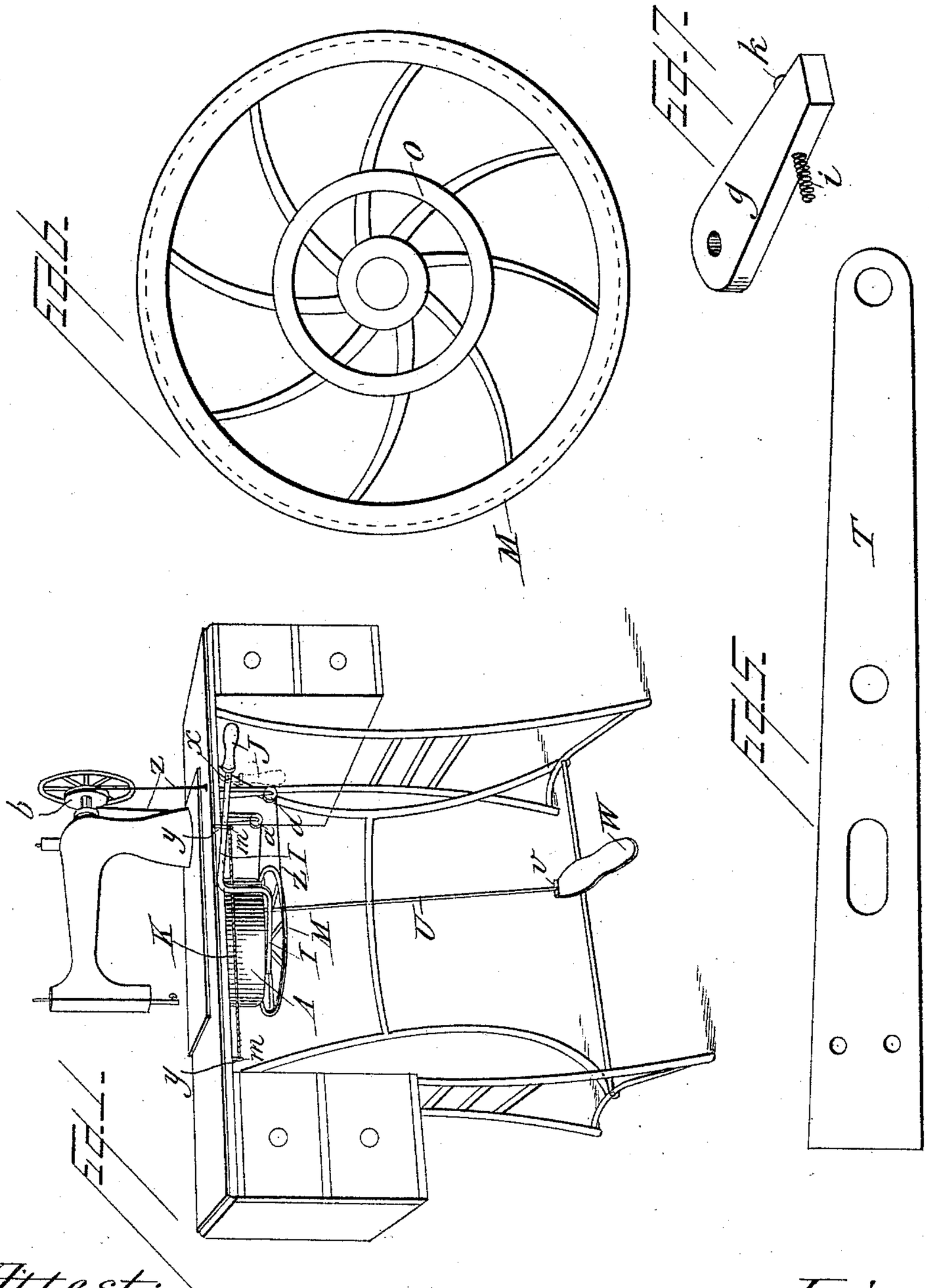
(No Model.) 2 Sheets—Sheet 1.

