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ELECTROMAGNETIC TOY ENGINE.

APPLICATION FILED DEC. 18, 1907.

Fig. 1.

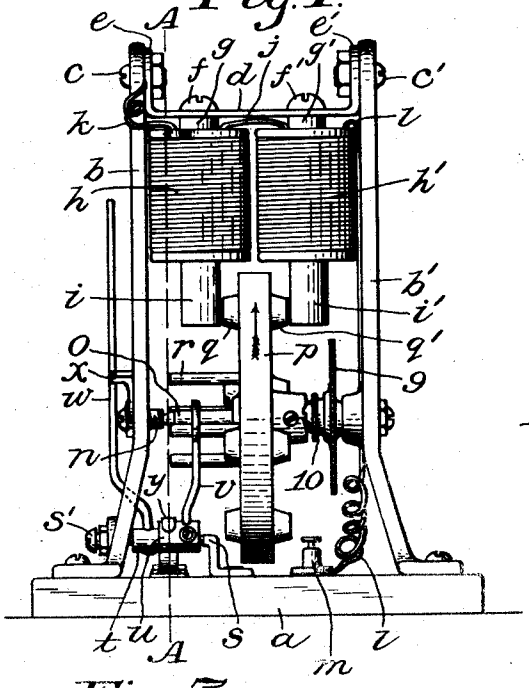


Fig. 2.

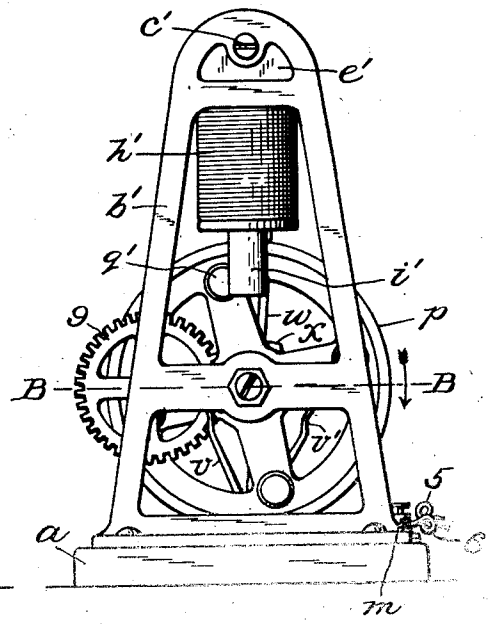


Fig. 3.

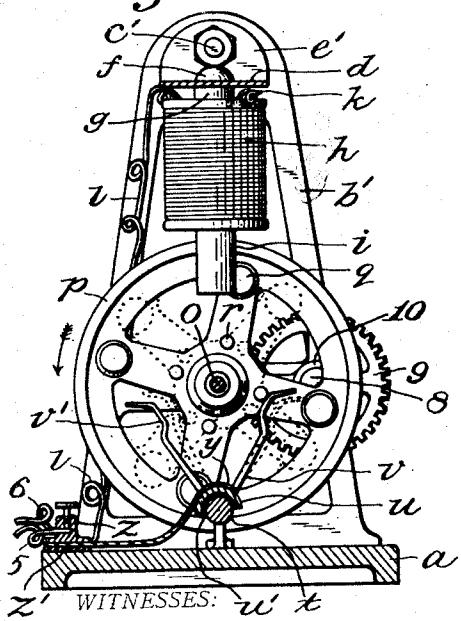
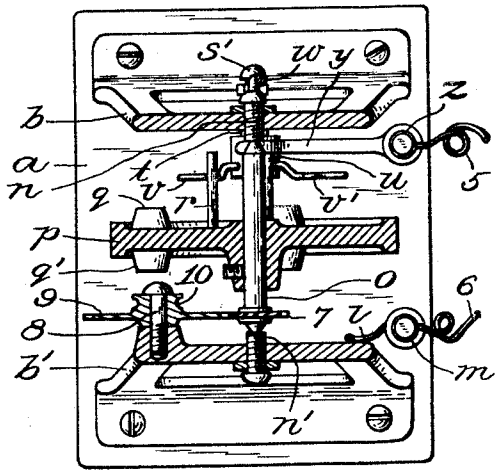


Fig. 4.



