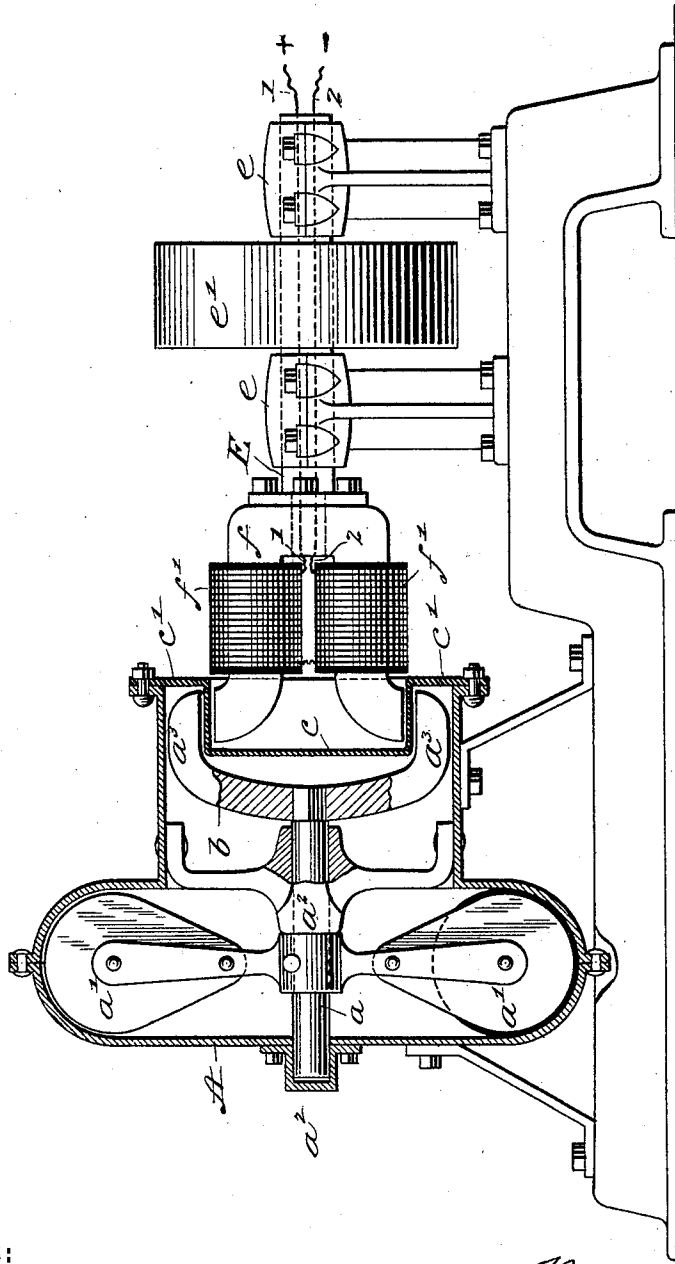


(No Model.)

T. J. FAY.
MAGNETIC COUPLING.

No. 591,395.

Patented Oct. 12, 1897.



WITNESSES:

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ELECTRIC COLD SUPPLY COMPANY, OF MAINE.

MAGNETIC COUPLING.

SPECIFICATION forming part of Letters Patent No. 591,395, dated October 12, 1897.

Application filed September 30, 1896. Serial No. 607,426. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. FAY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Magnetic Couplers, of which the following is a full, clear, and exact description.

My invention relates to means for transmitting power to a machine located inside of a sealed chamber without creating openings through the walls of said chamber. Where pumps or blowers are used to move a body of gas other than atmospheric air, the machine must be placed inside of a hermetically-sealed casing in order to prevent the escape of the material acted upon. To transmit power to such a machine from a source of power located outside of the casing necessitates making an opening through which the shaft may be passed, but it has been found in practice that, although the shaft-bearing may be packed as perfectly as possible, the bearing soon wears sufficiently to allow the gas to escape. Electric motors have been placed bodily in the gas-chamber and coupled direct to the pump or blower, but an objection arises from this practice in the fact that if the gas be an explosive gas the sparks from the motor may cause an explosion, or if the gas be not of an explosive nature the heat naturally generated by the motor will injure the gas or raise its temperature to an undesirable point.

