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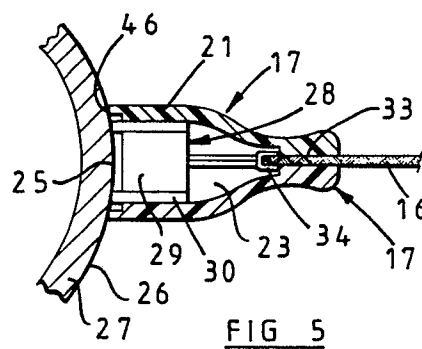
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(54) A retractable barrier device.

(57) A retractable barrier device comprises a reel assembly including a spindle rotatable within a cylindrical housing and a flexible elongate barrier element (16), secured at one end to the spindle so as to be wound on the spindle by rotation of the spindle by a spring, which is tensioned as the element is withdrawn from the spindle. There is attached to the free end of the flexible element a magnetic assembly (17) comprising a permanent magnet (28) within a housing (21), for engagement with a suitable metal keeper spaced from the reel assembly. The magnetic assembly (17) includes a part-cylindrical concavely curved surface (25) so disposed that the magnet (28) will hold the assembly in magnetic engagement with a part-cylindrical convexly curved metal surface (26) when the concave surface (25) on the assembly (17) is brought into registering engagement with the convex surface (26). The magnet (28) lies within a mouth portion of the assembly (17), and in an alternative arrangement the mouth of the assembly may fit over a flat, correspondingly shaped, keeper plate.



Description

A Retractable Barrier Device

The invention relates to retractable barrier devices of the kind comprising a reel assembly including a spindle rotatable on a support and a flexible elongate barrier element, secured at one end to the spindle so as to be capable of being wound on the spindle by rotation thereof, the free end of the flexible element having secured thereto an assembly which magnetically engages a fixed device located in a position spaced from the reel assembly.

In one known form of such device the fixed device is in the form of a comparatively large circular permanent magnet, and the assembly on the end of the flexible element comprises a correspondingly shaped circular metal keeper disc which can be engaged with the fixed magnet, the flexible elongate element being in the form of a strip of fabric webbing.

Such devices may be used in situations where a temporary barrier is required to indicate that access past the barrier is prohibited or restricted. For example, such devices may be associated with supermarket check-outs to indicate, when required, that a particular check-out is not in operation. The reel assembly is fixed at about waist height to one side of the gangway past the check-out, and the fixed magnet is mounted at the opposite side of the gangway at the same height. When it is required to bar access through the gangway, the flexible element is withdrawn from the spindle and the assembly on its free end is engaged with the fixed magnet so that the element extends across the gangway. When access through the gangway is to be permitted again, the keeper plate is disengaged from the magnet and the flexible element rewound on the spindle, which is normally spring loaded so that this rewinding occurs automatically.

Such devices may also be used temporarily to bar access through certain doorways and stairways in buildings to which the public is otherwise admitted, such as stately homes, museums, galleries and other public buildings.

While such known devices are useful, there is frequently a demand for a temporary barrier in circumstances where the existing forms of device are not suitable. Thus there may not be available a suitable surface on which the magnet may be conveniently mounted. For example, in supermarkets one side of the gangway through each check-out is often defined by a tubular metal rail. Also, a barrier may be required to mark off temporarily a large area rather than simply access through a gangway or doorway. In this case it is common to provide free-standing vertical posts which are spaced apart across the required area, adjacent posts being connected by flexible elements. Usually each flexible element is in the form of a rope having at each end a hook which connects with a corresponding ring or hook on the upper part of a post. While such arrangements are adequate in use, they can be inconvenient to erect and store due to the provision of separate lengths of rope. For

example, if a length of rope is stolen or otherwise becomes lost, the associated support post becomes useless.

The present invention sets out to provide an improved form of retractable barrier device which can not only be used in the circumstances described above, but can also be used in conjunction with free-standing posts or similar supports.

According to the invention there is provided a retractable barrier device comprising a reel assembly including a spindle rotatable on a support and a flexible elongate barrier element, secured at one end to the spindle so as to be capable of being wound on the spindle by rotation thereof, the free end of the flexible element having secured thereto an assembly which magnetically engages a fixed device located in a position spaced from the reel assembly, characterised in that the assembly on the flexible element is a magnetic assembly comprising a permanent magnet within a housing, and said fixed device comprises a metal keeper surface which, in use, is located in a position spaced from the reel assembly, the magnetic assembly including a part-cylindrical concavely curved surface so disposed in relation to the magnet that, in use, the magnet will hold the assembly in magnetic engagement with a part-cylindrical convexly curved metal keeper surface when the two curved surfaces on the assembly and keeper respectively are brought into registering engagement.

Using a device according to the present invention, the magnetic assembly on the end of the flexible barrier element may be readily engaged directly with the surface of a tubular rail or post, provided the rail or post is formed of ferrous metal, without the necessity of fitting a magnet or keeper plate to it. Alternatively the assembly may be engaged with a keeper plate curved around the surface of the rail or post in the case where it is made of some non-magnetic material.

There may be provided a number of posts on each of which is mounted a reel assembly so that, in use, the posts may be spaced apart in the required positions and then each flexible element may be withdrawn from its spindle and the magnetic assembly on the free end thereof engaged with an adjacent post or a keeper plate thereon.

The device according to the invention may also be used in the conventional manner across a fixed gangway or doorway in which case a keeper plate may be mounted at one side of the gangway or doorway in the conventional manner. In this case the keeper plate may have a part-cylindrical curved convex surface for engagement with the magnetic assembly, but preferably the magnetic assembly is such that it will also magnetically engage with a flat keeper plate.

