

No. 661,806.

Patented Nov. 13, 1900.

E. C. LEA.

SHUTTLE MECHANISM FOR SEWING MACHINES.

(Application filed Mar. 20, 1899.)

(No Model.)

3 Sheets—Sheet 1.

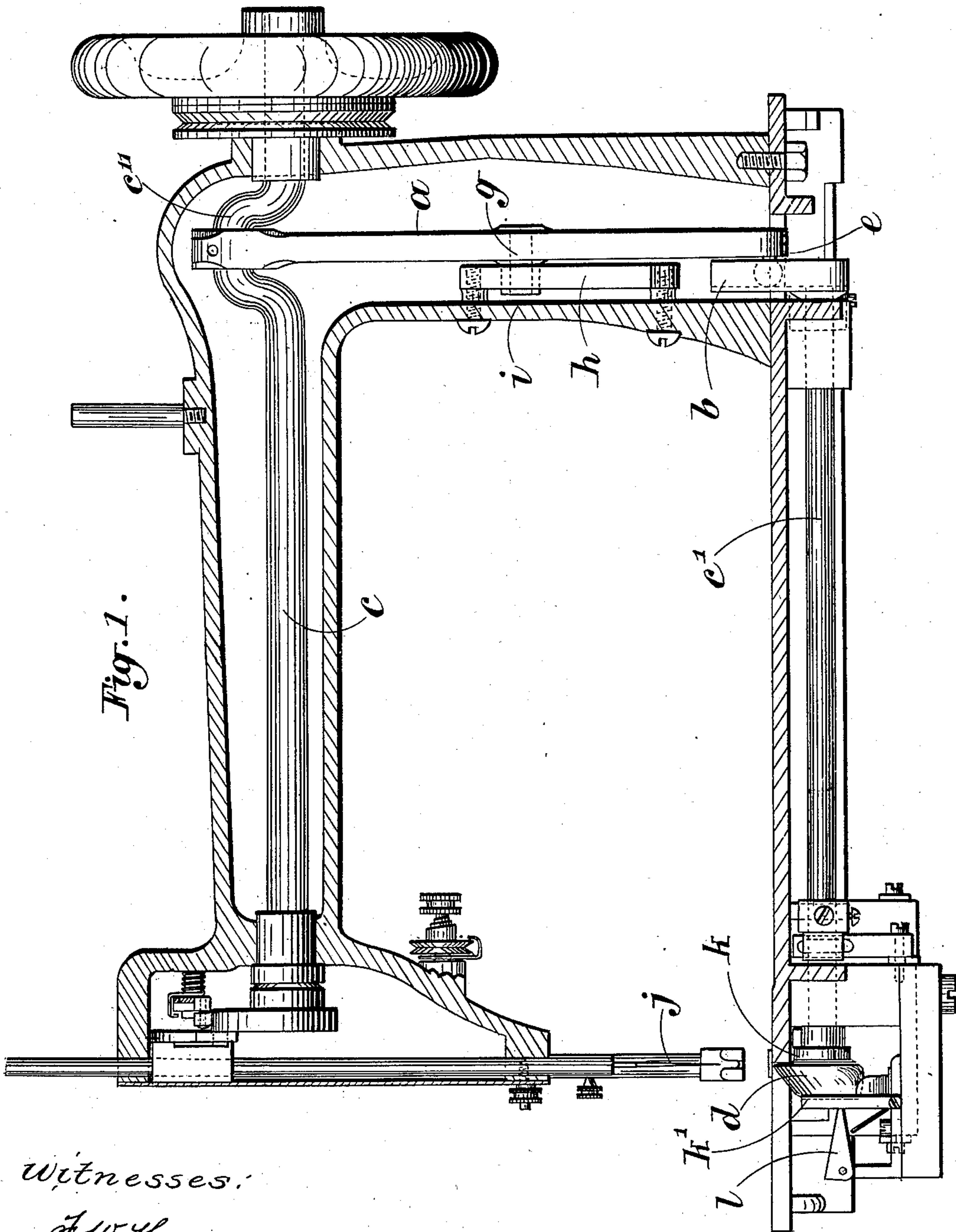


Fig. 1.

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Fig. 2.