E. S. REED & C. T. PAINTER.

SPRING MOTOR.

No. 444,905. Patented Jan. 20, 1891.



Attest:
F. H. Schott
Wm. C. Boyden.

Inventor
Eli S. Reed
Carl T. Painter
per Fred E. Tasker, Atty

(No Model.)

2 Sheets—Sheet 2.

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FIG. 2.

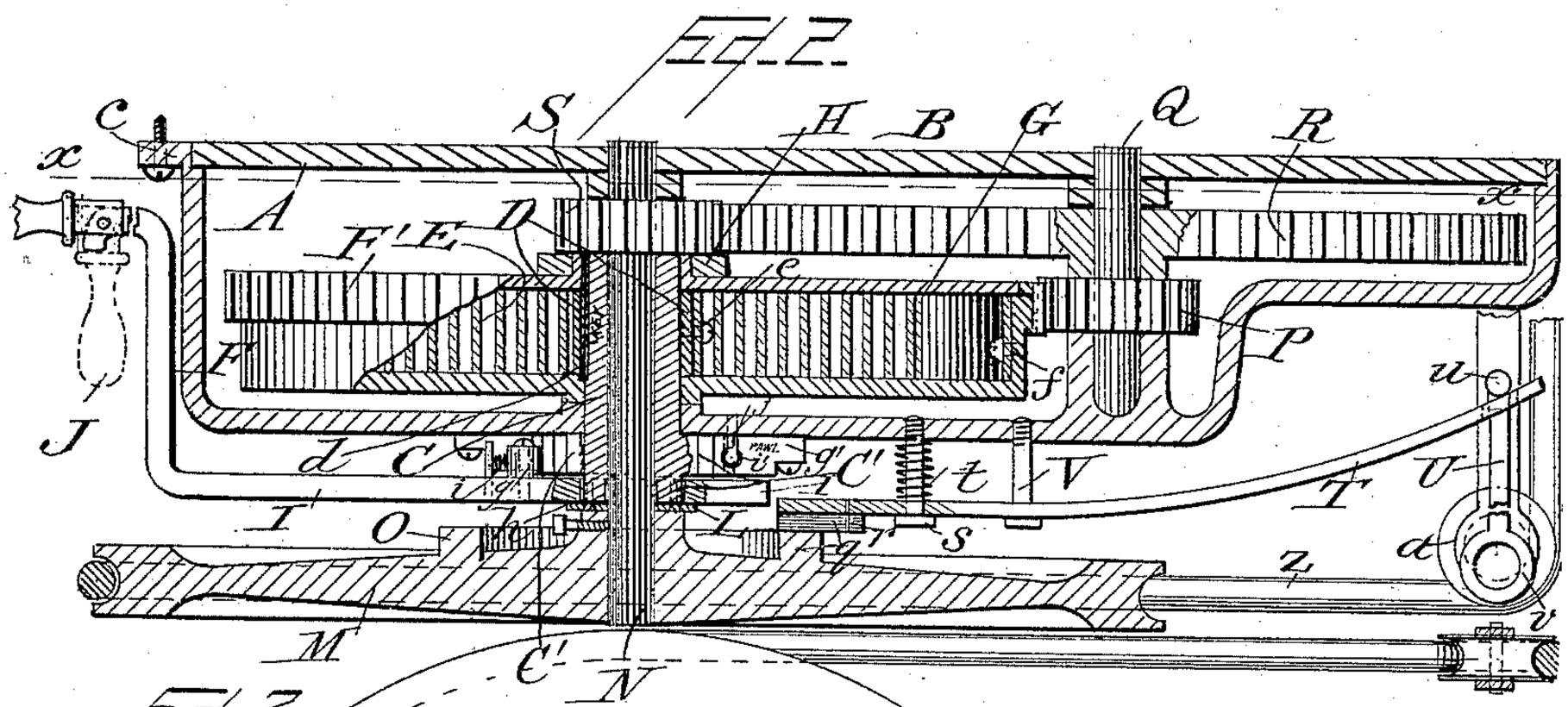


FIG. 3.