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ELECTROMAGNETIC TOY ENGINE.

No. 882,681. Specification of Letters Patent. Patented March 24, 1908.

Application filed December 18, 1907. Serial No. 407,000.

To all whom it may concern:

Be it known that we, HARRY G. HAWEKOTTE and HENRY W. KLAUSMANN, citizens of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Electromagnetic Toy Engines; and we do declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to operative toys, and it has reference particularly to electromagnetic toy engines.

Objects of the invention are to provide a simple and inexpensive toy engine to resemble or imitate practical steam engines or explosive engines, a further object being to provide a toy of the above-mentioned character that may be not only amusing but which may be utilized for driving toy machines of various kinds, a still further object being to provide an electro-magnetic toy engine that may be constructed at the minimum cost and be durable and economical in use.

The invention consists in an improved electro-magnetic engine comprising an upright frame, a pair of electro-magnet cores depending from the top of the frame and having suitable windings, a main shaft mounted in the frame, an armature wheel secured to the shaft and having armatures projecting from opposite sides thereof to be carried thereby between the magnet cores, the wheel being provided with pins at one side thereof to engage either one of two adjustable contact fingers for making and breaking the electric circuit, the fingers being controlled by a reverse lever, so that the engine may be adjusted to operate in either forward or backward directions. And the invention consists further in the parts and combinations and arrangements of parts as hereinafter particularly described and defined in the claims appended hereto.

Referring to the drawings Figure 1 is an elevation of one side of the improved engine; Fig. 2, an elevation of another side thereof; Fig. 3, a vertical sectional view approximately on the line A A in Fig. 1; and, Fig. 4, a horizontal sectional view approximately on the line B B in Fig. 2.

Similar reference characters in the different figures of the drawings designate like elements or features of construction.

In a practical embodiment of the invention, a suitable base plate *a* is provided that is adapted to lie horizontally, the base being preferably metallic, and on the top thereof two metallic upright frame members *b* and *b'* are suitably secured thereto, the uppermost portions of the members having each a screw-bolt *c* or *c'* connected thereto. A yoke *d* has flanged ends *e* and *e'* that are connected by the screw-bolts to the frame members, the yoke serving as a tie-bar for the upper portion of the frame, and it has two screws *f* and *f'* connected thereto whereby two magnet cores *g* and *g'* are secured to the under side of the yoke and extend downward therefrom in a vertical plane, the cores having suitable windings as *h* or *h'*, and have also projecting lower ends *i* and *i'* respectively that extend a suitable distance and considerably beyond the lower ends of the windings. The windings of the two cores are connected by a circuit wire *j*, the winding *h* being connected by a wire *k* to the frame member *b*, and the winding *h'* being connected by a wire *l* to a binding post *m* that is mounted on the base *a*. The frame members are provided with a pair of bearings *n* and *n'* that are arranged in a horizontal plane between the base *a* and the lower ends of the core extensions, the bearings being preferably screwed into the frame members and locked by means of locking nuts, the inner ends of the bearings being suitably adapted to rotatively support a main shaft *o* that has its ends journaled in the bearings, so that the main shaft is arranged horizontally.

An armature wheel *p* is suitably secured to the main shaft near the middle portion thereof, and has a suitable number of armatures *q* projecting from one side thereof, and a suitable number of similar armatures *q'* projecting from the opposite side thereof, the wheel being of suitable diameter so as to extend between the two core extensions *i* and *i'*, and the armatures are so arranged on the wheel that they may be carried between the core extensions and at suitable distances therefrom to be attracted by the energized cores. In this manner the magnetic power is applied to both sides of the wheel so that the wheel will run steadily on its bearings and not wabble as would be the case in cheap toy construction if the power were applied at one side only of the wheel intermittently, and