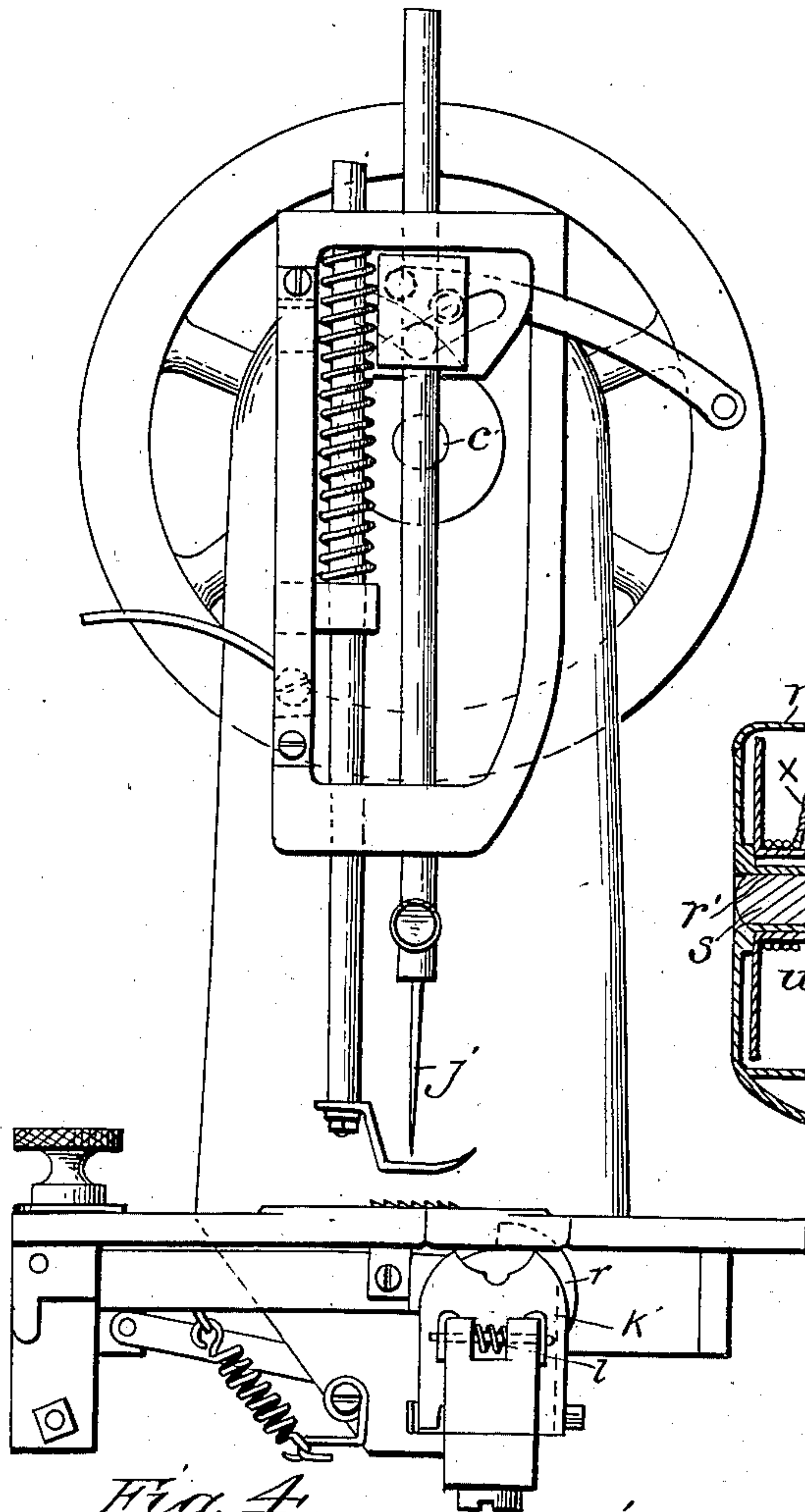


Fig. 11.

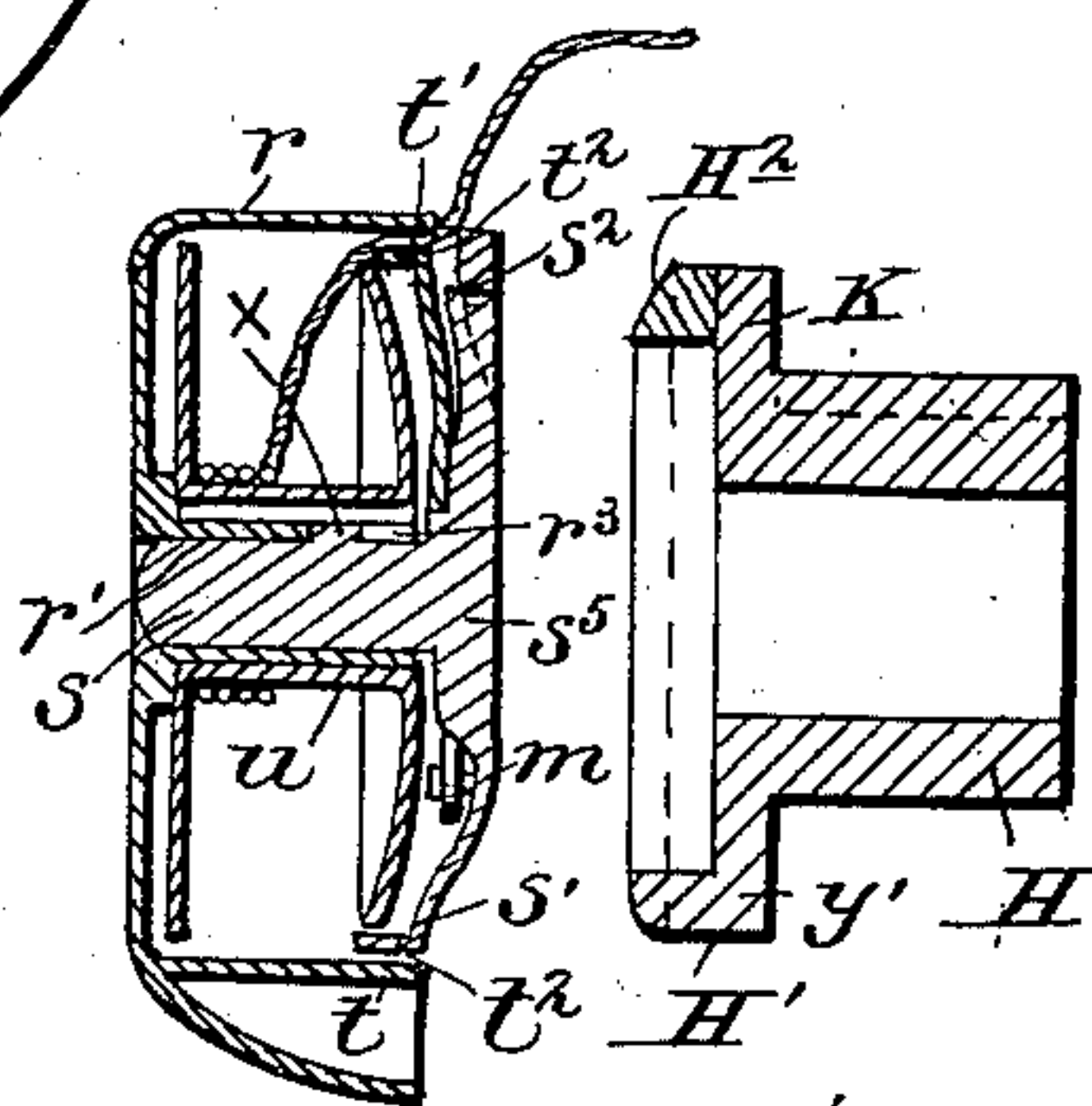


Fig. 12.

