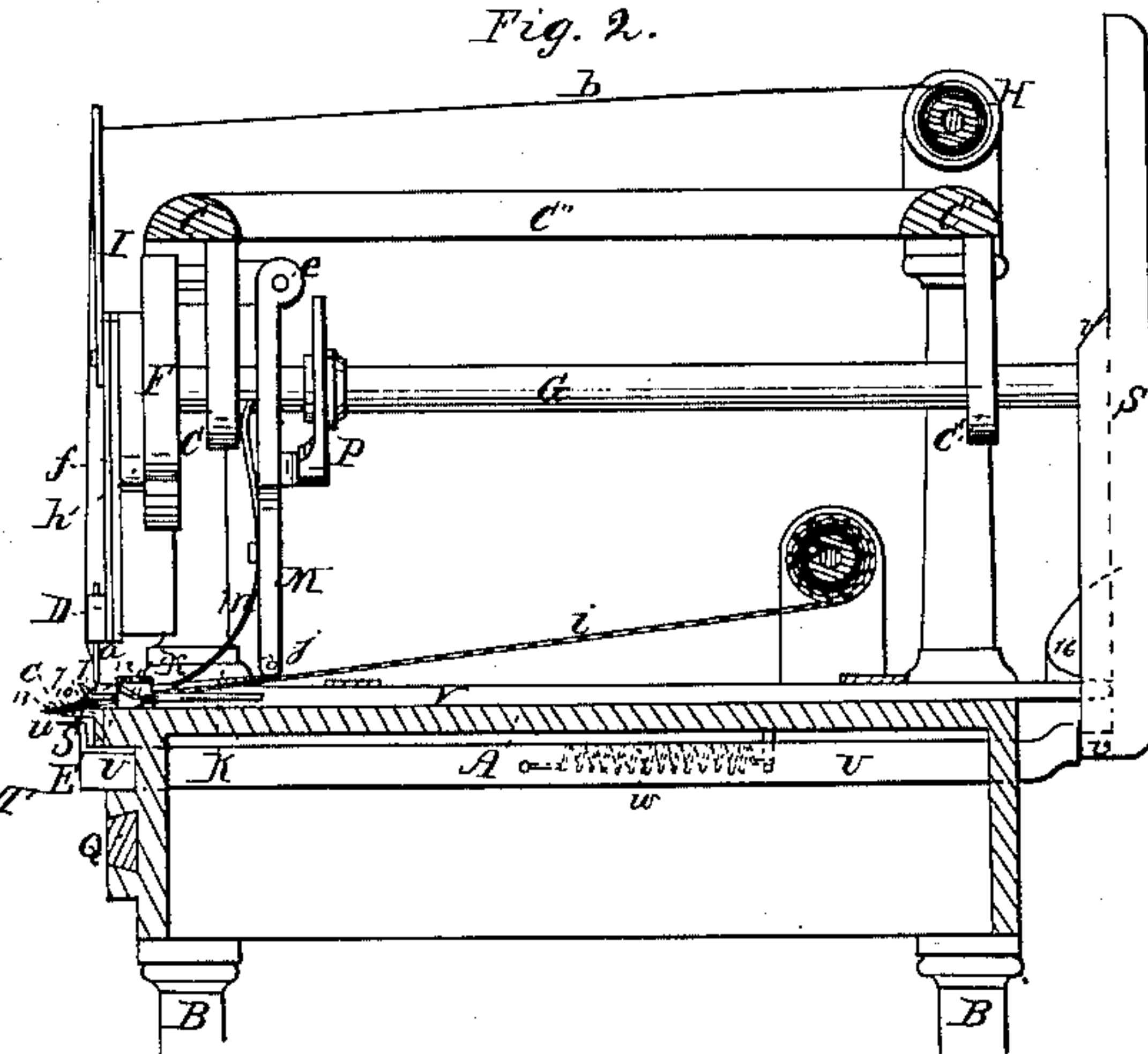


Fig. 3.

