No. 716,948. Patented Dec. 30, 1902.

W. J. SHORTILL.

ESCAPEMENT MOTION.

(Application filed Sept. 21, 1901. Renewed July 19, 1902.)

(No Model.) 2 Sheets—Sheet 1.

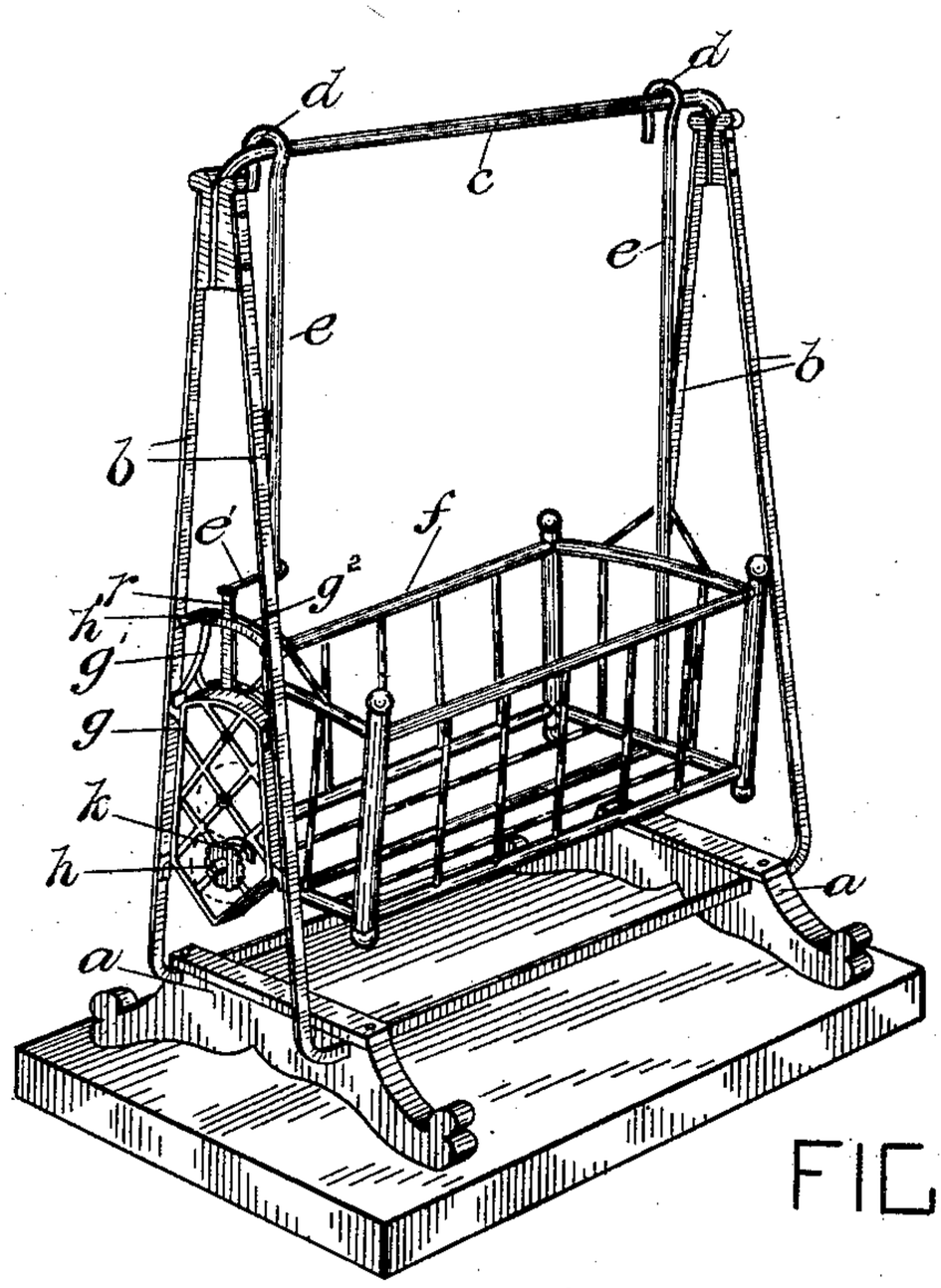

FIG. 1

FIG. 2

Witnesses
W. O. Guest