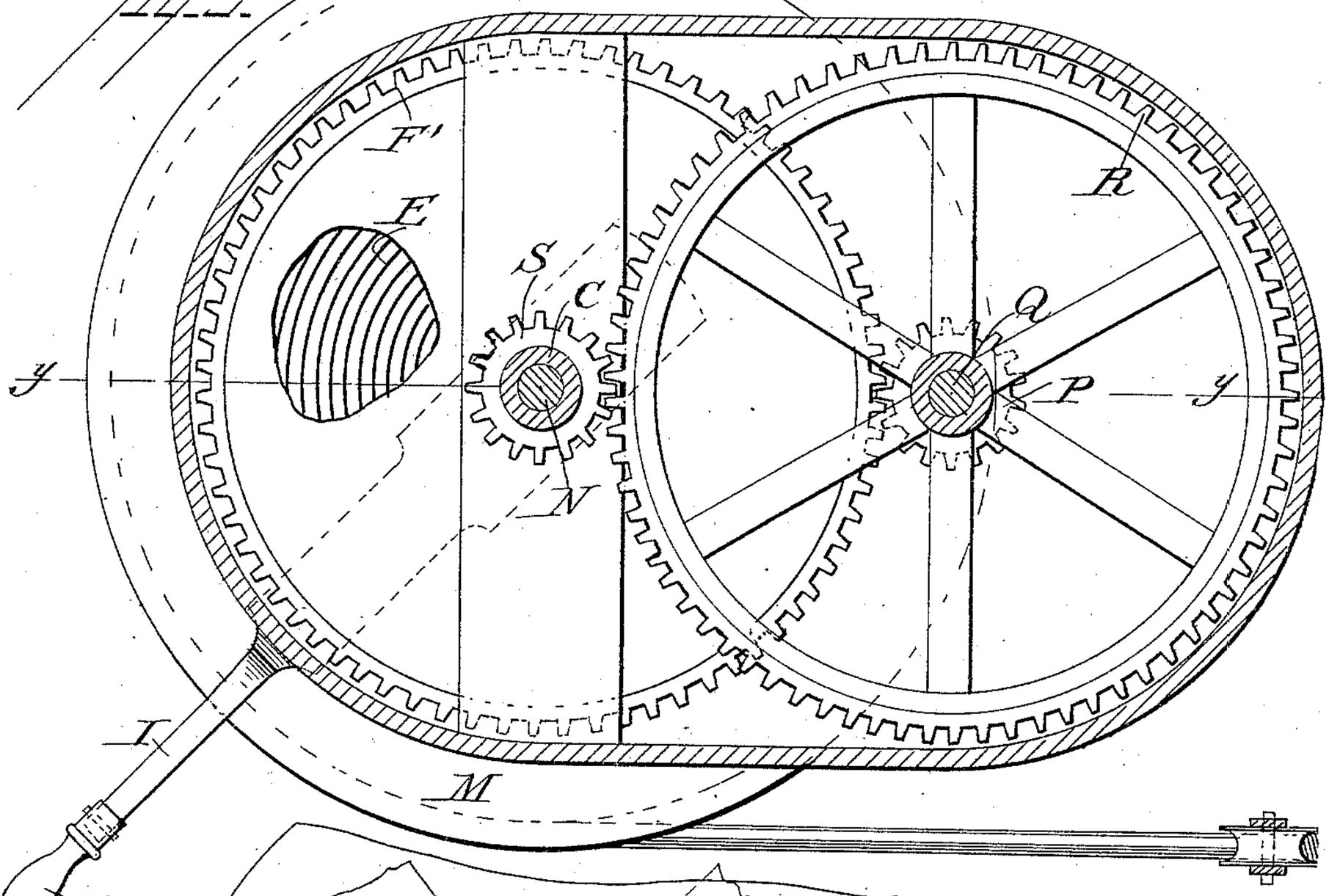
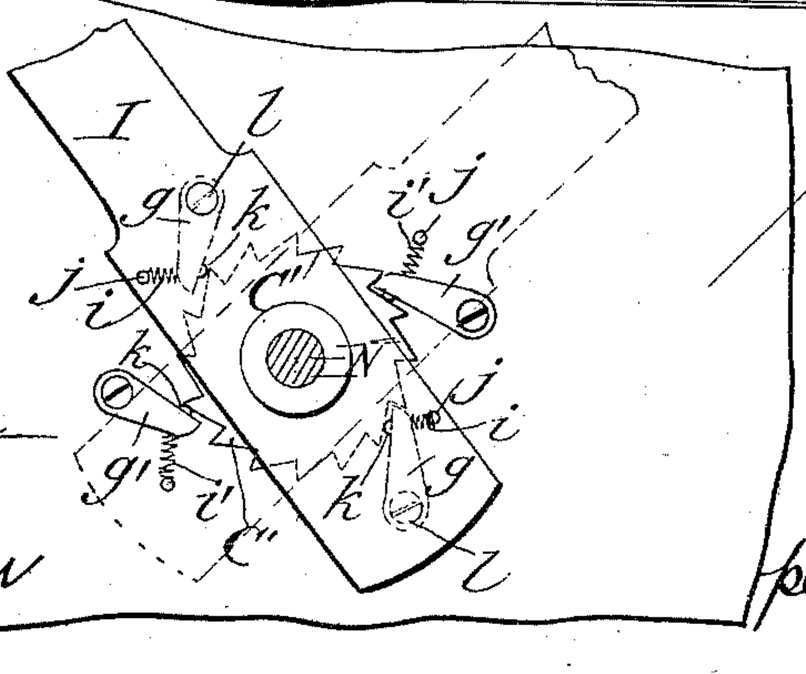