In accordance with my invention the pump, blower, or other machine confined in the sealed chamber is driven from an external source of power without making any openings whatever in the walls of the chamber. This is accomplished by using an electromagnetic coupler in the manner hereinafter particularly described.

In the accompanying drawing the figure represents a section through the casing of a gas-machine, showing the machine therein in side elevation, also a side elevation of the power-transmitting apparatus.

A represents a hermetically-sealed casing which contains, or through which passes, a gas or liquid. In this chamber is placed a pump or blower of any suitable character, such as a shaft *a*, carrying a set of blades *a'* and mounted

in suitable bearings *a² a³*. Any other machine may be located in this casing and driven in the manner hereinafter described, the shaft *a* representing the shaft of any such machine. 55 On the end of shaft *a* is mounted a cross-head *b*, of soft iron, constituting the armature of an electromagnet, as will hereinafter appear. The extremities of this armature are preferably offset at substantially right angles to the cross-head to form polar faces *a³*. These polar faces stand close to the surface of one of the walls of the gas-tight chamber, said wall being formed with a cylindrical inward projection *c*, passing into the embrace 65 of the armature, and around the periphery of which the armature may rotate with just sufficient clearance to prevent contact. The wall or diaphragm *c'* of which the cylinder *c* is a part is of non-magnetic material, such as brass, bronze, or possibly glass. 70

Outside of the chamber *a* is mounted a shaft *E* in suitable bearings *e* and upon which is fixed a pulley *e'*. This shaft is preferably in line with shaft *a* in the case. At one end it carries a horseshoe-magnet consisting of a core *f* and a pair of coils *f'*. The poles of the core pass into the cylinder *c* and face toward the inner cylindrical surface at diametrically opposite points. The shaft *E* is hollow, and 80 the wires 1 and 2 lead from a suitable source of electricity through the shaft to the coils *f'*. It will be seen that when the armature *b* inside of the casing *A* is standing in the position shown in the drawings with relation to the poles of the magnet it closes the magnetic circuit of the magnet except for the small air-gaps and the non-magnetic plate *c* between the polar faces. Consequently there will be a magnetic attraction between the core of the magnet and the armature which may be of 90 such strength as to cause the armature to follow or rotate with the core whenever the core is rotated, so that if power is transmitted to shaft *E* from an engine, electric motor, or other suitable source by a belt to pulley *e'* 95 substantially the same power will be transmitted through the magnetic coupler described to the pump, blower, or other machine inside of the casing *A*. Thus the machine is driven from an external source of power without creating any openings in the casing and 100

without liability of causing leaks. The lines of force passing between the magnet and armature are substantially radial in direction. Consequently no end thrust is imparted to either shaft. This is the preferred construction, but the polar faces may be arranged at right angles to the shafts, if desired.

If desired, an electric motor may be coupled direct to the shaft E, in which case the pulley e' might represent the armature of the motor, but this is an unimportant feature, the principal element being the means for coupling the power-shaft with the shaft to be driven.

I wish to disclaim herein the use of a permanent magnet for my coupler, inasmuch as such an apparatus is entirely inefficient and impracticable for transmitting large powers, and even if it were possible to use a permanent magnet to transmit large powers I would still prefer to use an electromagnet, for the reason that it is possible to vary the power of the clutch either manually or automatically by varying the current permitted to pass through it and in this way utilize the coupler or clutch as a safety or regulating appliance to prevent the overloading of the driving-motor, and also to economize in the power consumed by the clutch.

I have not herein shown or described any

apparatus for so varying the power of the magnet, nor do I herein claim any such apparatus, but I refer to it merely to show one of the advantages of an electromagnet over a permanent magnet for the transmission of power.

A permanent magnet is not a clutch that is capable of disconnecting as well as connecting two members together. It is a mere coupler the force of which cannot be altered.

Having thus described my invention, I claim—

The combination of a hermetically-sealed case, a machine therein having a main rotating shaft to be driven, a driving-motor and its rotating shaft located outside of said casing, an electromagnetic clutch having its two members mounted respectively on the two rotating shafts, one member being inside the casing and the other outside thereof, whereby the clutching and unclutching of the two rotating shafts may be effected through an unperforated wall of the casing.

In testimony whereof I subscribe my signature in presence of two witnesses.

THOMAS J. FAY.

Witnesses:

FRANK S. OBER,
WM. A. ROSENBAUM.