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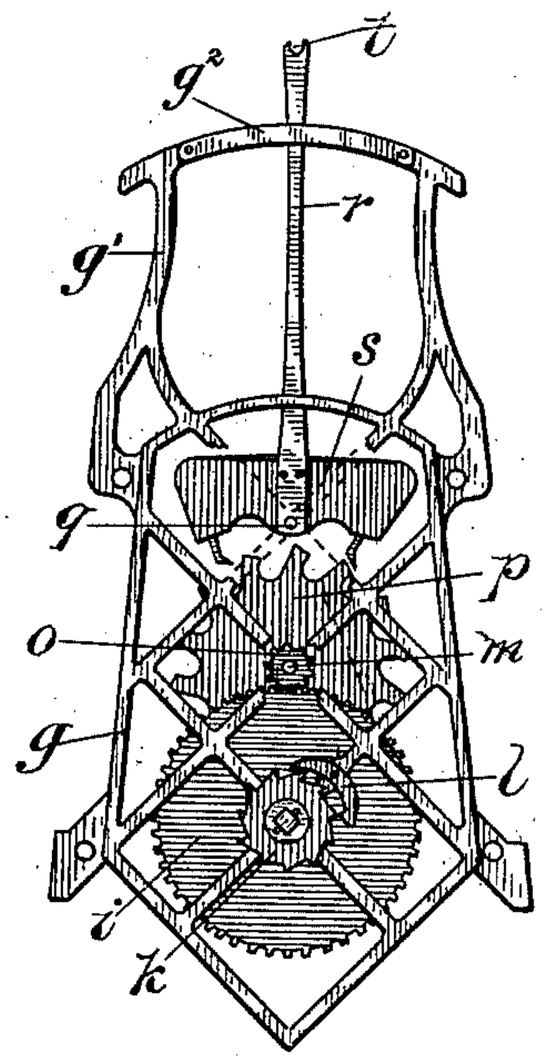

FIG. 3

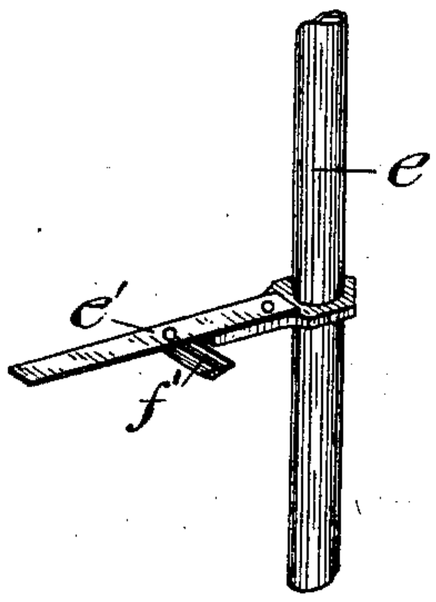

FIG. 4

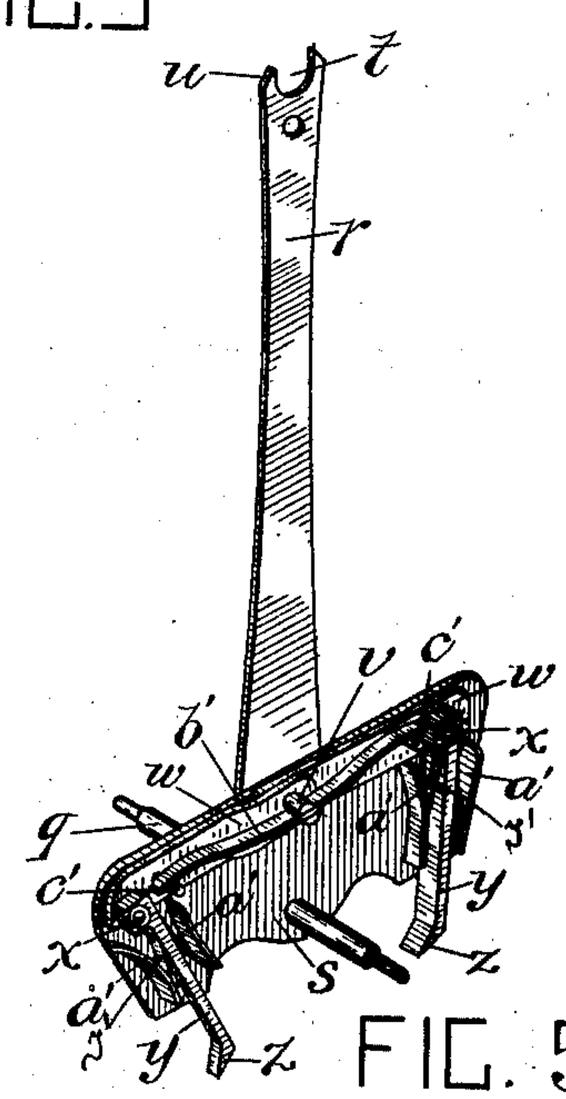

FIG. 5

Witnesses
W. L. Guest
L. F. Brock.