FIG. 4.



Attest:
F. H. Schott
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Inventor
Eli S. Reed
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Attys

UNITED STATES PATENT OFFICE.

ELI S. REED AND CARL T. PAINTER, OF CHATTANOOGA, TENNESSEE, ASSIGNORS TO THE UNIVERSAL SEWING MACHINE MOTOR ATTACHMENT COMPANY, OF SAME PLACE.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 444,905, dated January 20, 1891.

Application filed March 17, 1890. Serial No. 344,264. (No model.)

To all whom it may concern:

Be it known that we, ELI S. REED and CARL T. PAINTER, citizens of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Spring-Motors; and we declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improvement in spring-motors, adapted especially for the purpose of driving sewing-machines, but also useful for actuating other kinds of light machinery, the object of the invention being to provide a simple, cheap, and efficient motor consisting of few parts, which may be easily wound up, readily and speedily applied to any kind of a sewing or other machine, quickly stopped or started, and which will conform in as great a degree as possible to the multitude of requirements demanded of a motor of this kind; and the invention therefore consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

In the annexed drawings, illustrating our invention, Figure 1 is a perspective view of a sewing-machine, in connection with which our improved spring-motor is arranged in operative position. Fig. 2 is a cross-sectional view of our improved spring-motor on the line *y y* of Fig. 3. Fig. 3 is a sectional plan view on the line *x x* of Fig. 2. Fig. 4 is an enlarged detail view of a part of the winding-lever, ratchet-pawls, and adjacent parts. Fig. 5 is a detail plan view of the brake-lever. Fig. 6 is an enlarged plan view of the main driving-wheel. Fig. 7 is a detail perspective view of one of the pawls.

