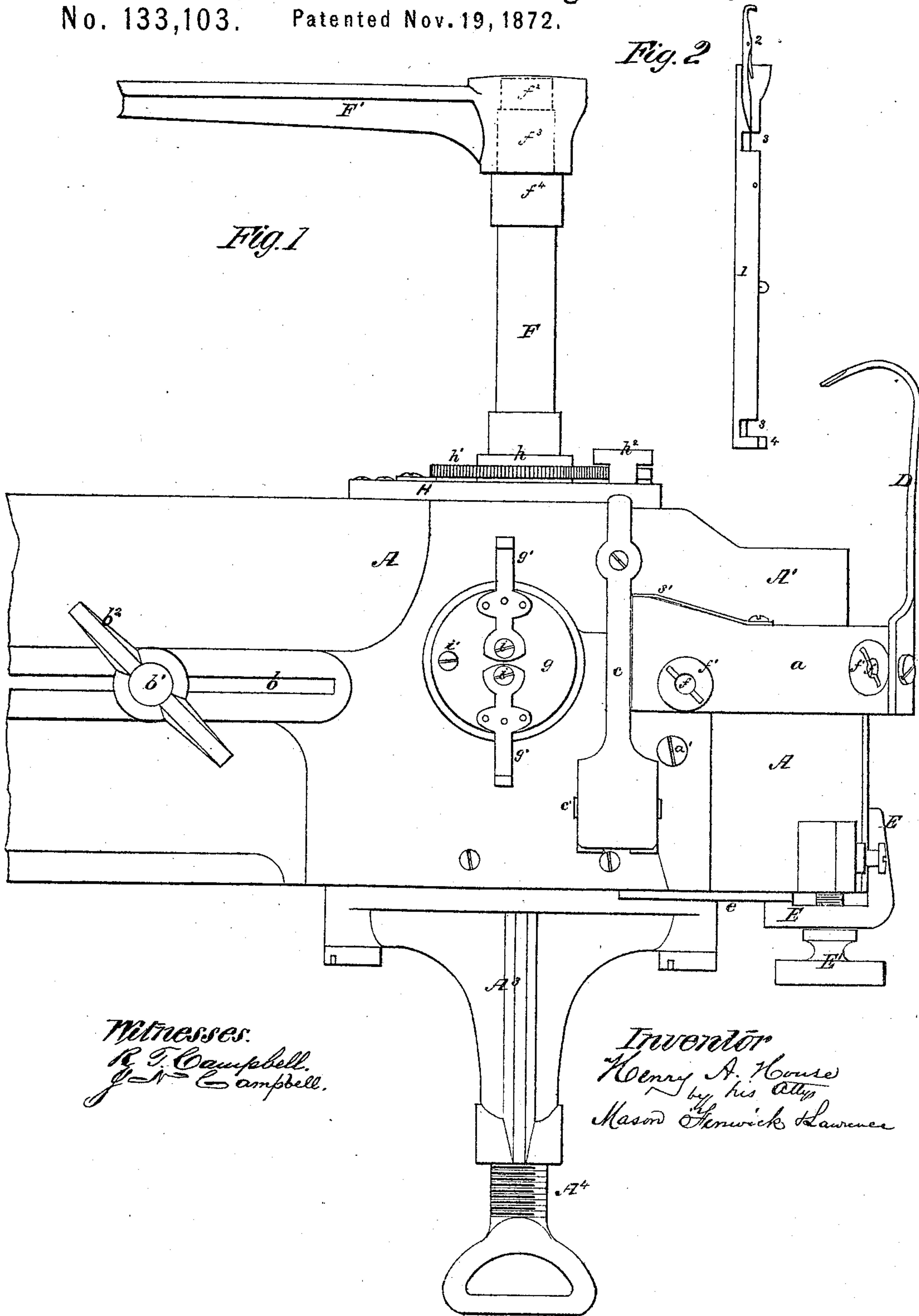


H. A. HOUSE.
Improvement in Knitting-Machines.
No. 133,103. Patented Nov. 19, 1872.



