

June 1, 1965

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3,187,129

MAGNETIC SWITCH ASSEMBLY

Filed April 5, 1962

4 Sheets-Sheet 1

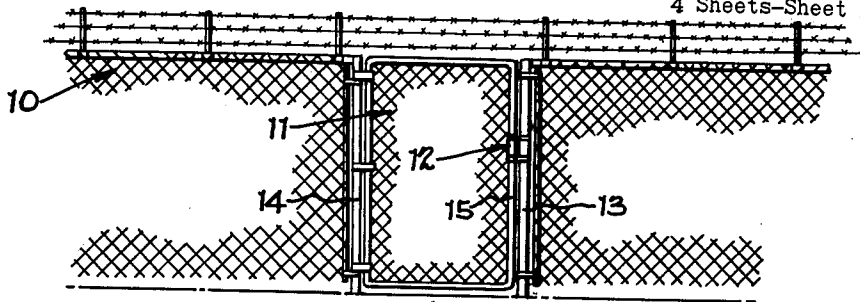


Fig. 1

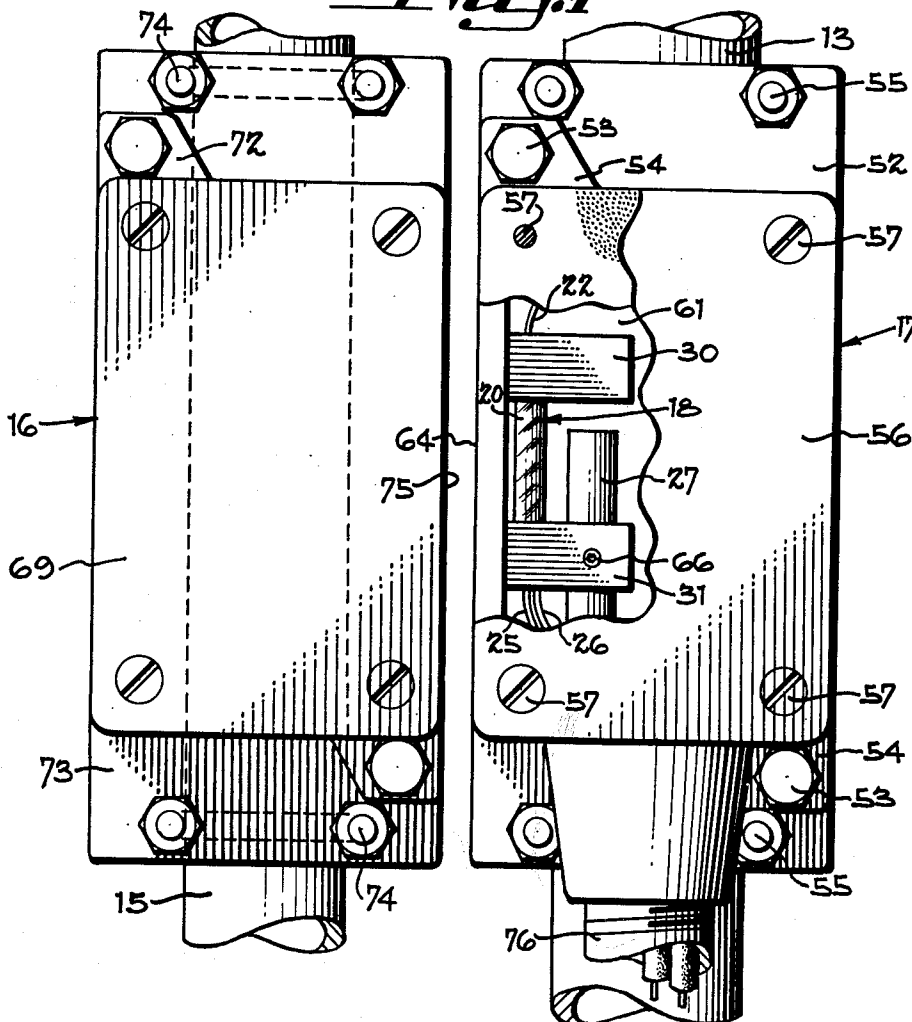


Fig. 2

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4 Sheets-Sheet 2

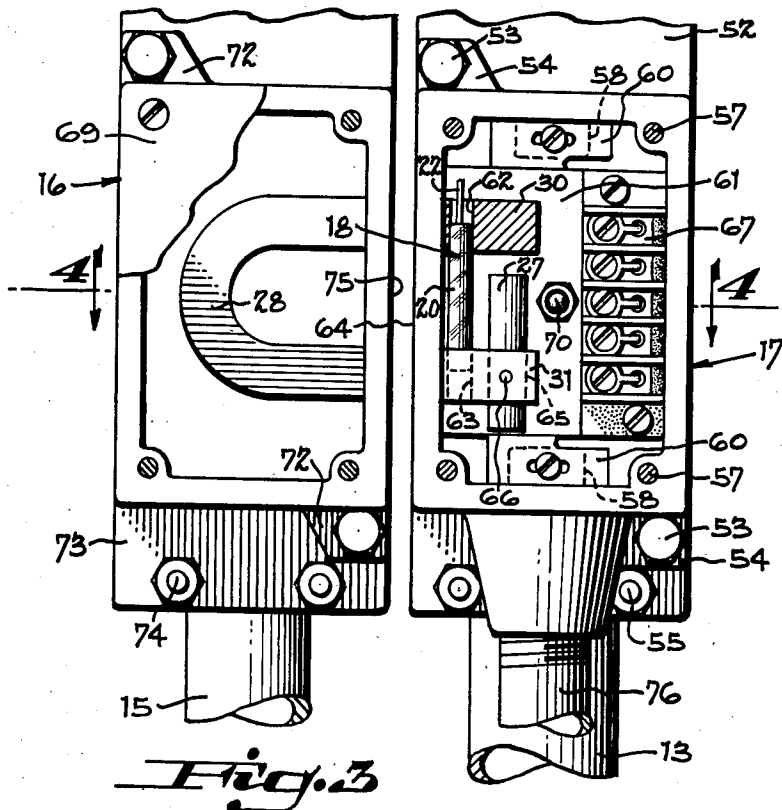


Fig. 3

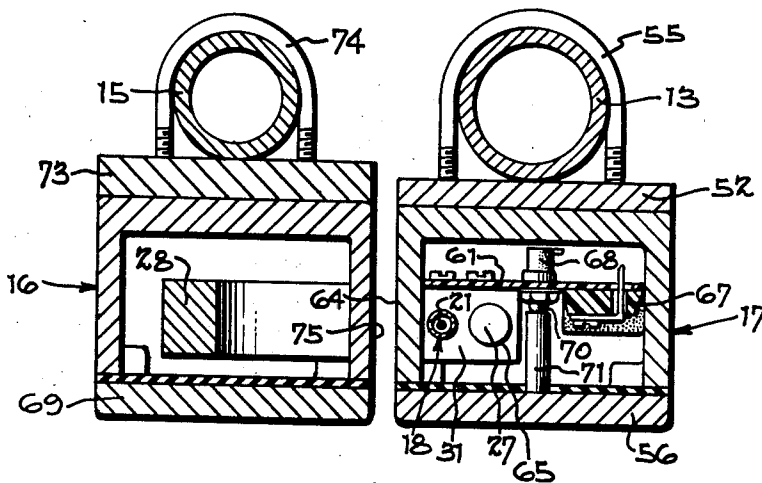


Fig. 4

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4 Sheets-Sheet 3

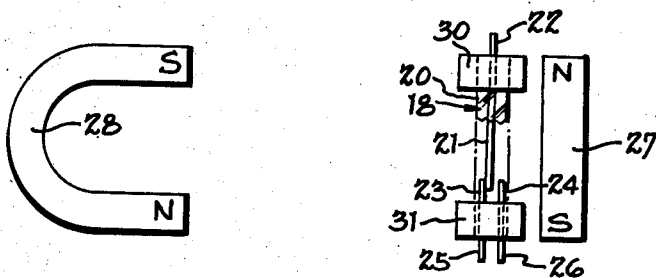


Fig. 5

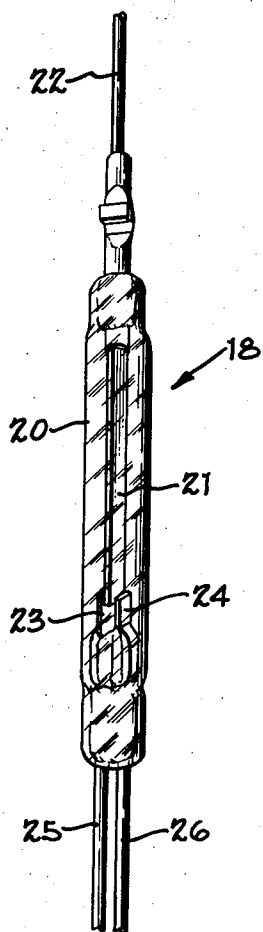


Fig. 11

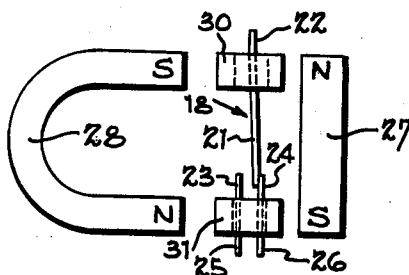


Fig. 6

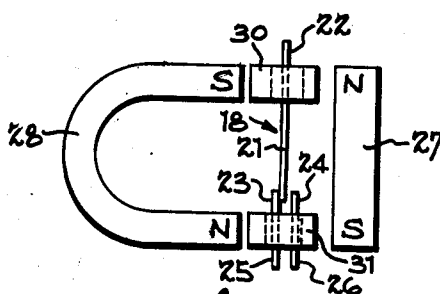


Fig. 7

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MAGNETIC SWITCH ASSEMBLY

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4 Sheets-Sheet 4

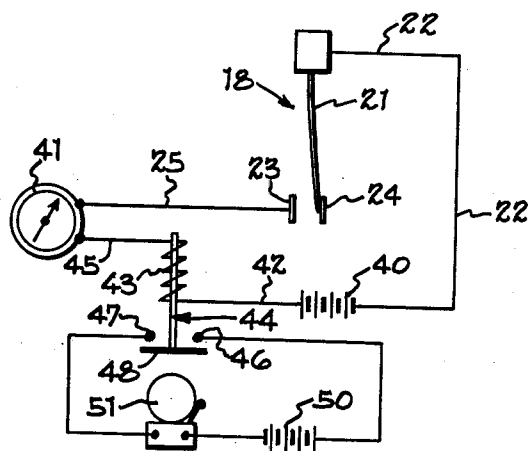


Fig. 8

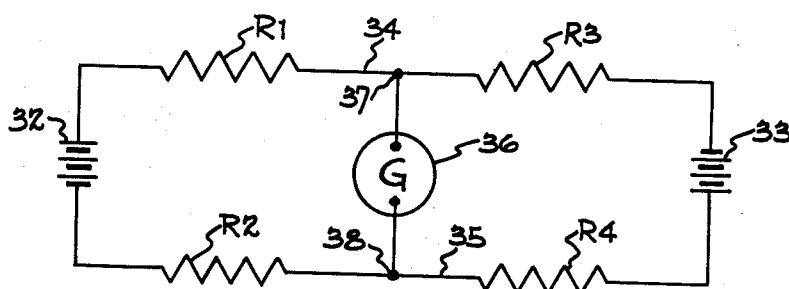


Fig. 9

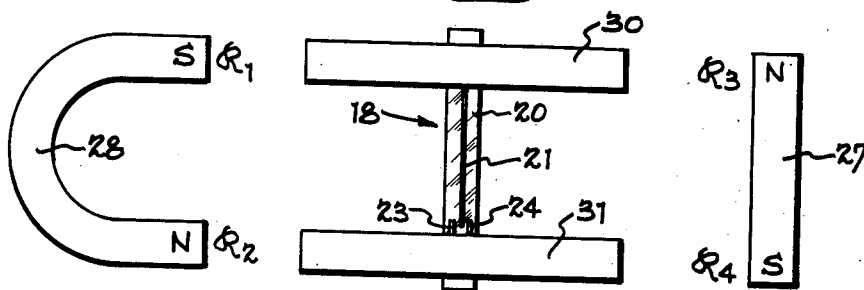


Fig. 10

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3,187,129

MAGNETIC SWITCH ASSEMBLY

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Filed Apr. 5, 1962, Ser. No. 185,292

5 Claims. (Cl. 200—61.62)

This invention relates to alarm circuits and is particularly directed to a magnetic switch assembly for opening or closing an electrical circuit to indicate whether a door, gate, window or the like, is in an open or closed position.

