

No. 634,667.

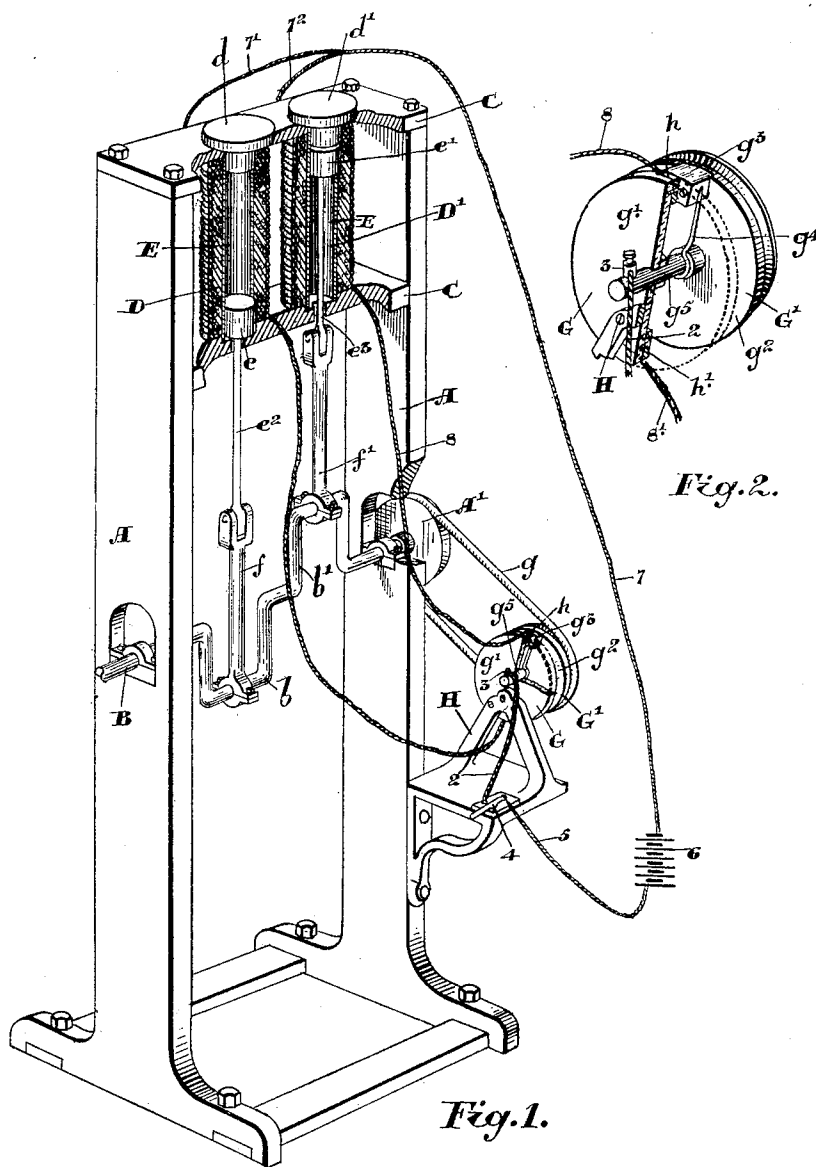
Patented Oct. 10, 1899.

G. H. B. HOOPER.

ELECTROMAGNETIC CYLINDER ENGINE.

(Application filed July 31, 1897. Renewed Mar. 28, 1899.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE H. B. HOOPER, OF TORONTO, CANADA.

ELECTROMAGNETIC CYLINDER-ENGINE.

SPECIFICATION forming part of Letters Patent No. 634,667, dated October 10, 1899.

Application filed July 31, 1897. Renewed March 28, 1899. Serial No. 710,837. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HENRY BINGHAM HOOPER, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Electromagnetic Cylinder-Engines, of which the following is a specification.

My invention relates to improvements in electromagnetic cylinder-engines; and the object of the invention is to design an electrical engine which will convert a reciprocating motion into a rotary motion economically and with a great deal more advantage than such motion is converted in an ordinary steam-engine and without any of the disadvantages of a steam-engine; and it consists, essentially, of a plurality of solenoids having longitudinal movable cores and rods connected to same and to the cranks of a suitable shaft, a peculiarly-formed commutator, and electric source of supply connected through the commutator to the solenoid-coils and so arranged as to operate successively on the cores of the solenoids, so as to raise them, as hereinafter more particularly explained.

