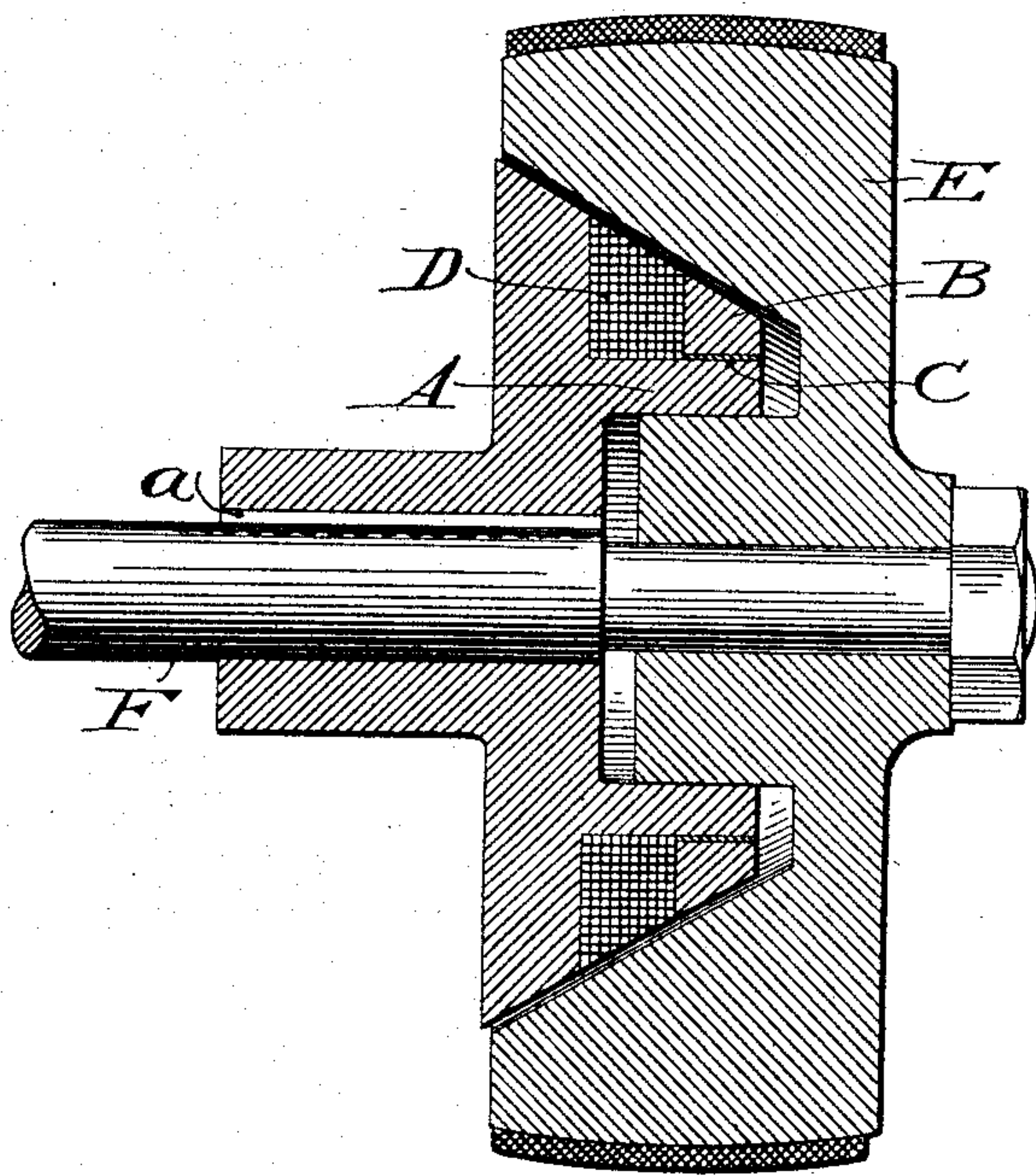


(No Model.)

G. A. BROWN.  
MAGNETIC CLUTCH OR COUPLING.

No. 505,025.

Patented Sept. 12, 1893.



Witnesses:

James F. Duhamel  
Horace A. Dodge.

GEORGE A. BROWN,  
Inventor,

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Attys.