In modern day alarm circuit systems, it is common practice to provide in the system one or more switches which are actuated when a door, gate or the like, is opened or closed. These switches are placed in a circuit which is thereby effective to provide a signal at a remote guard station indicating the position of the door or the like. Among the types of switches which have been proposed are so-called magnetic switches. These switches generally include a magnetically responsive switch element which is mounted in a stationary position upon a door frame or the like. The switch cooperates with a movable magnetic member carried by the door or other movable closure member. When using such a switch, the switch is connected in circuit with a power source and an alarm so that the alarm is actuated whenever the door is moved from its closed position.

The principal defect with these magnetic switches and various other types of prior art switches as well, is that they are relatively easy to defeat so that a prowler, or the like, can open a door to gain access to the secured area without setting off an alarm at a remote guard station. Prior art switches can also be defeated following opening of the door so that the alarm circuit at the guard station indicates that the door has been closed when actually the door is still open allowing free access to and egress from the secured area.

More specifically, the prior art magnetic switches normally can be defeated by bringing an auxiliary clapper magnet into proximity with the magnetic switch to maintain that switch in its closed position while the door is opened and the influence of the magnet on the door is removed. Similarly, the switches can be defeated after the door has been opened in a legitimate way by bringing a magnet into proximity with the magnetic switch so that a signal is sent to the guard station indicating that the door has been closed, while in fact it is held open.

The principal object of the present invention is to provide a magnetic switch assembly which is effective to open or close a circuit when a door, gate or the like, is shifted from its closed position, and which provides a much higher degree of security against defeat.

More particularly, the present invention is predicated upon the concept of placing a magnetically responsive reed switch in a magnetic bridge circuit including a stationary permanent local magnet mounted adjacent to the switch and a movable remote magnet carried by the door. In one preferred embodiment, an elongated reed switch is mounted vertically upon a door frame, stationary gate post or the like. The upper and lower ends of this reed switch are disposed adjacent to ferro-magnetic pole pieces. A local magnet is mounted with one pole of the local magnet adjacent to each of the pole pieces. The remote magnet is mounted upon the door, or the like, and is disposed so that when the door is closed the two poles of the remote magnet are also disposed adjacent to the ferro-magnetic pole pieces on the side of the pole pieces remote from the local magnet.

