

(No Model.)

2 Sheets—Sheet 1.

P. A. TARBOX.
SPRING MOTOR.

No. 590,533.

Patented Sept. 21, 1897.

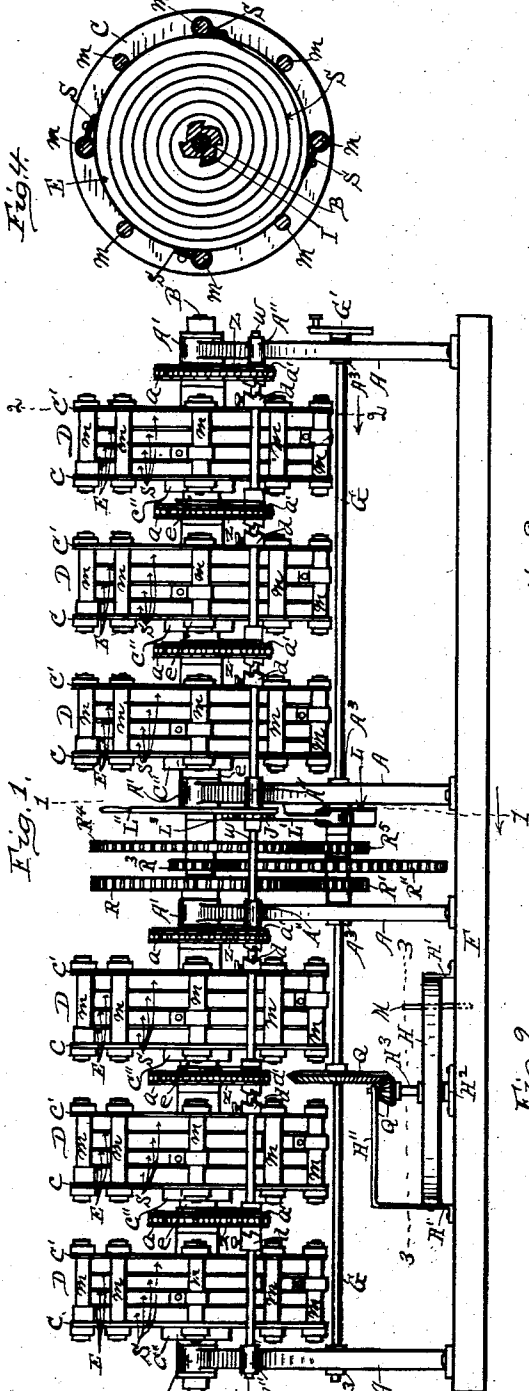


Fig. 1.

Witnesses,
Wm Hutchins.
Wm Henion

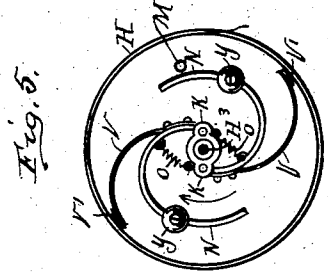


Fig. 5.

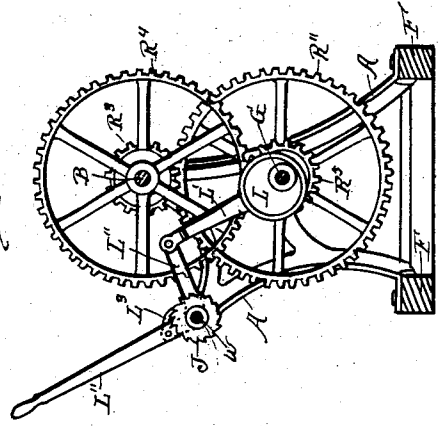


Fig. 3.

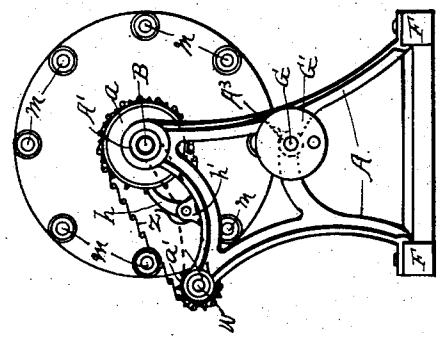


Fig. 2.