The part-cylindrical concavely curved surface of the magnetic assembly may be provided on the housing of the magnetic assembly, and in this case the magnet is preferably so disposed in relation to

said curved surface that at least part of the magnet will contact a curved surface which is brought into registering engagement with the curved surface of the housing.

The magnet may comprise a main magnetic body sandwiched between two plate-like pole pieces, the magnetic body being set back from said curved surface of the housing but the pole pieces projecting from the magnetic body to engage a curved surface brought into registering engagement with the curved surface on the housing. (Although, for convenience, reference is made to pole pieces, as explained later this term is intended to cover elements which engage any opposite faces of the magnetic body, and is not limited to elements which engage the north and south pole faces of the magnetic body.)

The aforesaid support for the spindle may include a part-cylindrical convexly curved surface of ferrous metal, the radius of curvature of said surface being substantially the same as the radius of curvature of the concavely curved surface on the magnetic assembly, so that the magnetic assembly may be brought into registering engagement with the convexly curved surface on the reel assembly of another similar device. For example, the support may comprise a generally cylindrical housing of ferrous metal within which the spindle is coaxially rotatable.

In any of the above arrangements wherein there is provided a separate keeper plate assembly for magnetic engagement by said magnetic assembly, said housing may include an open mouth portion, and the keeper plate assembly may then be so shaped and dimensioned as to be at least partly receivable in the mouth of the housing.

This feature may be advantageous whether or not the magnetic assembly incorporates a concavely curved surface, since it locates the magnetic assembly accurately with the keeper plate, and makes it less likely that the assembly will become accidentally detached from the keeper plate by a sideways force. Accordingly, the invention also provides a retractable barrier device comprising a reel assembly including a spindle rotatable on a support and a flexible elongate barrier element, secured at one end to the spindle so as to be capable of being wound on the spindle by rotation thereof, the free end of the flexible element having secured thereto an assembly which magnetically engages a fixed device located in a position spaced from the reel assembly, characterised in that the assembly on the flexible element is a magnetic assembly comprising a permanent magnet within a housing, and said fixed device comprises a metal keeper surface which, in use, is located in a position spaced from the reel assembly, said housing including an open mouth portion and the keeper plate assembly being so shaped and dimensioned as to be at least partly receivable in the mouth of the housing.

In any arrangement according to the invention where the keeper plate is received within the mouth of the housing, the peripheral shape of the keeper plate preferably substantially matches and fits within the mouth of the housing. The keeper plate is also preferably dimensioned so as to contact at least part

of the magnet within the housing when the keeper plate is received within the mouth of the housing.

The keeper plate is preferably substantially flat, and may be mounted on a separate carrier which, in use, may be mounted on a fixed surface.

With any of the devices according to the invention there may be provided an electrically operated audible and/or visual alarm unit, said alarm unit being controlled by operation of an alarm switch which is adapted to be actuated by disturbance of the device from its normal operative condition. The alarm unit may be integrally formed with an electrical plug adapted to be received in an electrical power socket.

The aforesaid alarm switch may comprise a magnetically operated switch so located in the carrier for the keeper plate as to be operated by the magnet when the magnetic assembly is engaged with, or disengaged from, the keeper plate.

Alternatively, the alarm switch may be a micro-switch adapted to be operated by rotation of the spindle of the reel assembly. With such an arrangement the alarm unit may be integral with the reel assembly, or a post or other structure on which the reel assembly is mounted.

In another arrangement the alarm switch may include means for sensing retraction of the flexible element onto the spindle of the reel assembly, the switch being adapted to be operated upon such retraction being sensed.

The following is a more detailed description of embodiments of the invention, reference being made to the accompanying drawings in which:

Figure 1 is a diagrammatic representation of a barrier installation in which an assembly according to the invention may be used,

Figure 2 is a similar view of an alternative form of installation,

Figure 3 is an exploded view of a reel assembly of a device according to the invention,

Figure 4 is a vertical section through a magnetic assembly of a device according to the invention,

Figure 5 is a horizontal section through the magnetic assembly,

Figure 6 is a similar view of a modified form of magnetic assembly,

Figure 7 is a perspective view of a combined power plug and alarm for use with the invention,

Figure 8 is a diagrammatic horizontal section through a barrier device according to the invention, showing means for mounting the device in a concealed manner, and

Figure 9 is a front view of the housing for the magnetic assembly in the arrangement of Figure 8.

Figure 1 shows a typical barrier installation incorporating retractable barrier devices according to the present invention. The installation comprises a plurality of free-standing support posts 10 each having a base 11. Mounted at the upper end of each post 10 is a reel assembly 12 of a device according to the invention. As shown in Figure 3, each reel assembly comprises a fixed cylindrical metal housing 13 formed with an axially extending slot 14. A spindle 40 is rotatable coaxially within the housing

13. The spindle is rotatable in bushes 41 mounted in opposed circular end caps (15 and 42, or 15 and 43,) of the housing 13 and is connected to the lower end cap 42 or 43 by a clock spring 44 which becomes wound up as the spindle 40 is rotated in one direction, thereby to provide automatic retraction of the flexible elongate barrier element 16 which is wound on the spindle. When the reel assembly is to be mounted on a vertical post 10, a lower end cap of the kind indicated at 43 in Figure 3 is used. This has a downwardly projecting, reduced diameter portion 45 which can be secured within the hollow upper end of the post. In the case where the assembly is to be mounted on a vertical surface (as will be described with reference to Figure 2) a plain lower end cap is used, of the kind indicated at 42 in Figure 3.

