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⑤④ **An establishment with locking systems.**

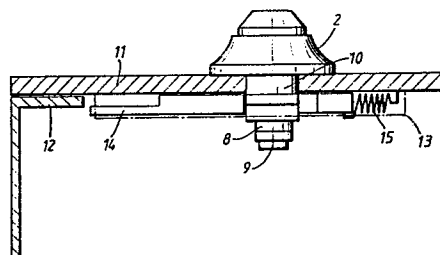
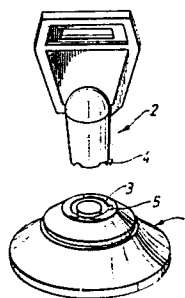
⑤⑦ There is disclosed an establishment comprising a plurality of locking systems, each locking system comprising:

- a container (12) with an aperture;
- a closure member (11) which may be moved so as to close the aperture;
- a hole (7) for accommodating a lock (1);
- a lock (1) locatable in the hole (7); and
- actuating means (2) for actuating the lock (1) between a locked mode and an unlocked mode;

the arrangement being such that, with the actuating means (2) being in a position to actuate the lock (1), the lock (1) may be introduced into the hole (7) whereupon, with the closure member (11) closing the aperture, suitable operation of the actuating means (2) not only causes the lock (1) to secure itself with respect to the container (12) or the closure member (11) or to an element associated with either thereof, but also causes the closure member (11) to be locked with respect to the container (12):

wherein the locks are interchangeable such that, in use, in the establishment, persons requiring locks can be issued with locks and their respective keys on a random basis, thereby enhancing security.

A plurality of similar locks, operated by different keys can be interchangeable, and can be used with a plurality of containers, on a random basis, such as for safes in a hotel.



EP 0 206 724 A2

A ESTABLISHMENT WITH LOCKING SYSTEMS

This invention relates to an establishment with a plurality of locking systems and, more particularly, to locking systems in which the lock is removable from the safe or other security device.

British Patent Application No. 8427022 discloses a safe suitable for installation in hotel rooms and the like including a container provided with a hinged door, a key hole in the door and a bracket on the interior surface of the door adapted removably to mount a lock for the safe, a key hole in the lock being located in register with the key hole in the door when the lock is mounted by the bracket.

The arrangement disclosed in British Patent Application No. 8427022 requires the door of the safe to be open while the lock is being accommodated in the bracket which is on the inside face of the door, and requires the key to be removed from the lock because the key needs to approach the outside face of the door before being put in the key hole of the door and hence into the key hole of the lock. This can increase the likelihood of the key being lost. Also the arrangement disclosed in Specification No. 8427022 makes it necessary for the door of the safe to be in the open position while the lock is being accommodated in the bracket or removed therefrom.

According to the present invention there is provided an establishment comprising a plurality of locking systems, each locking system comprising:

- a container with an aperture;
- a closure member which may be moved so as to close the aperture;
- a hole for accommodating a lock;
- a lock locatable in the hole; and
- actuating means for actuating the lock between a locked mode and an unlocked mode;

the arrangement being such ~~that~~, with the actuating means being in a position to actuate the lock, the lock may be introduced into the hole whereupon, with the closure member closing the aperture, suitable operation of the actuating means not only causes the lock to
5 secure itself with respect to the container or the closure member or to an element associated with either thereof, but also causes the closure member to be locked with respect to the container:

10 wherein the locks are interchangeable such that, in use, in the establishment, persons requiring locks can be issued with locks and their respective keys on a random basis, thereby enhancing security.

The locking systems of the establishment of the
15 present invention can take various different forms.

A first form of locking system for an establishment in accordance with the present invention comprises:
a container with an aperture;

20 a closure member which may be moved so as to close the aperture;

a hole in a front face of the closure member for accommodating a lock; the hole being away from the edge of the closure member;

25 a lock locatable in the hole; and
actuating means for actuating the lock between a locked mode and an unlocked mode;

the arrangement being such that, with the actuating means being in a position to actuate the lock, the lock may be introduced into the hole perpendicularly or
30 substantially perpendicularly to the front face whereupon, with the closure member closing the aperture, suitable operation of the actuating means not only causes the lock to secure itself with respect to the closure member or to an element associated there-
35 with, but also causes the closure member to be locked with respect to the container.