Figure 1 is a perspective view showing merely two solenoid-coils and their coacting mechanism. Fig. 2 is a detail of the commutator.

In the drawings like letters and numerals of reference indicate corresponding parts in each figure.

Although I only show two solenoid-coils, it will be understood that I preferably use at least four, so as to eliminate the dead-center in the rotation of the shaft by reciprocating means. In this specification it is merely necessary to show two in order to exemplify my invention. It will be noticed that the shaft is broken away at one end.

A are suitable standards.

B is a crank-shaft provided with the cranks b and b' and suitably journaled on the standards A.

C C are cross-bars connecting together the tops of the standards, and D D' are solenoid-coils, and $d d'$ are the pole-pieces of the solenoids.

$e e'$ are the cores, which fit within the cyl-

inder centers of the solenoids and are designed to have longitudinal movement therein.

e^2 and e^3 are rods attached to or forming part of the cores e and e' . The rods e^2 and e^3 are connected by the connecting-rods f and f' to the cranks b and b' , respectively, of the main shaft B.

G is a commutator having affixed to one end thereof a pulley G', which is connected by a belt g to a pulley A' on the shaft. The commutator G consists of the disks g' and g^2 , forming part of the pulley G', the contact-block g^3 , the spring-finger g^4 , and the arbor g^5 , to which the finger is secured. The disk g' is secured at the lower end to a standard H, attached to or forming part of the main standard A. A wire 2 leads from a binding-post 3 to a switch 4, which is connected by a wire 5 to the battery 6. The battery 6 is connected by a wire 7 with branch wires 7' 7² to one end of the solenoid-coils D D', respectively. The block g^3 rotates with the pulley G' and has a wiping contact with the blocks h and h' , respectively, which are secured to the disks g' .

8 is the wire leading from the contact-block h to the solenoid-coil D', and S' is a wire leading from the contact-block h' and to the solenoid-coil D.

When the current is thrown in by the switch 4, it will pass (the parts being in the position shown in the drawings) through the wire 2, arbor g^5 , spring-finger g^4 , contact-block g^3 , contact-block h , wire 8, through the solenoid-coil D', wires 7² 7, back to the battery 6, and complete the circuit through the wire 5. When the core e' is drawn up completely, the spring-finger will have passed upon the contact-plate H' and the current will be cut out from the coil D' and pass through the wire S' to and through the coil D, magnetizing such coil and drawing up the crank b . As it is preferable to have four or more of these solenoid-coils and their crank connections, it will be seen that the current will be thrown successively into the coils, so that a continuous rotary movement is imparted to the shaft A. The natural tendency of the cores of the solenoid will of course be to drop of their own gravity when the current is cut out from the

coil by the commutator, as hereinbefore described. It will thus be seen that there will be no back pressure for the core to contend against similar to that in the steam-engine, and the cores acting in succession or in a prescribed order of rotation will impart a continuous rotary movement to the shaft by means of the connecting-rods, thus very effectually and advantageously converting a reciprocating motion into a rotary one.

What I claim as my invention is—

1. In combination, the vertical standards, the cross-bars extending between the upper parts thereof and connecting the same, the solenoids held between said cross-bars, the removable cores having rods depending therefrom, a crank-shaft extending between said standards below said solenoids, the rods connecting the cranks thereon to the core-rods, a commutator, a pulley on said crank-shaft,

a drive connection from said pulley to the commutator and the electric source of supply and the leads.

2. In combination a plurality of solenoids and cores and rods attached to the same, the connecting-rods, the shaft and cranks, an electrical source of supply, the common return-wires, the wire 5, switch 4, wires 8 8' commutator G deriving motion from the main shaft and suitably journaled, and consisting of the insulating-plate g' , contact-plates h h' to which the wires 8 8' are respectively connected, contact-block g^3 and spring-finger g^4 secured in the arbor g^5 to which the wire 5 is connected as and for the purpose specified.

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Witnesses:

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