Referring again to Figure 1, the flexible elongate barrier element 16 extends through the slot 14 in the housing 13 and is secured at one end to the spindle 40. The element 16 may comprise, for example, fabric webbing or a flat plastics strip, although the invention includes within its scope other forms of flexible elements such as chains or cords. Connected to the free end of the element 16 is a magnetic assembly 17, which will be described in greater detail below.

Initially the element 16 is wound on the spindle 40 within the reel assembly 12 with the magnetic assembly 17 adjacent the slot 14. As the element 16 is withdrawn from the reel assembly, rotating the spindle 40, the clock spring 44 is wound up. The element is extended until the magnetic assembly 17 can be engaged with the housing 13 of the reel assembly on an adjacent post 10. The loading of the clock spring 44 tensions the element 16 and also rotates the spindle, once the magnetic assembly 17 has been detached from the adjacent post, so as automatically to retract the element back into the reel assembly.

In the arrangement described and shown each post assembly is purpose built and the reel assembly 12 is mounted coaxially with the post and at the upper end thereof in any suitable manner. For example the flange 45 of the lower end cap 43 of the housing may be screwed or welded within the upper end of the main part of the post 10. Alternatively, however, the reel assembly may be provided as a separate unit having means for securing it to a pre-existing post. For example, the reel assembly may have welded to its housing 13 a bracket, clamp or strap by means of which the assembly may be secured to a post. In such a case, the reel assembly may be used alternatively with a fixed installation for example as shown in Figure 2.

Referring to Figure 2, the reel assembly 12 has a bracket 18 welded to its housing by means of which the assembly may be screwed to the side of a supermarket check-out counter 19. The magnetic assembly 17 may then be directly engaged with a post or rail 20 spaced from the counter 19 to define the gangway past the counter.

The reel assembly 12 may be of the kind shown in Figure 3. However, in a further improved arrangement there may be associated with the spindle, within the assembly, a latch mechanism which

operates in a similar fashion to the latch mechanism in a roller blind so that once the flexible element has been withdrawn to a required extent from the spindle the latch mechanism operates to engage and hold the element and prevent its retraction into the housing by the spring 44. As in a roller blind arrangement, the flexible element 16 may be retracted into the reel assembly when required by twitching the element so as to release the latch mechanism, allowing the spring to rotate the spindle and wind in the flexible element.

Figures 4 and 5 show in greater detail the magnetic assembly 17 mounted on the end of the flexible element 16. The magnetic assembly comprises a two part housing 21 which is preferably moulded from plastics material although it may also be formed from other materials, such as metal. The two parts of the housing are held together by self-tapping screws which pass through bosses 22 integrally moulded in each half of the housing 21.

As best seen in Figures 4 and 5, the two parts of the housing define a cavity 23 which is generally rectangular in cross-section having at one end a rectangular open mouth 24. The vertical side edges 46 of the mouth 24 are flat, but the parts of the housing above and below the mouth 24 are concavely and cylindrically curved as indicated at 25 so as to be engageable with the convexly curved outer surface 26 of a tubular metal post 27 (or the outer casing of another reel assembly) as shown in Figure 5.

At the upper end of the concavely curved surface 25 the housing 21 is formed with a straight transverse lip 62. When the magnetic assembly is attached to a reel housing 13, as shown in Figure 1, or is attached to the topmost end of a post, the lip 62 sits on the upper surface of the housing or post to prevent the assembly sliding downwards. In cases where the assembly is required to engage the curved surface of a post away from the end, as shown in Figure 2, the lip 62 is removed so that the curved surface 25 can fit closely on to the curved surface of the post.

Mounted within the cavity 23 is a permanent magnet 28 comprising a central magnetic body 29 on opposite sides of which are pole plates 30. As best seen in Figure 5, the pole plates 30 are wider than the magnetic body 29 and the magnet 28 is so located within the cavity 23 that the pole plates touch the surface 26 of the post when the curved surfaces 25 of the housing engage said surface. (A similar effect could be obtained by having the plates 30 of the same width as the body 29, but displacing them towards the mouth of the cavity.) It is not essential that the pole plates touch the surface of the post, and the magnet could be so located that its main body and pole plates are slightly spaced from the surface of the post. Alternatively, the surface of the magnet 28 could be cylindrically and concavely curved so as to engage with the surface of the post over a large area.

As best seen in Figure 4, the magnet 28 is retained within the cavity 23 in the housing by means of projections 31 moulded on the inner surface of the housing which engage in corresponding recesses in

the upper and lower end faces of the magnet 28. However, other means may be provided for retaining the magnet within the housing. For example it may be arranged for the screws which hold the two halves of the housing together to pass through or otherwise engage with the magnet.

At the opposite end of the housing to the mouth 24, the housing is formed with a narrow elongate slot 33 through which the webbing element 16 passes. The end of the element 16 within the cavity 23 is engaged by a generally U-sectioned metal clip 34 which is clamped into engagement with the end of the webbing and prevents its withdrawal through the slot 33.

It will be seen that due to the concavely curved shape of the end surfaces 25 of the magnetic assembly it may be brought firmly into engagement with the curved surface of the post 27. If the post is formed of ferrous metal the magnet 28 will hold the assembly directly in engagement with the post. If the post is not made of ferrous metal then a suitable keeper plate can be affixed to its surface. Such keeper plate may be curved around the surface of the post so as to be engaged by the whole of the curved surface of the magnetic assembly, or it may be a flat plate. In this case the keeper plate is preferably adapted to enter within the mouth 24 of the housing in the manner shown in Figure 6.

