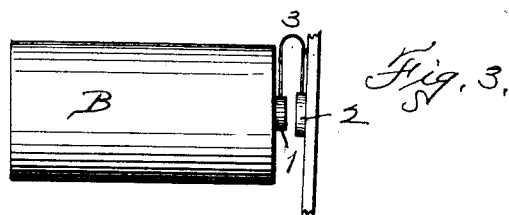
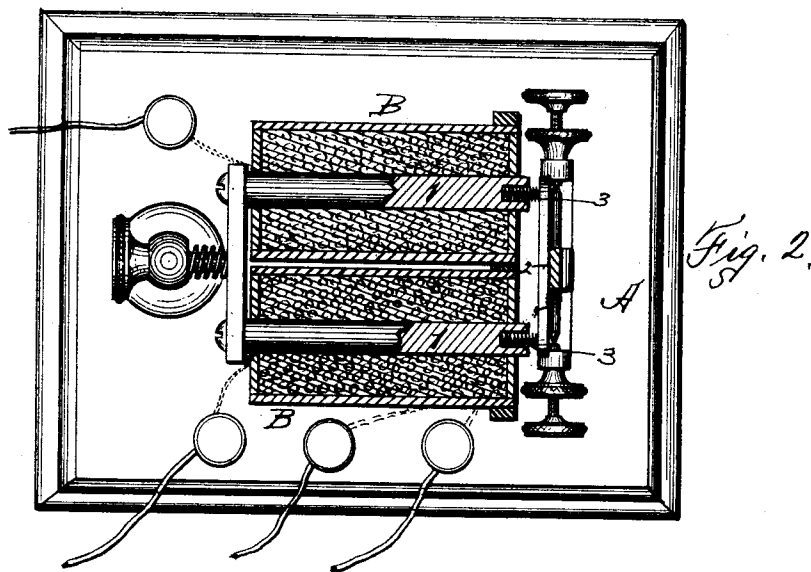
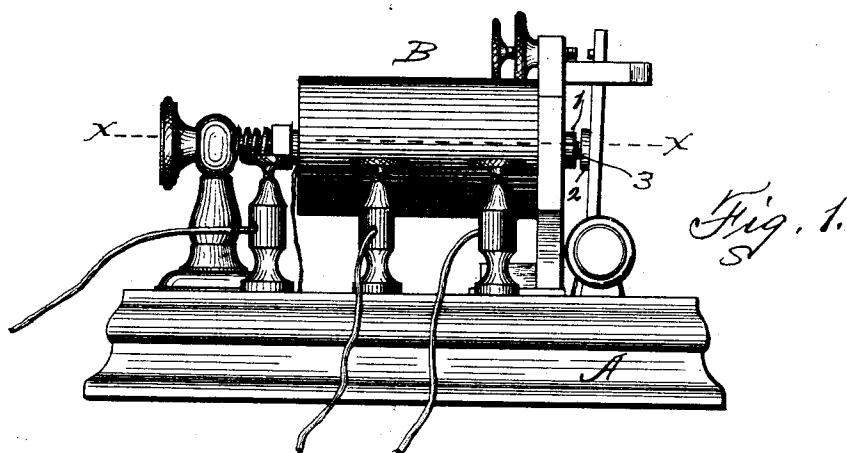


(No Model.)

F. M. LOCKE.
RELAY.

No. 512,656.

Patented Jan. 9, 1894.



WITNESSES:

H. A. Cushman
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INVENTOR

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BY

Smith & Davidson
his ATTORNEYS

UNITED STATES PATENT OFFICE.

FRED M. LOCKE, OF VICTOR, NEW YORK.

RELAY.

SPECIFICATION forming part of Letters Patent No. 512,656, dated January 9, 1894.

Application filed June 19, 1891. Serial No. 396,864. (No model.)

To all whom it may concern:

Be it known that I, FRED M. LOCKE, of Victor, in the county of Ontario, in the State of New York, have invented new and useful Improvements in Relays, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The object of my invention is to render more responsive, the armatures of the electromagnets, such as relays, by relieving said armature of the effect of the residual magnetism which lingers in the cores after the exciting current has been cut off. By thus relieving the armature I obtain the very desirable result of insuring a more nearly synchronous response of the make and break of a relay, to the opening and closing of the actuating circuit.