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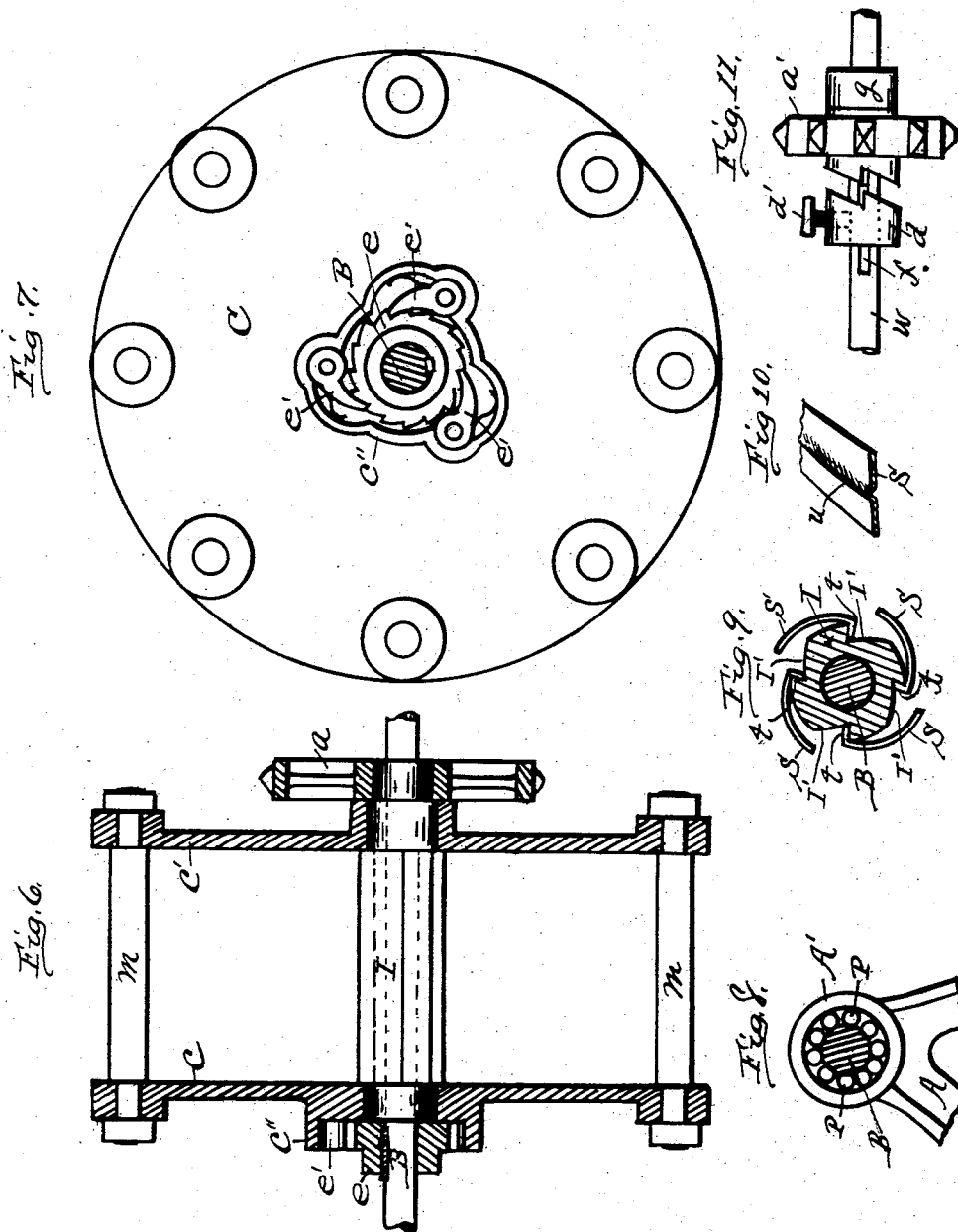
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2 Sheets—Sheet 2.

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Witnesses
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Inventor
Pascal A. Tarbox

UNITED STATES PATENT OFFICE.

PASCHAL A. TARBOX, OF JOLIET, ILLINOIS.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 590,533, dated September 21, 1897.

Application filed October 30, 1896. Serial No. 610,554. (No model.)

To all whom it may concern:

Be it known that I, PASCHAL A. TARBOX, a citizen of the United States of America, residing at Joliet, Illinois, have invented certain new and useful Improvements in Spring-Motors, of which the following is a specification, reference being had therein to the accompanying drawings and the letters of reference thereon, forming a part of this specification, in which—

Figure 1 is a side elevation of the motor; Fig. 2, an end elevation of the same; Fig. 3, a cross-sectional elevation of the motor on line 1 1 of Fig. 1, looking in the direction of the arrow; Fig. 4, a cross-sectional view of one of the spring-heads of the motor, as on line 2 2 of Fig. 1, looking in the direction of the arrow; Fig. 5, a plan view of the motor's governor, taken on line 3 3 of Fig. 1, looking down; Fig. 6, a detailed sectional view of one of the spring-heads of the motor with the springs thereof removed; Fig. 7, an end view of one of said heads; Fig. 8, a detailed view of one of the journal-bearings of the motor; Fig. 9, a detailed sectional view of the hollow spindle of one of said heads and of the shaft upon which the spindle is sleeved and a side view of the inner end portion of the springs of said head; Fig. 10, a detailed perspective of a section of one of the spiral springs of the motor, and Fig. 11 is a detailed side view of one of the winding-shaft clutches of the motor.