Referring to Figure 6, there is shown an arrangement whereby a modified version of the magnetic assembly of Figures 4 and 5 may also be used if required for engagement with a flat surface rather than a tubular rail or post. In such arrangement the pole plates 30 are of the same width as the magnetic body 29 and are thus set back from the mouth 24 of the housing. There is mounted on the flat surface 35 a moulded plastics carrier 47 for a rectangular metal keeper plate 36 of such thickness that it may project into the mouth 24 of the housing, preferably to contact the magnet 28, although it may be slightly spaced therefrom. It will be seen that in this case the keeper plate 36 also serves to prevent lateral displacement of the magnetic assembly 17.

The arrangement of Figure 6 may also be used for attachment of the assembly to a curved surface of a support post, as mentioned above, simply by mounting the flat plate 36 directly on the support post, the thickness of the plate being such as to allow the curved surface 25 of the assembly to come into engagement with the surface of the post.

In an alternative arrangement for allowing connection of the magnetic assembly 17 to a flat surface, there may be provided a special keeper plate having a concavely curved cylindrical surface with which the assembly may engage.

In any of the arrangements described above, it may be desirable for an audible or visual warning to occur should the magnetic assembly 17 become disengaged from its keeper, possibly indicating that somebody has passed the barrier. In this case, there may be associated with the keeper plate, for example as indicated diagrammatically in Figure 6, a magnetically operated reed switch 37 which is arranged to be operated upon removal of the magnet 28 from its vicinity. Operation of the switch

37 is arranged, in known manner, to actuate an alarm bell, buzzer, synthetic spoken warning, light, or any other form of audible or visual indicator, either in the immediate vicinity of the barrier device or at a remote monitoring location.

In this arrangement, if the pole pieces 30 were to engage the north and south pole faces respectively of the magnetic body 29 they would, with the keeper plate 36, complete a magnetic circuit and there may then be insufficient stray magnetic flux to operate the reed switch 37. For this reason, therefore, the plates 30 actually engage the faces which are at right angles to the north and south faces of the magnetic body 29. In other words, the face of the magnetic body 29 which engages flat against the keeper plate is either the north or south pole face of the magnetic body. The magnetic circuit is not then complete and there is sufficient stray magnetic flux to ensure that the reed switch 37 is actuated.

Figure 7 shows diagrammatically, by way of example, a convenient form of alarm buzzer. The buzzer mechanism, together with the necessary transformer if required, is housed within a rectangular casing 48 which also incorporates a conventional 13 amp three pin plug assembly, the rectangular section pins being indicated at 49. The unit may thus be simply plugged into a conventional 13 amp socket and this provides the necessary power for the alarm buzzer. Alternatively the plug assembly may be of any other form appropriate to the country in which the unit is to be used. The casing is formed with slots 50 to allow the sound of the alarm to emerge. A small indicating lamp 51 is provided to indicate that the unit is "on" and an on/off switch 52 is also provided on the casing.

On each side of the casing 48 is 3.5 mm mono jack socket 53, the two sockets being wired in series and connected to the buzzer circuit. The reed switch 37 in the fixed part of the magnetic assembly is connected by a flexible cable to a small jack plug which, in use, is plugged into one of the sockets 53 on the alarm unit. The reed switch 37 is normally open but is closed when the magnetic assembly 17 engages the keeper plate 36, thus completing the circuit to the alarm unit. In this condition the operating circuit for the alarm is latched. Should the magnetic assembly 17 be detached from the keeper plate 36, the removal of the magnet 28 from the vicinity of the reed switch 37 causes the reed switch to open, breaking the circuit to the alarm unit. The electric latch holding the alarm "off" is thus released and the alarm sounds. The alarm buzzer can be turned off by switching off or unplugging the alarm unit, and reset by switching it on again or re-plugging it in.

If required, a series of magnetic assemblies may be wired together in a loop and connected to a common alarm unit, by means of the two sockets 53, so that the alarm unit will sound should any of the assemblies be detached.

The alarm unit shown in Figure 7 may also incorporate a rechargeable back-up battery pack. This enables the unit to be used in a situation where no mains supply is available, but in the case where a mains supply is available the presence of the battery

back-up ensures that the alarm can still operate even if there is a power failure or the unit is unplugged from the mains supply.

The alarm unit may incorporate additional switch contacts which become closed when the alarm is activated, which contacts may be connected, if desired, to an auxiliary warning circuit, such as a circuit supplying a remote indicating device.

Instead of the alarm being activated by a magnetically operated reed switch associated with the keeper plate, it may be activated by a micro-switch associated with the reel assembly. In this case, referring to the form of reel assembly shown in Figure 3, the lower end of the spindle 40 of the assembly may be extended downwardly and arranged to project completely through a central aperture in the lower end cap 42 or 43 of the assembly housing. A micro-switch (as indicated at 59 in Figure 3) is carried on a mounting plate 60 which is spaced below the lower end cap 42 or 43 and is secured thereto by mounting posts 61. The movable operating element of the micro-switch carries a small roller 63 which bears against the periphery of the projecting lower end of the spindle 40, so as to maintain the switch in a normally closed condition.

