(No Model.) 3 Sheets—Sheet 1.

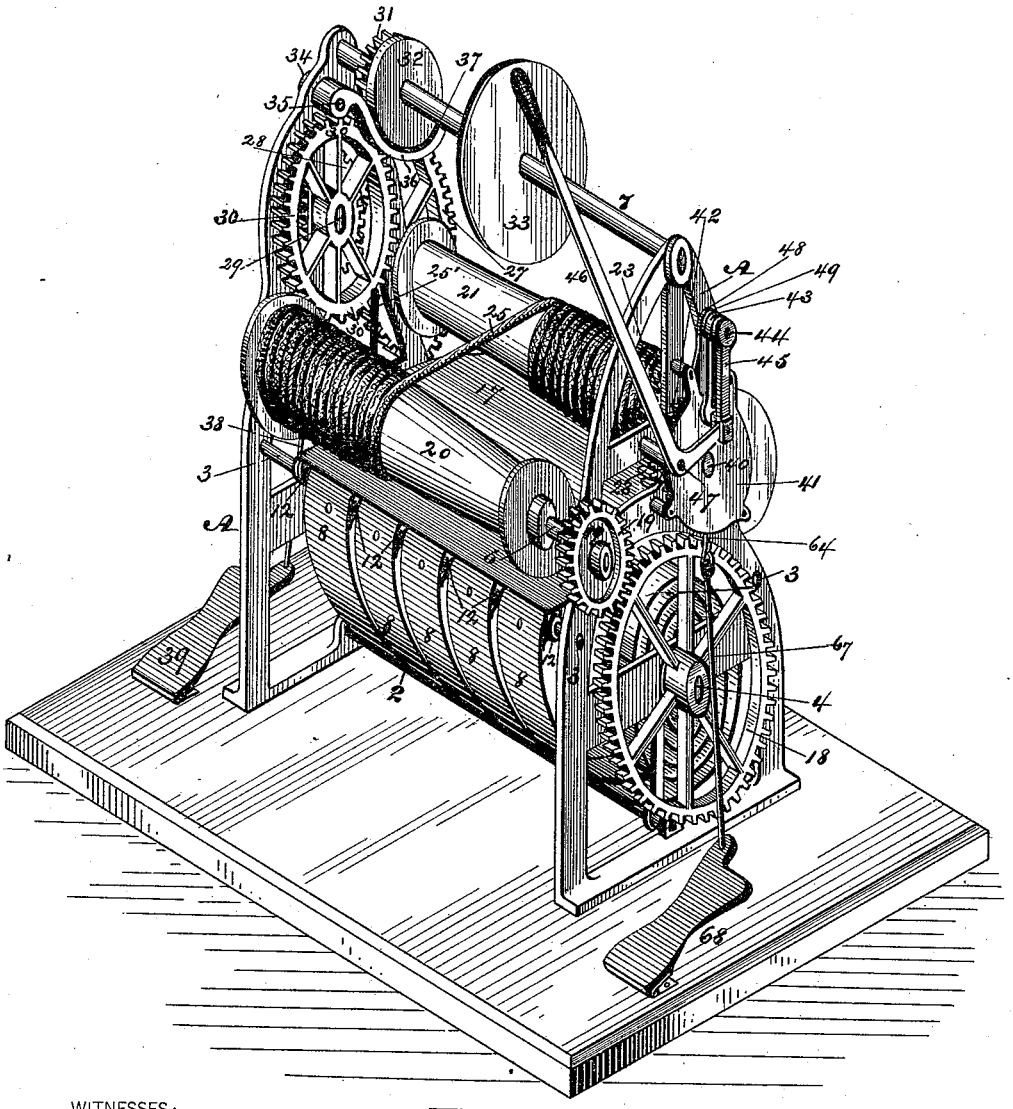
W. H. BAGLEY & A. C. NEALL.

C. E. NEALL, Administratrix of A. C. NEALL, Deceased.

SPRING MOTOR.

