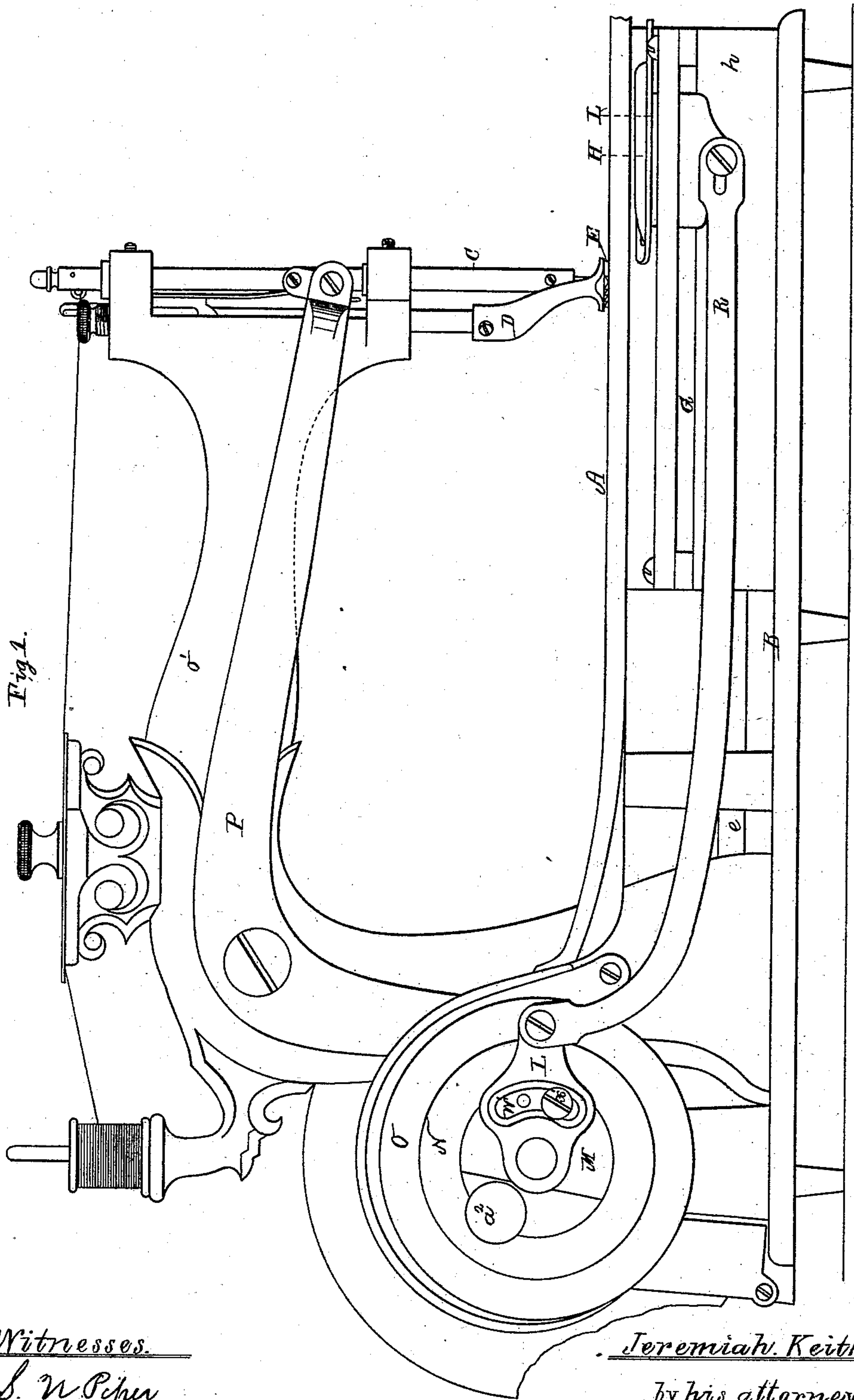


J. KEITH.
Sewing-Machine.

No. 215,462.

Patented May 20, 1879.