As may be seen from Figure 3, the spindle 40 is formed with a longitudinal slot 40a. If the barrier, once extended, is tampered with by removing the magnetic assembly from its keeper, or if the flexible barrier element 16 is cut or even merely pulled, the spindle 40 will rotate, either due to the barrier element being retracted into the device by the spring, or due to a further length of the element being withdrawn from the device. As the spindle 40 rotates, the roller 63 on the operating element of the micro-switch 59 will fall into the slot 40a in the spindle, opening the switch and thus activating the alarm.

Instead of being mounted to engage the lower end of the spindle 40 as shown, the micro-switch 59 might be mounted at the top of the reel assembly, to engage the upper end of the spindle 40, or might be located within the cylindrical housing 13 itself so as to engage an intermediate portion of the spindle.

The micro-switch arrangement may be provided as a back-up, in addition to the above-mentioned reed switch associated with the keeper plate. However, it is also particularly suitable for use in an arrangement where an alarm unit controlled by the micro-switch is mounted on or in the post itself. In this case the alarm unit may be battery powered and the post and alarm will then be entirely self-contained, providing great convenience in use.

The electrical circuitry required to achieve the above methods of operation will be apparent to those skilled in the design of such circuitry, and will not therefore be described in detail.

Figures 8 and 9 show a neat and unobtrusive method of mounting the barrier device within a structure, such as a vertical surface of a check-out counter in a supermarket.

In this arrangement there is welded to the cylindrical housing 13 of the device a metal mounting lug 54 by means of which the device may be secured

to a vertical wall panel 55 of a fixed structure, so as to lie behind the wall. Adjacent the barrier device, the wall panel 55 is formed with a rectangular slot 56 within which is fitted a sleeve 57 which extends from the front surface of the wall panel 55 to the housing 13. The sleeve 57 has an integral front flange 58 which overlies and is secured to the front surface of the wall panel. The slot 14 in the housing 13 is in register with the sleeve 57, which is so dimensioned and shaped as to receive the magnetic assembly 17 when the flexible element 16 is fully retracted into the reel assembly.

In order to withdraw the magnetic assembly from the sleeve 57 when it is required to set up the barrier, there may be provided a key which is so shaped that it may be inserted into the sleeve 56. At least the end of the key is formed from ferrous metal so that, when inserted in the sleeve 57, it attracts and holds the magnetic assembly, and thus enables the assembly to be withdrawn from the sleeve.

In the arrangement of Figures 8 and 9, an associated alarm device may be controlled by an infra-red or similar device (not shown) which is mounted behind the wall panel 55 and projects a beam through an eyelet or similar hole (also not shown) in the flexible element 16, which hole is positioned so as to come into register with the beam when the element is fully extended. If the barrier is tampered with the element will move, bringing the eyelet hole out of register with the beam, and this may be arranged, in known manner, to activate the alarm device.

Any other known form of proximity detection device may be used, instead of an infra-red beam, to detect the presence of a hole in the element 16, or a device attached to it, when the element is fully extended or fully retracted, so as to operate an alarm switch in the appropriate manner should the barrier be tampered with.

In the arrangement described above the holding power of the magnet 28 will normally be sufficient to prevent detachment of the magnetic assembly from the keeper plate, rail or post upon accidental pressure on the flexible element, since this will normally result in a fairly direct pull in the direction of the length of the elongate element 16. The assembly may, however, be removed from the keeper plate, rail or post when required by levering the assembly sideways, pivoting it about one side edge of the housing, so as to break the magnetic connection.

However, in the event of an emergency, someone running at the barrier or pushing firmly against it will readily apply sufficient pressure to disengage the magnetic assembly from its keeper and thus open the barrier. The arrangement has the advantage that as soon as the magnetic contact is broken the flexible element will immediately be automatically retracted into the reel assembly, so as not in any way to impede passage past the barrier.

Claims

1. A retractable barrier device comprising a reel assembly (12) including a spindle (40)

rotatable on a support and a flexible elongate barrier element (16), secured at one end to the spindle so as to be capable of being wound on the spindle by rotation thereof, the free end of the flexible element having secured thereto an assembly (17) which magnetically engages a fixed device (27, Fig. 5; 36, Fig. 6) located in a position spaced from the reel assembly, characterised in that the assembly (17) on the flexible element (16) is a magnetic assembly comprising a permanent magnet (28) within a housing (21), and said fixed device comprises a metal keeper surface (27, Fig. 5; 36, Fig. 6) which, in use, is located in a position spaced from the reel assembly (12), the magnetic assembly including a part-cylindrical concavely curved surface (25) so disposed in relation to the magnet (28) that, in use, the magnet will hold the assembly in magnetic engagement with a part-cylindrical convexly curved metal keeper surface when the two curved surfaces on the assembly and keeper respectively are brought into registering engagement.

2. A device according to Claim 1, characterised in that said part-cylindrical concavely curved surface (25) is provided on the housing (21) of the magnetic assembly (17), and the magnet (28) is so disposed in relation to said curved surface that at least part of the magnet will contact a curved surface which is brought into registering engagement with the curved surface of the housing.

3. A device according to Claim 1 or Claim 2, characterised in that the support for the spindle includes a part-cylindrical convexly curved surface (13) of ferrous metal, and the radius of curvature of said surface is substantially the same as the radius of curvature of the concavely curved surface (25) on the magnetic assembly (17), whereby the magnetic assembly may be brought into registering engagement with the convexly curved surface on the reel assembly (12) of another similar device.

4. The combination, with a retractable barrier device according to any of the preceding claims, of an elongate post (10), said device being mounted at or adjacent the end of the post which, in use, is uppermost.