Like letters of reference designate like parts throughout all the different figures of the drawings.

A denotes the main casing of the motor, which may be of any suitable size and shape, and which is designed to be located directly beneath the table of the sewing or other machine and secured thereto, so that it may be out of the way and may occupy as small a space as possible. The casing contains the mechanical parts of the motor. This casing is provided with a top plate B, which has on its lower sides bosses or bearings to receive the upper end of the main shaft N and shaft Q. Further, the main casing has, as shown in Fig. 2, a flange *c*, preferably half-way round its upper edge, which flange is provided with screw-holes therein, through which pass attaching-screws for the purpose of rigidly fastening the casing A, and consequently the motor, to the bottom of the sewing-machine table. On the lower end of the shaft N and below the main casing is a band-wheel M, having a grooved periphery which receives a belt *z*. This belt passes around the band-wheel M, thence to the small band-pulleys *a a* near the end of the sewing-machine table, (see Fig. 1,) then upward through holes bored in the table, and then around the band pulley or wheel *b* on the driving-shaft of the sewing-machine, so that in this way the connection is made directly with the wheel on the drive-shaft.

F denotes the main geared drum, having at its upper edge a neatly-turned and nicely-finished rabbet which allows the cap-plate G or cover of the drum to fit neatly therein. (See Fig. 2.) Within the drum F is the coiled spring E, the tension of which in unwinding serves to actuate the gearing. One end of the spring E is secured to the stud *e* on the outer surface of the thimble D, while the other end of the spring is fastened to the stud *f* on the inside of the drum. The sleeve or thimble D surrounds the ratchet-tube C, which extends upward through drum F and inside of thimble D, said thimble being slotted and rigidly secured to the ratchet-tube C by means of a key *d* entering the slot. On the upper side of the cap-plate G, at the center thereof, is a circular flange. This flange serves as a support for the small gear S, which is secured on the shaft N. H denotes a cross-bar located horizontally within the main casing A, passing between the gear S and the cap-plate G, the aforesaid flange on the upper side of the cap-plate entering the said cross-bar H and turning therein as a journal when the main spring geared drum revolves. Parallel to the shaft N is the shaft Q, which likewise has bearings in the main casing A. This shaft carries the large gear R, which engages with the small gear S, and it also carries the small pinion P,

which is in engagement with the large gear F′, whose teeth are formed on the outer surface of the drum F, so that in this way it will be noted that we have a train of gearing consisting of the drum-gear F′, the pinion S, the large gear R, and the pinion P, which is really a train of back gearing, whereby the drum-gear serves to actuate the shaft which passes through the ratchet-tube and which carries the main band-wheel M.

I denotes the winding-lever, the inner end of which is located horizontally below the main casing, said lever being perforated near its end for the passage therethrough of the vertical drive-shaft N, while the outer end of the lever is suitably bent to bring it into convenient proximity to the hand of the operator, and is provided with a drop-handle J, which is pivoted to the extreme outer end in such a way that it can be lifted into a position of horizontality for the purpose of being easily manipulated in the winding of the motor, or can be allowed to drop down to a vertical position, as shown in dotted lines in Fig. 2, where it is out of the way when not needed. The ratchet-tube C is formed integral with the ratchet C′, which lies directly beneath the main casing A.

The lever I carries two oppositely-located spring-actuated pawls which engage the ratchet-wheel C′. *g g* denote these lever-pawls, and *i i* their springs, which tend to press them into engagement with the teeth of the ratchet. On the bottom of the main casing is another pair of oppositely-located spring-actuated pawls *g′ g′* and their springs *i′ i′*. Thus we find here a series of four pawls, two on the lever and two on the frame, and all acting on the ratchet. As the lever moves in one direction, say to the right, (see Fig. 4,) the lever-pawls slip idly over the ratchet-teeth, engaging them successively, but producing no action thereon. When the lever moves in the reverse direction, the lever-pawls being in engagement, the ratchet will be partially rotated, and while this rotation is taking place the pawls on the main casing will drop into the teeth successively, and will thus hold the ratchet in whatever position the lever I may place it. The result of rotating the ratchet will obviously be to wind up or more closely coil the spring E, one end of which we have seen to be fastened to the sleeve or thimble, which is keyed to the ratchet-tube, which passes through the drum.