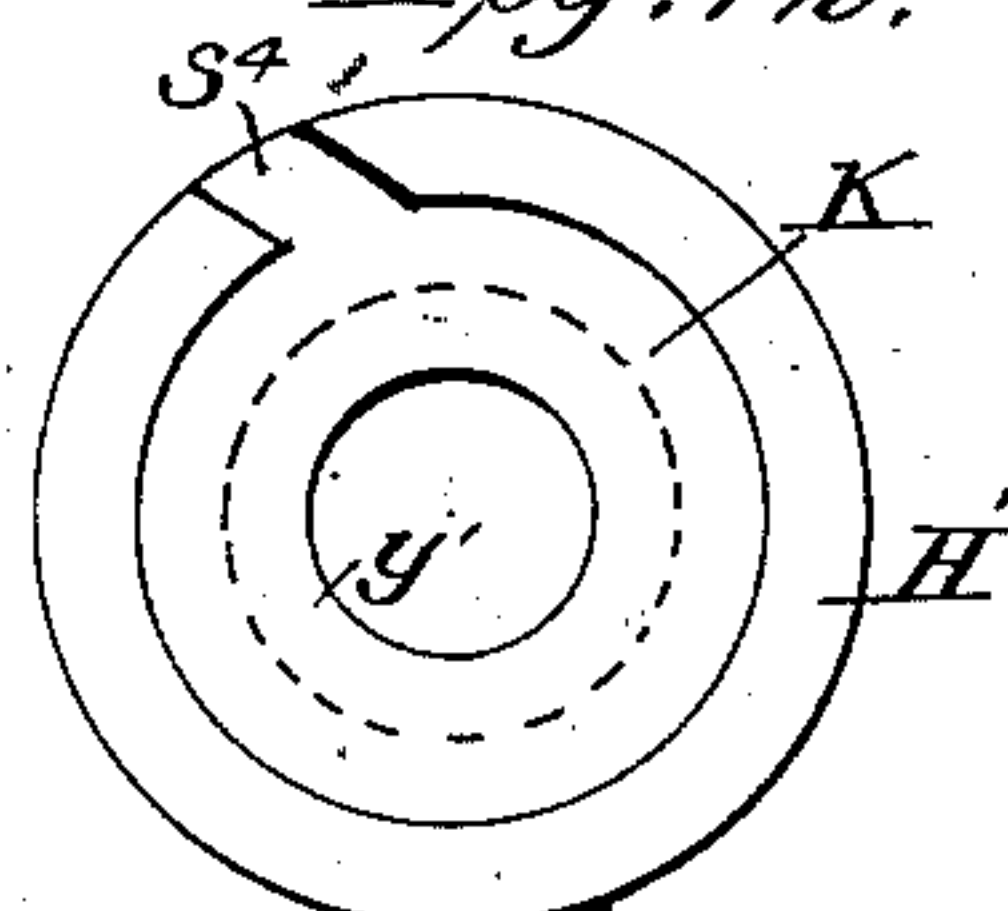


Fig. 3.

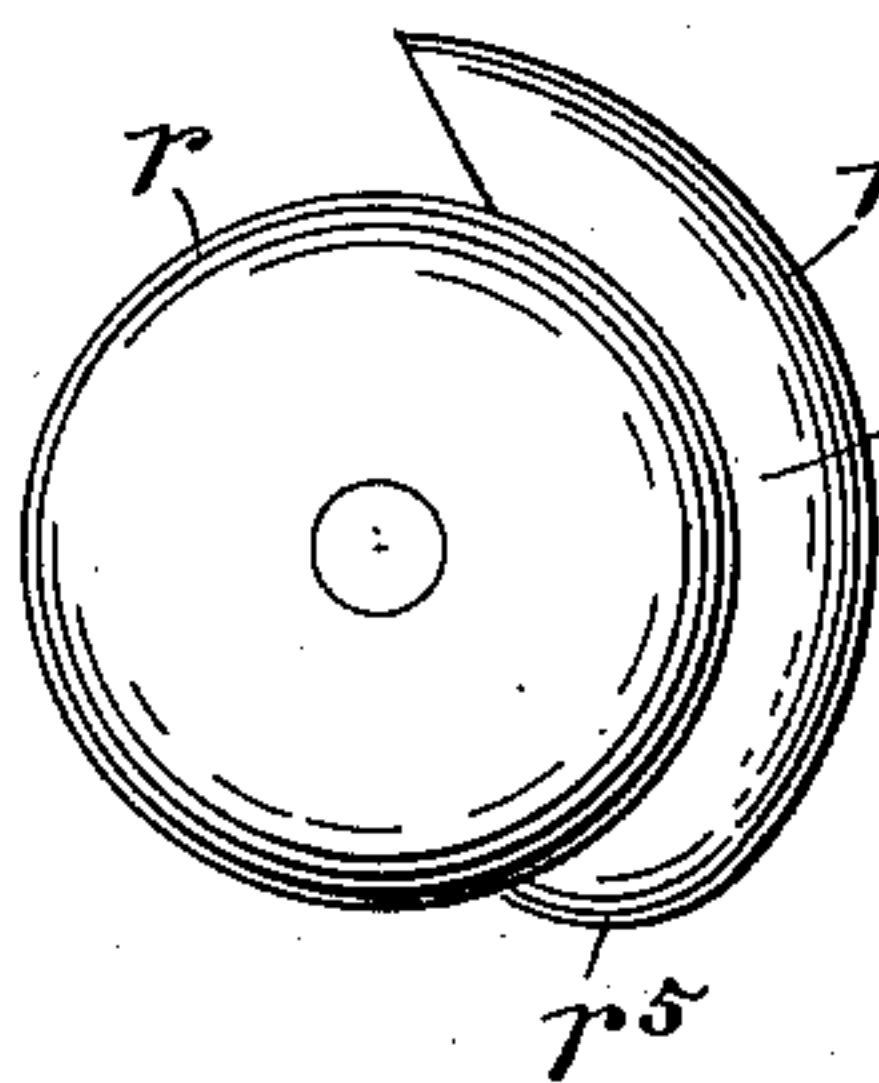


Fig. 4.