My invention is based upon the fact that if the poles of a magnet be bridged by a connection of magnetic material, of sufficient sectional area to completely close the magnetic circuit between the poles, by conveying all the lines of force between them without chocking, little or no attractive force is exerted by the magnetic poles or by their connection, upon an extraneous magnetic body. It depends upon the further fact that if the poles of the magnet should be in effect extended, by bodies of magnetic material of sufficient sectional area to convey all the lines of force between the poles, the armature in contact with such extensions is not attracted by the main body of the cores. So also, if such extensions are movable or extensible, without losing contact with the cores, and the armature is made to move with them, there will be no opposition to such receding, if the energy left in the magnet cores is reduced to such a low degree that it can all be transmitted through the reduced connections between the armature and poles.

In carrying out my invention, I employ means which, notwithstanding the receding of the armature will maintain a magnetic circuit between the magnet poles, through the armature, which means takes the form of extensible pole connections which remain in contact with the armature and poles and conduct all the residual magnetism. These connections are of such reduced sectional area that they are practically of no effect while

the magnet poles are energized by the passage of a current, but they extend the poles, in effect, when only the residual magnetism lingers in the iron cores. These extensible magnetic connections, may be of any suitable form, so long as they maintain contact with both cores and the armature as the latter recedes. I prefer to make such extensions, however, in the form of iron springs, so that they will be self-extensible and locate them directly between or with their ends between the ends of the armature and the respective poles of the magnet cores, so that they can serve the additional function of the armature repelling power.

My invention will be fully understood upon reference to the accompanying drawings, in which—

Figure is a side elevation of a relay to which my invention is applied. Fig. 2 is a horizontal section on the line $x-x$ of Fig. 1. Fig. 3 is a detail view illustrating a modification.

A represents a suitable base upon which is mounted a relay having magnetic coils B.

1 represents the cores of the relay magnet and 2 is the armature mounted to vibrate on suitable bearings, between the usual make and break.

3 represents the extensible connection of magnetic material in contact with each pole and the armature so as to establish the magnetic circuit from one pole through the armature to the other pole, and this connection is preferably in the form of a spring so as to render it self extensible and having its ends in contact with the pole and armature so as to adapt it for repelling the armature in addition to the primary function. This magnetic connection 3, is of such small sectional area in comparison with the magnet cores, that when the cores are in their normal state of excitement by the current which traverses their windings, such magnetic connections have practically no effect upon the greatly increased field of force and the armature is attracted without any retardation. When however, the exciting circuit is opened, the magnetic connections are sufficient to accommodate all of the lines of force of the greatly reduced magnetism and they then have every effect of extension of the poles of the magnet. Moreover since these extensions by their construction follow

the receding armature which is therefore always in contact with the poles, no opposition is exerted upon the receding armature by the cores proper.

5 Having thus described my invention, what I claim is—

1. The method of overcoming the effect of residual magnetism upon the armature of electro-magnets, consisting in maintaining
10 from one magnet pole through the receding armature to the other magnet pole, a magnetic circuit of substantially the character specified.

2. The method of overcoming the effect of residual magnetism in electro-magnets, which
15 consists in establishing at the time of receding, a magnetic circuit between the poles of sufficient capacity to conduct the lines of force of the residual magnetism but of capacity insufficient to conduct the lines of the
20 increased field of force when the magnet is excited by a traversing current, as explained.

3. In combination with an electro-magnet and its armature; a permanent magnetic
25 connection between the armature and each pole,

of reduced sectional area as compared with the magnet cores, substantially as and for the purposes set forth.

4. In combination with an electro-magnet and its armature; the herein described
extensible magnetic connection in contact with
said armature and the cores of the magnet,
and of reduced sectional area for the purpose
explained. 30

5. In combination with an electro-magnet
and its armature; extensible and elastic
connections of magnetic material located between
the armature and the respective cores for
repelling the armature and of smaller sectional
area than said cores, whereby they establish
a circuit for the residual magnetism but do
not restrict the attractive force of the excited
magnet as explained. 35

In witness whereof I have hereunto set my
hand this 13th day of June, 1891. 40

FRED M. LOCKE.

In presence of—

Z. C. CURTICE,

G. R. SEARL.