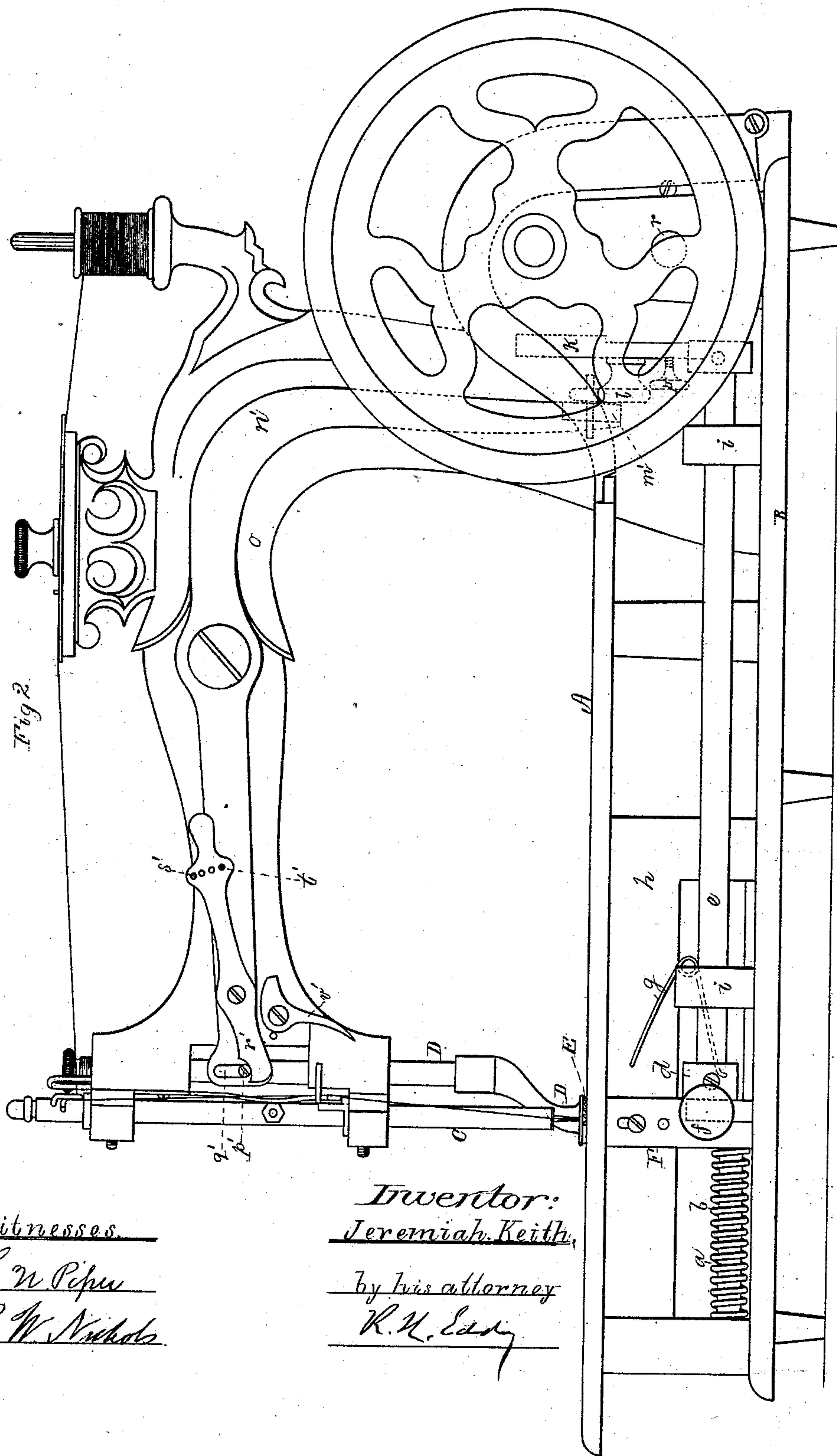
Witnesses.
S. W. Peper
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Jeremiah Keith.
by his attorney
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