5. A retractable barrier device comprising a reel assembly (12) including a spindle (40) rotatable on a support and a flexible elongate barrier element (16), secured at one end to the spindle so as to be capable of being wound on the spindle by rotation thereof, the free end of the flexible element having secured thereto an assembly (17) which magnetically engages a fixed device (36) located in a position spaced from the reel assembly, characterised in that the assembly on the flexible element is a magnetic assembly (17) comprising a permanent magnet (28) within a housing (21), and said fixed device comprises a metal keeper plate assembly (36) which, in use, is located in a position spaced from the reel assembly (12), said housing including an open mouth portion

and the keeper plate assembly (36) being so shaped and dimensioned as to be at least partly receivable in the mouth of the housing.

6. A device according to Claim 5, characterised in that the peripheral shape of the keeper plate (36) substantially matches and fits within the mouth of the housing (21).

7. The combination, with one or more devices according to any of the preceding claims, of an electrically operated audible and/or visual alarm unit (48, 49), said alarm unit being controlled by operation of an alarm switch (37 or 59) which is adapted to be actuated by disturbance of the device from its normal operative condition in which the magnetic assembly (17) engages said keeper surface.

8. A device according to Claim 7, characterised in that said alarm switch comprises a magnetically operated switch (37) so located in a carrier (47) for the keeper plate (36) as to be operated by the magnet (28) when the magnetic assembly is engaged with, or disengaged from, the keeper plate.

9. A device according to Claim 7, characterised in that said alarm switch is a micro-switch (59) adapted to be operated by rotation of the spindle (40) of the reel assembly (12).

10. A device according to Claim 7, characterised in that said alarm switch includes means (Fig. 8) for sensing retraction of the flexible element (16) onto the spindle (40) of the reel assembly, the switch being adapted to be operated upon such retraction being sensed.

11. A device according to Claim 7, characterised in that the alarm unit (48, 49) is integrally formed with an electrical plug (49) adapted to be received in an electrical power socket.

12. A device according to any of the preceding claims, characterised in that there is provided a sleeve (56) having means for mounting it adjacent the reel assembly (12), which sleeve is shaped and dimensioned to accommodate the magnetic assembly (17) when the flexible barrier element (16) is retracted into the reel assembly.

