(No Model.) 2 Sheets—Sheet 1.

A. P. GATHRIGHT.

MOTOR.

No. 455,459. Patented July 7, 1891.

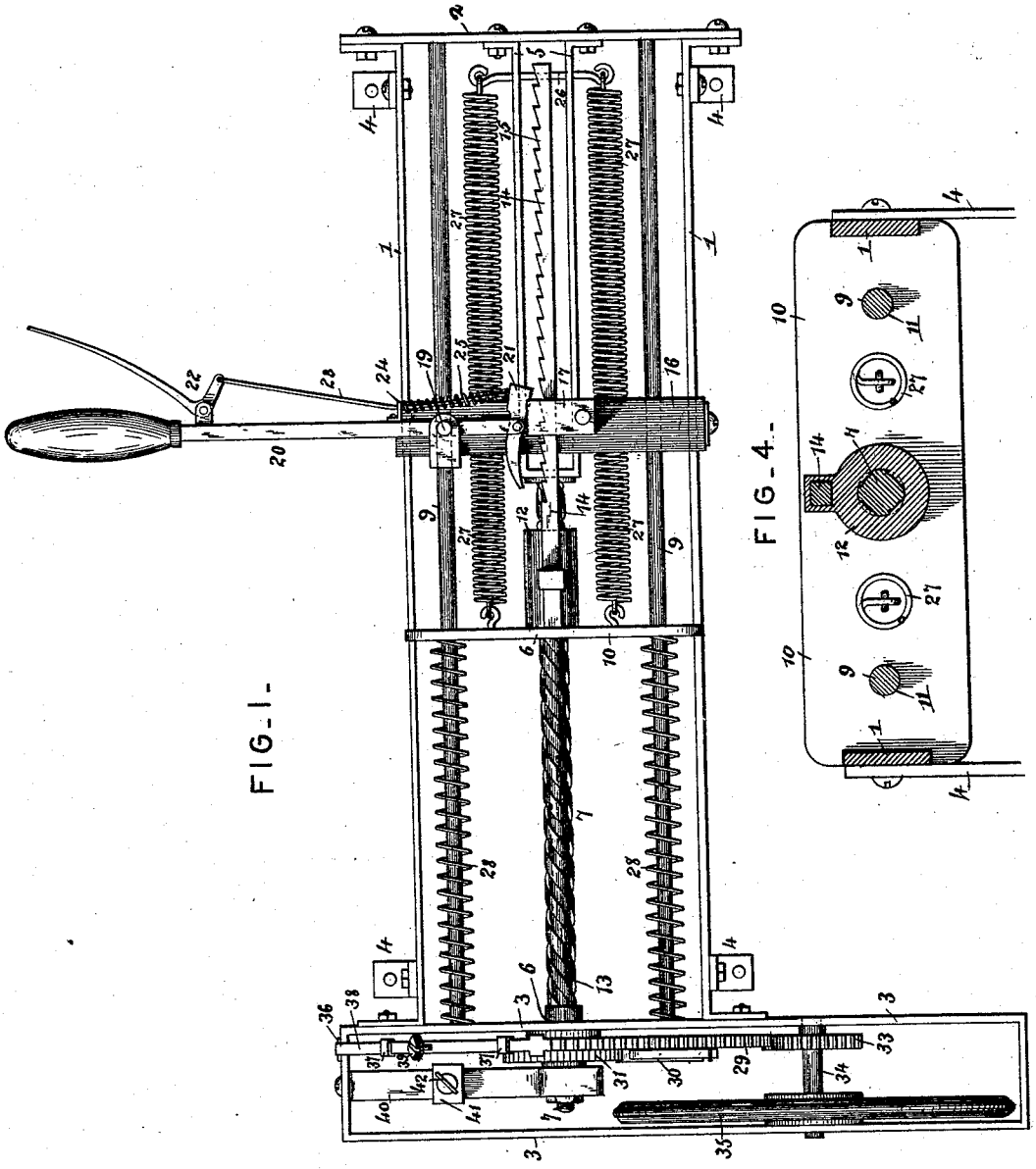


FIG. 1.

FIG. 4.

Witnesses:

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W. S. Duvall.