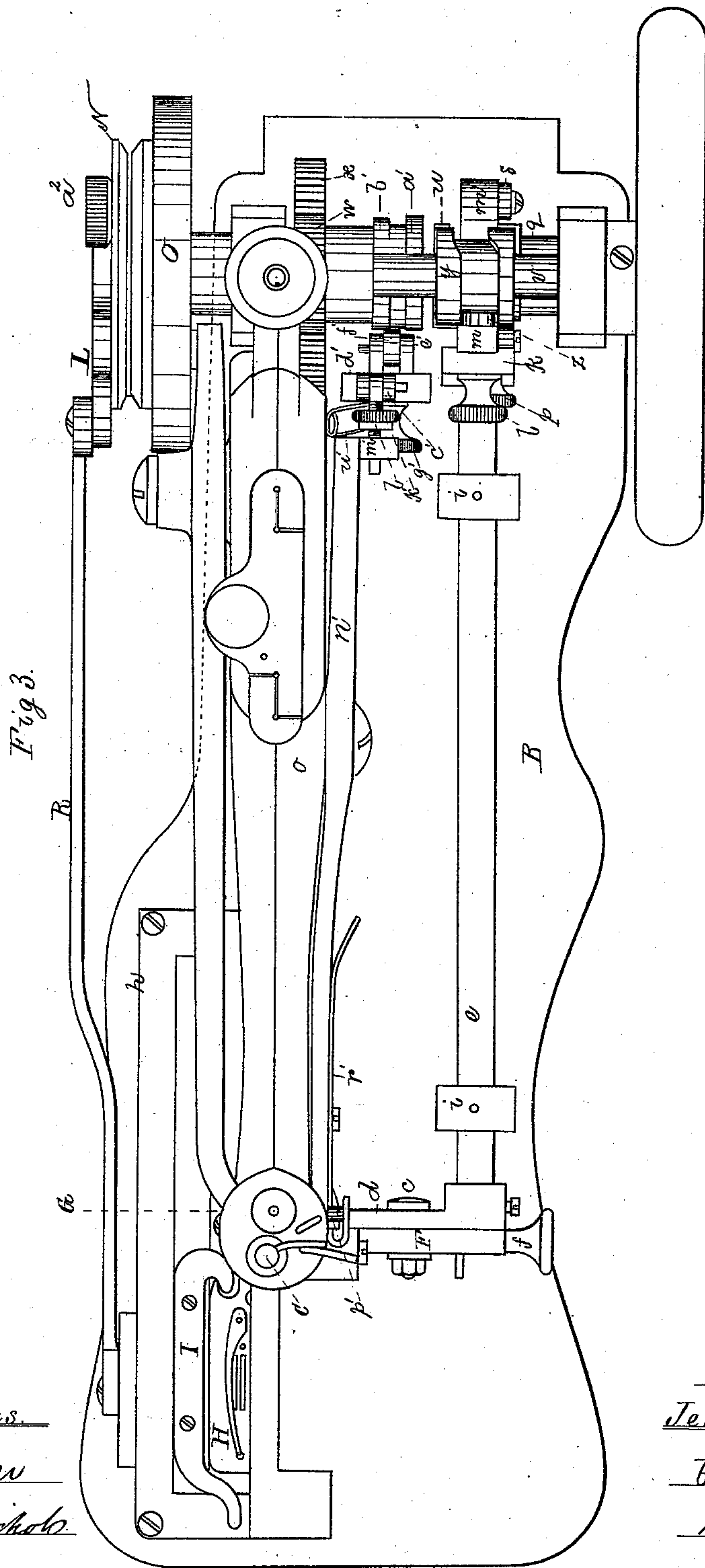
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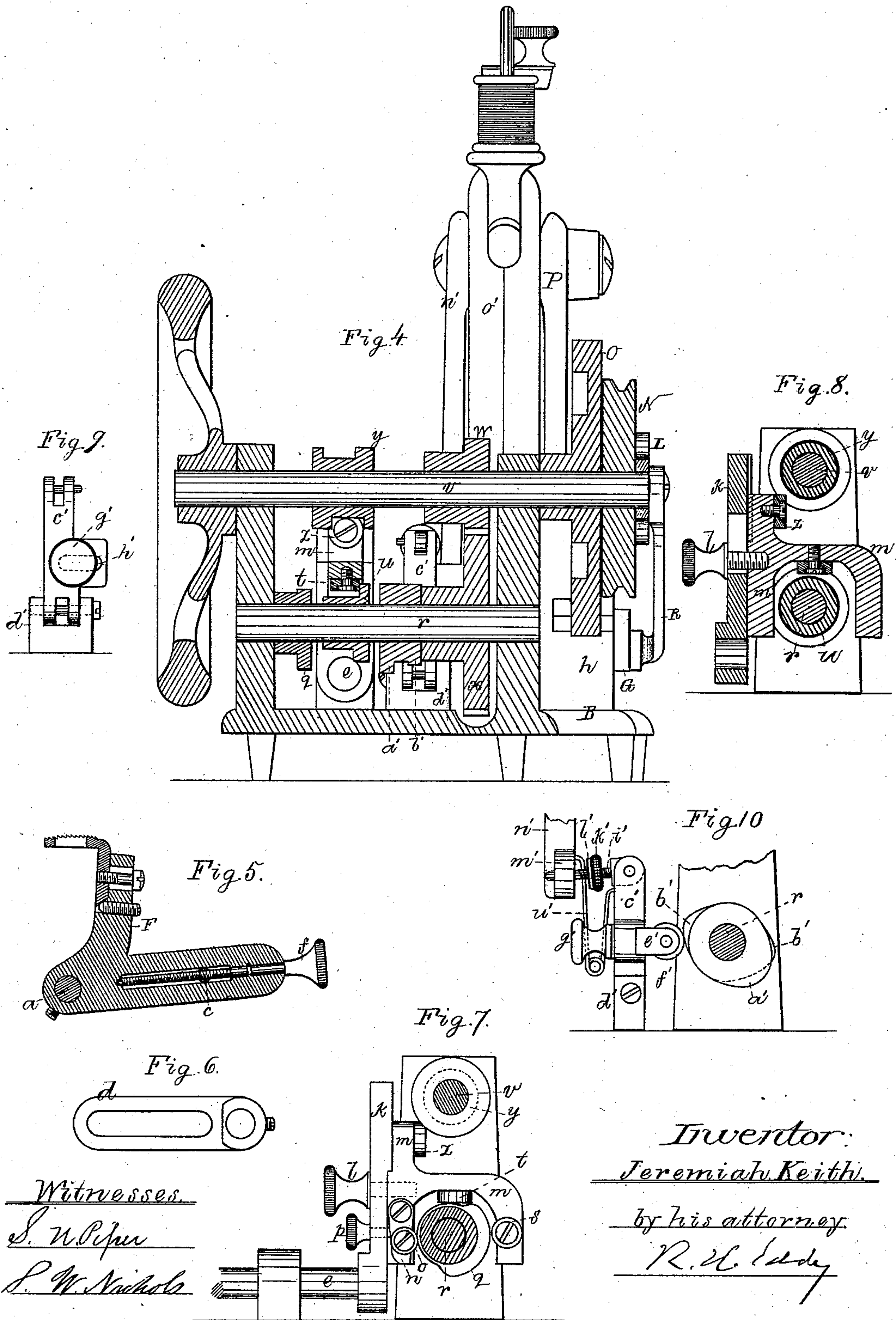
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UNITED STATES PATENT OFFICE.