Inventor.
W. J. Shortill
by C. A. Locke
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UNITED STATES PATENT OFFICE.

WILLIAM J. SHORTILL, OF MARKDALE, CANADA.

ESCAPEMENT-MOTION.

SPECIFICATION forming part of Letters Patent No. 716,948, dated December 30, 1902.

Application filed September 21, 1901. Renewed July 19, 1902. Serial No. 116,210. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. SHORTILL, of Markdale, in the county of Grey and Province of Ontario, Canada, have invented certain new and useful Improvements in Escapement-Motions; and I hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to certain new and useful improvements in escapement-motions; and it relates more particularly to the peculiar construction and operation of the lever and pallets and the mechanism by means of which they are actuated.

In carrying out the invention the lever is fitted to the framework of the mechanism and is provided with a cross-head which is arranged substantially at right angles to the length of the lever and to the middle of which is pivoted two outwardly-directed arms carrying at their outer ends receding pivoted pallets, so disposed as to alternately engage the teeth of the scape-wheel. The scape-wheel is rigidly mounted on a rotatable shaft journaled in the framework of the mechanism and is fitted with a pinion-wheel the teeth of which engage with the teeth of the driving spur-wheel. Opposed to the lever is a pendulum-arm fitted with an impulse-pin arranged to register in the eye of the lever, the end of the lever being beveled to provide inclines at the sides of the eye, so that should the lever bank the impulse-pin will glide over the inclines and again engage with the eye of the lever as the pendulum-arm swings back, as hereinafter more fully set forth, and more particularly pointed out in the claims.

The invention can be adapted to many different purposes, and particularly to the escapes of a clock or the propelling motion of a cradle. To illustrate the invention, I have appended two sheets of drawings, showing it adapted for swinging a cradle, in which—

Figure 1 represents a perspective view of a cradle, showing the relative position of the various parts. Fig. 2 represents a side elevation of the escapement-motion looking at it from its obverse side. Fig. 3 represents a similar view of the escapement-motion looking at it from the reverse side. Fig. 4 represents an enlarged perspective view of the impulse-pin, showing it in a normal position; and Fig. 5 represents an enlarged perspective view of the lever and receding pallets.

Like letters of reference refer to like parts throughout the specifications and drawings.

a represents the base of the cradle, having at each end rigid standards *b*, supporting at their upper ends a rigid cross-bar *c*. Mounted on the cross-bar *c* are the eyes *d* of the swinging or pendulum arms *e*, from which is suspended the cradle *f*. Connected to the standard *b* at one end of the cradle *f* is the frame *g* of the escapement-motion. Journaled in the lower part of the frame *g* is a rotatable shaft *h*, upon which is loosely mounted a spur-wheel *i*. Coiled on the shaft *h* in juxtaposition to the spur-wheel *i* is the operating-spring *j*, one end of which is connected to the shaft *h* and the other end of which is connected to the spur-wheel. Rigidly mounted on the shaft *h* on the outer side of the frame *g* is a ratchet-wheel *k*, and engaging with the ratchet-wheel *k* is a gravity-dog *l* to prevent the reverse rotation of the shaft, so that the spring *j* can cause the forward rotation of the spur-wheel. The end of the shaft *h* on the outer side of the ratchet-wheel *k* is fitted to receive a key or winding-tool. Journaled in the frame *g* above the spur-wheel is a shaft *m*, upon one end of which is rigidly mounted a pinion-wheel *o*, engaging with the teeth of the spur-wheel *i*, and on the other end a scape-wheel *p*, engaging with the receding pallets of the lever. Connected to the frame *g* above the scape-wheel *p* is a stud *q*, upon which is rigidly mounted the inner end of the oscillating lever *r*. The inner end of the lever *r* is fitted with a cross-head *s*, while its outer end is bifurcated to provide an eye or crotch *t* for the impulse-pin. The outer end, top, and sides of the lever *r* are beveled to provide inclines *u* at each side of the eye or crotch *t*. Projecting from the middle of the cross-head *s* above the stud *q* is a pin *v*, upon which is pivotally mounted the inner ends of the pallet-arms *w*. The outer end of each of the pallet-arms *w* is fitted with a pin *x* in parallel alinement with the pin *v*, and loosely mounted upon the pins *x* are the pallets *y*, the outer ends of which are fitted with inclined teeth *z* to engage with the teeth of the scape-wheel *p*. Connected to the cross-head