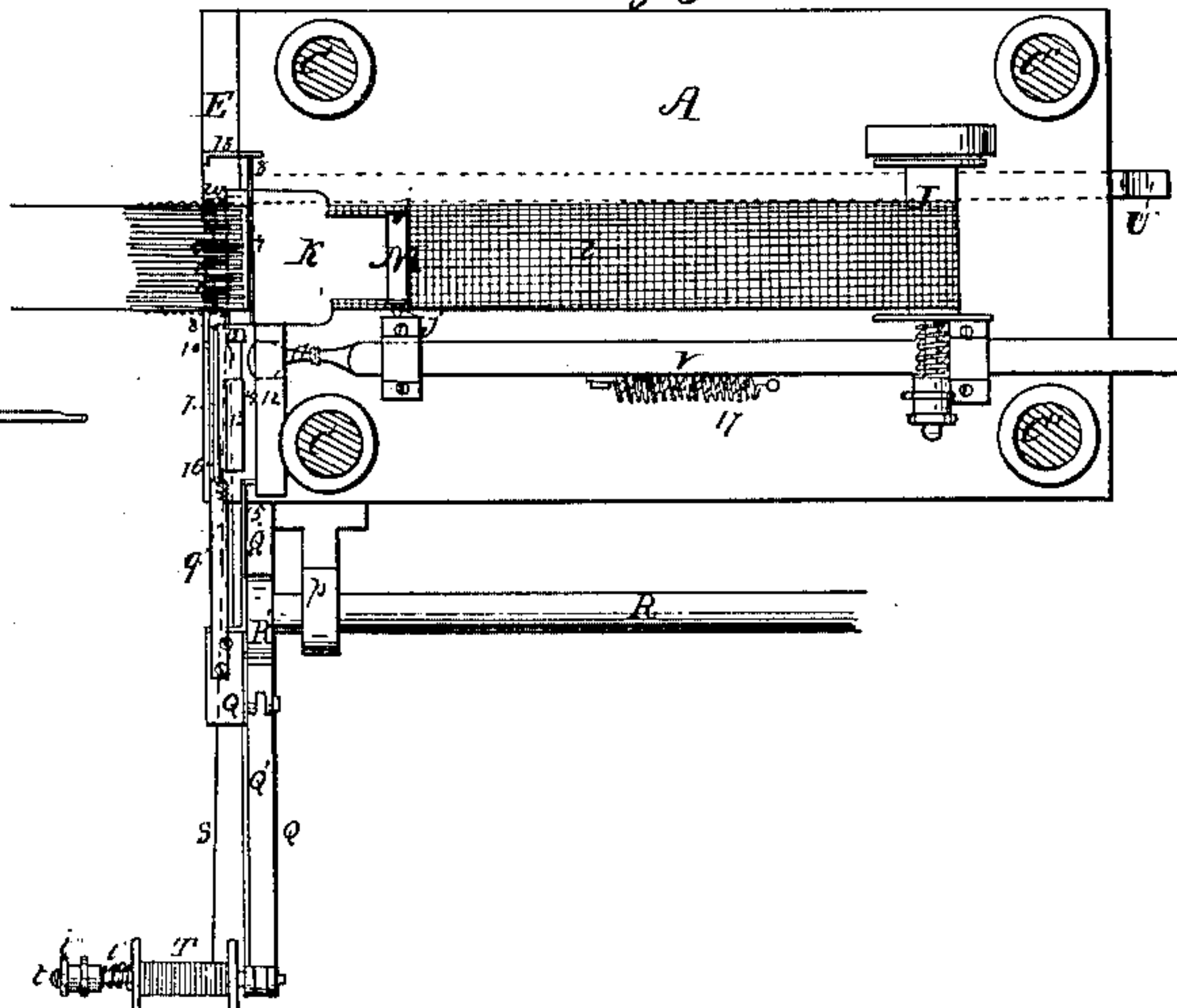


Fig. 5.

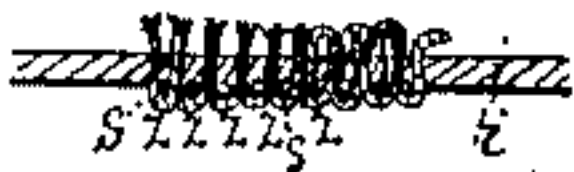
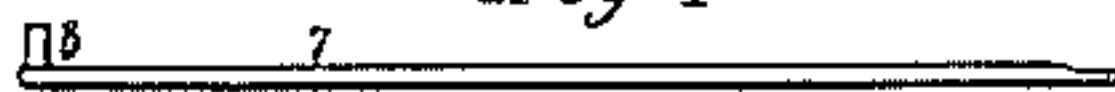


Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES MILLER, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND GEO. RICARDO, OF
SAME PLACE.