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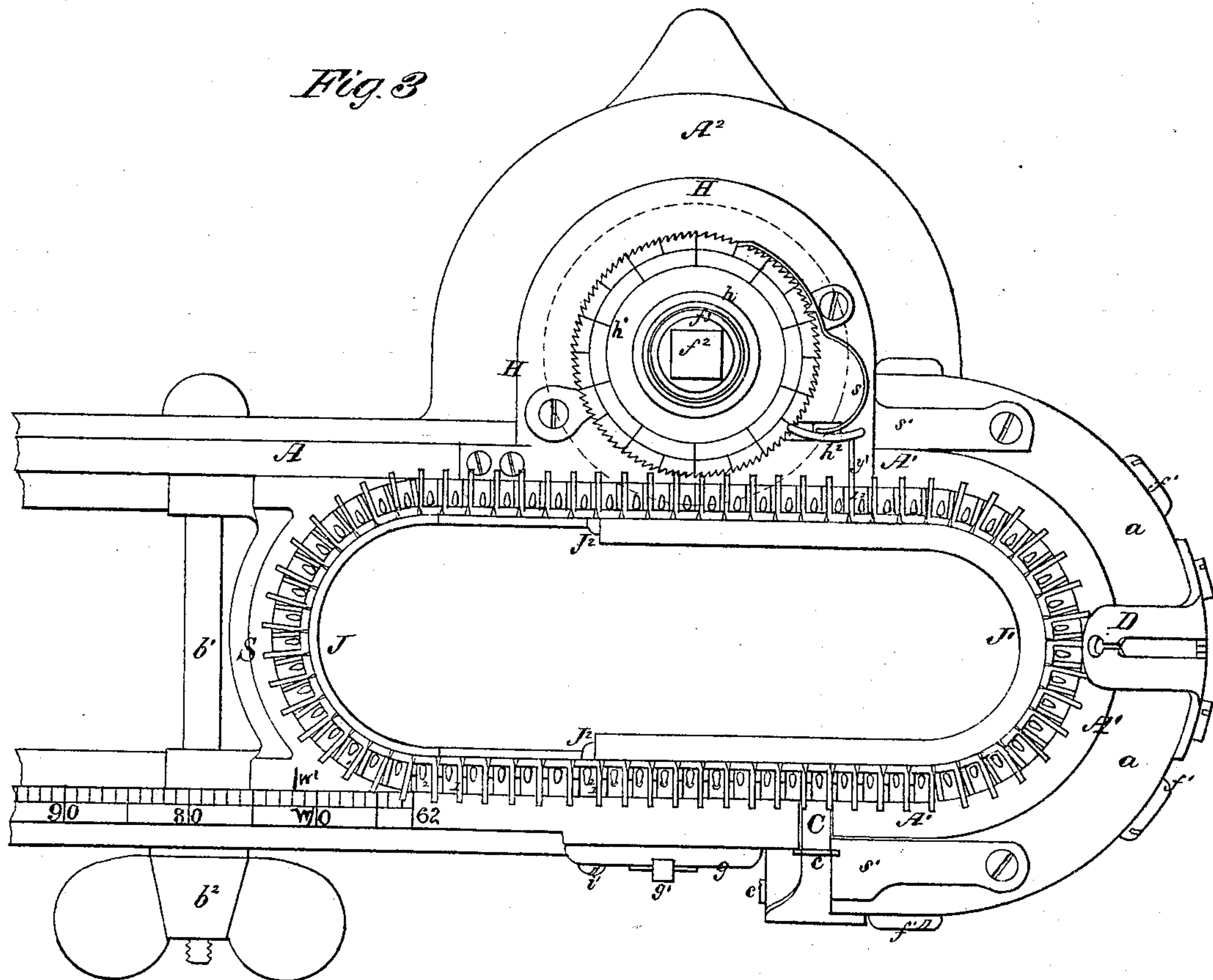
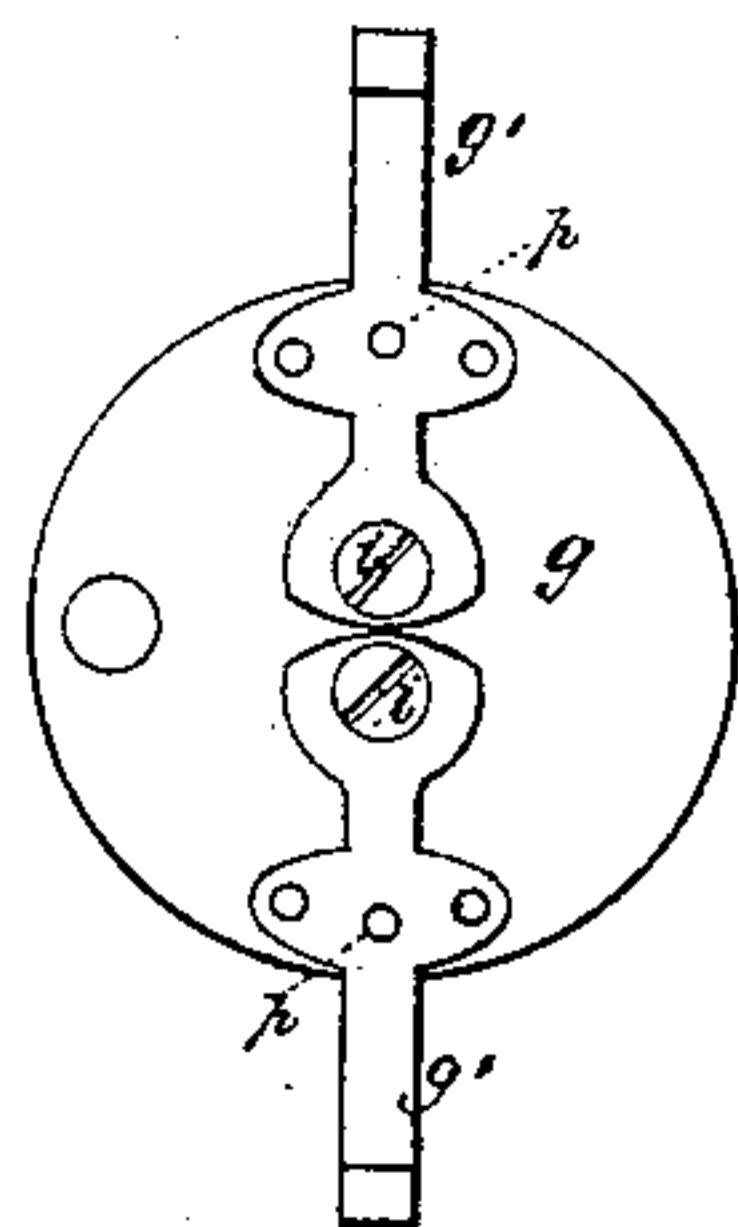