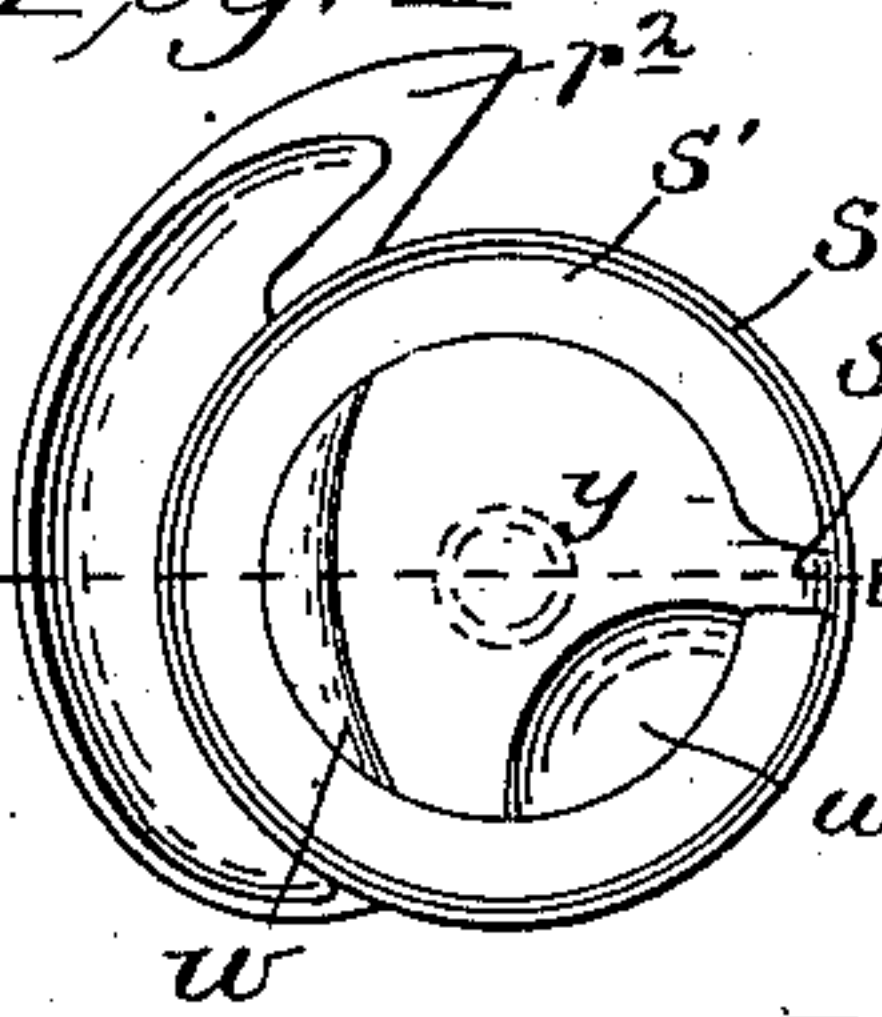


Fig. 5.

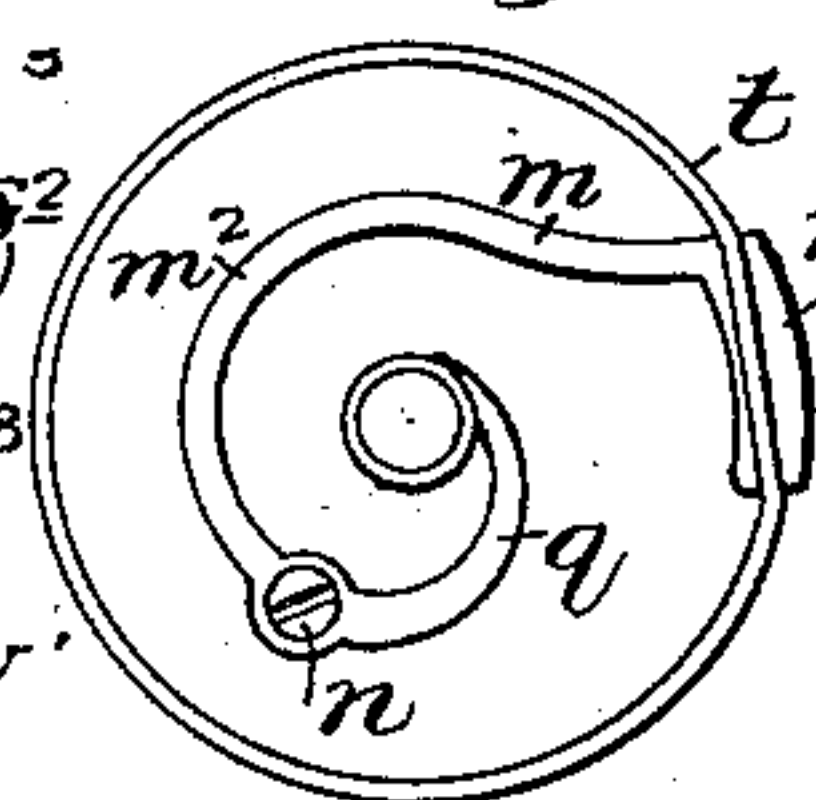


Fig. 6.