s in juxtaposition to the pallets y are guides a' to limit the motion of the pallets during the swing or oscillation of the lever. Connected to the pallets y are springs y', which engage with the inner faces of the guides a' to cause the pallets to recede when the teeth of the pallets have been freed from engagement with the teeth of the scape-wheel. The object of the receding pallets is to prevent the impact of the scape-wheel on the pallets, and thus provide a silent-running motive power. In the case of a powerful escapement such as is required to run a cradle or large piece of mechanism it is necessary to prevent the dropping of the scape-wheel on the pallets, which noise, if permitted to exist, would be a source of endless annoyance. By means of the peculiar construction of the pallets with their receding springs and the teeth of the scape-wheel the pallet is not at liberty to recede until the run or draw is practically completed. Connected to the pin v is a curved spring or springs b', the ends of which engage with pins or lugs c', projecting outwardly from the adjacent faces of the pallet-arms w, the object of the spring being to maintain the arms in such position that the pallets will normally engage with the teeth of the scape-wheel during its rotation. The faces of the teeth d' of the scape-wheel are inclined to correspond to the inclination of the pallet-teeth z, so that during the rotation of the scape-wheel the inclined faces of its teeth will glide under the inclined faces of the pallet-teeth as the pallets are alternately raised during the oscillation of the lever. Projecting outwardly from the swinging or pendulum arm e, contiguous to the lever r, is an impulse-pin e', which is so arranged as to normally register in the eye or crotch t and engage with the ends of the lever r during the normal motion of the lever and swinging or pendulum arm. In the event of the lever r becoming banked during its oscillation the impulse-pin will glide over the inclines u and again engage with the eye on the return movement of the lever. The under side of the impulse-pin is fitted with a pivoted button or wedge f', by means of which the impulse-pin is raised above the level of the top of the lever to stop the mechanism and lowered into engagement with the eye of the lever when it is desired to start it again.

The frame g is provided with an outwardly-directed extension g', having a curved guide g^2, in which moves the outer end of the lever r, the motion of the lever being limited by buffers h', connected to the guide.

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

1. An escapement-motion consisting of a swinging lever, pallet-arms pivoted to the swinging lever, pallets connected to the pallet-arms, a spring connected to the lever engaging the pallet-arms to hold them in their normal position, a rotatable scape-wheel to engage the pallets and mechanism to rotate the scape-wheel in combination with a pendulum-arm and an impulse-pin connected to the pendulum-arm adapted to be actuated by the movement of the swinging lever, substantially as specified.

2. An escapement-motion consisting of a frame, a swinging lever pivoted to the frame, a cross-head for the lever, pallet-arms pivotally connected to the cross-head, a spring connected to the lever engaging the pallet-arms to maintain them in their normal position, pallets connected to the pallet-arms, inclined teeth for the pallets, a rotatable scape-wheel, the teeth of which are provided with inclined faces to engage the inclined teeth of the pallets, an eye for the swinging lever, the outer end of the swinging lever beveled to provide inclines at the sides of the eye in combination with a pendulum-arm, and an impulse-pin connected to the pendulum-arm adapted to register in the eye of the swinging lever and be engaged thereby, substantially as specified.

3. An escapement-motion consisting of a frame, a swinging lever pivoted to the frame, a cross-head for the lever, pallet-arms pivotally connected to the cross-head, a spring connected to the cross-head engaging the pallet-arms to maintain them in their normal position, pallets connected to the pallet-arms, inclined teeth for the pallets, a rotatable scape-wheel, the teeth of which are provided with inclined faces to engage the inclined teeth of the pallets, an eye for the swinging lever, the outer end of the swinging lever beveled to provide inclines at the sides of the eye in combination with a pendulum-arm, an impulse-pin connected to the pendulum-arm adapted to register in the eye of the swinging lever and be engaged thereby, and a button pivoted to the under side of the impulse-pin to disengage it from the eye of the swinging lever, substantially as specified.