Fig. 4



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Fig. 5

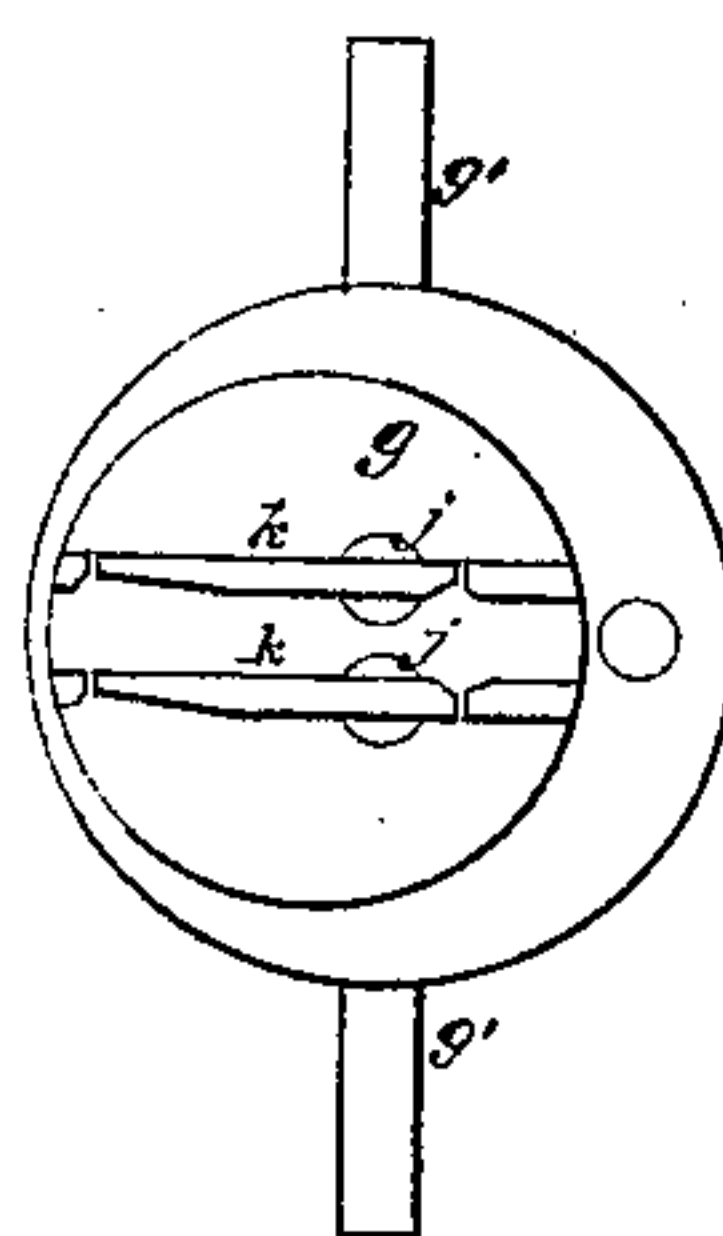
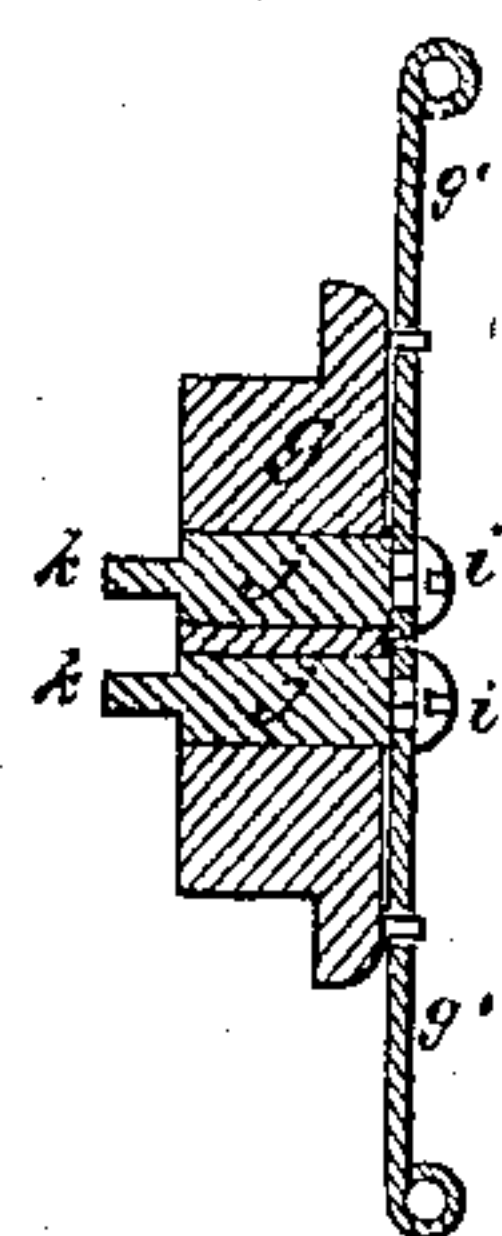
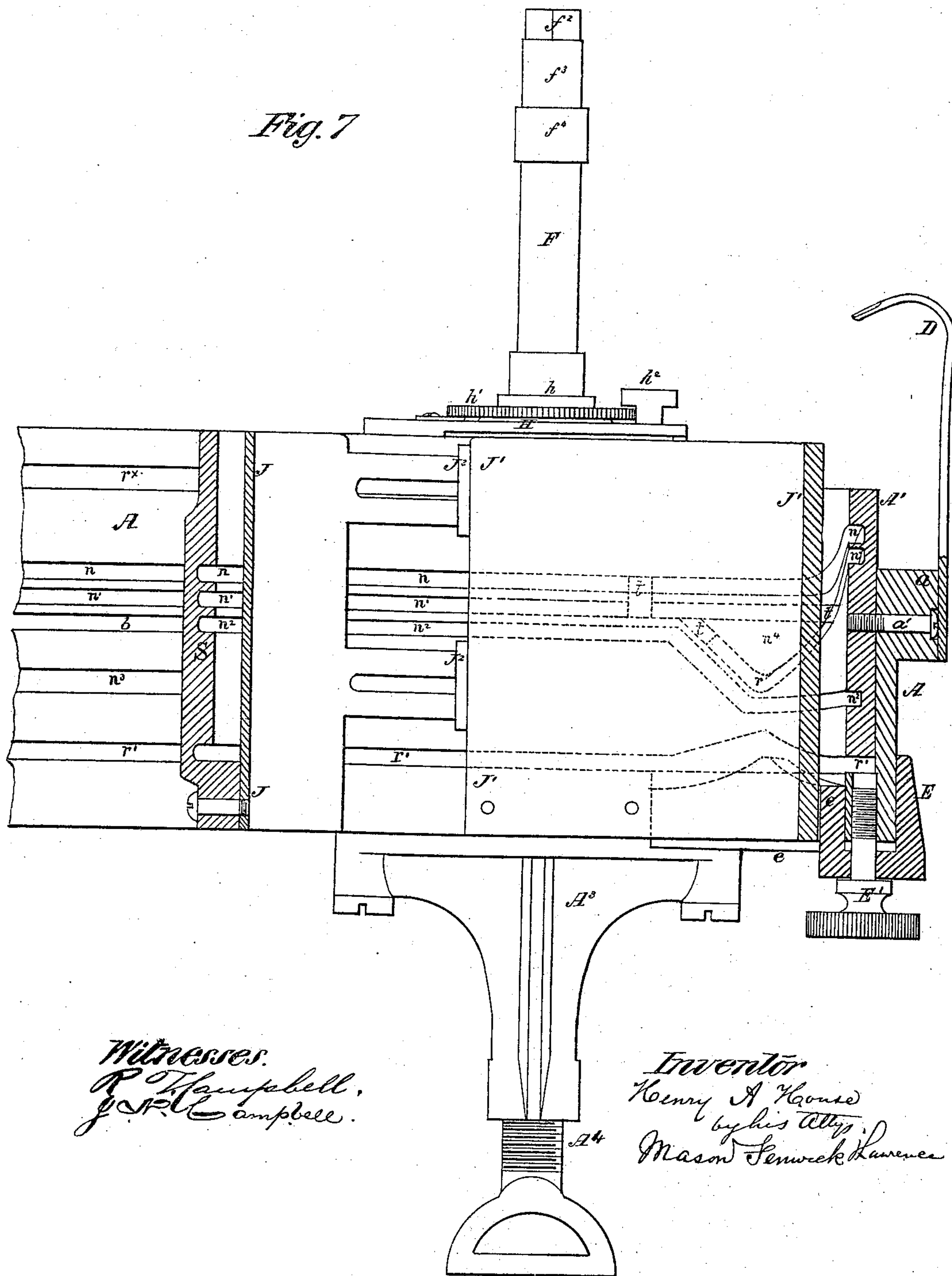