MACHINERY FOR MANUFACTURING PILE FABRICS.

Specification of Letters Patent No. 27,671, dated March 27, 1860.

To all whom it may concern:

Be it known that I, CHARLES MILLER, of the city, county, and State of New York, have invented certain new and Improved Machinery for the Manufacture of Piled Fabrics; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

My invention relates to the manufacture of piled fabrics suitable for carpets or for other purposes by the introduction into a previously woven foundation of canvas or other fabric, of threads which, after being passed through said foundation in the form of rows of loops at regular or suitable intervals, are secured by a continuous filling thread which passes through the several rows of loops in succession. In this way I am enabled to produce a pile on either or both sides of the foundation; the protruding loops forming it on one side and the portion of the thread between the loops forming it on the other side; and by cutting the thread between the loops I am enabled to produce a cut or velvet pile on one side.

My invention consists in the employment, in this manufacture, of a series of needles arranged side by side at suitable distances apart for passing the threads through the foundation in the form of loops in rows extending the whole width of the fabric, and a long needle operating transversely to the first-mentioned or loop needle, for carrying the filling thread through the loops.

My invention also consists in a certain contrivance for holding the filling thread during the retreat of the needle which passes it through the loops for the purpose of preventing the said thread being withdrawn wholly or partly from the loops by the retreat of its needle. It also consists in a certain contrivance for feeding the foundation to the needles for the reception of the pile threads. Also in certain means of operating a set of rods or wires which I in some cases employ for the purpose of forming the pile.

In the accompanying drawing, Sheet I, represents a machine for the manufacture of fabrics with an uncut pile on one side, embracing only a portion of my invention; and Sheet II, represents a machine for the manu-

facture of fabrics with a cut pile on one side or of fabrics with a cut pile on one side and an uncut pile on the other, embracing the whole of my invention.

I will first describe the machine shown in Sheet I, for the reason that it is the simplest, and afterward describe the machine shown in Sheet II.

In Sheet I, Figure 1, is a front elevation of the machine. Fig. 2 is a vertical section of the same, taken at right angles to Fig. 1. Fig. 3, is a sectional plan of the same. Fig. 4, is a perspective view of a portion of the front plate of the machine. Fig. 5 is a front view of the end of the needle which carries the feeding or locking thread. Fig. 6, exhibits a section, parallel with the pile threads, of the fabric produced.

Similar letters of reference indicate corresponding parts in the several figures.

A, is the bedplate supported on suitable standards B, B, and having erected on opposite ends two frames C, C', containing the bearings for the horizontal main shaft G, of the machine. These frames C, C', are stayed together at the top by a bar C''. The front frame C, also contains the guides f, f, for the vertically working slider D, which carries the needles a, a, for the introduction of the pile threads; said needles being of the kind commonly used in sewing machines, that is to say having eyes near their points and grooves in their backs and being arranged vertically and firmly secured side by side and very near together, forming a row of a length equal to the desired width of the piled fabric to be manufactured.

To the front of the bedplate there is secured a plate E, on the front edge of which there are formed teeth e, e, of such width and at such distances apart that the needles may work up and down freely between them, the tops of said teeth being flush with the top of the plate A, to support the fabric between the needles, and the bottoms of said teeth being made of angular form as shown in Figs. 2 and 4, so that the teeth where they unite with the body of the plate A, are of the whole depth of the plate, but that the upper portions have a much less depth. The needles pass between the deep portions of the teeth. The needle-slider D, derives the necessary movement to operate the needles

from a grooved cam F, on the main shaft G, the groove *g*, of said cam receiving an anti-friction roller *h*, attached to the slider, the movement of the slider being of a similar character to that which is commonly given to the needle-slide or needle-arm of sewing machines, that is to say, its downward movement is uninterrupted but a stoppage takes place at an early stage in its upward movement to permit the entry of the filling thread into the loops of the pile threads. The needles rise high enough for their points to pass a little way above the top of the plate E, and low enough to take their eyes some distance below the thin parts of the teeth *c*, *c*.