L designates a dividing-plate or support to hold the lever I in place on the lower end of the ratchet-tube below ratchet C′—that is to say, in position between the band-wheel M and the ratchet C′.

h designates a series of four screws, the number of course being variable at pleasure, which pass through said dividing-plate or support L into the lower shoulder or end of the ratchet-tube D for the purpose of securely fastening the said plate to the ratchet.

The pawls *g g* and *g′ g′* have on their back surfaces circular holes to receive the spiral springs *i i i′ i′*, which we have just mentioned, all of which springs press against the pins *j j j j*, which force the pawls into engagement with the ratchet C′. The pawls *g g* and *g′ g′* are also provided on their inside faces next to the ratchet at points near the teeth of the ratchet with circular holes which receive leather or rubber tips *k*, that project out just far enough to keep the faces of the pawls from striking the faces of the teeth of the ratchet, so as to avoid the disagreeable clicking noise which is otherwise heard when the machine is undergoing the winding operation. These pawls *g g* and *g′ g′* are supported upon the pivots *l l*, two of which are carried on the bottom of the main casing A and two on the winding-lever I. In Fig. 1 the winding-lever I is shown as having a guard or rest K just back of the drop-lever handle J, said guard or rest being secured to the bottom of the sewing-machine table by means of screws *m m*, located at each end of the guard K. These screws *m m* have each an outside rubber casing *y* thereon, which are adapted to be struck by the winding-lever I at each end of its movement as it operates from side to side.

On the upper side of the large band-wheel M is cast a friction-flange or integral circular rim or wheel, (see Fig. 2,) said rim being concentric with the wheel M.

We will now proceed to describe the brake devices by means of which the wheel M is stopped or started or held in any desired position.

T denotes the brake-lever, having at one end the shoe *q*, of leather or other suitably material, which is firmly secured thereto be means of the rivets *r r*. This shoe is adapted to bear upon the integral rim or flange O. The lever T is slotted at a point adjacent to the shoe *q* to permit the passage therethrough of the headed screw *s*, which is firmly attached to the under side of the motor-casing A, and which projects downward therefrom, said screw being enveloped with the coiled spring *t*, which bears upon the upper side of the lever T and tends to force the same downward, and thus hold the brake-shoe in contact with the flange O. Obviously when the brake-lever T is lifted the spring *t* will be compressed, and thus be in readiness to return the lever to its former position, where the shoe will bear upon the flange O as soon as the lifting force is removed from said lever T.

V designates another screw which is rigidly fastened to the under side of the casing A, and which projects downward therefrom and which is headed and connected to the lever T similarly to the headed screw *s*. This headed screw V serves as a fulcrum for the lever T. At the outer end of said lever is formed a slot, through which passes a rod U, having at one end a ball *u*, that rides on the upper side of the lever T, while at the other end of the rod U is a ring *v*, that is connected

to the treadle *w* of the sewing-machine. It will be evident, therefore, that by pressing upon the treadle *w* with the foot the rod U will be caused to bear downward upon the upper end of the lever T, thus pressing said lever downward upon the head of the screw V, and consequently upward upon the spiral spring *t*, and thus removing the friction-shoe *q* from the flange O, so as to start, stop, graduate, or regulate or govern the speed of the said wheel, and consequently of the motor. In this way the operator is given complete control of the speed of the machine and can stop or start it at pleasure.