No. 421,650. Patented Feb. 18, 1890.

Fig. 1.



WITNESSES:

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C. F. Hoyer

INVENTORS:

Wm. H. Bagley

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BY John A. Wiedersheim ATTORNEY.

(No Model.) 3 Sheets—Sheet 2.

W. H. BAGLEY & A. C. NEALL.

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SPRING MOTOR.

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Fig. 2.

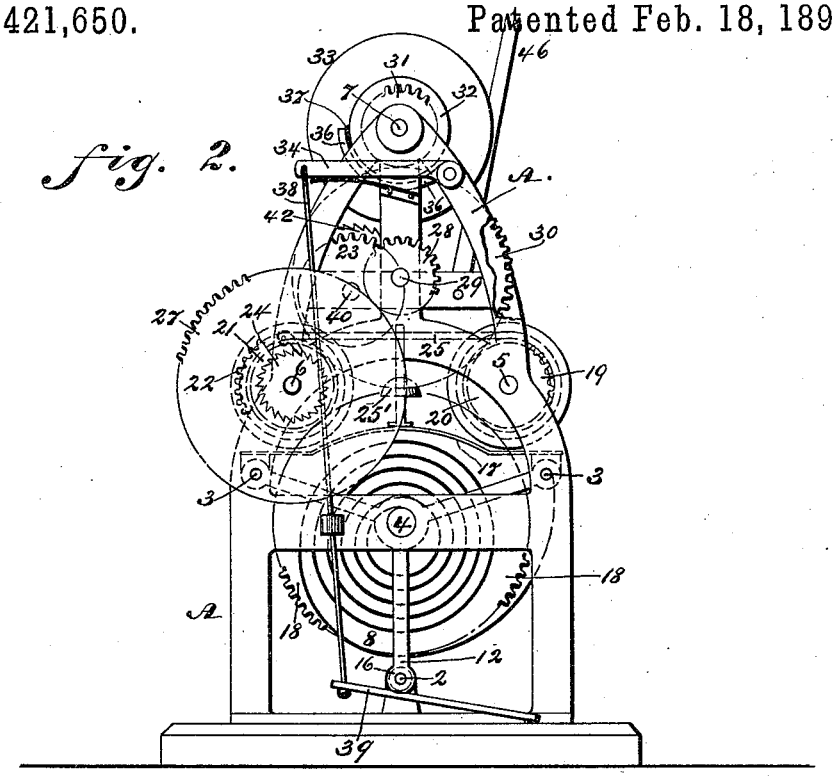


Fig. 3.

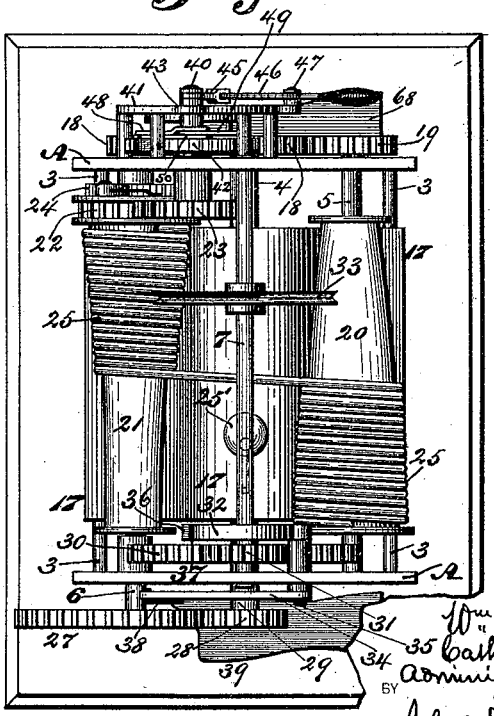
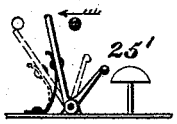


Fig. 8.



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(No Model.) 3 Sheets—Sheet 3.

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SPRING MOTOR.