the bearings not close fitting. A suitable number of pins *r* project from one side of the wheel *p* for making electrical connections, the wheel being an electrical conductor, and electrically connected by means of the main shaft with the frame members. A journal bearing *s* is mounted on the base *a* and an opposite bearing *s'* is mounted in the lower portion of the frame member *b*, preferably being screwed into the frame so as to be adjustable and held by a lock-nut. A rock shaft *t* is journaled in the bearings *s* and *s'* and has a connector plate *u* secured thereto but electrically insulated therefrom by a layer of insulating material *u'*, the plate being curved and having two contact fingers *v* and *v'* fixedly mounted thereon, so that either finger may be moved to the circular path of the pins *r* to form contact therewith, the rock shaft being provided with a reverse lever *w* to be latched in connection with a suitable latch bar *x* mounted on the member *b*. A contact plate *y* normally rests on the plate *u* and is secured to a binding post *z* and insulated from the base *a* by insulating material *z'* or otherwise as may be desired. Circuit wires 5 and 6 are connected to the binding posts *z* and *m* respectively, to be connected to the two elements of a battery for energizing the electro-magnets.

In order to transmit power from the engine, a pinion 7 is suitably attached to the main shaft *o* and an axle 8 is mounted on the frame member *b'* and rotatively supports a gear wheel 9 that engages the pinion 7 and has a grooved pulley 10 attached thereto, so that a drive belt may be driven by the pulley to drive other toys.

In practical use, the direction of movement of the engine may be determined by means of the reverse lever *w* which may be shifted so as to move either the finger *v* or the finger *v'* to the path of movement of the pins *r*. In the present case four armatures are on either side of the wheel *p* and there are four pins *r*. When either armature is near the core extension and advancing thereto, contact will be made between a pin *r* and the finger *v* or *v'*, the contact being broken when the armature arrives at the core, and the momentum of the wheel will carry the other armatures forward in succession, as will be understood. The plate *y* permits the rock shaft *t* to move freely with the plate *u* sliding in contact with the plate *y*, so as to form electrical connection. Other results of the operation of the engine will be readily understood from the foregoing detail description of construction.

Having thus described the invention, what is claimed as new is—

1. In an electro-magnetic toy engine, the combination of two upright frame members having each a journal bearing, a yoke attached to portions of the frame members, two wound electro-magnet cores attached to the yoke and extending therefrom, the cores having extensions projecting beyond the windings thereof, a shaft mounted rotatively in the journal bearings, an armature-wheel secured to the shaft and extending between the extensions of the two cores and having a plurality of armatures on opposite sides thereof to be carried thereby between opposing sides of the two core-extensions.

2. In an electro-magnetic toy engine, the combination of a base, two upright frame members having each a bearing that is adjustable toward or from the other in horizontal direction, a shaft mounted rotatively on the bearings, a yoke secured to the frame members above the shaft, two armature cores attached to the under side of the yoke and extending towards the shaft, an armature-wheel secured to the shaft and carrying armatures on the two sides thereof between the lower ends of the cores, pins projecting from a side of the armature-wheel, a contact-finger mounted in the path of the pins, a binding post on the base in connection with the finger, and windings on the cores connected with the frame members.

3. In an electro-magnetic toy engine, the combination of a base, two upright frame members on the base, two binding posts on the base, a shaft mounted rotatively between the frame members above the base, a yoke attached to the uppermost portions of the frame members above the shaft, two magnet cores attached to the under side of the yoke and extending downward toward the shaft, an armature-wheel secured to the shaft and carrying armatures on the two sides thereof between the opposing sides of the lower ends of the cores, pins on one side of the armature-wheel, a bearing mounted on the base, a bearing mounted on one of the frame members, a rock shaft mounted on the two bearings and provided with a reverse-lever, a connector-plate secured on the rock shaft and insulated therefrom, a contact-plate in engagement with the connector-plate and having connection with one of the binding posts, two contact fingers on the connector-plate and movable to or from the path of the pins, windings on the cores connected together and to a frame member and also to the other binding post, a pinion secured to the shaft, an axle mounted on one of the frame members, a gear wheel on the axle and engaging the pinion, and a pulley carried by the gear wheel.

In testimony whereof, we affix our signatures in presence of two witnesses.

HARRY G. HAWEKOTTE.
HENRY W. KLAUSMANN.

Witnesses:
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E. T. SILVIUS.