The reed switch is in a first conductive state, e.g. closed, when the magnetic force of the magnetic field produced by the local magnet and remote magnet exactly counter-

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balance one another. The reed switch changes to a second state, e.g. opens, when the fields are unbalanced and the field of either the remote magnet or the local magnet predominates. Thus, as is explained in detail below, this magnetic circuit functions as a bridge circuit which is unbalanced if any of the air gaps between the ferromagnetic pole piece and the poles of the remote or local magnets is changed or if the strength of either of the magnets is changed.

The principal advantage of the present magnetic switch assembly is that it reliably provides a signal each time the door is opened or closed. At the same time, it is practically impossible to defeat the switch to make it fail to provide a signal upon opening of the door or to falsely indicate that a door has been closed when it actually remains open. For in order to cause a false indication it is necessary in the first place for an intruder to have a magnet of exactly the right size and exactly the right strength. In opening the door, this magnet must be manipulated in a precise manner to keep the vector magnetic field sum of the local magnet, remote magnet and third magnet constant and equal to zero while the remote magnet is shifted. While this may be theoretically possible, it is extremely difficult in practice. Moreover, even after the door has been opened, it is exceedingly difficult for someone to simulate closing of the door by bringing a third magnet into proper position to simulate the closed position of the remote magnet. Again, it would be necessary not only for the intruder to have a magnet of the right strength and physical dimensions, but also it would be necessary for him to mount the magnet in a precise position relative to the switch in order to effect a balance of the magnetic fields. Again, as a practical matter, this is almost impossible without tripping the switch which would cause an alarm at the guard station.

Another advantage of the present switch is that the switch assembly can readily be installed despite variations which occur in the spacing between the door frame and door, between a fence post and gate, and the like. More particularly, in the present switch unit, means are provided for adjustably positioning the local magnet relative to the reed switch so that after the switch housing and remote magnet have been installed, the magnetic circuit can be brought into proper balance by merely adjusting the position of the local magnet. After this magnet has been positioned to effect a magnetic balance, it is locked in place by a set screw or other similar means.

Another advantage of the present switch assembly is that it is extremely simple to manufacture and install and is relatively economical.

These and other objects and advantages of the present invention will be more readily apparent from a consideration of the following and detailed description of the drawings illustrating a preferred embodiment of the invention.

In the drawings:

FIGURE 1 is an elevational view of a protective fence having magnetic switch assembly of the present invention installed in connection with the gate thereof.

FIGURE 2 is an enlarged elevational view of the magnetic switch of the present invention with the cover of the switch housing being partially broken away to show details of the construction.

FIGURE 3 is an elevational view similar to FIGURE 2 with the cover of the switch housing completely removed and the cover of the magnet housing partially broken away to show the cooperative relationship of various components.

FIGURE 4 is a cross-sectional view taken along line 4—4 of FIGURE 3.

FIGURE 5 is a diagrammatic view showing the reed switch under the dominant influence of the local magnet.

FIGURE 6 is a diagrammatic view showing the reed

switch under a condition in which the field of the local magnet is balanced out by the remote magnet.

FIGURE 7 is a diagrammatic view showing the reed switch under a condition in which the field of the remote magnet predominates.

FIGURE 8 is a schematic circuit diagram of one alarm circuit embodying the switch assembly of the present invention.

FIGURE 9 is a schematic circuit diagram of an electrical bridge circuit which is analogous to the present magnetic switch assembly.

FIGURE 10 is a schematic view of the magnetic circuit of the present switch arranged for comparison with the analogous electrical circuit of FIGURE 9.

FIGURE 11 is an elevational view of one suitable form of magnetic reed switch.

FIGURE 1 shows a protective fence 10 having a gate 11 and a magnetic switch assembly 12 of the present invention for monitoring the condition of closure of the gate. More specifically, fence 10 is a conventional fence used for the perimeter protection of plants, military, installations and the like. While the exact details of construction of the fence constitute no part of the present invention, in the form shown the fence comprises wire link sections which terminate at rigid vertical posts 13 and 14. Post 14 carries hinges which support movable gate 11.

Gate 11 comprises a wire link section mounted upon a rigid frame-work formed of tubular members, or the like. This frame-work includes a vertical frame member 15 disposed closely adjacent to post 13 when the gate is in the closed position.

Switch assembly 12 comprises a magnetic housing 16 mounted upon frame member 15 and a stationary switch housing 17 mounted upon post 13 at the same height as magnet housing 16. Consequently, when the gate 11 is closed, the magnet housing and switch housing are juxtaposed and are spaced slightly from one another as is shown in FIGURE 2. It is to be understood that the use of the present switch assembly is not limited to gates in fences. Rather, the present switch assembly can also be utilized to advantage in many other installations, such as in connection with the door of a building. In such an installation the magnetic switch housing 16 is mounted upon the door adjacent to the free vertical edge thereof and switch housing 17 is mounted upon the door frame closely adjacent to housing 16 when the door is in the closed position.