This invention relates to certain improvements in a multiple-spring motor; and it consists in certain novel constructions and arrangement and in certain novel combinations of parts, which improvements are fully set forth and described in the following specification and pointed out in the claims.

Referring to the drawings, A represents a set of standards which are secured to a platform F and thus form the frame of the motor, and each said standard is provided with journal-bearings A' and A³ and with side extending boxes A''.

B is a shaft equal in length to the entire length of the motor and is placed in bearings A' and has disposed thereabout in each said bearings a series of antifriction-rolls P, as shown in Fig. 8, and placed on each end portion of said shaft between said bearings is a

set of spring-drums or spring-heads D D D, a set of spring-winding sprocket-wheels *a*, fixed on the spindles of said heads, and a set of ratchet-wheels *e*, fixed on said shaft, and between the inner or center bearings A' A' is a spur gear-wheel R, fixed on said shaft B, and a pair of connected spur-gears R³ and R⁴, sleeved on said shaft. The spring-heads D are made in duplicate, and each head comprises a hollow spindle I, sleeved on shaft B and made with a series of face offsets I', and a pair of end disks C and C', sleeved on the end portions of said spindle and connected together by means of a series of cross-rods *m* adjacent their periphery. (See Fig. 6.)

Fixed on one end of spindle I is a sprocket-wheel *a*, and fixed on shaft B adjacent disk C is a ratchet-wheel *e*, coming within an extending side case C'' of said disk, in which case C'' are placed spring-pawls *e'*, (see Fig. 7,) arranged to engage said ratchet-wheel and adapted, when the disk C is turned, to drive said ratchet-wheel and thereby drive shaft B.

Each head D is provided with a set of four spiral springs S, hooked, as at *t*, at their inner end and placed with said hooks each engaging an offset I' of spindle I in the manner represented in Fig. 9 and provided with loops at their outer end, placed on cross-rods *m* in the manner shown in Fig. 4, and sleeved on said spindle between said springs is a set of disks E (see Figs. 1 and 4) for the purpose of preventing said springs interfering with each other.

Placed in bearings A³ of standards A is a counter-shaft G, having sleeved thereon a pair of connected gears R' and R'', the smaller gear R' thereof being placed in mesh with and driven by gear R, and the larger gear R'' thereof being placed in mesh with and adapted to drive gear R³ and also the said connected gear R⁴, which in turn is arranged in mesh with and drives a smaller gear R⁵, which is fixed on said counter-shaft. Therefore by the use and arrangement of said gears said counter-shaft is by the action of shaft D driven at a much greater speed than said shaft B.

As a means of controlling the speed of said counter-shaft I have employed a governor comprising a stationary rim H, secured to platform F by means of feet H', a vertical spindle H², placed in a step-box H³ at its

lower end and supported at its upper end by means of a bearing H'' , a hub having side lugs $K K$, curved arms $N N$, hinged to said lugs and provided with adjustable weights $y y$, and with spring-arms $V V$, having wipers $V' V'$, adapted to engage the inner side of said rim, and coil-springs $o o$, arranged connecting said arms $N N$ with hub $K K$ for the purpose of yieldingly holding said arms $N N$ contracted. Fixed on said spindle H^3 is a bevel-pinion Q' , arranged in mesh with and driven by a bevel gear-wheel Q , which is fixed on counter-shaft G , as represented in Fig. 1, and when said counter-shaft is driven said spindle is driven at a much greater speed than said counter-shaft, and by centrifugal action the weighted arms $N N$ are expanded, overcoming the tension of their springs $o o$, and thus bringing the wipers $V' V'$ of arms $V V$ to bear against rim H , which serves as a brake to prevent too rapid speed of shaft G , as should said shaft tend to a greater speed than admitted by the governor the governor will tend to hold said wipers with increased tension, and thereby to maintain a uniform speed. Various speeds may be had by adjusting weights $y y$ on arms $N N$. If a more rapid speed is desired, weights $y y$ are adjusted in on arms $N N$, and if a less speed is desired said weights are adjusted out on said arms, as when said weights are adjusted in the leverage is decreased and greater force is required to expand them. Hence wipers $V' V'$ will then bear with less friction on rim H . And when said weights are adjusted out the leverage is increased and less force is required to expand them. Hence wipers $V' V'$ will then bear with increased friction on rim H . W is a shaft supported in the side boxes A'' of standards A and has sleeved thereon a series of sprocket-wheels a' , a wheel a' opposite each wheel a of the heads D , and placed about each pair of said wheels $a a'$ is a sprocket-chain Z .