4. An escapement-motion consisting of a swinging lever, pallet-arms connected to the swinging lever, pallets pivoted to the pallet-arms, a spring connected to the lever engaging the pallet-arms to hold them in their normal position, an eye at the outer end of the swinging lever the sides of the outer end of the swinging lever beveled to furnish inclines at the side of the eye in combination with the pendulum-arm, an impulse-pin connected to the pendulum-arm registering in the eye of the swinging lever and engaged thereby during the swinging movement of the same, and a button pivoted to the impulse-pin to disengage it from the eye of the swinging lever, substantially as specified.

5. An escapement-motion consisting of a swinging lever, pallet-arms connected to the swinging lever, pallets pivoted to the pallet-arms, a spring connected to the lever engaging the pallet-arms to hold them in their normal position, guides connected to the swinging lever for the pallets, receding springs connected to the pallets engaging the guides, a

rotatable scape-wheel to engage the pallets and mechanism to rotate the scape-wheel in combination with a pendulum-arm and an impulse-pin connected to the pendulum-arm adapted to be actuated by the movement of the swinging lever, substantially as specified.

6. An escapement-motion consisting of a frame, a swinging lever pivoted to the frame, a cross-head for the lever pallet-arms pivotally connected to the cross-head, a spring connected to the lever engaging the pallet-arms to maintain them in their normal position, pallets connected to the pallet-arms, inclined teeth for the pallets, guides for the pallets connected to the cross-head and receding springs connected to pallets engaging the guides, a rotatable scape-wheel the teeth of which are provided with inclined faces to engage the inclined teeth of the pallets, an eye for the swinging lever, the outer end of the swinging lever beveled to provide inclines at the sides of the eye in combination with a pendulum-arm, and an impulse-pin connected to the pendulum-arm adapted to register in the eye of the swinging lever and be engaged thereby, substantially as specified.

7. An escapement-motion consisting of a frame, a swinging lever pivoted to the frame, a cross-head for the lever, pallet-arms pivotally connected to the cross-head, a spring connected to the cross-head engaging the pallet-arms to maintain them in their normal position, pallets connected to the pallet-arms, inclined teeth for the pallets, guides for the pallets connected to the cross-head and receding springs connected to the pallets engaging the guides, a rotatable scape-wheel the teeth of which are provided with inclined faces to engage the inclined teeth of the pallets, an eye for the swinging lever the outer end of the swinging lever beveled to provide inclines at the sides of the eye in combination with a pendulum-arm, an impulse-pin connected to the pendulum-arm adapted to register in the eye of the swinging lever and be engaged thereby, and a button pivoted to the under side of the impulse-pin to disengage it from the eye of the swinging lever, substantially as specified.

8. An escapement-motion consisting of a swinging lever, pallet-arms connected to the swinging lever, pallets pivoted to the pallet-arms, a spring connected to the lever engaging the pallet-arms to hold them in their normal position, guides connected to the swinging lever for the pallets, receding springs connected to the pallets engaging the guides, an eye at the outer end of the swinging lever the sides of the outer end of the swinging lever beveled to furnish inclines at the side of the eye in combination with the pendulum-arm, an impulse-pin connected to the pendulum-arm registering in the eye of the swinging lever and engaged thereby during the swinging movement of the same, and a button pivoted to the impulse-pin to disengage it from the eye of the swinging lever, substantially as specified.

9. An escapement-motion consisting of a swinging lever, pallet-arms connected to the swinging lever, pallets pivoted to the pallet-arms, a spring connected to the lever engaging the pallet-arms to hold them in their normal position, guides connected to the swinging lever for the pallets, receding springs connected to the pallets engaging the guides, a rotatable scape-wheel to engage the pallets and mechanism to rotate the scape-wheel in combination with the pendulum-arm, an impulse-pin connected to the pendulum-arm adapted to be actuated by the movement of the swinging lever, and buffers to limit the motion of the swinging lever, substantially as specified.

Markdale, September 2, 1901.

W. J. SHORTILL.

In presence of—
ROBERT S. RAE,
J. W. MCARDLE.