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

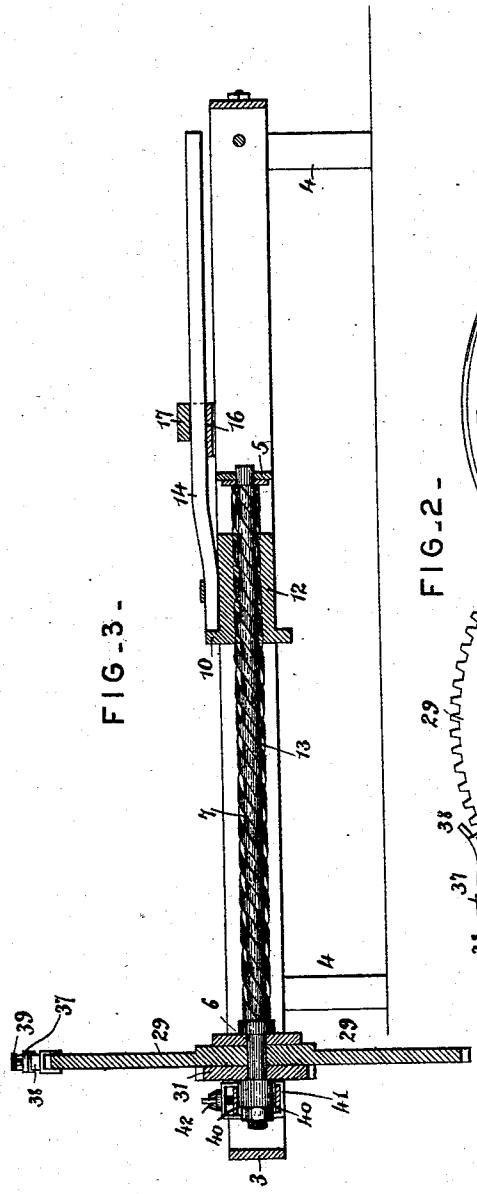
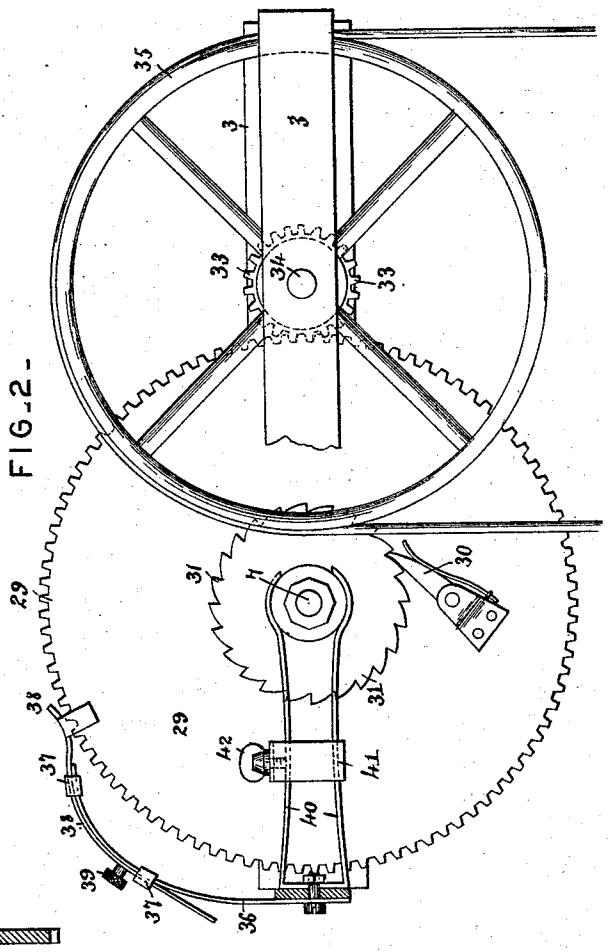


FIG. 2.



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UNITED STATES PATENT OFFICE.

ALBERT P. GATHRIGHT, OF MERIDIAN, MISSISSIPPI.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 455,459, dated July 7, 1891.

Application filed January 17, 1891. Serial No. 378,119. (No model.)

To all whom it may concern:

Be it known that I, ALBERT P. GATHRIGHT, a citizen of the United States, residing at Meridian, in the county of Lauderdale and State of Mississippi, have invented a new and useful Motor, of which the following is a specification.

This invention has relation to improvements in spring-motors adapted for running light machinery, and is especially adapted for operating sewing-machines.

The objects of the invention are to provide a spring-motor of cheap and simple construction adapted to receive its motive power from the simple form of coiled spring, to provide means for placing the spring or springs under tension and for converting their strength into rotary power, and, furthermore, to provide a means for regulating the expending of the power.

Other objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a plan of a motor constructed in accordance with my invention. Fig. 2 is an end elevation. Fig. 3 is a vertical longitudinal section. Fig. 4 is a transverse section.

Like numerals of reference indicate like parts in all the figures of the drawings.