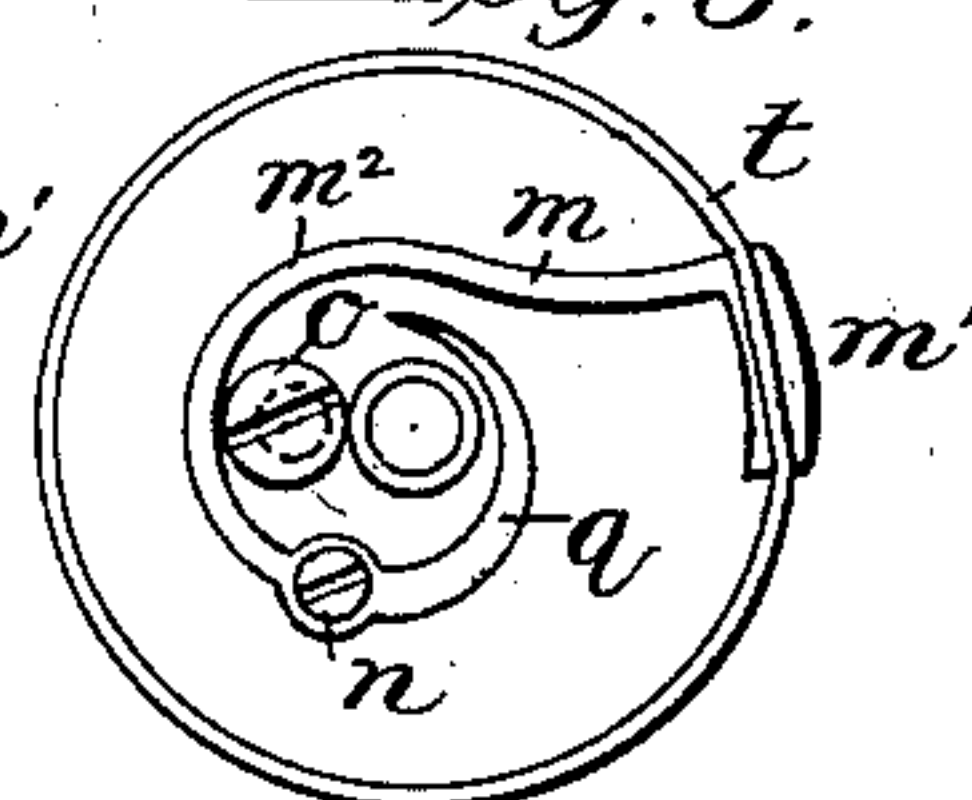
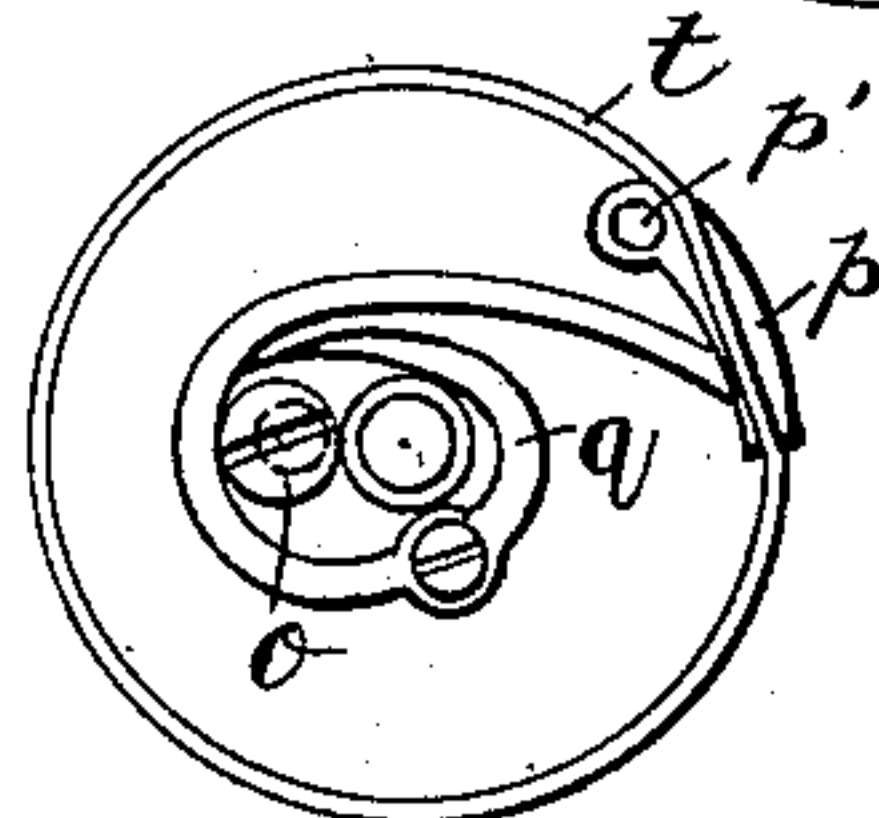


Fig. 7.



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3 Sheets—Sheet 3.

Fig. 8.