Fig. 6



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Fig. 8

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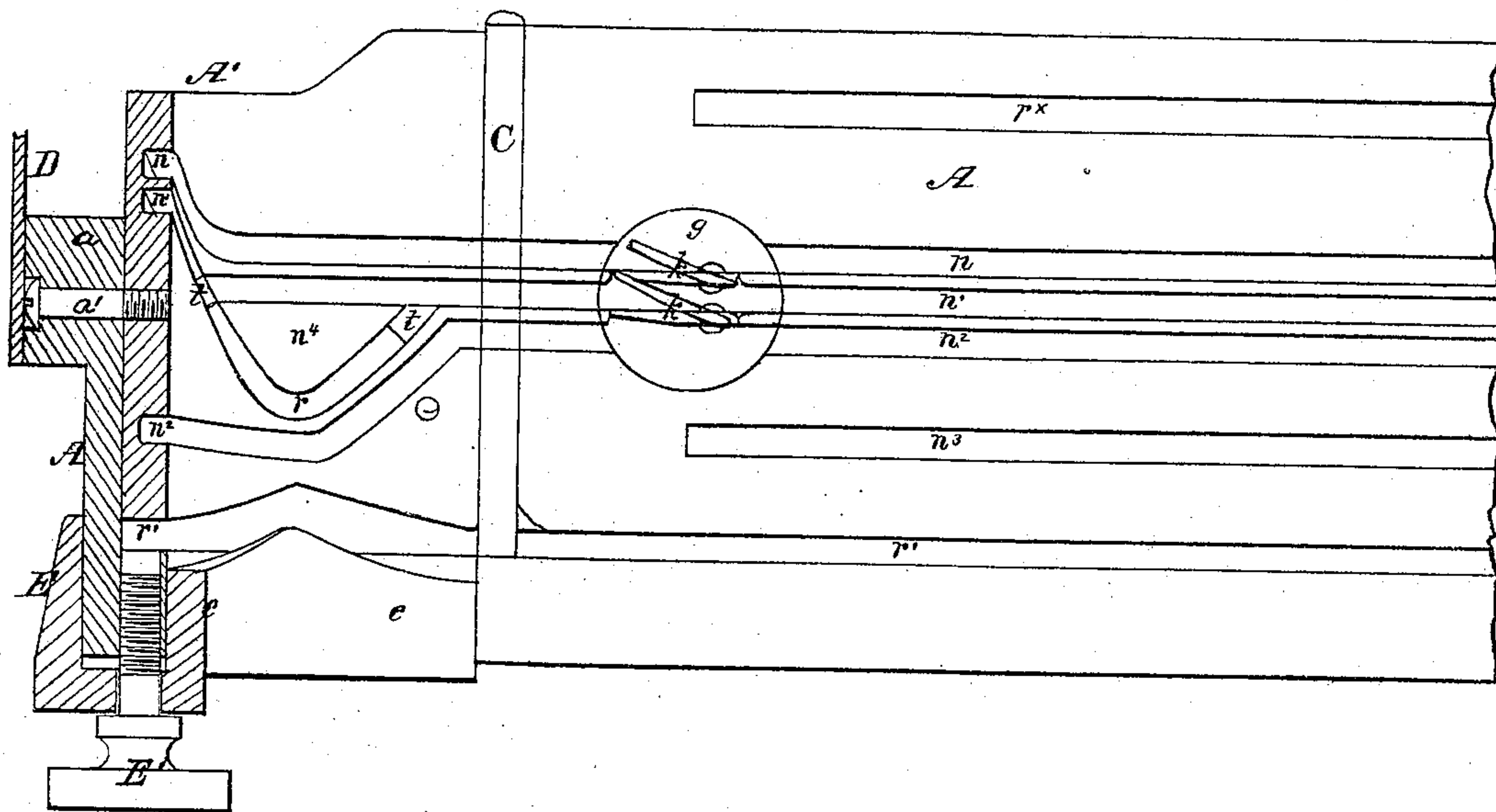