JEREMIAH KEITH, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **215,462**, dated May 20, 1879; application filed January 15, 1879.

To all whom it may concern:

Be it known that I, JEREMIAH KEITH, of Providence, of the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Sewing-Machines; and do hereby declare the same to be described in the following specification, and represented in the accompanying drawings, of which—

Figures 1 and 2 are opposite side elevations of a sewing-machine containing my invention. Fig. 3 is a top view of it as it appears after removal of its work-supporting plate and the covers of the mechanism of its main and auxiliary shafts. Fig. 4 is a transverse section of it, such section being taken through its said main and auxiliary shafts.

Such other figures as may be necessary to a further representation of the machine or the parts constituting my invention are hereinafter referred to and described.

The sewing-machine to which my present invention appertains belongs to the class of that mentioned and described in the United States Patent No. 170,741—that is to say, it is a sewing-machine of the needle-and-shuttle kind, which may be used not only for the performance of plain stitching, but for the working of a button-hole in or for embroidering a fabric.

In this machine the work-feeder has, for feeding the work lengthwise thereof or transversely of the machine, a reciprocating or forward-and-backward movement without any appreciable vertical movement; and, besides, it has, when used for embroidering or button-hole stitching, lateral or transverse movements.

The presser is provided with mechanism for raising it and holding it off the work when the needle may be therein, and the feeder may be moved backward under the work, which at such a time is held stationary by the needle.

In embroidering or making the button-hole stitching, the presser, after a retreat of the feeder, drops down upon the work. The needle next rises out of the work, and the feeder is moved laterally a short distance, and thus moves the work laterally. Next, the needle descends and passes into the work, and the shuttle passes through the loop of the needle-thread. Next, the needle rises out of the work,

and the feeder is moved laterally in the opposite way to that in which it was previously moved, such feeder in the meantime being advanced, the compound motion imparted to it producing, as a resultant, an oblique movement of it and the work. Next, the needle descends and passes into the work, the shuttle again goes through a loop of the needle-thread, the presser rises off the work, and the feeder retreats, the product of such operations being the button-hole or embroidery stitch.