In accordance with the present invention, the switch housing 17 has mounted therein a reed switch 18. The details of construction of the magnetic reed switch 18 constitute no part of the present invention. The switches are well known in the art. For example, one form of reed switch is shown in United States Patent No. 2,332,338.

The details of this preferred form of magnetic reed switch 18 are shown in FIGURE 11. As there shown, the switch comprises a glass housing 20 which is evacuated and subsequently filled with a gas such as hydrogen. The housing encloses a thin magnetic reed 21 formed of a ferromagnetic material, such as iron. This magnetic reed 21 is connected to a conductor 22 and passes outwardly through the glass housing through a suitable seal, such as a glass to Kovar seal or the like. In addition to the magnetic reed 21, the switch housing also includes a magnetic fixed contact 23 and a non-magnetic fixed contact 24. These contacts are connected to leads 25 and 26 respectively, the leads entering the glass tubing through a suitable seal.

Switch 18 is adjusted so that reed 21 is spring urged into engagement with stationary contact 24 when there is no external magnetic field present. However, when the switch is brought into the presence of a magnetic field, the field tends to concentrate in the air gap between the free

end of reed 21 and stationary magnetic contact 23. Thus, the reed is shifted toward and into engagement with stationary contact 23. In the present switch unit two magnets are utilized to control actuation of reed switch 18.

One of these magnets is a local magnet 27 mounted within switch housing 17 in close proximity to reed switch 18. A second magnet is "remote" magnet 28 mounted in magnet housing 16. In addition to these magnet members, the magnetic circuit includes two ferromagnetic pole pieces 30 and 31 mounted within switch housing 17 adjacent to either end of magnetic reed switch 18.

The manner in which the remote magnet 28 and stationary magnet 27 cooperate with pole pieces 30 and 31 and magnetic reed switch 18 is diagrammatically shown in FIGURES 5, 6 and 7. More particularly, as was explained previously, reed switch 18 is preset so that magnetic reed 21 is spring urged into engagement with non-magnetic contact 24 in the absence of an external magnetic field. However, when a strong magnetic field is brought into the region of pole pieces 30 and 31, as for example by local magnet 27, the space between the free end of magnetic reed 21 and the magnetic contact 23 functions as an air gap in which the field forces concentrate. This concentration of magnetic field forces causes magnetic reed 21 to be attracted to magnetic contact 23 as is shown in FIGURE 5. This is the condition of the switch when gate 11 is open or ajar or in any position other than a fully closed position. In such a case, remote magnet 28 is spatially removed from the magnetic reed 18 so that the force of local magnet 27 predominates in the manner shown in FIGURE 5.

FIGURE 6 illustrates the condition in which the remote magnet 28 is brought into a predetermined position relative to the pole pieces 30 and 31 and magnetic reed switch 18. It is to be noted that the relationship of the poles of local magnet 27 and remote magnet 28 is reversed. That is, the north pole of local magnet 27 is adjacent to pole piece 30, while the south pole of remote magnet 28 is adjacent to that pole piece. Similarly, the north pole of magnet 28 is disposed adjacent to pole piece 31, while the south pole of local magnet 27 is disposed adjacent to that pole piece. As is shown in FIGURE 6, when gate 11 is closed, the remote magnet is positioned so as to substantially cancel the magnetic field effects exerted upon reed switch 18 by local magnet 27. Thus, reed 21 is shifted by its internal mechanical biasing into engagement with non-magnetic contact 24.

It will readily be appreciated that remote magnet 28 must be precisely positioned relative to the pole pieces to result in this cancellation of the field effect of local magnet 27. For example, as is shown in FIGURE 7, if remote magnet 28 is brought too close to the pole pieces 30, 31 so that its field effect predominates over the field effect of magnet 27, a high field concentration is again built up in the gap between the end of reed 21 and magnetic contact 23 so that the reed is attracted into engagement with magnetic contact 23.

As is shown in FIGURES 9 and 10, the present magnetic circuit is highly analogous to an electrical bridge circuit. Specifically, FIGURE 9 shows a conventional form of bridge circuit including a pair of batteries 32 and 33. One terminal of battery 32 is connected to a resistor R_1 , while a second terminal of battery 32 is connected to a resistor R_2 . In a similar manner, one terminal of battery 33 is connected to a resistor R_3 while a second terminal of this battery is connected to a resistor R_4 . The resistances R_1 and R_3 are connected together through a lead 34 while resistances R_2 and R_4 are connected to a lead 35. A galvanometer 36 is connected between leads 34 and 35. Under balanced conditions, the potential between points 37 and 38 developed by the loop including R_1 , R_2 and battery 32 is exactly equal and opposite to the potential across these points through the loop between resistances R_3 , R_4 and battery 33. Thus, the galvanometer registers no current flow. However, if any of the resistances R_1 , R_2 , R_3

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or R_4 is changed, even if R_1 and R_2 or R_3 and R_4 are changed simultaneously, the bridge is unbalanced and the galvanometer indicates a current flow.