Fig. 9

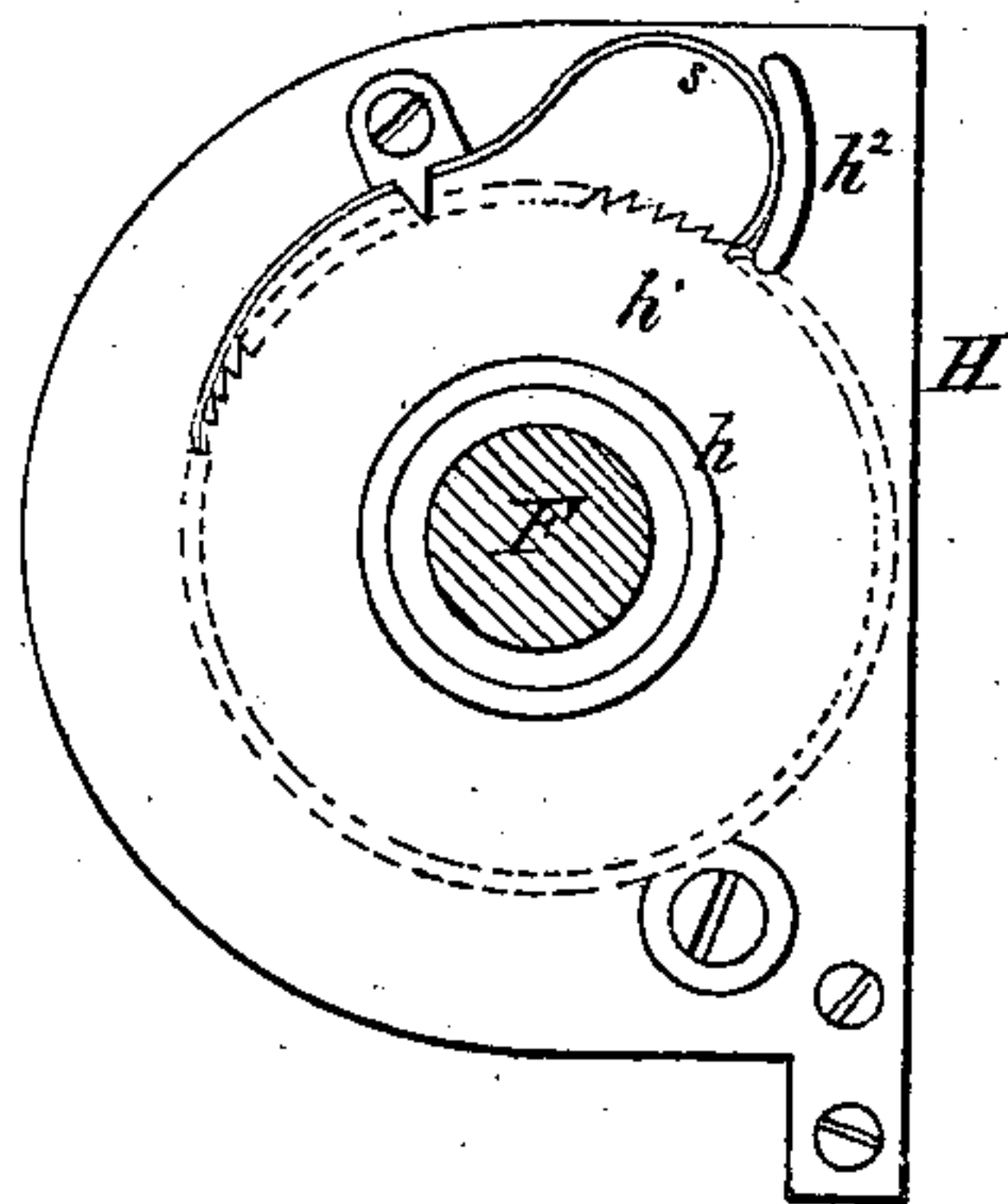
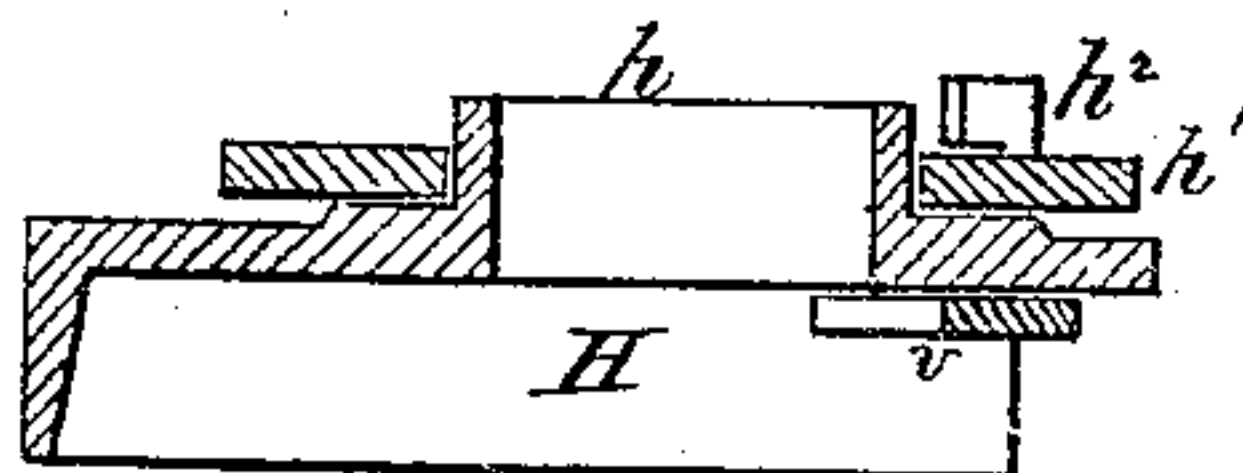