The machine, as hereinafter described, has certain improved mechanism for operating the feeder and presser and effecting the changes necessary to adapt the machine to the performance of either plain sewing or button-hole stitching or embroidery-work, the nature of my invention being fully set forth in the claims hereinafter presented.

In the drawings, especially in Figs. 1 and 2 thereof, A denotes the table or work-support plate, and B the frame, of the machine. C is the needle-bar; D, the presser, and E the feeder, the latter being fastened to the upper arm of an angular lever, F, of which and the feeder a vertical section is shown in Fig. 5. This lever at its vertex is pivoted on a stationary rod, *a*, arranged below the shuttle-race. The lever turns and slides freely on the rod and against a helical spring, *b*, encompassing the rod, such spring serving to slide the lever on the rod, in order to effect one of the lateral movements of the feeder.

The longer arm of the lever F is slotted lengthwise, and has extending transversely through the slot a joint-pin, *c*, which goes through a slot in an arm, *d*, arranged alongside of the slotted arm of the lever F, and projecting from a rock-shaft, *e*, arranged as represented. Fig. 6 is an inner-side view of the said arm *d*.

The pin *c*, provided with a head and a screw and nut, is adjustable in the slots, and has passing through it a screw, *f*, for effecting such adjustment or movement of it lengthwise of such slots, the said screw being arranged within and swiveled to the slotted arm of the lever F. A spring, *g*, secured at one end in the shuttle-race stand *h*, presses with its other end on the arm *d*, and serves to effect a downward movement of the arm, and a consequent resultant

retreat of the feeder, preparatory to each forward movement of the work.

The rock-shaft *e*, supported in two short posts, *i i*, has an arm, *k*, extending upward from it, and grooved lengthwise in its rear face.

Fig. 7 is a side view, and Fig. 8 a vertical section, of the arm *k* and its appliances, to be described.

By means of a clamp-screw, *l*, going through a slot in the arm *k*, there is fixed to the said arm an auxiliary curved arm, *m*, which, at its lower part, has hinged to it another or shorter arm, *n*, carrying a friction-roller, *o*.

A screw, *p*, is screwed through the arm *k* and against the arm *n*, said screw *p* and arm *n* serving to regulate the advance sliding movement of the rock-shaft *e*, and thereby determine the length of the button-hole stitch.

A cam, *q*, on the secondary shaft *r* works against the friction-roller *o*, and also against another such roller, *s*, projecting on the opposite side of the cam from the curved arm *m*. Furthermore, the said arm *m* has extending down from it at the vertex of its arch another friction-roller, *t*, which bears against a cam, *u*, fixed on the secondary shaft *r*, and suitably formed to effect the lateral movement of the arm *m* sufficient to produce, by means of the arm *k*, shaft *e*, slotted arm *d*, pin *c*, and angular lever *F*, an advance movement of the feeder for embroidery-work or button-hole stitching.

Immediately over the secondary shaft *r* is the primary or driving shaft *v*, the two shafts being provided with gears *w x*, for causing the lower to be revolved once by the upper of such shafts while such upper makes two revolutions.

The driving-shaft *v* has fixed upon it a grooved cam, *y*, which, like the cam *u*, is to effect the lateral movement of the arm *m* sufficient to produce, by means of the arm *k*, shaft *e*, slotted arm *d*, pin *c*, and lever *F*, an advance movement of the feeder for plain sewing. To operate with the cam *y* there is a friction-roller, *z*, which projects from the curved arm *m*. On sliding upward such curved arm, so as to bring the said roller *z* into the groove of the cam *y*, the arm will be moved out of engagement with the secondary-shaft cams for effecting advance and lateral movements of the feeder, as hereinbefore described, during the formation of the embroidery or button-hole stitches. On the secondary shaft are fixed the cams *a¹ b'*, appertaining to the mechanism for effecting the necessary elevation of the presser to admit of the feeding of the work either while the plain or button-hole stitch is being made. The cam *b'* is to be in action while the button-hole stitch is being made. This cam during an entire revolution causes the presser to be raised twice, whereas the cam *a¹* during an entire revolution causes the presser to be raised but once, the cam *a¹* being in action only while plain sewing is being

performed. In front of the said cams *a¹ b'* is an arm, *c'*, which is hinged to a short stationary standard, *d'*, (see Figs. 9 and 10, the first of which figures is a front view of the arm and standard, while the second is a side elevation of the arm and a sectional representation of the secondary shaft, showing, in side view, the two cams.) To the rear side of the arm there is applied a slide, *e'*, provided with a friction-roller, *f'*, and a clamp-screw, *g'*, the shank of the latter going through a slot, *h'*, made horizontally in the arm, the same being so as to enable the friction-roller to be moved laterally against or directly in front of the periphery of either of the cams *a¹* or *b'*, the clamp-screw serving to fix the slide in either of its extreme positions.