FIGURE 10 is a diagrammatic view of the present switching circuit. This switch circuit is a magnetic bridge. In this bridge, local magnet 27 is analogous to battery 33, while remote magnet 28 is analogous to battery 32. The air gap between the south pole of battery 28 and pole piece 30 has a reluctance

$$R_1$$

which is analogous to the resistance R_1 of the electric bridge. Similarly, the air gap between the north pole of magnet 28 and pole piece 31 has a reluctance

$$R_2$$

which is analogous to the resistance R_2 in the electric bridge. In a similar manner, the air gap between the north pole of local magnet 27 and pole piece 30 and the air gap between the south pole of magnet 27 and pole piece 31 have reluctances

$$R_3 \text{ and } R_4$$

corresponding to electric resistances R_3 and R_4 respectively.

The reed switch 18 functions to detect any magnetic unbalance in the same manner as galvanometer 36 functions to detect any electrical unbalance. Reed switch 18 is actuated if any of the reluctances

$$R_1, R_2, R_3 \text{ and } R_4$$

is changed, even if the reluctances

$$R_1 \text{ and } R_2$$

are changed simultaneously or the reluctances

$$R_3 \text{ and } R_4$$

are changed simultaneously. It will also be readily appreciated that once the relationship of reed switch 18, pole pieces 30 and 31 and remote switch 28 is established, as for example when the switch housing 17 is mounted upon a stationary fence post 13 or door frame, and magnet housing 16 is mounted adjacent to it upon a closed gate or door, the magnetic bridge can initially be balanced by adjusting the position of local magnet 27. The means for effecting this adjustment are described below.

The manner in which the present magnetic switch assembly is utilized in an alarm system is shown diagrammatically in FIGURE 8. It is of course to be understood that this alarm circuit is merely exemplary and that the present switch can also be used with many different types of circuits as well. As is shown in FIGURE 8, reed switch 18 is connected to two leads 22 and 25. Lead 22 is joined to the magnetic reed 21 and to a source of power, such as batteries 40. Similarly, lead 25 is joined to magnetic contact 23 and to a meter 41. A lead 42 interconnects the opposite terminal of power source 40 to a relay coil 43 of relay 44. The relay coil is also joined through lead 45 to a second terminal of meter 41. Relay 44 includes stationary contacts 46 and 47. The contacts are normally open when the relay is de-energized. However, when the relay pulls in upon energization of coil 43, contacts 46 and 47 are bridged by contact 48. Relay contacts 46 and 47 are placed in series with a power source indicated by batteries 50 and an alarm 51.

In operation, so long as gate 11 is closed, the magnetic fields of the local magnet 27 and remote magnet 28 balance one another out. Thus, the reed 21 of switch 18 is maintained in engagement with non-magnetic contact 24 and a circuit to relay coil 43 is open at the magnetic switch. However, when gate 11 is open, the remote magnet 28 is shifted to unbalance the magnetic bridge so that reed 21 is shifted into engagement with magnetic contact 23. This completes a circuit to meter 41 providing a visual indication of an alarm condition and to a relay coil 43. When the relay is energized, a circuit is completed from power source 50 to alarm 51.

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The details of construction of one preferred form of switch unit are best shown in FIGURES 1-4. As is there shown, switch housing 17 is formed of a non-magnetic material, such as aluminum or the like. This switch housing is of generally rectangular configuration and is mounted upon a plate 52 by means of bolts 53 which pass through openings in ears 54 provided on housing 17 and openings provided in plate 52. Plate 52 is in turn mounted upon stationary fence post 13 by means of U-bolts 55. Housing 17 is provided with a cover 56 which is bolted over the housing opening as by means of bolts 57.

The housing 17 includes two transverse shoulders 58 having threaded openings therein. These shoulders support flanges 60 of a mounting plate 61. Pole pieces 30 and 31 are bolted in parallel spaced relationship to one another upon mounting plate 61. Each of these pole pieces is provided with a bore 62 and 63 for receiving and supporting the cylindrical housing of reed switch 18. In one embodiment, the reed switch is merely frictionally held in place. However, other means can be employed to mount the switch if desired.

Reed switch 18 is held by pole pieces 30 and 31 in parallel spaced relationship with front face 64 of housing 17. The pole pieces extend transversely of this face and of the longitudinal axis of the reed switch. Pole piece 31 also is provided with a second bore 65 for receiving local magnet 27. In this embodiment, magnet 27 is in the form of a cylindrical bar magnet. Magnet 27 is disposed parallel to reed switch 18 on the side of that reed switch remote from front face 64. Magnet 27 is slidable within bore 65 toward and away from pole piece 30. Thus, the field influence of this magnet upon pole pieces 30 and 31 is readily adjustable by shifting the magnet relative to the pole pieces. Once the magnet is properly positioned, however, it is held in place by means of a set screw 66. Housing 17 also encloses a conventional terminal block 67 for providing electrical connections to leads 22 and 25 of the reed switch 18. These terminal blocks also provide connections to a cover switch 68 mounted upon plate 61 and having a button 70 positioned to be depressed when the cover is closed by a pin 71 formed integral with cover 56. Switch 68 is connected so that it provides an alarm whenever cover 56 is removed.

