L. E. BATES & V. V. HANKS.
ELECTRIC FIRE AND BURGLAR ALARM.
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To all whom it may concern:

Be it known that we, LEWIS E. BATES and VOLLE V. HANKS, citizens of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Electric Fire and Burglar Alarms, of which the following is a specification.

This invention relates to improvements in electric fire and burglar alarms and more particularly to a new system in which a relay and the permanent magnet associated therewith are so utilized that a very small amount of current will be required thus permitting the use of an ordinary dry battery without the necessity of frequently replacing the latter.

With the above and other objects in view the invention consists in the novel construction, arrangement and combination of parts hereinafter fully illustrated in the accompanying drawings and described and claimed in the following specification.

In the drawings:

Figure 1 is a diagrammatic view of an electric signaling system embodying the invention; and,

Figs. 2 and 3 are respectively front and rear end views of the relay with its surrounding permanent magnet.

In the accompanying drawings 1 denotes the core preferably made of soft iron, of an electro-magnet which is surrounded by a high resistance coil 2, and extending around this electro-magnet is a permanent magnet 3 of U-shape. This magnet has secured to its central or cross portion by a screw or the like 4 the rear or inner end of the core 1 of the relay, the latter being thus supported above the lower arm or base 5 of the magnet. This base 5 is preferably secured by screws 6 to a base 7 of wood or other non-conducting material to which latter is also pivoted at 8 a swinging armature 9. One of the screws 6 has electrically connected to it one end of the high resistance coil 2, so that the coil is electrically connected with the permanent magnet 3. The upper arm or top portion 10 of the permanent magnet 3 has an upstanding lug 11 provided with a threaded opening to receive an adjustable stop screw 12 with which the armature 9 contacts when moved in one direction. Said armature is pulled in the opposite direction by a coiled spring 13 having one end anchored to a post 14 on the base 7, its other end connected to the armature 9 between its ends and after passing through an opening in an upright 15 which is arranged adjacent the armature 5 and has a threaded opening near its upper end for an adjustable stop and contact screw 16 which limits the swinging movement of the armature under the action of the spring 13. The lower end of the upright 15 has a right angularly projecting base portion which is fastened to the base 7 by a screw or the like 17.

In utilizing the improved relay or magnet described above a main circuit 18 is provided which includes one or more normally closed circuit closers 19 which may be of any construction and operated by the action of heat, mechanically, manually, or in any other manner. One branch of this main circuit 18 is connected to one end of the high resistance coil 2 and its other end is connected by a conductor 20 to one pole of a dry battery 21 of low voltage and it is here shown as consisting of two cells. The other pole of the battery 21 is connected to that screw 6 to which one end of the coil 2 is connected so that this end of the conductor 22 is also electrically connected to the magnet 3. This conductor 22 has included in it a manually operated switch 23. The last mentioned pole 25 of the battery is also connected by a conductor 24 to the armature 9 and said conductor 24 is grounded as shown at 25. The anchoring screw of the upright 15 which is of metal is connected by a conductor 26 to a manually operated switch 27 which is in turn connected by a conductor 28 to one terminal of an electric alarm device which may be of any form and construction for making either an audible or visual signal and which is here shown as an electric bell 29. The other terminal of this alarm bell 29 is connected by a conductor 30 to the conductor 20 so that the bell is energized by the battery 21 when the alarm circuit just described is closed at the switch 27 and at the armature contact screw 16. The signal 29 may be located at any point but when located adjacent the circuit closers 19 a distantly located signal device of any construction may be provided and for this purpose one or more electric lamps 31 are provided included in an ordinary electric.
lighting circuit 32. One arm of this circuit is connected to a swinging armature 33 of a relay 34 and the other branch of the lighting circuit 32 is connected to an adjustable stop screw 35 for said armature 33, the latter being attracted by the usual coil spring 36. The coil of the relay 34 has one end connected by a conductor 37 to the conductor 28 between the bell and switch 27 and the other end of said coil is connected by a conductor 38 to the conductor 30.