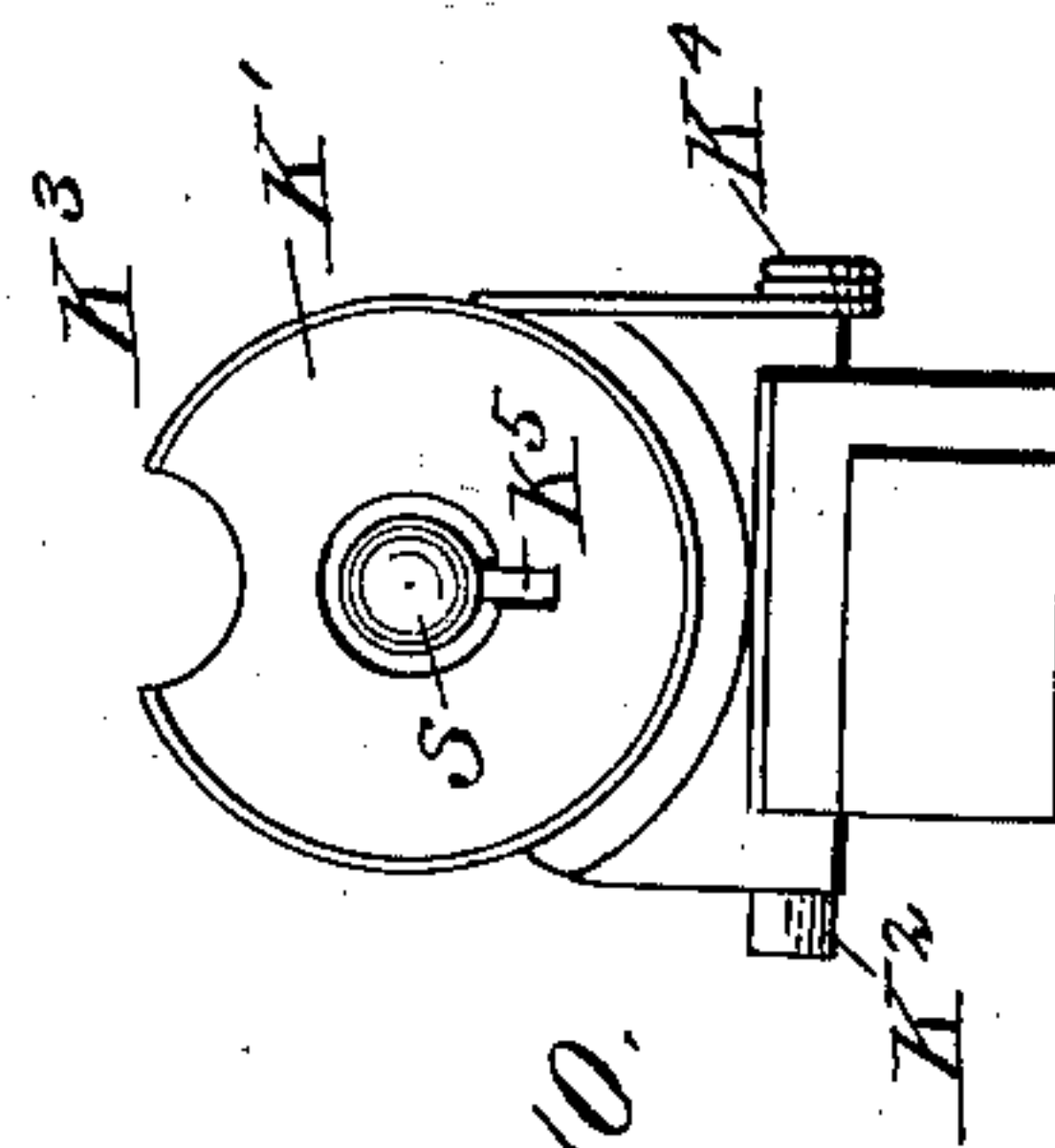
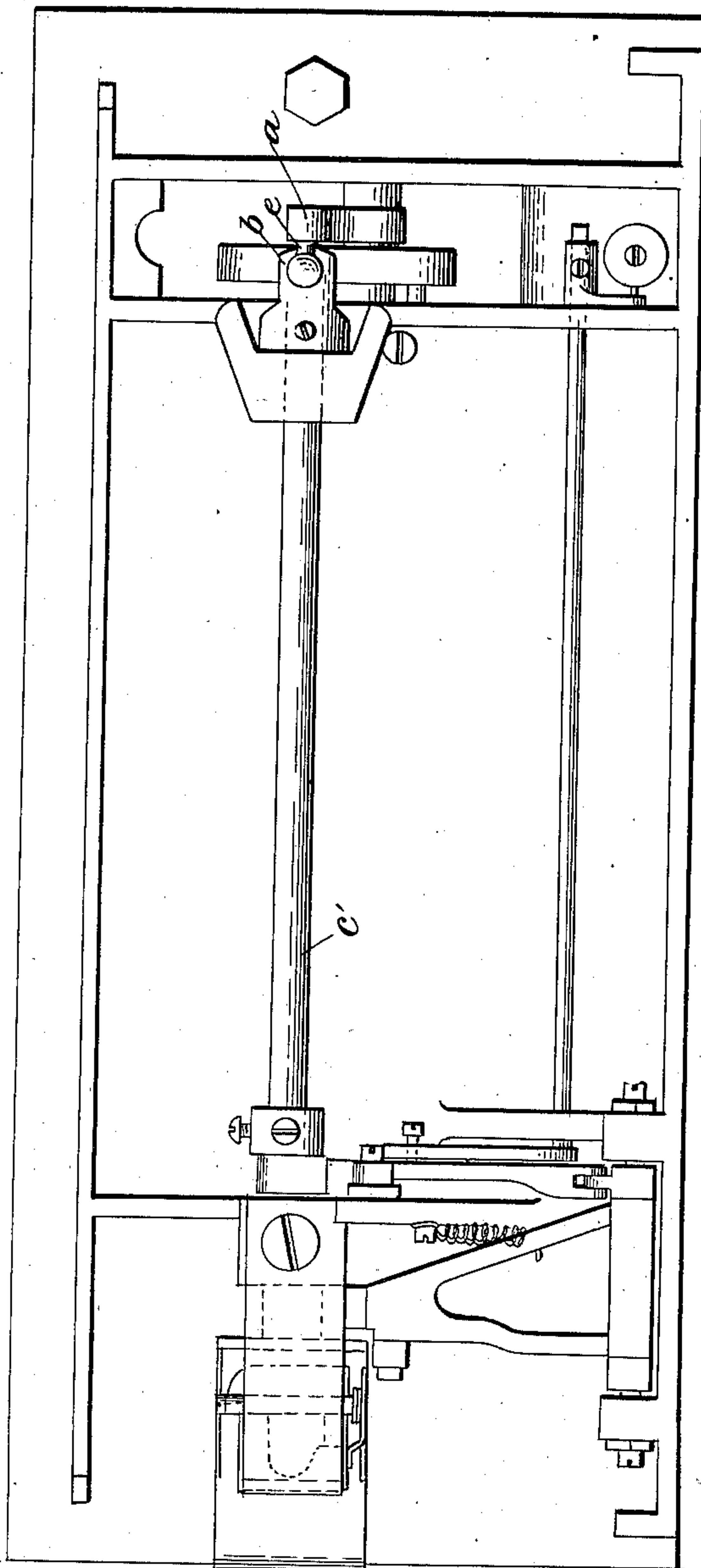


Fig. 10.