In practicing my invention I construct a frame-work which consists of opposite longitudinal side bars 1, connected at their outer ends by a transverse end bar 2. The opposite or inner ends of the side bars are fastened to an oblong transverse frame 3, disposed at a right angle to the main frame, and the two frames are bolted together and supported by suitable legs 4. To the end bar 2 of the main frame there is secured an inwardly-disposed bracket 5, having a bearing at its inner end, which is longitudinally opposite a similar bearing 6 in the side bar of the frame 3. In these bearings there is mounted for rotation a shaft 7, the inner end of which extends beyond the bearing 6 and into the frame 3. The cross-bar 2 and the side bar of the frame 3 forming the cross-bar at the opposite end of the machine are connected at each side of the shaft 7 by means of guide-rods 9.

10 designates a yoke-plate, the opposite ends of which are recessed or bifurcated to loosely embrace the opposite longitudinal side bars of the main frame. This yoke-plate is provided with perforations 11 for the passage of the guide-rods, and from its rear face there projects a bored stud 12 for the reception of the shaft 7. The shaft 7 between its bearings is provided with spiral grooves 13, and above the stud there projects rearwardly from the yoke-plate a bar 14, provided upon one side with rearwardly-disposed teeth 15, combined to form a ratchet or rack-bar. A transverse strap or supporting-bar 16 spans the distance between and connects the two longitudinal side bars, and upon the same is mounted a guide-block 17, through which the rack-bar passes. At one side of the block there is pivoted to the supporting-bar, as at 19, a lever 20, to the inner end of which is pivoted a pawl 21, the inner end of which is designed to engage the rack-bar. A bell-crank 22 is pivoted to the lever, and a rod 23 leads from the lower end of the bell-crank to the outer end of the ratchet, said rod passing through a bracket-eye 24, between which and the ratchet and coiled about the rod is a spring 25, serving to normally disengage the pawl from the teeth of the rack-bar. By operating the bell-crank lever it will be apparent that said pawl will be thrown into engagement with the teeth of the bar.

A transverse-pin 26 passes through the bearing-bracket of the main frame, and the opposite ends of said pin protrude at each side of the bracket. Coiled springs 27 have their outer ends connected to the pins and their inner ends connected to the yoke-plate and serve to draw the plate toward the outer end of the main frame. Auxiliary springs 28 encircle the guide-rods between the side bar of the supplemental frame and the yoke-plate and aid the main springs in forcing the yoke-plate to the rear.

Loosely mounted upon the shaft 7 within the oblong transverse frame 3 is a large gear 29, having a pawl 30, spring-pressed into engagement with a ratchet-wheel 31, fixed upon the shaft. The gear is loose upon the shaft and operates therewith when moved in one direction, by reason of its pawl engaging with said ratchet-wheel, while at the same time said gear can move in the opposite direction

independent of the shaft, during which movement the pawl will ride over the teeth of the ratchet. The large gear engages and drives a small pinion 33, mounted upon a shaft 34 at the opposite end of the oblong frame 3, and upon said shaft is mounted a grooved pulley 35, which connects with the wheel of the sewing-machine, or may lead to the drive-wheel of any machine. Secured to one end of the frame 3 is a curved standard 36, formed of spring metal and provided with keepers 37, in which is located a spring metal curved friction-arm 38, terminating in a plate embracing the periphery of the large gear 29 and being adjustable upon the standard by means of a set-screw 39.

40 designates a pair of spring-clamping arms, secured to the end of the frame 3 and embracing the shaft 7 beyond the gear 29. A stirrup 41 loosely embraces the clamping-arms and a set-screw 42 projects through the stirrup and bears upon the arms, thus serving to clamp the arms upon the shaft.

In operation, the bell-crank lever is pressed so as to engage with the teeth of the rack-bar and the operating-lever thrown to the rear, which serves to force the rack-bar and the yoke inwardly. The pawl is then withdrawn and the lever thrown to the front, and said pawl swung into re-engagement with a succeeding tooth, and in this manner the rack-bar is fed. As the yoke moves to the front by reason of the spirally-bored stud thereof engaging with the grooves of the shaft 7, said shaft is rotated and its rotations are not imparted to the large gear 29 by reason of the fact that the pawl of said gear rides over the teeth of the ratchet of the shaft, and hence no connection is made between the shaft and ratchet. In order to prevent any possibility of the gear turning during this winding up of the spring and a storing of the power, I provide the curved spring-clamp heretofore described, which is moved over upon the periphery of the wheel and serves to retain the same against any movement whatever. By means of the set-screw and its stirrup, as heretofore described, said tension-arms may be clamped upon the shaft 7, and when the spring-clamp or brake is removed from the wheel the springs serve to draw the yoke-plate toward the outer end of the main frame, and in so doing rotate the shaft 7 and its gear, which latter imparts motion, through the medium of the pinion and pulley, to a machine to which it is desired to transmit power.