Fig.10



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Fig 11

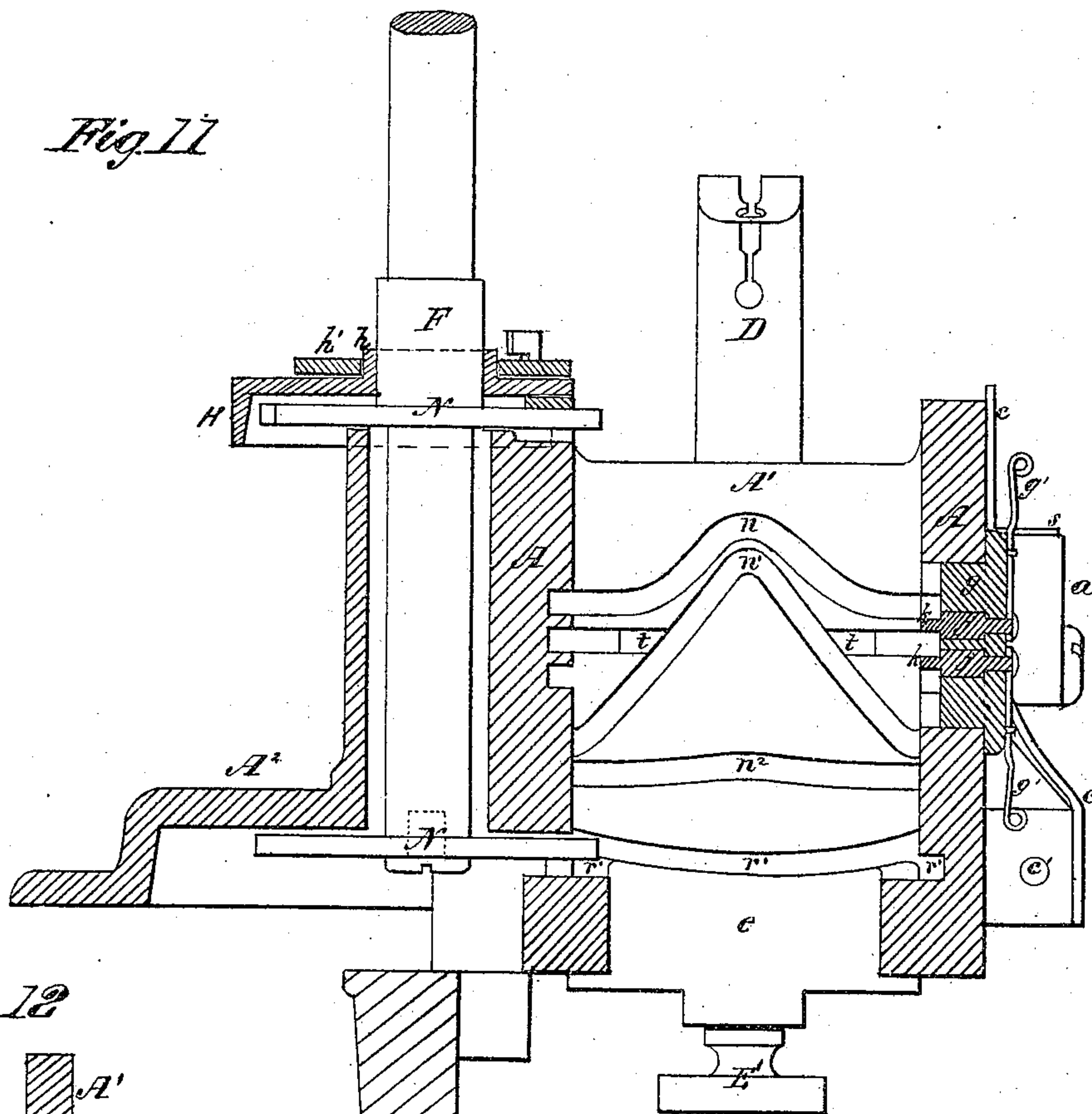
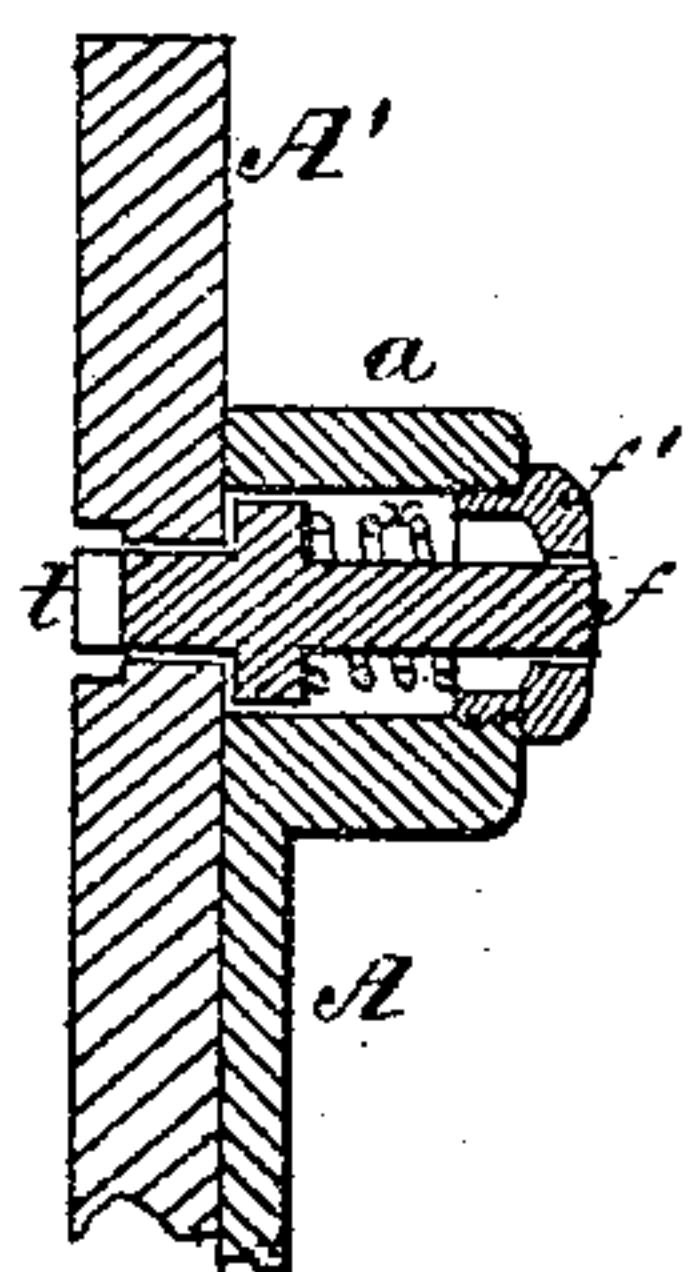