# UNITED STATES PATENT OFFICE.

GEORGE A. BROWN, OF MUSKEGON, MICHIGAN.

## MAGNETIC CLUTCH OR COUPLING.

SPECIFICATION forming part of Letters Patent No. 505,025, dated September 12, 1893.

Application filed February 11, 1893. Serial No. 461,869. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE A. BROWN, a citizen of the United States, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Electro-Magnetic Clutches or Couplings, of which the following is a specification.

My invention relates to electro-magnetic clutches or couplings wherein connection of two parts is effected and maintained through the attraction of an armature by an electro-magnet, and in which actual and immediate contact is necessary; and it consists in the combination of an electro-magnetic clutch or coupling having an interrupted magnetic circuit, with an armature adapted and arranged to be brought into direct contact with the pole or poles of said electro-magnet.

The drawing is a sectional view of a clutch embodying the said invention.

It is well understood that if the electric circuit of an electro-magnet be opened during contact of the armature with the pole or poles of the magnet, the armature will adhere with greater or less tenacity, owing to residual magnetism. If, however, the magnetic circuit be broken or interrupted at any point, there will be little or no residual magnetism, and consequently the armature will fall away or may be withdrawn from the magnet poles without difficulty.

In the application of electro-magnetism to brakes, clutches, &c., it is found that residual magnetism greatly interferes with the certainty and efficiency of operation, maintaining a contact when it should be broken; and owing to the rubbing or frictional contact it is impracticable to maintain in efficient condition the thin facing or coating with which magnet poles are sometimes provided to prevent residual magnetism. To render the interrupting layer or body available for such uses, and make it applicable generally to electro-magnetic clutches, I introduce such material into the body of the magnet core at any suitable point, leaving the exposed face or faces in the natural condition, while the interrupting non-magnetic material is protected from wear or abrasion.

In the drawing I have shown a form of clutch which I have used with good results. In this,

the body or core A of the magnet is made in the form of a conical hub or clutch member, grooved to receive the helix or coil D, and having one of its polar portions, B, made in the form of a ring, separate from the body, but shrunk or otherwise securely fastened thereon around an intervening band, layer, or film C of copper, brass, zinc or the like. A pin or key, *a*, of brass or other non-magnetic material may be employed to prevent the ring B from turning independently of hub A.

E indicates an armature, constituting the second clutch member, and recessed to receive or fit upon the conical hub A, so that when the part A is energized by the passage of an electric current through the coil D, the parts are drawn together and caused to bind with a force due to the wedging action of the conical faces, and the attractive force of the magnet.

The drawing shows the armature or part E of the clutch in the form of a band pulley, having a limited movement upon the shaft F, toward and from the part A, which latter is keyed fast upon the shaft. Obviously, however, the arrangement may be reversed or varied at will.

The parts A and E may represent parts of a brake as well as a clutch, or they may stand for any other two parts requiring to be alternately connected and disconnected.

I do not mean to be understood as claiming broadly an electro-magnet with an interrupted magnetic circuit, or with pole-shoes insulated from the body of the pole or poles, as such magnets have been proposed for use in electric motors. In such motors, however, there is no actual contact of the magnet pole pieces and the armatures, and there is consequently no trouble from residual magnetism; but where the parts come into direct contact, the effect of residual magnetism is very great; a clutch of this description but with uninterrupted magnetic circuit, used in hoisting machinery, requiring a pull of over two hundred pounds to effect a separation after de-energization of the magnet; whereas, with the interrupted magnetic circuit, a clutch otherwise the same, is separated with the application of very slight force.

Having thus described my invention, what I claim is—

1. An electro-magnetic clutch, comprising

an electro-magnet, the magnetic circuit of which is interrupted by non-magnetic material; and an armature, adapted and arranged to make direct contact with said electro-magnet, substantially as set forth.

5 2. In an electro-magnetic clutch or coupling, the combination with an armature E, of an electro-magnet comprising a body A, pole piece B, non-magnetic layer C between the  
10 body and the pole-piece, and winding D; the

magnet and the armature being of conical form and adapted and arranged to come into direct contact and adhere one to the other, substantially as and for the purpose set forth.

In witness whereof I hereunto set my hand 15  
in the presence of two witnesses.

GEO. A. BROWN.

Witnesses:

A. J. SHAW,

JNO. W. HERRON.