Magnet housing 16 is also formed of non-magnetic material and is of generally rectangular cross section. This box includes a cover 69 which is bolted to the housing and mounting flanges 72 which are bolted to a plate 73. The plate is in turn mounted upon gate frame member 15 by means of U-bolts 74. The magnet housing 16 includes an outer face 75 which extends parallel to and closely adjacent to front face 64 of switch housing 17 when the gate 11 is closed. Remote magnet 28, in the embodiment shown, is a horseshoe magnet having its pole faces disposed adjacent to outer face 75 of the housing. These pole pieces are spaced apart the same distance as pole pieces 30 and 31. When magnet housing 16 and switch housing 17 are installed, the magnetic portions of remote magnet 28 are vertically aligned with pole pieces 30 and 31 as is shown in FIGURE 3. Magnet 28 is held within housing 16 in any suitable manner, for example by means of a plastic matrix which surrounds the magnet and fills the interior of housing 16.

When installing a magnetic switch assembly of the present invention, magnet housing 16 and switch housing 17 are respectively mounted upon gate frame member 15 and stationary gate post 13. The switch boxes 16 and 17 are precisely located in vertical alignment. Electrical connections are made to the cover switch 68 and reed switch 18. These connections are fed through conduit 76 to suitable remote control alarm stations which may be located at some substantial distance from the gate. Next, the cover 56 of housing 17 is removed and local magnet 27 is adjusted by shifting the magnet longitudinally until the magnetic circuit balances, i.e., the reed 21 of the magnetic switch shifts into engagement with non-

magnetic contact 24. Thereafter, the cover 56 is placed over the housing 17. When an alarm circuit of the type shown in FIGURE 8 is utilized, there is no alarm so long as gate 11 is closed. However, when the gate is open, relay 44 is energized to sound alarm 51.

The present magnetic switch offers a maximum protection against defeat. For in order to prevent the reed switch from shifting to an alarm condition when the gate is opened, the magnetic fields in the neighborhood of pole pieces 30 and 31 must always cancel each other out. Thus, for example, if the gate 11 has been opened, and an intruder desires to simulate a closing of the gate so that the signal at the guard house shows that the gate has been closed, he might attempt to do so by bringing an auxiliary magnet adjacent to the switch box 17. Obviously, unless the magnet were the same size and of the same strength and orientation as the magnet inside magnet box 16, the magnetic bridge circuit could never be brought into balance. Then, even in the remote chance that the intruder had the correct type of magnet it would still be necessary for him to mount it in precisely the correct position relative to box 17 in order to maintain switch 18 in a closed condition. As a practical matter, this operation is almost impossible without at some time tripping the alarm switch.

From the foregoing disclosure of the general principles of this invention and the above description of a preferred embodiment, those skilled in the art will readily comprehend various modifications to which the invention is susceptible. For example, while remote magnet 23 has been shown as a horseshoe magnet, this magnet could, of course, be a bar magnet or any other suitable form of two pole magnet. Also, while switch 18 has been shown as being incorporated in a normally open circuit, this switch could be utilized in any suitable form of alarm circuit, such as a normally closed circuit in which a normally energized relay is deenergized upon opening of the switch. Accordingly, I desire to be limited only by the scope of the following claims.

Having described my invention, I claim:

1. A magnetic switch assembly for indicating the position of a closure member in an alarm circuit comprising a switch housing adapted to be mounted upon a stationary frame adjacent to a movable closure member, a magnet housing adapted to be mounted upon said closure member adjacent to a free edge thereof, whereby when said closure member is closed the magnet housing and switch housing are disposed in juxtaposition, two ferromagnetic pole pieces mounted within said switch housing in parallel spaced relationship with one another, a magnetic reed switch, means mounting said reed switch within said housing with the axis of said reed switch transverse to said pole pieces, one end of the reed switch being adjacent to each of the pole pieces, one of said pole pieces having an opening formed therein, a local magnet telescopically disposed within the opening and extending parallel to said reed switch toward the second of said pole pieces, a remote magnet, means mounting said remote magnet within said magnet housing, the pole of said remote magnet adjacent a pole piece being of opposite polarity to the pole of the local magnet adjacent to the same pole piece, said local magnet, said remote magnet and said pole pieces forming a magnetic bridge circuit, said reed switch including a movable contact shiftable between a first and second position, said contact being shifted to said first position only when said magnetic bridge circuit is balanced.