In operation the switch 23 is closed so that the battery circuit will be completed through coil 2 and cause the armature 9 to draw up to the contact screw 12, this circuit being traced as follows: from the battery to conductor 20, circuit 18 including circuit closers 19, coil 2, conductor 22 including 23 to battery. The tension of the retracting spring 13 is such that it is just sufficient to overcome the attracting force of the permanent magnet 9 that after the armature 9 has been drawn up to the contact screw 12 the switch 23 may be open and the armature 9 will be held in attracted position. The circuit will now be as follows: from battery 21 through conductor 20, circuit 18 including circuit closers 19, coil 2, binding post or screw 6, permanent magnet 3, contact screw 12, armature 9 and conductor 24 back to battery. Should any of the circuit closers 19 be actuated to break the circuit just described, the spring 13 will draw the armature in contact away from the screw 12 and in contact with the screw 16 thereby completing the circuit through the alarm bell 29 as follows: battery 21, conductors 20 and 30, bell 29, conductor 28, switch 29, conductor 26, upright 15, screw 16, armature 9, and conductor 24 to battery. The current will also flow through the relay 34 because its two conductors 51 and 35 are connected to the conductors leading from the bell 29, and the armature 33 which is normally retracted, will be drawn up to close the electric light circuit 32 at 35 thereby giving the distantly located signal or alarm. If the attempt should be made to ground the main circuit 18 or the circuit closers 19, the battery will be short-circuited through the ground connection 25 and the spring 13 will draw the armature 9 into engagement with the screw 16 thereby producing the same result as indicated above.

What is claimed is:
1. The combination of a relay having a coil of high resistance, a permanent magnet associated therewith and electrically connected to the coil, the armature of said relay engaging said permanent magnet when attracted by the coil, a normally closed circuit closer, a manual switch, a low voltage battery, circuit connections uniting said battery, switch, armature, coil, magnet and circuit closer, and a signal controlled by the armature when the latter is retracted.
2. The combination of a relay having a high resistance coil and a permanent U-shaped magnet surrounding the same, the latter having its ends coacting with the armature of said relay, one end of said coil being electrically connected to one end of the magnet, the other end of the latter carrying a contact to be engaged by said armature when attracted, a spring to retract the armature and having a tension slightly greater than the attractive force of the permanent magnet, a battery circuit including a normally closed circuit closer and a manually actuated switch and said coil, said battery circuit being also connected to said armature and said magnet, and a signal actuated by the movement of said armature under the action of said spring.
3. The combination of a relay having a high resistance coil and a permanent U-shaped magnet surrounding the same, the latter having its ends coacting with the armature of said relay, one end of said coil being electrically connected to one end of the magnet, the other end of the latter carrying a contact to be engaged by said armature when attracted, a spring to retract the armature and having a tension slightly greater than the attractive force of the permanent magnet, a battery circuit including a normally closed circuit closer and a manually actuated switch and said coil, said battery circuit being also connected to said armature and said magnet, a ground connection for the battery and a signal actuated by the movement of the armature under the action of said spring.
4. The combination of a relay having a high resistance coil and a permanent U-shaped magnet surrounding the same, the latter having its ends coacting with the armature of said relay, one end of said coil being electrically connected to one end of the magnet, the other end of the latter carrying a contact to be engaged by said armature when attracted, a spring to retract the armature and having a tension slightly greater than the attractive force of the permanent magnet, a battery circuit including a normally closed circuit closer and a manually actuated switch and said coil, said battery circuit being also connected to said armature and said magnet, a ground connection for the battery and a signal actuated by the movement of the armature under the action of said spring.
for said battery and an electric alarm device, a switch to control the latter, a contact for the armature to limit its movement under the action of said spring, and an alarm circuit including said device, said battery, the last mentioned switch, the last mentioned contact and the armature.

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

LEWIS E. BATES.
VOLLIE V. HANKS.

Witnesses:
J. VINÉ SMITH,
J. M. GRIEBIN.