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fig. 4.

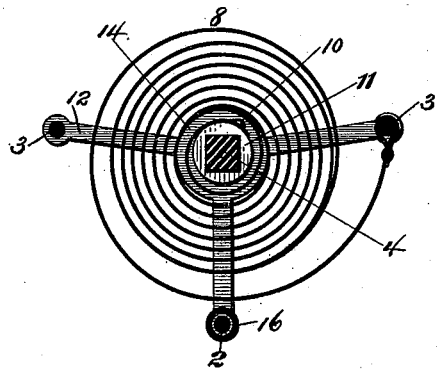


fig. 5.

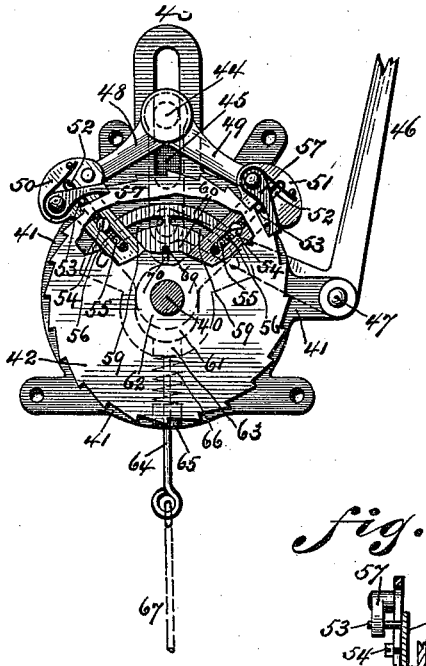


fig. 6.

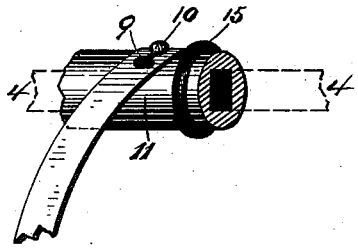
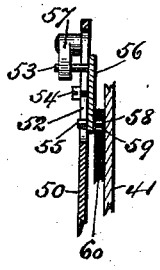


fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM H. BAGLEY AND CATHARINE E. NEALL, (ADMINISTRATRIX OF ALFRED C. NEALL, DECEASED,) OF PHILADELPHIA, PENNSYLVANIA.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 421,650, dated February 18, 1890.

Application filed August 23, 1889. Serial No. 321,796. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. BAGLEY and CATHARINE E. NEALL, (administratrix of the estate of ALFRED C. NEALL, deceased,) both residing in the city and county of Philadelphia, State of Pennsylvania, said ALFRED C. NEALL having also resided in the city and county of Philadelphia, State of Pennsylvania, do hereby state that the said WILLIAM H. BAGLEY and ALFRED C. NEALL have invented a new and useful Improvement in Spring-Motors, which improvement is fully set forth in the following specification and accompanying drawings.

This invention relates to a mechanical motor employing springs as the prime motive power; and it consists in the employment of specially-constructed winding and unwinding drums or cylinders, an automatic compound pawl-and-ratchet mechanism, and a novel form of brake, together with the general arrangement of the parts, as will be hereinafter more fully set forth.

Figure 1 represents a perspective view of the motor entire. Fig. 2 represents an end elevation thereof. Fig. 3 represents a top plan view thereof. Fig. 4 represents a transverse vertical section of a portion thereof. Fig. 5 represents a detail view of the compound pawl mechanism. Fig. 6 represents a detail perspective view of one of the springs in position. Fig. 7 represents a sectional view of a portion of the compound pawl mechanism. Fig. 8 represents a side view of the bell mechanism.