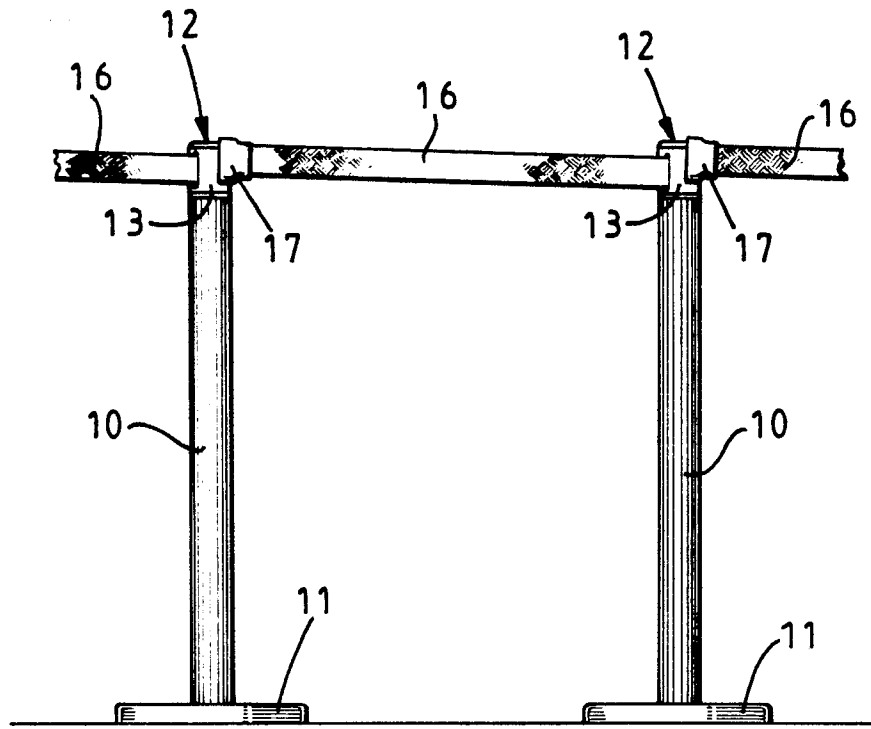


FIG 1

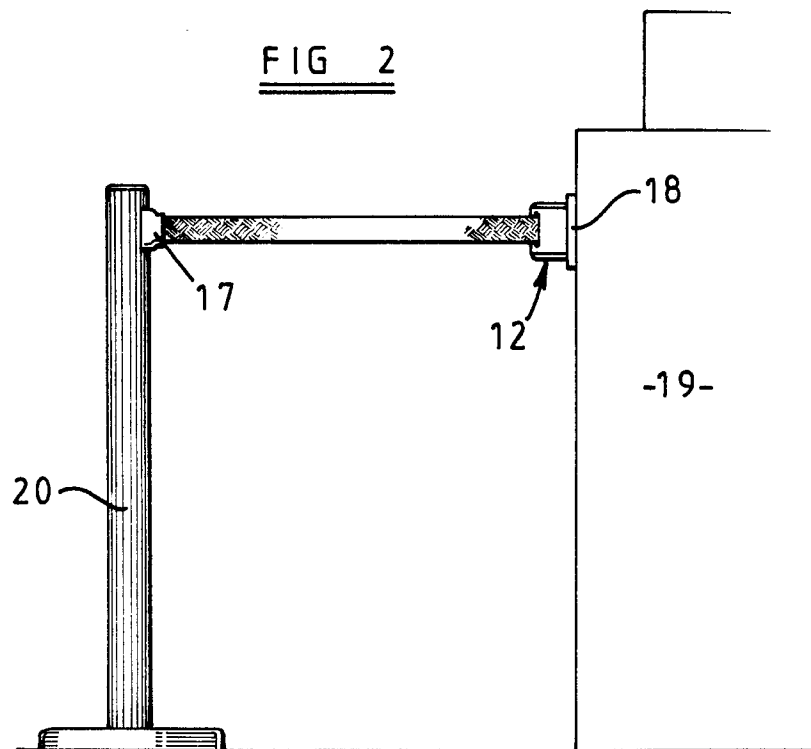
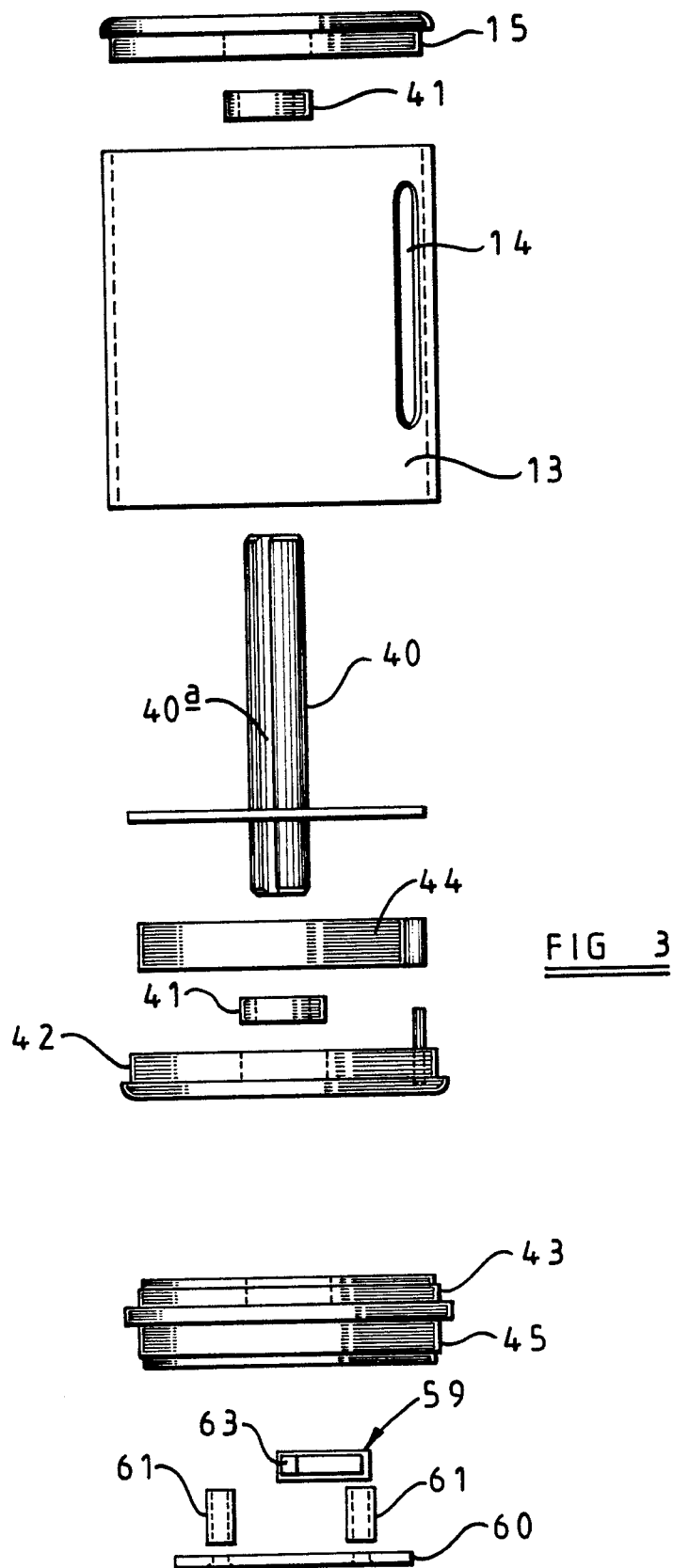