Fig 12



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UNITED STATES PATENT OFFICE.

HENRY A. HOUSE, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. 133,103, dated November 19, 1872.

To all whom it may concern:

Be it known that I, HENRY A. HOUSE, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain novel Improvements in Knitting-Machinery; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1, Plate 1, is an elevation of one side of the machine with part of the frame and crank-handle broken away and the needles removed; Fig. 2, Plate 1, is a view of a needle and needle-case; Fig. 3, Plate 2, is a top view of the machine; Figs. 4, 5, and 6, Plate 2, show the switch-block and switches in different positions; Fig. 7, Plate 3, is a section taken longitudinally and vertically through the center of the machine; Fig. 8, Plate 4, is a section taken longitudinally and vertically through the center of the frame, with the inside plates removed to expose the grooved ways and switches; Figs. 9 and 10, Plate 4, are views of the counting device; Fig. 11, Plate 5, is a section taken transversely and vertically through the machine; and Fig. 12, Plate 5, is a sectional view of the frame, showing the mode of applying the latches, which are in grooves for the needle-toes.

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

This invention relates to certain improvements which are applicable to knitting-machines wherein the needles travel in the path of a flattened ellipse, and at proper times are caused to rise and descend for receiving yarn and casting off the loops. Instances of such machines will be found in the schedules annexed to Letters Patent granted to me on the 6th day of April, 1869, and also on the 12th day of April, 1870. The improvements relate, first, to a mode of applying a device for counting the courses of loops around the driving-shaft and over the upper gear-wheel which moves the needles; second, to a mode of applying the beveled latches into the frame of the machine, consisting in a shouldered latch-stem, a coiled spring, and a screw-plug, thus avoiding the use of external springs; third, to an improved construction of the frame of the machine of two detachable parts, one

part of which forms the semicircular grooved surface at that end of the machine where the needles are raised and depressed; fourth, to a simple device for switching the needle-toes from the main working-groove, and vice versa, and also for switching the whole or part of the needles out of operation or into operation at pleasure.

The following description of my invention will enable others skilled in the art to understand it.

In the accompanying drawing, A represents the frame of the machine, which, in a top view, presents two parallel sides terminating at one end in a semicircular portion. This latter portion is thickened externally, at *a*, into a semicircular rib, and it is recessed internally to receive a semicircular lining, *A*¹, the inner face of which is grooved to receive the needle-toes, as will be hereinafter explained. By removing screws *a'* the grooved piece may be slipped out and another piece of corresponding size and shape inserted in its stead. This removable piece *A*¹ will therefore allow the frame of an old machine to be readily repaired, as it is this piece which is most rapidly rendered useless. The opposite end of the frame A is completed by a sliding head, S, the inner grooved surface of which is semicircular. This sliding head has tenons formed on its flat sides, which are received into grooves *r*^x *n*³ made into the inner sides of the side plates of frame A, and by means of a flat bolt, *b*¹, which passes through slots *b b* and a clamp-nut, *b*², the head S can be secured fast to the frame at any desired point. The inner surfaces of the frame A, the piece *A*¹, and the head S form the outer wall of an endless vertical channel, in which the needles in their sheaths or quills operate, the inner wall of which channel is formed by plates *J J*¹ *J*², which may be elongated or compressed by adjusting the head S when it is desired to increase or diminish the length of the said channel for more or less needles. On one side of the frame A, and nearer one end than the other thereof, is formed a tubular box which terminates at its lower end in a hollow base, *A*². Below this hollow base the jaw *A*³ and clamping-screw *A*⁴ are applied to the frame A, and used to clamp the machine to the edge of any fixed object. The upper end of the tubular box terminates below the upper edges of