The operation of our improved spring-motor as applied to sewing-machines or other light machinery will be obvious from the foregoing description of the construction and arrangement of the several parts. By giving the hand-lever I a few reciprocations in a horizontal direction the spring will be coiled to its highest tension. The brake will hold the parts immovable until it is desired to start the sewing or other machine, and then by simply pressing the foot upon the treadle the brake can be released and the parts started. Evidently the drum-gear under the actuation of the internal spring will begin to revolve, and thus set in motion the train of back gearing, thereby actuating the shaft which carries the main wheel M, and thus moving the belt *z* and transmitting power to the driving-shaft of the sewing-machine.

Reference is here made to the pending applications for Letters Patent on spring-motors filed by Eli S. Reed, May 29, 1890, one of which has the Serial No. 353,622 and the other Serial No. 353,623, which applications contain certain claims which cover features found in this application.

The particular construction of the winding mechanism illustrated in Fig. 4 of the drawings in this case is not claimed herein, it not being the joint invention of Reed and Painter, but the sole invention of Eli S. Reed, and the same is therefore claimed in a pending application of said Reed for Letters Patent on a spring motor filed May 29, 1890, Serial No. 353,622.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a spring-motor, the combination, with a spring-driven train of gearing which includes a geared drum containing the drive-spring, of a winding-ratchet having an integral part thereof serving as a journal for the geared drum, a sleeve surrounding said journal within the drum, one end of the spring being attached to said sleeve and the other end to the drum, said sleeve being itself connected to the said integral part of the ratchet, and the drive-shaft with its drive-wheel, said shaft being actuated by the gearing and said wheel being belted to the driven machine.

2. In a spring-motor, the combination of the drum having a geared rim, the spring within the drum, the winding-ratchet having an integral tube on which the drum revolves, the sleeve or thimble surrounding said tube within the drum and connected to the tube, to which sleeve one end of the spring is attached, the shaft within said tube carrying the main drive-wheel, and the multiplying-gearing connecting the geared drum and shaft for actuating the latter.

3. The combination, in a spring-motor, of the drum having a geared rim, the spring within the drum, the winding-ratchet having an integral tube on which the drum revolves, the drive-shaft within said tube carrying at its lower end a drive-wheel, the sleeve on the tube within the drum, to which sleeve one end of the spring is attached, and a parallel shaft carrying a pinion that engages the drum-gear and a gear-wheel that engages a pinion on the drive-shaft.

4. The combination of the drum having a geared rim, the spring within the drum, the winding-ratchet having an integral tube on which the drum revolves, a thimble or sleeve surrounding said tube, to which one end of the spring is connected, the drive-shaft within the ratchet-tube carrying at its lower end a drive-wheel, the gearing connecting the geared drum with the drive-shaft, and the winding-lever with its pawls for operating the winding-ratchet.

5. The combination of the drum having a geared rim, the spring within the drum, the winding-ratchet having an integral tube on which the drum revolves, the drive-shaft within said tube carrying at its lower end a drive-wheel, the plate connected to the lower end of the ratchet-tube below the ratchet, the winding-lever on the lower end of the ratchet-tube between said plate and the ratchet, said lever being provided with pawls for operating the ratchet, and the gearing connecting the drum with the drive-shaft.

6. In a spring-motor, the combination, with the drive-wheel, of the brake-lever, the treadle connected to one end thereof, the fulcrum-pin supporting said lever, and the spring-provided screw arranged in connection therewith, substantially as described.

7. The combination, with the drive-wheel, of the brake-lever T, the screw-pin V, supporting it, the spring-provided screw *s*, the rod U, and the treadle, substantially as described.

8. In combination with the drive-wheel M, having the integral concentric flange O, the brake-lever T, having shoe *q*, adapted to bear on the flange O, the screw V, supporting the lever, the spring-provided screw *s*, the rod U, having the ball *u* and the eye *v*, and the treadle connected to said rod, substantially as described.

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CARL T. PAINTER.

Witnesses:
W. R. ROWLES,
J. W. ROPER.