The pile threads *b*, *b*, which are shown in different colors may be supplied from a roll or beam H, of similar character to the yarn beam of a loom supported on the top of the rear standard C, or may be supplied from a number of bobbins or spools. The said threads pass from the beam H, or their bobbins or spools through guiding eyes *d*, *d*, in a bar I, on the top of the needle slider D, and thence down to the needles. A suitable degree of friction is produced on the beam or spools by any well-known means of producing friction on such contrivances, as employed in looms and other machinery, to preserve a proper tension of the pile threads *b*, *b*.

J, is a roll from which the woven foundation for the piled fabric is supplied, arranged to turn freely on a fixed spindle or hung in suitable bearings a short distance above the back part of the bedplate A. I employ for this foundation any plain woven goods of cotton, flax, or other material according to the character of the fabric I wish to produce. For the production of carpets I would use a foundation of stout canvas or duck, and for the production of lighter fabrics some lighter goods. The foundation *i*, which is represented tinted green in the drawing, passes from the roll J, forward over the bedplate and the plate E, and under a smoothing plate K, which presses it smoothly out upon the bedplate and under the needle slider D, to a take-up roll L, arranged to rotate on a fixed spindle *r*, in front of the machine.

The smoothing plate K, which keeps the foundation spread out smoothly on its arrival at the needles, is attached by a hinge joint *j*, to a lever M, which is suspended from a fixed fulcrum pin *e*, and which also carries a pawl *k*, for operating upon a ratchet wheel *l*, fast on one end of the take-up roll for the purpose of giving the necessary rotary motion to the said roll. The said plate K, is pressed down upon the foundation by means of a spring *m*, applied between it and the lever. The lever M, derives the necessary motion for operating the pawl *k*, from a cam P, on the main shaft G.

N, is the needle which places the filling or locking thread *s*, through the loops of the pile thread *b*, *b*, which are protruded through the foundation *i*, by the needles. This needle N, has an eye *n*, near its extremity, said eye passing vertically through it, and it is of a length sufficient to permit its eye to pass through a whole row of loops of the pile threads that have been protruded through the foundation by the needles *a*, *a*. The said needle is arranged horizontally to work close within the angles of the teeth *c*, *c*, of the front plate, and is carried by a slider Q, which works in a suitable horizontal guiding groove in the front of the bedplate A. This slider Q, is driven by a connecting rod Q', which connects it with the arm R', of a horizontal rockshaft R, which works in bearings in brackets *p*, *p*, secured to the side of the bedplate A, the said rockshaft deriving the necessary rocking motion to operate the slider Q, from a crank pin or eccentric wrist *q*, attached to a fly wheel S, on the main shaft G, the said crank pin being connected by a rod S', with the arm R'' of the rockshaft R.

The filling thread *s*, is supplied to the needle N, from a spool T, which is fitted to a spindle *t*, carried by the slider Q, the said spool having produced upon it the necessary friction to produce a desirable degree of tension on the thread by a spring *t'*, which is compressed against the spool by a nut *t''*, fitted to a screw thread on the spindle *t*.

u, is a tongue of steel or other metal arranged at the opposite end of the row of teeth *c*, to that from which the needle N, enters the loops of the pile threads; the said tongue being attached to the front end of a horizontal sliding rod U, which is arranged to work in guides under the bedplate A, at right angles to the needle N, and parallel with the sides or selvage of the foundation fabric, and which is moved back and forth by the combined action of a face cam *v*, on the front of the fly wheel S, and a spring *w*, which connects it with the bedplate and holds it back against the said cam. The duty of the tongue *u*, is to advance and pass between the top needle N, and its thread *s*, after the latter have passed through a row of loops of the pile threads, for the purpose of catching the said thread *s*, and holding it while the needle N, retreats through the loops of the pile threads, thus preventing the thread *s*, being drawn back out of the loops of the pile threads. To provide for the free passage of the said tongue between the needle N, and its thread, the said needle has a cavity *y*, in its under side near the eye as shown in Fig. 5, and the tongue passes the needle in this cavity.