2. A magnetic switch assembly for indicating the position of a closure member in an alarm circuit comprising a switch housing adapted to be mounted upon a stationary frame adjacent to a movable closure member, a magnet housing adapted to be mounted upon said closure member adjacent to a free edge thereof, whereby when said closure member is closed the magnet housing and switch

housing are disposed in juxtaposition, two ferromagnetic pole pieces mounted within said switch housing in parallel spaced relationship with one another, a magnetic reed switch, means mounting said reed switch within said housing with the axis of said reed switch transverse to said pole pieces, one end of the reed switch being adjacent to each of the pole pieces, one of said pole pieces having an opening formed therein, a local magnet telescopically disposed within the opening and extending parallel to said reed switch toward the second of said pole pieces, a remote magnet, means mounting said remote magnet within said magnet housing, said remote magnet having poles spaced apart substantially the same distance as said pole pieces, the pole of said remote magnet adjacent a pole piece being of opposite polarity to the pole of the local magnet adjacent to the same pole piece, said local magnet, said remote magnet and said pole pieces forming a magnetic bridge circuit, said reed switch including a movable contact shiftable between a first and second position, said contact being shifted to said first position only when said magnetic bridge circuit is balanced.

3. A magnetic switch assembly for indicating the position of a closure member in an alarm circuit comprising a switch housing adapted to be mounted upon a stationary frame adjacent to a movable closure member and having a vertical front face disposed toward said closure member, a magnet housing adapted to be mounted upon said closure member adjacent to a free edge thereof, whereby when said closure member is closed the magnet housing and switch housing are disposed in juxtaposition, two ferromagnetic pole pieces mounted within said switch housing and extending horizontally inwardly from said front face in parallel spaced relationship with one another, a magnetic reed switch, means mounting said reed switch within said housing with the axis of said reed switch extending vertically closely adjacent to said front face, one end of the reed switch being adjacent to each of the pole pieces, a local bar magnet, means mounting said local magnet parallel to said reed switch on the side of said switch remote from said front face, a remote magnet, means mounting said remote magnet within said magnet housing, said remote magnet having poles spaced apart substantially the same distance as said pole pieces, and disposed in alignment with said pole pieces when said closure member is closed, the pole of said remote magnet adjacent a pole piece being opposite to the pole of the local magnet adjacent to the same pole piece, said local magnet, said remote magnet and said pole pieces forming a magnetic bridge circuit, said reed switch including a movable contact shiftable between a first and second position, said contact being shifted to said first position only when said magnetic bridge circuit is balanced.

4. A magnetic switch assembly for indicating the position of a closure member in an alarm circuit comprising a switch housing adapted to be mounted upon a stationary frame adjacent to a movable closure member and having a vertical front face disposed toward said closure member, a magnet housing adapted to be mounted upon said closure member adjacent to a free edge thereof, whereby when said closure member is closed the magnet housing and switch housing are disposed in juxtaposition, two ferromagnetic pole pieces mounted within said switch housing and extending horizontally inwardly from said front face in parallel spaced relationship with one another, a cylindrical magnetic reed switch, said pole pieces having openings therein receiving said reed switch whereby said reed switch is mounted within said housing with the axis of said reed switch extending vertically closely adjacent to said front face, one of said pole pieces having a second opening formed therein, a local bar magnet disposed within the opening extending parallel to said reed switch and extending toward the second of said pole pieces, set screw means for holding said bar magnet in place, a remote magnet, means mounting said remote magnet within

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said magnet housing, said remote magnet having poles spaced apart substantially the same distance as said pole pieces, the pole of said remote magnet adjacent a pole piece being of opposite polarity to the pole of the local magnet adjacent to the same pole piece, said local magnet, said remote magnet and said pole pieces forming a magnetic bridge circuit, said reed switch including a movable contact shiftable between a first and second position, said contact being shifted to said first position only when said magnetic bridge circuit is balanced.

5. A magnetic switch assembly for indicating the position of a closure member in an alarm circuit comprising a switch housing adapted to be mounted upon a stationary frame adjacent to a movable closure member and having a vertical front face disposed toward said closure member, a magnet housing adapted to be mounted upon said closure member adjacent to a free edge thereof, whereby when said closure member is closed the magnet housing and switch housing are disposed in juxtaposition, two ferromagnetic pole pieces mounted within said switch housing and extending horizontally inwardly from said front face in parallel spaced relationship with one another, a cylindrical magnetic reed switch, said pole pieces having openings therein receiving said reed switch whereby said reed switch is mounted within said housing with the axis of said reed switch extending vertically closely adjacent to said front face, one of said pole pieces having a second opening formed therein, a local bar magnet disposed within the opening extending parallel to said reed switch and

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extending toward the second of said pole pieces, set screw means for holding said bar magnet in place, a remote magnet, means mounting said remote magnet within said magnet housing, said remote magnet having poles spaced apart substantially the same distance as said pole pieces and disposed in alignment with said pole pieces when said closure member is closed, the pole of said remote magnet adjacent a pole piece being opposite to the pole of the local magnet adjacent to the same pole piece, said local magnet, said remote magnet and said pole pieces forming a magnetic bridge circuit, said reed switch including a movable contact shiftable between a first and second position, said contact being shifted to said first position only when said magnetic bridge circuit is balanced.

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