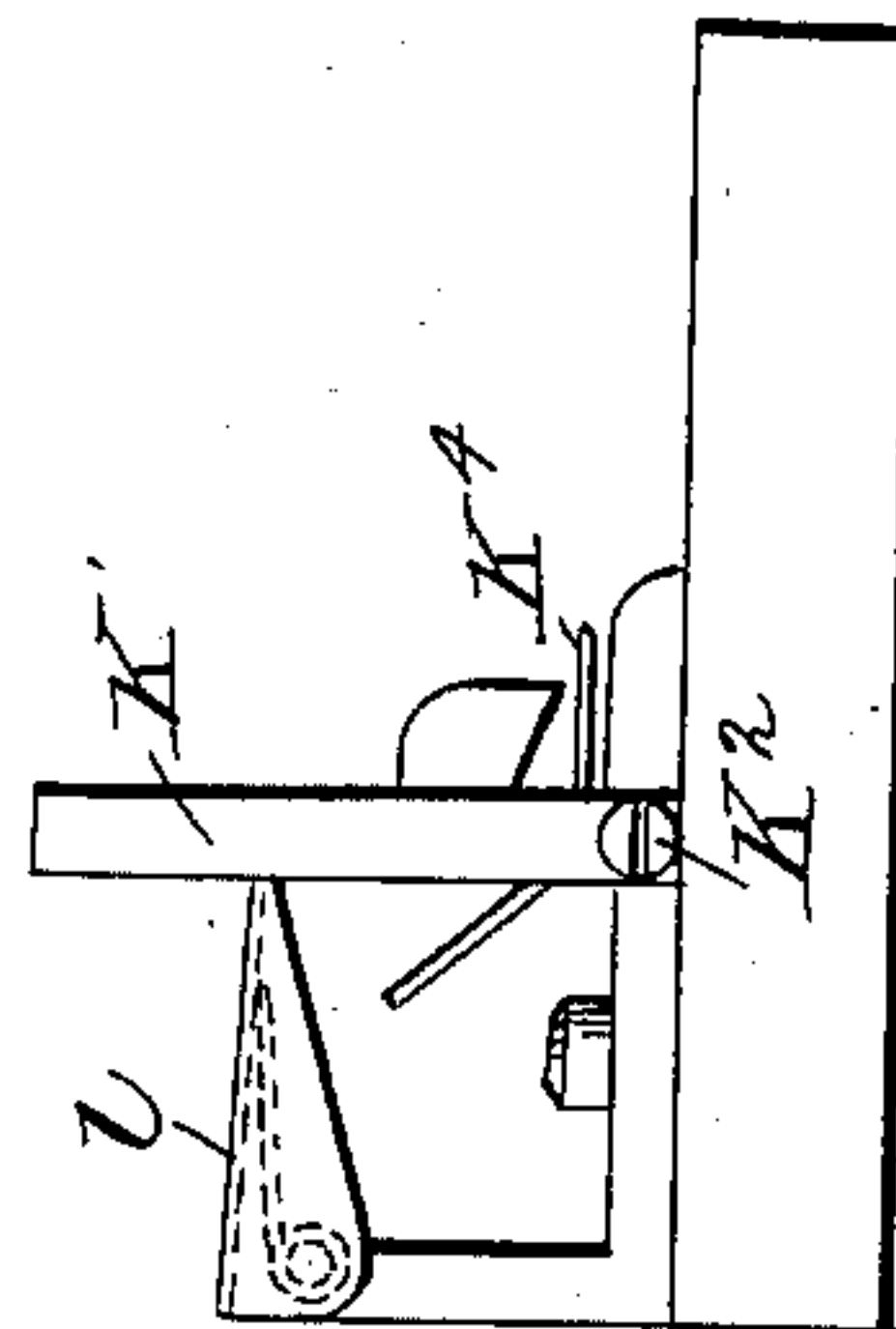


Fig. 9.

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UNITED STATES PATENT OFFICE.

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SHUTTLE MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 661,806, dated November 13, 1900.

Application filed March 20, 1899. Serial No. 709,806. (No model.)

To all whom it may concern:

Be it known that I, ERNEST CHARLES LEA, engineer, a subject of the Queen of Great Britain, residing at 4 Silverdale, Surbiton road, Kingston-upon-Thames, in the county of Surrey, England, have invented new and useful Improvements in Sewing-Machines, of which the following is a specification.

My invention relates to improvements in sewing-machine shuttles; and the object of the same is to produce a device of this character which may be employed in all machines using this general type of rotatable shuttle and which will be simple in construction and efficient in operation. The related mechanism is illustrated and partially described; but while there is novelty in its design the same is not claimed in this application.

The novel construction by which the above-stated object is attained will now be fully set forth and claimed.

In the drawings which accompany this specification and of which they form a part, Figure 1 is a vertical section of the upper portion of a sewing-machine with my device attached thereto. Fig. 2 is an end elevation of the same. Fig. 3 is a front view of the shuttle. Fig. 4 is a rear view of the same. Fig. 5 is a plan view of the tension which is mounted inside the shuttle-cover. Fig. 6 is a plan view of an alternate construction of the tension-spring with an eccentric adjusting-screw. Fig. 7 is a plan view of a modified construction of the tension with a pivoted tension-block. Fig. 8 is a plan view of the under side of the bed-plate of the machine. Fig. 9 is a side view of the shutter. Fig. 10 is a front view of the same. Fig. 11 is a section on the line A B in Fig. 4 and a section of the carrier *k*. Fig. 12 is a face view of the shuttle-driver.

Like characters of reference designate like parts wherever they occur in the different views of the drawings.

The mechanism for carrying out my invention is illustrated as being mounted in an arm and on a bed-plate of ordinary construction. Two main horizontal shafts are employed, (designated C and C'.) The former is mounted in the horizontal arm and the latter under the bed-plate and parallel to the former.

The shaft C is provided with a crank C'', to which is connected a connecting rod or lever *a*. Secured centrally to the lever *a* is a pin *g*, mounted to slide in a slot *i* in a guide *h*. The lower end of the lever *a* carries a pin *e*, which engages a grooved cam *b*, keyed on the end of the shaft C'. By this combination just described of the shaft C, the crank C'', the lever *a*, provided with pins *g* and *e*, and the cam *b* the shaft C' is actuated.

My improved shuttle consists of two principal parts—a cylindrical body portion and a cover for the same. These will be taken up and described in the order named. The cylindrical member is designated by the character *r*. It is an integral member closed at one end and open at the other. Formed integral therewith or permanently secured thereto is a tubular portion *r'* of equal length to the body portion *r* and designed to serve as an axis for a thread-bobbin U, mounted in the shuttle. This bobbin is of ordinary construction. The tube *r'* is cut by a slot *r³* throughout a portion of its length, the function of which will appear later. Formed integral with the shuttle *r* is a loop or thread hook *r²*. This hook is designed to engage the thread-loop brought down by the needle and throw it around the shuttle. To assist it in performing this function, its body is extended halfway around the shuttle and is rounded off at *r⁴* and *r⁵*. The cover is designated by *s³*. It consists, essentially, of a disk *s⁵* and a pin *s*. The disk *s⁵* is of a diameter smaller than the inner diameter of the cylinder *r*, thereby leaving an annular space *t²* for the thread to pass through, and has a rim or flange *t* formed integral therewith to prevent the thread from getting between the disk and the head of the bobbin U. A level rim *s'* extends almost around the outer edge of the disk *s⁵* and is only broken by the intervention of a stud or spur *s²*, which juts out from a raised center portion *y*. The rim *s'* serves as a seat for the shuttle when inserted in a driver *k*, (to be described,) which the cover is shaped to fit loosely. The portion *y* is elevated above the rim *s'* and has formed therein a convex portion *w* and a concave portion *w'*. The portions *w* and *w'* and the stud *s²* facilitate and direct the passage of the thread-loop around the shuttle. The