One end of the hub of each wheel a' is formed as a clutch, and fixed on shaft W adjacent the opposite end of each said hub is a collar, as shown at g in Fig. 11, and adjustably feathered on said shaft adjacent the clutch end of each said wheel a' is a clutch-head d , placed on the feather, as shown at f in Fig. 11, and adapted to be moved into or out of engagement with the clutches of said wheels a' , and held at either adjustment by means of a hand-screw, as represented at d' in said figure. Fixed on shaft W is a ratchet-wheel J , and sleeved on said shaft adjacent said wheel is a bell - crank lever L'' , having a pawl L^3 , arranged to engage the teeth of said ratchet-wheel, and fixed on shaft G is an eccentric L , having the strap L' thereof arranged connecting one end of said bell-crank lever, as shown in Fig. 3.

Shaft W is designed as a winding - shaft, and initially eccentric-strap L' is disconnected from lever L'' and said lever is operated by hand, the operation of which, through the agency of its pawl L^3 and ratchet-wheel J ,

turns shaft W , and with it the clutch-heads d , and said clutch-heads are then set, consecutively, so as to engage the clutch-hub of wheels a' and thereby drive said wheels in consecutive order and through the agency of chains Z drive wheels a consecutively, and thereby wind the springs S of each head D in consecutive order until the springs of each head D shall have been wound, and placed operating against the face of each wheel a is a spring-pawl h , pivotally connected to a boss h' of standard A , as shown in full lines in Fig. 2, or to a bar U , supported at its ends by shafts B and W , as represented by dotted lines in said figure, and also shown in Fig. 1, which pawls are engaged by the teeth of said wheels a and prevent back turning of said wheels, and hence maintain the winding until paid out in the action operating shaft B .

When the winding of each set of springs S is thus completed, eccentric-strap L' is connected with lever L'' , and as shafts B and G are driven by the energy stored in said springs said lever L'' is operated, to in turn operate shaft W , by means of the pawl L^3 and ratchet-wheel J , and thus utilize a portion of the power stored to aid in rewinding certain ones of said sets of springs until all the power stored shall have been exhausted and it is again necessary to wind all of the springs by hand-power.

As a means of holding the motor from operation when the springs thereof are wound a pin M is placed in a hole of platform F in such position as to be in the path and prevent rotation of governor-arms $N N$.

Fixed on one end of shaft G is a crank-disk G' , from which power may be transmitted, or said disk may be substituted by a gear or pulley to suit circumstances in transmitting power.

The springs S are made with a central longitudinal corrugation, as shown at u in Fig. 10, which is for the purpose of increasing their stiffness, thereby rendering it possible to utilize a comparatively light-weight material in making the springs and at the same time attaining a tension equal to a much heavier material, and, further, in winding said springs said corrugations serve as a guide to uneven winding.

Having thus described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is as follows:

1. In the herein-described motor the spring-head comprising the hollow spindle provided with the face offsets, the disk-heads sleeved on the end portions of said spindle; the cross-rods connecting said disks adjacent their periphery; the pawl-case extending at the side of one of said disks; pawls arranged in said case and adapted to engage the teeth of a ratchet-wheel on the shaft upon which said head is mounted; a chain winding-wheel fixed on one end of said spindle; the multiple spiral springs, consecutively hooked, at their inner end, on the offsets of said spindle, and looped

consecutively, at their outer end, about said cross-rods; and the spring-dividing disks sleeved on said spindle, substantially as set forth.

5 2. In the herein-described motor; in combination with the spring-heads and their chain-gearred winding mechanism; the shaft supporting the drive-wheels of said gear; the
10 ratchet-wheel fixed on said shaft; the bell-crank lever sleeved on said shaft and pro-

vided with the pawl arranged to engage said ratchet-wheel; the motor counter-shaft; the eccentric fixed on said shaft and provided with a strap detachably connected with said bell-crank lever, substantially as and for the purpose specified. 15

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In presence of—

WM. J. HUTCHINS,
WILLIAM HENION.