The operation of this machine is as follows. The end of the foundation fabric having been brought forward from the roll

J, and secured to the take-up roll L, the pile threads having been brought from their beam H, or spools, to and through the eyes of the needles *a, a*, and the filling or locking thread *s*, having been brought from the spool T, to and some distance through the eye of the needle N, the main shaft G, is set in motion by any suitable agency to give motion to the several parts of the machine. Every time the slider D, descends, its needles *a, a*, pass through the foundation *i*, carrying with them the pile threads doubled or looped; and after the said needles have been drawn back far enough to produce a slackness of their threads in front of the needles in the same manner as the slackness is produced in sewing machines for the admission of the shuttle or looper, the needle N, advances and carries its thread *s*, in a doubled condition across the front of the needles *a, a*, and between the said needles and the slack portions of their threads.

When the needle N has completed its advance and carried its eye *n*, some distance past the last needle of the row, the tongue *u*, advances and passes between the said needle and its thread *s*, and is thus caused to retain the said thread in the form of a loop, as shown in Fig. 1, when the needle N, retreats past the needles *a, a*, and so causes the said thread to be left doubled within the looped portions of the pile threads that protrude through the foundation *i*. The retreat of the needle N, is followed by the completion of the ascent of the needles *a, a*, and the threads *s*, locks the loops of the pile threads and prevents their withdrawal through the foundation. The tongue *u*, does not move back out of the loop of the filling threads *s*, till after the needles *a, a*, have completed their ascent and tightened the loops of the pile threads *b, b*, upon the said filling thread. Every time the needles *a, a*, are withdrawn from the fabric the pawl *k*, operates upon the ratchet *l*, and turns the take-up roll the requisite distance to present the foundation *i*, in a suitable position to receive a new row of loops from the needles *a, a*; and every repetition of the above described series of operations passes a new row of loops of pile thread through the foundation and introduces therein the locking or filling thread. The pile threads on the upper surface of the finished fabric lie close against the foundation, between the rows of loops as shown at *x, x*, in Fig. 6, and the pile is formed by the loops *z, z*, and their filling, on the under surface, which constitutes the face of the finished fabric.

In Sheet II, Fig. 1, is a front elevation of the machine. Fig. 2, is a vertical section of the same, taken at right angles to Fig. 1. Fig. 3 is a plan of the same. Fig. 4, is a front view of one of the rods on which the

pile is formed. Fig. 5, is a section parallel with the pile threads of the fabric produced in the machine.

Similar letters of reference indicate corresponding parts in the several figures. 79

This machine only differs from that represented in Sheet I, in its using rods over which to form the pile, and in its having some additional mechanism for the purpose of introducing and drawing these rods, 75 and in its dispensing with the take-up roll and using a different means of feeding the woven foundation to the needles and taking up or carrying away the finished fabric; and therefore to avoid needless repetition I 80 will not particularly describe those parts of this machine which are common to the already described machine but only the parts which differ; and I have indicated those parts which correspond by the same letters 85 in both sheets of the drawings, so that the foregoing description of those parts will apply also to Sheet II.

The rods 7, 7, which are employed in this machine and of which there may be two or 90 more, consist simply of wires of sufficient length to pass through the rows of loops of the pile threads, and protrude a short distance from each end of the row, having each at one end a small cutter 8, and being 95 squared or flattened at the opposite extremity to enable them to be laid hold of by the nippers by which they are withdrawn from the pile and to prevent them turning in said nippers. These rods, after the first and 100 each succeeding row of loops has been made and secured by the filling thread in the manner described with reference to Sheet I, of the drawing, are deposited one at a time above the woven foundation *i*, by the means 105 which I will presently describe, and are pushed forward to bring the last one that has been thus deposited to a position above the teeth *c, c*, and in front of the needles *a, a*, by the advance of the plate K, which 110 only differs from that of the machine represented in Sheet I, by having its front edge made deeper and beveled in front as shown in Fig. 2 (Sheet II) to prevent the rods slipping over it. The needles *a, a*, in descending pass behind the last rod and lay the pile threads over it in the form of loops previously to the formation of the row of loops below the foundation *i*; and as the needle N, advances into the last mentioned 120 row of loops to introduce the locking or filling thread therein, in the manner before described, a pair of spring nippers 9, which are attached to the slider Q, that carries said needle, advance along with the said 125 needle and have their lips forced on to the squared or flattened extremity of the front rod and are thus caused to seize the said rod which is prevented being pushed longitudinally by said nippers by a stop 18, on the 130

plate E; and when the said slider Q, moves back again, the nippers, moving along with it, draws said rod from the pile that has been formed upon it, and the cutter 8, on the said rod cuts the loops of said pile.