pin s is sized to fit snugly the tube r' and has formed thereon a lug x , designed to fit the slot r^3 to limit the movement of the cover and pin and secure them against any displacement except direct withdrawal. Secured inside the cover s^5 is a tension mechanism m , Figs. 5, 6, and 7, for regulating the tension of the thread. This tension comprises a tension-block m' and a spring-arm m^2 , formed integral therewith and secured by a screw n . The tension-block m' fits an aperture in the flange t and projects a short distance beyond the edge of the disk s^5 . By this arrangement the thread is engaged and held momentarily between the block m' and the edge of the body r , as at t' , at every revolution of the shuttle. Therefore the operation of the tension is intermittent. By the addition of a screw o having an eccentric head the force of the tension is regulated by turning the head to bear with more or less force against the spring m^2 . This spring m^2 is prolonged backward to form a tail q , which is curved around and bears against the end flange of the bobbin U, and thereby serves to regulate its motion on its axis. A modified form of tension-block (denoted by p) is shown in Fig. 7. This block is pivoted on a pintle p' , and the spring-arm corresponding to the arm m^2 bears against it.

A shuttle-driver k (shown in Fig. 11) is composed of a cylindrical portion H, provided with a flange y' , having a rim H' . The outer diameter of the rim H' is equal to the outer diameter of the cylindrical body portion of the shuttle, and the outer edge is turned or beveled off at H^2 to provide a lead for the thread, and thus prevent fraying it. The combination of the flange and rim forms a dish-like cavity for loosely containing the shuttle, which is placed therein cover first. A slot s^4 is cut in the rim H' to accommodate the stud or spur s^2 on the cover. This slot extends at an angle to the radii, cutting it. A shutter for retaining the shuttle in place in the driver is illustrated in Figs. 2 and 10, and consists of a centrally-apertured disk k' , mounted on an axis k^2 . This disk has a rim k^3 , and a spring k^4 surrounds the axis k^2 to hold the disk normally upright. The shutter k' is locked in place by a pivoted arm l . A small spring k^5 , secured at one end, presses lightly against the end of the pin s and serves to take up the vibration of the shuttle and make it work more smoothly.

When the shuttle is in use, it is placed in the driver k after the bobbin has been filled and inserted in the shuttle and the cover put on. The shutter k' is then raised and locked by the arm l and the machine started. The shuttle will be carried around in unison with the shaft C', since the stud s^2 on the cover fits the slot s^4 in the rim of the driver and the cover r^5 is prevented by the lug x from turning independent of the body portion of the shuttle. The hook r^2 will be carried around and will engage the thread-loop

brought down by the needle and carry it around and pass it over the shuttle, the stud s^2 being the last to pass through. As the thread swings around the shuttle it will be engaged by the tension m and momentarily detained, thereby regulating the stitch. The pressure of the tail q against the bobbin will insure its uniform rotation.

I do not wish to be limited as to details of construction, as these may be modified in many particulars without departing from the spirit of my invention.

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

1. A sewing-machine shuttle consisting, of a cylindrical body portion closed at one end and carrying a loop-engaging hook, a tubular projection centrally on said closed end and extending into said body portion, said projection being provided with a slot, a cover for said body portion of a less diameter than the inside of said body portion and having a convex portion and a concave portion, a flange or rim on said cover extending at right angles to the plane of the same, a centrally-projecting pin carried by said cover to enter the tubular projection on said body portion, a stud on said pin engaging in said slot whereby the cover is retained on the body portion and held from turning relative thereto.

2. In a sewing-machine shuttle, the combination, substantially as described, of a cylindrical body portion closed at one end and open at the other and provided with a tubular portion extending into the body portion and adapted to serve as an axis for a bobbin, a loop-engaging hook secured to said body portion and adapted to engage the thread and pass it around the shuttle, a cover adapted to fit said open end of said body portion with an intervening space for the thread to pass through as the shuttle is revolved, and provided with means for engaging a driver to adapt it to be carried around in unison with said driver, and a pin projecting centrally from said cover and adapted to fit snugly said tubular portion on said body portion, said pin being provided with means for limiting its movement, adapted to compel the said cover and pin to rotate in unison with said body portion.

3. In a sewing-machine shuttle, the combination, substantially as described, of a cylindrical body portion closed at one end, a tubular portion projecting from said closed end and adapted to serve as an axis for a bobbin, a loop-engaging hook secured to said body portion and adapted to engage the thread and pass it around the shuttle, a cover adapted to fit the open end of said body portion and leave an annular space for the thread to pass through and having a raised portion thereon provided with a convex and a concave portion formed therein, means for engaging a shuttle-driver to adapt the shuttle to revolve

in unison with said driver, and a pin projecting centrally from said cover, said pin being adapted to fit said tubular portion and provided with means to prevent it revolving independent of said tubular portion.

4. In combination with a rotary shuttle having a cylindrical body and a cover of less diameter than the inside of said body, said cover being provided with a rim or flange extending at right angles to the face thereof, of an automatic intermittent tension device mounted on said cover and consisting of a spring-bar secured at or near its inner end to the inside of said cover, a tension-block secured to the outer end of said spring-bar and projecting through an aperture in said rim on said cover, and adapted to engage and momentarily hold the thread between it and the edge of the shuttle, and an eccentric-headed screw mounted in the cover adjacent to said spring-bar and adapted to be turned

to bear with more or less force against said bar to regulate its flexure.

5. In combination with a rotary shuttle having a cylindrical body and a raised center portion thereon provided with a stud or spur jutting out therefrom, of a driver having a dish-like cavity therein, the inner diameter of said cavity being a loose fit for said raised center portion on said shuttle, the outer diameter of said driver being about equal to the extreme diameter of the said body portion and having its outer edge beveled off to form a lead for the thread to pass between the shuttle and said driver, and a slot in the rim of said driver which is adapted to contain said spur on said shuttle.

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