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

Referring to the drawings, A designates the supporting-frame, of suitable form and material, provided with a lower central tie-rod 2, two tie-rods 3 3, a power-shaft 4, having a square body, drum-shafts 5 and 6, and an upper power-transmitting shaft 7, which parts, in addition to their several functions, are combined to strengthen and give rigidity to the said frame. On the power-shaft 4 are mounted a series of springs 8, whose inner ends are constructed with slots 9, to engage studs 10 on arbors 11, which are formed with square openings to fit over the square body of shaft 4, and the outer ends of said springs are attached to one of the side tie-rods 3. A series of divisional guards 12, each comprising three integral arms, two of which are secured to the side tie-rods 3, and the other depending vertically for attachment to the lower tie-rod 2. These guards are formed with a central collar 14, through which passes the power-shaft 4 and the arbor 11, and are arranged on the outside of the two outer springs 8, and between all of the said springs to confine their coils in proper position. Between the central collars 14 of guards 12 and the arbors 11 of the springs a series of washers 15 are located and keep the parts in their adjusted position and prevent the springs from bearing on the collars 14 of the guards. The depending arms of said guards are held separated by collars 16, which are held stationary by a jam-nut on each side. A shield-plate 17 is connected at its two sides to the tie-rods 3, and covers the upper parts of the springs 8, and prevents contact therewith of parts above said springs. On the end of shaft 4 is keyed a master-gear 18, which meshes with a pinion 19 on the end of shaft 5, the latter shaft having thereon a convex conically-tapered drum 20. The shaft 6 has a concave conically-tapered drum 21 thereon, with its reduced end reversely arranged to that of the drum 20. One end of the drum 21 has a pinion 22 in connection therewith, meshing with a pinion 23, attached to the winding mechanism. Said drum 21 is also provided with a pawl and ratchet 24, to prevent a backward movement thereof. A cord or cable 25 is attached at its ends to the enlarged parts of said drums, and winds alternately upon each drum, and when fully wound strikes the arm of a gong or bell 25', to prevent straining of said cord or cable. A gear 27 is secured on the projecting end of shaft 6, and meshes with a pinion 28 on the end of a short shaft 29, and upon the opposite end of the latter shaft is secured a gear 30, meshing with a pinion 31 on the power-transmitting shaft 7. Shaft 7 has a brake-disk 32 thereon, and a pulley 33, from which power is taken.

An arm 34 is attached at the upper part of one side of the frame, and has a spring there-

under and impinging thereagainst to hold the same in a normally-elevated position. The said arm is secured to the end of a short horizontal shaft or pintle 35, to the opposite end of which is connected a curved brake-arm 36, carrying a shoe 37, of rubber or analogous material, adapted to bear against the brake-disk 32. The upper end of a pull-rod 38 is attached to the free end of the arm 34, and extending down through a suitable guide on the frame is connected to the rear end of a treadle 39, and by depressing said treadle the brake is withdrawn from contact with the disk 32 against the counteracting resilient effort of the spring under arm 34, which normally keeps the said brake in contact with the disk.

The pinion 23 is keyed to one end of a shaft 40, having bearing in the side of the frame, and in a plate 41, supported at a distance from said frame. A ratchet-wheel 42 is mounted on shaft 40 at a point outside of the frame, and between the same and the outer plate 41. The upper part of the plate 41 is provided with a slotted extension 43, in which is mounted a pin 44, having a link-arm 45 attached to the outer end thereof, and to the latter is secured the short member of an elbow-lever 46, fulcrumed on a rod 47, secured to the frame and provided with an elongated arm or lever projecting upward within convenient and accessible distance of an operator. Two arms 48 49 are pivotally attached to the inner end of pin 44, and to said arms are movably secured two arms 50 51, having apertures at their lower ends adapted to pass over shaft 40, and are formed also with elongated slots 52 in the body thereof for the purpose of receiving retention and actuating pins 53, 54, and 55 on the inner side of a pressure-block 56. The central pin 54 is a headed stud adapted to hold the pressure-blocks 56 in connection with the arms 50 51, which, in connection with the lower pins 55, retain the said pressure-blocks in a normally-adjusted position, and the upper pins 53 are adapted to bear against spring-actuated pawls 57 and lift them from engagement with the ratchet-wheel 42. The said pawls are arranged in the same direction and are thereby capacitated for push-and-pull pawls.