A second form of locking system for an establishment in accordance with the present invention

comprises:

- a container with an aperture;
- a closure member which may be moved so as to close the aperture;
- 5 a hole at an edge region of the front face of the closure member, for accommodating a lock;
- a lock locatable in the hole; and
- actuating means for actuating the lock between a locked mode and an unlocked mode;
- 10 the arrangement being such that, with the actuating means being in a position to actuate the lock, the lock may be introduced into the hole in a direction parallel to the front face whereupon, with the closure member closing the aperture, suitable operation of the
- 15 actuating means not only causes the lock to secure itself with respect to the closure member or to an element associated therewith, but also causes the closure member to be locked with respect to the container.
- 20 A third form of locking system for an establishment in accordance with the present invention comprises:
 - a container with an aperture;
 - a closure member which may be moved so as to close the aperture;
 - 25 a pocket provided on the container or closure member for accommodating a lock;
 - a lock locatable in the pocket; and
 - actuating means for actuating the lock between a locked mode and an unlocked mode;
 - 30 the arrangement being such that, with the actuating means being in a position to actuate the lock, the lock may be introduced into the pocket whereupon, with the closure member closing the aperture, suitable operation of the actuating means not only causes the lock to
 - 35 secure itself with respect to the pocket, but also causes the closure member to be locked with respect to the container.

The closure member of the locking system of the

establishment of the present invention, and this also applies to the first, second and third forms of locking system, may be a door which is pivotably mounted with respect to the container or may be a
5 drawer which can be slid into and out of the container.

The actuating means of the locking system of the establishment of the present invention, and this also applies to the first, second and third forms of locking system, may be in the form of a key which is
10 removable from the lock or may be in the form of a combination system which remains permanently associated with the lock.

In the first form of locking system the hole is preferably a slot, which is non-circular, so that a
15 non-circular portion of the lock may fit into the slot and be prevented from rotation with respect thereto, whilst another portion of the lock, which is also non-circular, passes through the hole and, upon actuation of the lock, can be caused to engage the
20 container or engage another member which engages the container.

The lock of the second form of locking system can have a hole in the form of a non-circular slot provided at an edge region of the closure member, there being
25 provision to prevent rotation of the lock with respect to the closure member.

In the third form of locking system of the establishment according to the present invention the pocket may be, but it is not necessarily, in the
30 container and the arrangement may be such that, with the lock in the pocket, actuation of the lock causes one or more member to project from the lock so as to secure the lock within the pocket and also to secure the closure member with respect to the
35 container.

As has been made clear above, with the locking system of the establishment of the present invention, the actuating means for actuating the lock can be in

such a position as to actuate the lock whilst the lock is being accommodated in the hole which is intended to receive it. This is in contrast to the arrangement disclosed in British Patent Application No. 8427022 and
5 has the advantage that the actuating means, if it is to be separated for security reasons from the lock, does not need to be separated until the lock is in position in the hole and the lock has been actuated so as to cause the lock to be secured in its proper location and
10 the closure member closed with respect to the container. Moreover, when the actuating means is a key which can be removed from the lock once the lock is in its correct position and has been actuated into the locking mode, the relationship between the key and the
15 lock can be such that with the lock in the unlocked mode the key cannot be withdrawn from the lock, and withdrawal of the key from the lock is possible only when the key has been turned to the appropriate position by which time the lock is in the locked
20 mode. Again, this provision reduces the likelihood of the loss of the key between, for example, the time that the lock and key are handed by the reception desk staff of a hotel to a guest and the time that the guest has put his valuables in a safe in his bedroom and locked
25 the safe.

When the guest departs from the hotel, he returns the lock and key to the reception desk and the same lock and key can be used for a further guest but in a different room, on a random pattern, thereby providing
30 a good degree of security.

It is possible for part of the lock of the locking system of the establishment of the present invention to secure the lock with respect to the container or
closure member and also to secure the closure member
35 with respect to the container; alternatively, part of the lock, upon suitable actuation, may cause another element, such as a dead bolt, to achieve the locking between the closure member and the container. In this

last-mentioned case the same part of the lock can secure the lock itself to the closure member or container.