A screw, *i'*, provided with a nut, *k'*, and a washer, *l'*, arranged as represented, is hinged to the upper part of the arm *c'*. That portion of the shank of the screw which is in front of the washer extends loosely through a hole in an ear, *m'*, projecting from the bent lever *n'*, for raising the presser, such lever being pivoted to the goose-neck *o'*. A stud, *p'*, projects from the presser-bar through a slot, *q'*, made transversely in the front arm of the said lever *n'*, and directly over the shorter arm of another lever, *r'*. The latter lever, besides being pivoted to the lever *n'*, has a series, *s'*, of holes made in its longer arm to receive a stud, *t'*, projecting from the lever *n'*. The stud *t'* and the lever *r'*, provided with the series of holes, are for effecting the proper application of the lever *n'* and the presser-bar stud, according to the thickness of the work to be sewed. A V-spring, *u'*, arranged between the arm *c'* and the lever *n'*, connected therewith, serves to effect the counter movements of the said arm and lever. Furthermore, there is pivoted to the goose-neck the usual lever *v'*, for elevating the presser and holding it off the work, such lever being formed and arranged with the lever *n'* in manner as represented.

In Figs. 1 and 3 of the drawings the shuttle-race is shown at *G*, the shuttle at *H*, and its driver at *I*. The said driver is pivoted to a connection-rod, *R*, which, in turn, is pivoted to an adjustable arm, *L*, so applied to the driving-shaft as to turn thereon. This arm *L* is arranged against a disk, *M*, fixed on such shaft. The arm *L* is furnished with an arcual slot, *w'*, and also with a clamp-screw, *x'*, going through such slot and screwed into the disk. Such arm and screw are for effecting the proper adjustment of the shuttle or its driver in relation to the needle. Encompassing the disk *M* is an annular driving-wheel, *N*, which, grooved in its periphery, is forced against the outer side of the cam *O* by means of a clamp-screw, *a²*, screwed into the disk and against the ring or wheel *N*. The cam *O* is for operating the needle-bar-actuating lever *P*, arranged as shown.

Having thus described my improved ma-

chine for effecting either plain sewing or embroidery or button-hole stitching, what I claim therein is as follows, viz:

1. For varying the advance movement of the feeder E, the combination of the pivoted slotted angular lever F, the movable joint-pin *c* and its adjusting-screw *f*, and the slotted arm *d*, they being arranged with and applied to each other, the feeder E, and the rock-shaft *e*, all substantially as represented.

2. For producing the advance and rearward movements of the feeder, the combination of the pivoted angular lever F, the joint-pin *c*, arm *d*, spring *g*, rock-shaft *e*, arm *k*, cam *y*, and driving-shaft *v*, substantially as set forth.

3. For enabling either of the cams *u* and *y* of the shafts *r* *v* to be thrown into engagement with the slotted arm *k* of the rock-shaft *e*, the combination, with the said cams, arm, and shafts, of the sliding or curved arm *m*, applied to the said arm *k*, the clamp-screw *l*, for fixing the said arm *m* in either of its extreme positions, and the studs or friction-rollers to operate with the said cams, all being substantially as set forth.

4. For determining the length of the button-hole stitch, the combination of the arm *n* and screw *p* with the cam *q*, arm *k*, shaft *e*, lever F, rod *a*, and springs *b*, constituting the mechanism for producing lateral movements of the feeder in making the embroidery or button-hole stitch.

5. For bringing into action either of the secondary-shaft cams *a'* *b'* to cause it to move the presser-actuating lever *n'*, the combination of the pivoted arm *c'* and the friction-roller slide *e'* and its clamp-screw *g'* with the said cams *a'* *b'* and the lever *n'*, all being arranged and applied substantially as set forth.

6. For effecting the proper adjustment of the shuttle-driver in relation to the needle, the combination of the slotted adjustable arm L, the disk M, and the clamp-screw *x'* with the driving-shaft and with the shuttle-driver I and its operative rod R, all being arranged and applied substantially as set forth.

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Witnesses:

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A. N. CUSHING.