Pins 58 project from the outer faces of the pressure-blocks 56 and have movement in curved slots 59 in a slide-plate 60, mounted against the outer plate 41. The plate 60 is constructed with a central elliptical opening 61, through which projects a bearing-shoulder 62 of the plate 41 and limits the vertical movement of said plate 60. A lug 63 is formed with the lower end of plate 60, and has a rod 64 secured thereto, which passes through a guide 65, attached to the lower end of plate 41, and is encircled by a coiled spring 66, having bearing at its upper and lower ends against the lug 63 and guide 65. This spring tends to keep the plate 60 normally elevated and thereby throw the pawls 57 out of engagement with the ratchet-wheel 42. The lower end of the rod 64 is formed with an eye, to which is attached the upper end of a pull rod or cord 67, connected at its lower end to a foot-treadle 68. A headed pin 69 passes through a slot 70 in plate 41 into the plate 60, and avoids a lateral displacement of the latter plate in either direction.

The arms 50 51 are depressed by pushing the lever 46 backward, and thereby the pawls 57 are brought into proper position with relation to the ratchet-wheel 42. The treadle 68 is pressed downward and the plate 60 lowered, together with the blocks 56, thus allowing the springs of pawls 57 to force said pawls into engagement with the ratchet-wheel 42. By a reciprocation of the lever 46 the ratchet-wheel is given a substantially-continuous rotation, which is imparted to the motor-springs through the intermeshing-gear, and at the same time the cord is unwound from the drum 20 and wound upon the drum 21. To start the mechanism in motion, the treadle 39 is depressed to release the brake-arm 36 from contact with the brake-disk 32, and the motor-springs and connecting-gearing released to impart motion to shaft 7 and to pulley 33. During this operation the cord will wind back on drum 20 from drum 21.

Having thus described the invention of WILLIAM H. BAGLEY and ALFRED C. NEALL, deceased, what is claimed as new, and desired to secure by Letters Patent, is—

1. A spring-motor comprising a series of springs, two conical rollers arranged as set forth, the winding mechanism operated by a treadle and lever, the brake operated by a treadle, and the gearing, substantially as described.

2. A spring-motor having a winding mechanism consisting of two pawls carried by pivoted arms, pressure-blocks having retention and actuating pins and mounted on said arms to control the depression of the pawls, the spring-actuated slide-plate, the ratchet-wheel, and the treadle and lever, substantially as described.

3. A spring-motor having a winding mechanism consisting of pivotally-connected vertically-reciprocating arms, carrying pawls and mounted in connection with a plate supported adjacent to a ratchet-wheel, a spring-actuated slide-plate operated by a treadle, and an elbow winding-lever, substantially as described.

4. A winding mechanism for a spring-motor, consisting of a ratchet-wheel, in connection with the spring-shaft, arms 50 and 51, pivoted to the ratchet-wheel shaft and carrying pawls and pressure-blocks, a slotted slide-plate for holding the pawls in engagement with a ratchet-wheel, the pull-rod and treadle in connection with the slide-plate, and the winding-lever, substantially as described.

5. A spring-motor comprising two conical drums or rolls, one of which is convex and the other concave, and having their enlarged ends oppositely situated, a cord connecting

the drums and adapted to wind thereon, a series of springs forming the prime motive power for said drums, the gearing connecting said springs and drums, to actuate the latter, and the winding devices, substantially as described.

6. A spring-motor comprising a main shaft, a series of springs attached to said shaft, as set forth, a series of guard-plates having arms for separating said springs, two conical rollers constructed and arranged as set forth and connected by a cord, the shield-plate between the springs and rollers, the winding mechanism operated by a treadle and lever, a brake operated by a treadle, and the gearing, substantially as described.

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Administratrix of the estate of Alfred C. Neall, deceased.

Witnesses:
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L. JENNINGS.