The nippers 9, hold the rod stationary behind an upward projection or projections 10, 10, on the front edge of the plate E, till the advance of a pair of spring nippers 11, which are attached to a slide V, working in guides on the top of the bedplate A, parallel with the pile threads and the foundation *i*, takes place, when the latter nippers seize said rod and move back again, drawing the said rod from between the nippers 9, as far as a stop 12, on the top of the bedplate through which stop the said nippers 11, pass; and the said rod being arrested by the said stop while the latter nippers move back through it, those nippers are caused to spring open and slip off it, leaving it in front of said stop, and in a recess 14, behind a small inclined plane 13, which is arranged in front of said stop, and over which the said rod has been carried by the nippers. The rod remains in this recess 14, till the slider Q, and needle N, advance again when it is pushed longitudinally from the recess 14, to a position in front of the plate K, by a pusher 15, attached to the slider Q, and when thus deposited in front of the said plate K, it is in readiness to be pushed forward by said plate to a position in front of the needles ready to receive the row of loops that will be formed upon it by the next descent of the needles *a, a*, through the foundation *i*, to carry the next row of loops through the said foundation. The slide V, which carries the nippers 11, is driven forward by means of a cam 16, (see Fig. 2) on the front of the fly-wheel S, and drawn back again by means of a spring 17, connecting said rod with the bed plate.

The feeding of the foundation *i*, to the needles and the carrying away of the piled fabric from in front of the needles is effected by the action of the plate K, on the rod last deposited in front of it; the said rod being pushed forward against the one in front of it that is in the last row of pile loops and thus driving forward the fabric over the front edge of the plate E, and drawing more of the foundation *i*, from the roll J. The piled fabric, as fast as it is delivered over the edge of the plate E, may be deposited upon the floor or in any suitable receptacle or may be taken up on a roller.

In the cut pile fabric thus produced, represented in section in Fig. 5, the filling thread *s*, in the loops *z, z*, serves to secure the cut pile and prevent its being drawn out of the foundation *i*. In the manufacture of cut pile fabrics I do not propose generally to use so large a locking thread *s*, as when

the pile is formed by the loops that are protruded through the foundation by the needles *a, a*, as this thread is not intended so much as a filling for the loops as to prevent their withdrawal through the foundation. I propose, however, in some cases, to use a larger locking or filling thread to produce a fabric with a cut pile on one side and an uncut pile on the opposite side, and also in some cases to produce an uncut pile upon rods 7, 7, applied and operating as herein described, but constructed without the cutters 8, so that the pile will not be cut by their withdrawal.

In the manufacture of these fabrics for carpets or for other purposes, a pattern may be produced in the pile by the printing or dyeing of the pile threads previous to the manufacture in a substantially similar manner to what is commonly practiced in the weaving of Brussels and other piled carpets.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The employment, in the manufacture of piled fabrics, of a series of needles *a, a*, for passing the pile threads through a previously woven foundation in rows of loops, and of a single needle N, operating transversely to the said series of needles, for the purpose of carrying a continuous filling or locking thread through the successive rows of loops of the pile threads, substantially as herein specified.

2. The employment, in combination with the series of pile thread needles *a, a*, and the filling or locking thread needle, of a tongue *u*, applied and operating substantially as described, to catch and prevent the withdrawal of the filling or locking thread.

3. The attachment of the nippers 9, which draw the rods from the pile, to the same slider Q, or its equivalent, which carries the locking or filling thread needle N, so that the same mechanism serves to operate the said nippers and the needle substantially as herein described.

4. The combination of the nippers 11, and the stop 12, with the nippers 9, the whole operating together substantially as and for the purpose herein set forth.

5. The combination with the two pairs of nippers 9, and 11, of the stop 12, the inclined plane 13, the recess 14, and the pusher 15, the whole operating together substantially as and for the purpose herein specified.

6. Feeding the foundation *i*, to the needles and carrying away the finished piled fabric from the needles by means of a plate K, or its equivalent pushing against the rods 7, 7, substantially as herein described.

CHARLES MILLER.

Witnesses:

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