Having described my invention, what I claim is—

1. In a motor, the combination of the frame-work, a spirally-grooved shaft, a yoke having an opening fitting and receiving the shaft, springs for drawing the yoke in one direction, means for moving the yoke in the opposite direction, a gear loosely mounted on the shaft, a pawl on the gear, a ratchet fixed upon the shaft and normally engaging the pawl, and a device for locking the wheel against rotation during said movement of the yoke, substantially as specified.

2. In a motor, the combination of the frame-work, the spirally-grooved shaft, the gear-wheel, the sliding yoke having an opening fitting the shaft, springs for drawing the yoke in one direction, and means for operating the yoke in the opposite direction, of a tension device for said shaft, substantially as specified.

3. In a motor, the combination of the frame, the spirally-grooved shaft, the gear-wheel mounted on the shaft, the sliding yoke having an opening for the reception of the shaft, springs for drawing the yoke in one direction and means for operating the yoke in the opposite direction, a support, a pair of spring-clamps extending from the support and embracing the shaft, a stirrup embracing the clamps, and a set-screw passing through the stirrup and bearing against one of said arms, substantially as specified.

4. In a motor, the combination, with the spirally-grooved shaft, the frame-work for supporting the same, the reciprocating yoke, and means for reciprocating the same, of springs for drawing the yoke in one direction, a large gear having a pawl and loosely mounted on the shaft, a ratchet-wheel rigidly mounted on the shaft and engaged by the pawl, a curved spring-metal standard located opposite the periphery of the gear and provided with keepers, and a sliding spring-arm mounted therein bearing against the gear, and a set-screw for adjusting the arm upon the standard, substantially as specified.

5. In a motor, the combination, with the frame-work, the rotatable spirally-grooved shaft, and the wheel upon the same, of a sliding yoke grooved to receive and fit the shaft, a rack-bar projecting from the yoke, a lever pivoted at one side of the rack-bar, and a spring-pressed pawl for engaging the rack-bar, substantially as specified.

6. In a motor, the combination, with the frame provided at one end with an inwardly-disposed bearing-bracket and a bearing-opening aligning with an opening formed in the end of the same, a spirally-grooved shaft journaled in the opening, a wheel mounted upon the shaft, and a pin passing transversely through the bracket, of a yoke-plate mounted for reciprocation upon and having an opening receiving and fitting the shaft, a rack-bar extending rearwardly from the yoke, a lever pivoted at one side of the rack-bar, a pawl pivoted in the end of the lever, a spring for withdrawing the pawl, mechanism for throwing the pawl into engagement with the rack-bar, and a pair of coiled springs connected at their front ends to the yoke and at their opposite ends to the frame, substantially as specified.

7. In a motor, the combination, with an oblong frame, a bracket extending from one end of the frame inwardly, a spirally-grooved shaft journaled in the frame and in the end

of the bracket and extending beyond the end of the frame, a wheel mounted on said end, a yoke mounted on the shaft and having an opening fitting and receiving the shaft, coiled springs connected at their front ends to the yoke and at their rear ends to the end of the frame, rods passing through the yoke-plate and connecting the opposite ends of the frame, and coiled springs interposed between the yoke-plate and the inner end of the frame, of means for distending the rear coiled springs and compressing the front pair of springs, substantially as specified.

8. The combination, with the main oblong frame, the secondary frame located at one end of the same and disposed at a right angle thereto, the inwardly-disposed bearing-bracket, the bearing of which aligns with a bearing formed in the side of the secondary frame, a spirally-grooved shaft mounted in the bearings and having its inner end projecting into said secondary frame, a ratchet fixed upon the shaft, a gear loose upon the shaft at one side of the ratchet and having the spring-pressed pawl for engaging the same, a short shaft mounted at one side of the spirally-grooved shaft and carrying a pinion and pulley, the former engaged by the large gear, the tension-clamp embracing the grooved shaft, the means for locking the gear against movement, and the transverse pin passing through the bearing-bracket, of the pair of coiled springs connected to the pins and to the yoke, the latter being mounted upon the spirally-grooved shaft, bifurcated at its opposite ends to embrace the frame, the rack-bar extending rearwardly from the yoke, the guide-rods passing through the yoke, the coiled springs encircling the same between the front face of the yoke and the secondary frame, the pivoted lever having the bell-crank, the spring-pressed pawl, and the rod connecting the same with the rear end of the pawl, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

ALBERT P. GATHRIGHT.

Witnesses:
W. D. CAMERON,
W. W. HENRY.