For a better understanding of the present invention and to show how the same may be carried into effect,
5 reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 is a perspective view of a standard lock and its associated key;

10 Figure 2 is a perspective view of the same lock as in Figure 1, but with the key inserted in the lock and with the lock provided with a cam, there also being shown a hole in a closure member through which the lock cam may be passed;

15 Figure 3 is a side view of the lock and key shown in Figure 2;

Figure 4 is a view from the interior of a container towards a closure member showing the lock cam and its relationship to a dead bolt, with the lock in the
20 unlocked position;

Figure 5 is a view from above of the arrangement illustrated in Figure 4;

Figure 6 is a view corresponding to that shown in Figure 4 but with the lock in the locked mode;

25 Figure 7 is a view corresponding to that in Figure 5 but with the lock in the locked mode;

Figure 8 is a side view through a lock and associated components and showing a bracket for supporting a lock cam;

30 Figure 9 is a view from the rear of the arrangement shown in Figure 8;

Figure 10 is a perspective view of the bracket shown in Figures 8 and 9;

35 Figure 11 is a view comparable to that shown in Figure 8 but with the bracket removed;

Figure 12 is a view from the rear of the arrangement shown in Figure 11 with the lock in the locked mode and the cam in the locking position;

Figure 13 is a view comparable to that shown in Figure 12 but with the lock in the unlocked position;

Figure 14 shows a combination lock in position with regard to a door closure member and with the door
5 closure member adjacent the wall of a container;

Figure 15 shows the lock of Figure 15 inserted into a recess in an edge region of a closure member;

Figure 16 shows the same arrangement as in Figure 15 but from the opposite end of the closure member;

10 Figure 17 shows in perspective a lock being slid into a recess in an edge region of a closure member;

Figure 18 is a horizontal section through the arrangement shown in Figures 14 to 17 with the closure member in the closed position and with the lock in the
15 locked mode;

Figure 19 is a front view of a lock of a different locking system in accordance with the present invention;

20 Figure 20 is a partial section through the lock of Figure 19 in position in a closure member;

Figure 21 is a perspective view from the rear of the lock of Figure 19;

Figure 22 is a perspective view of the hole in the closure member for accommodating the lock of Figures 19
25 and 21;

Figure 23 is a front view of a lock in position in a pocket provided in a container and showing a closure member, all being part of a further embodiment of a locking system of an establishment in accordance with
30 the present invention; and

Figure 24 is a perspective view of the lock shown in Figure 23 being inserted into the pocket.

Referring first to the embodiment illustrated in Figures 1 to 7, Figure 1 shows a lock generally
35 indicated by reference numeral 1 and a key generally indicated by reference numeral 2. The key and lock are of a standard design, such as that made by Lowe & Fletcher Limited, of Bilston, West Midlands. The lock

has an annular recess 3 for receiving the key, but in the illustrated embodiment the key can only be introduced into, and withdrawn from, the recess 3 when the key 2 is in one particular orientation with respect to the lock 1 by virtue of the projection 4 on the key 2 needing to cooperate with the cut-away 5 adjacent the annular recess 3. Figure 2 is similar to Figure 1 except that the key 2 is now inserted in the lock 1. Also the arrangement shown in Figure 2 is provided with a lock cam 6 which is rotatable in response to actuation by the key 2. The lock cam 6 is elongate and corresponds to, but is slightly smaller than, a hole 7 through which the lock cam 6 may be passed.

The lock cam 6 is not planar, and an intermediate region of the cam 6 is secured by a nut 8 to the lock spindle 9. Secured against rotation with respect to the main body of the lock 1 is a projection 10 which is non-circular and which has two parallel sides which can fit between the two parallel sides of the hole 7. The projection 10, when located in the hole 7, can prevent any rotation of the main body of the lock 1, whilst the lock cam 6 on the spindle 9 is free to rotate upon suitable actuation by the key 2.