the parallel portions of frame A, and is covered by a cap, H, on which a counter is applied. The driving-shaft F passes up through said tubular box and the cap H, and has keyed to it two spur-wheels, N N, of equal diameter, one of which is in the hollow base A², and the other is just beneath the cap H. These wheels move the needles 2 and their quills 1 around in their channel like an endless chain, and their teeth are received into notches 3 3 in the needle-quills 1, (see Fig. 2,) where the upper wheel engages with the needles 2 and the lower wheel with teeth formed on the quills. The needles 2 and their quills 1 are constructed like those described in my Letters Patent numbered 101,878, with the exception that wide lips are formed at their upper ends to arrest the yarn as the needles descend to complete the loops. The toes on the lower end of the needles work in the grooves hereinafter described, and the toes 4 on the lower ends of the quills rest upon the horizontal ways of the groove r', and are held down by this groove, as explained in said Letters Patent. The cap H has a collar, h, rising from its upper side, which is concentric to the axis of the shaft F, and on which is loosely applied a counting-wheel, h¹, having ratchet-teeth formed on its periphery. The upper side of this wheel is graduated and numbered from 10 to 100, which are noted by a pointer on the stationary portion of a spring-pawl, s, one end of which engages with the teeth on wheel h¹, and holds this wheel while the other bowed end presses against a curved slide, h², which acts as a pawl to move the wheel. The slide h² is attached to an arm, v, beneath the cap H, and is acted upon by an extension, y', of a lip of one of the needle-quills 1 every time such quill passes the slide. The upper end of the shaft F is square at f², beneath which is a cylindrical portion, f³, terminating below in a shoulder, f⁴. This is for the purpose of receiving sockets formed in one end of a removable crank, F', and connecting the latter to the shaft in a steady manner. This crank F' turns horizontally, and it is desirable in starting the machine to adjust the crank on its shaft in the most convenient position, which can only be done by making the upper end of the shaft prismatic and fitting the crank on it, as described. The upper end of the head S, which is flush with the upper edges of the side plates of frame A, has a mark, w', on it, which, when it is made to register with one of the marks of a scale, W, on the frame A, shown in Fig. 3, will indicate the number of needles confined in the machine. This index will save much time hitherto required to count each set of needles put into the machine. There are three main grooves, n n¹ n², on the inner side of the machine for the toes of the needles to work in. These grooves are arranged in a similar manner to those described and shown in my Letters Patent numbered 101,878. The upper groove n is designed to receive the needle-toes when it is desired to

raise a certain number of needles out of action with the work on them during the operation of knitting the heel of a stocking by means of a certain number of needles whose toes traverse in the intermediate groove n¹. The groove n¹ is the working-groove, and the needle-toes, when working therein and moving either to the right or left hand, pass between two switches, k k, and also dip down into a V-shaped groove, r. The beveled latches t t, at the upper extremities of the V-shaped grooves r, allow the needle-toes to follow but one of these grooves in each circuit of the needles.

This mode of guiding the needles when traveling either to the right or left is fully explained in my Letters Patent 101,878, and is intended, as therein explained, to raise the needles as they pass the yarn-guide D for receiving the yarn, and then to depress them into their quills for casting off the old loops and forming new loops. Directly beneath the grooves which give vertical movements to the needles, and inserted into a recess which is formed by omitting a portion of the ways at the base of groove r, is a vertically-adjustable semicircular cam, e, the upper edge of which supports and guides the needle-quills as they pass around over it. The shank E of this cam-plate e is U-shaped, and embraces the lower edge of the frame A, as shown in Figs. 7 and 8; and by means of a thumb-screw, E', the cam-plate can be raised or depressed, thereby changing the relative positions of the upper ends of the quills with respect to the hooked ends of the needles, and forming the loops tighter or looser, as may be required. This cam-plate and its office in the machine are also described and shown in my Letters Patent last referred to.

I employ a hinged gate, C, for introducing the needles into the machine and removing them therefrom. This gate is acted on outside of the frame A by a spring-plate, c, which keeps it in place during the operation of the machine. The inner side of this gate is crossed by grooves n n¹ n². Prior to my present invention the needle-toes were adjusted, one at a time, from one groove into another by springing open the gate C—a tedious and somewhat uncertain operation. I now apply switches k k for this purpose, which are sections of the ribs between the grooves n n², and which are secured to oscillating studs or pivots j j that pass through a plug, g, and are made fast to spring-levers g' g', shown in Figs. 6 and 11. The plug g is furnished externally with dowel-pins p p, and the levers are perforated to receive said pins. By means of these two switches the toes of all the needles, or any desired number of them, can be removed from the main working-groove n¹ into either the upper groove n or into the lower groove n², and by reversing the movement of the shaft F the toes of all or any number of the needles can be adjusted back again into the groove n¹. The switch-plug g is a short-flanged cylinder,

and is fitted into a hole drilled through the frame A and secured by a screw, *i*. Each one of the latches *t* is formed on one end of a shouldered stem, *f*, which is fitted loosely into a hole drilled into the thickened portion *a* of frame A, as shown in Fig. 12. Into this hole is screwed a hollow plug, *f'*, and between this plug and the shoulder on the stem *f* a spring, *x*, is applied for holding the nose of the latch in place and allowing it to recede when pressed against by the needle-toes. By unscrewing the plug the latch can be withdrawn and repaired or renewed, as may be found necessary.

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

1. The counting-wheel *h*¹ applied around a collar, *h*, which surrounds the driving-shaft F, and which rises from a cap, H, over the upper wheel N, substantially as described.

2. The combination, with the upper and lower grooves *n* *n*² and the intermediate groove *n*¹, of the switches *k* *k*, substantially as described, and for the purpose set forth.

3. The combination, with the main section A of the frame, constructed with an angular recess, as described and shown, of the semi-circular section A¹ carrying the latches *t* *t* and having the cam-grooves formed in it, and constructed to extend down into the main section and also rest against the seat formed by the recessed portion of the main section, all as described.

4. The switch-plug *g*, inserted through one side of the frame A, and bearing switches *k* *k* on one side and their operating-levers *g*¹ *g*¹ on the opposite side, substantially as described.

5. The shouldered spring-latches *t* *f* and hollow screw-plugs *f'*, inserted into the frame A and arranged in the relation to the grooves for the needle-toes, as set forth.

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