FIG 2



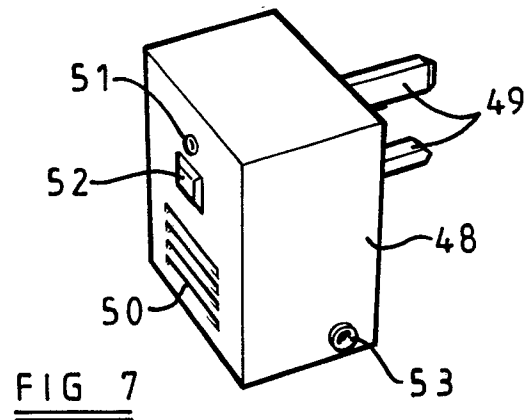
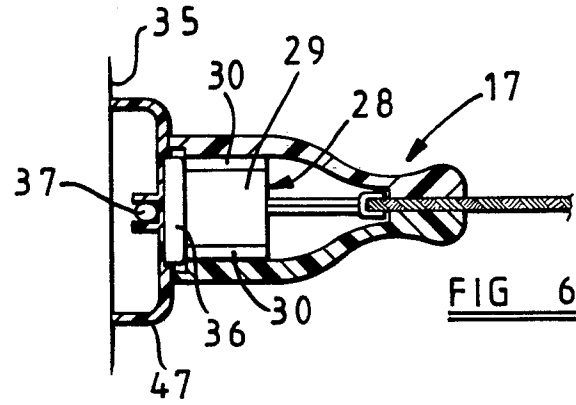
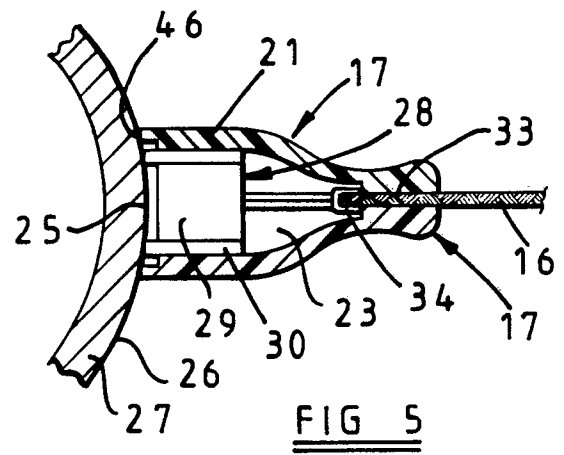
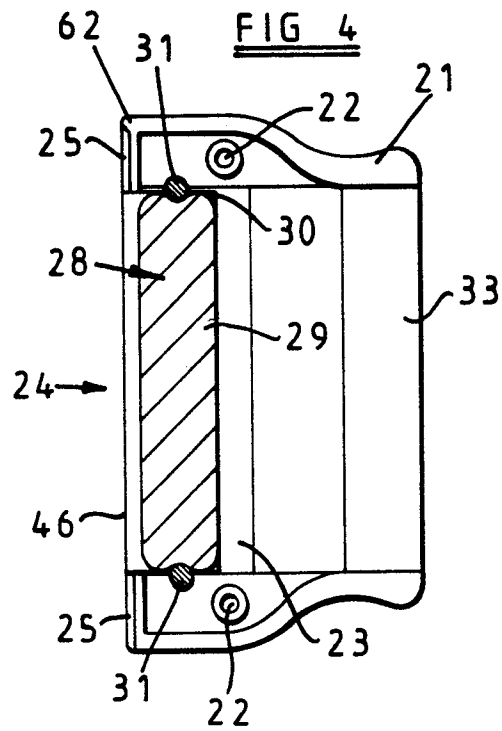


FIG 8

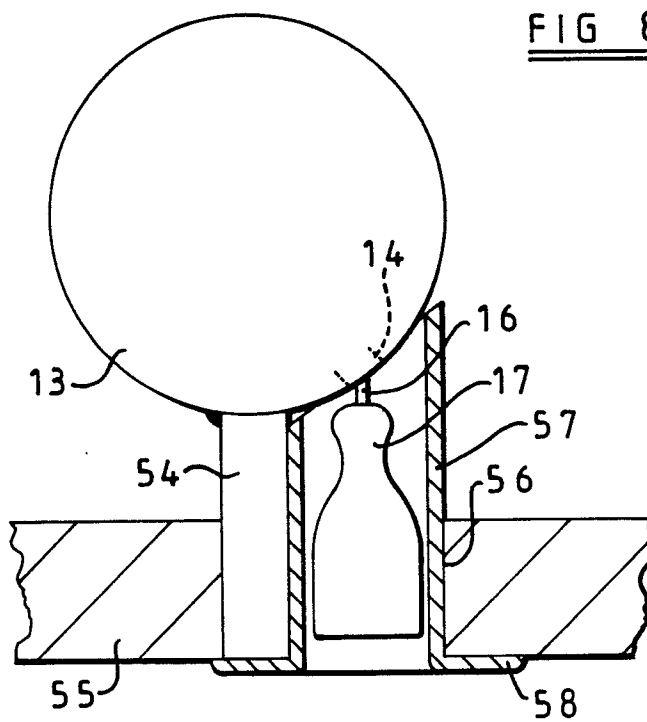
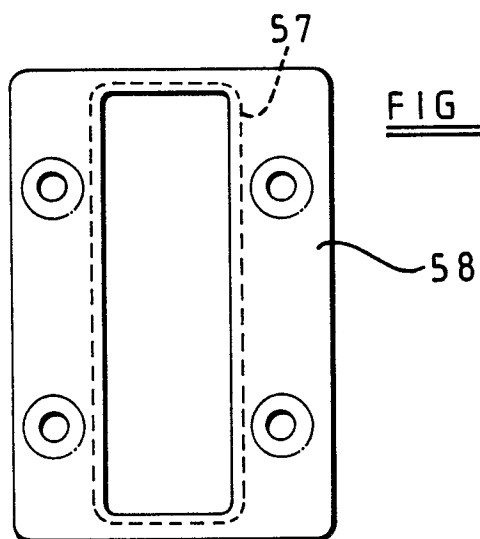


FIG 9





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	AU-B- 504 766 (BRITISH AIRPORTS AUTHORITY) * Page 2a, lines 4-12; page 3, line 4 - page 5, line 1; figures 1,2 *	1,4,5	E 06 B 11/00
Y	GB-A-2 095 321 (T. MORITA) * Page 1, line 76 - page 2, line 18; page 3, lines 31-36; figures 1,23 *	1,4,5	
A	-----	2,3,6	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 06 B A 01 K E 01 F E 05 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25-10-1989	Examiner VERVEER D.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			