Referring now to Figures 4 and 5, there are shown a hinged door 11 for closing an aperture of a container 12. Mounted on the back of the door 12 is a bracket 13 which serves as a guide for a dead bolt 14 which is urged to the right (in Figures 4 and 5) by the action of a tension spring 15. The dead bolt 14 has an abutment face 16, the arrangement being such that when the lock 1 is being fitted to the door 11, the cam 6 is vertically disposed as it passes through the vertically disposed hole 7 in the door. When the lock 1 has been moved in towards the door 11 as far as it will go, and with the projection 10 snugly accommodated in the hole 7, turning of the key 2 in the appropriate direction causes rotation of the spindle 9 and hence of the cam 6 with the result that the cam acts on the abutment face

16 of the dead bolt 14 so as to cause the dead bolt 14 to be moved to the left (in Figures 4 and 5), against the action of the spring 15. The result of this leftward movement is as shown in Figures 6 and 7. The
5 lock 2 is secured now with respect to the door 11 by virtue of the cam 6 no longer being able to pass through the hole 7, and also the door 11 is secured with respect to the container 12 by virtue of the fact that the dead bolt 14 is now secured behind part of the
10 container 12. Although the action of the spring 15 is now greater on the dead bolt 14, the latter is prevented from returning to its original position by the cam 6. At this stage the key 2 can be withdrawn from the lock so as to leave the locking system in the locked
15 mode. The bracket 13 has only been shown in outline in Figures 4, 5 and 6 and has, for the sake of clarity, been omitted in Figure 7. A suitable general form of bracket is shown with regard to a later embodiment.

Turning now to the embodiment illustrated in
20 Figures 8 to 13, this is similar in many respects to the embodiment illustrated in Figures 1 to 4. In the arrangement shown in Figures 8 to 13, the lock 21 is shown in situ in a hole (like the hole 7 in Figure 2) in a door 22. Securely mounted on the rear face of the
25 door 22 is a bracket 23 shown most clearly in Figure 10. The bracket serves as a guide for the dead bolt 24 which can be moved to the left (in Figure 12) by the lock cam 25 against the action of springs 26. The bracket has a first raised portion 27 which is higher
30 than a second raised portion 28. This is because the first raised portion needs to accommodate the innermost part of the lock 21, whereas the second portion 27 merely needs to accommodate the reciprocating dead bolt 24. The bracket 23 is also provided in the region of
35 its first portion 27 with a hole 29 for accommodating the nut 30 and the rearmost portion of the spindle 31, and the bracket 23 is also provided with flanges 32 by which the bracket may be secured to the rear of the

door 22.

Turning now to the system illustrated in Figures 14 to 18, the lock generally indicated by the reference numeral 41, instead of being introduced into a hole away from the edge of the door, as is the case with the 5 embodiments described in detail herein above, is introduced into a slot 42 provided in an edge region of the door 43. The slot 42 is generally rectangular in form as is also the rearmost part of the lock 41. The 10 door 43 is secured between inner and outer flanges 44 and 45 provided on the lock 41. Whilst the door 43 is in the open position the lock 41 may be freely moved into and out of the slot 42. However, with the lock 41 fully in the slot 42, when the door 43 is closed, so as 15 to close the container 46, the container 46 prevents removal of the lock 41 from the slot 42. Suitable actuation of the lock 41 causes a dead bolt 47 of the lock to project and to become positioned behind part of the container 46, as is shown in Figure 18, thereby 20 preventing any relative movement between the door 43 and the container 46.

Regardless of whether the lock 41 shown in Figures 14 to 18 merely relies on a combination or on a key, it is to be appreciated that the whole lock, together with 25 the key when one is required, can be moved as one entity into the slot 42 of the door 43. This minimises the loss of any components by, for example, a guest staying in a hotel.

In a different embodiment of the locking system 30 illustrated in Figures 19 to 22 a lock 51 is located in a door 52 which has a suitable hole 53. Located on the rear of the door 52 adjacent the hole 53 is a stop 54.

The rear of the lock is generally circular in cross-section but is provided with three projections 35 55, only two of which are shown. The projections 55 can pass through corresponding cut-aways 56 adjacent the hole 53; that part of the lock bearing the projections 55 can be rotated so that the projections 55, instead

of being opposite the cut-aways 56, are opposed to regions of the door adjacent the hole 53, thereby preventing withdrawal of the lock 51 from the door 52. Excess rotation of the projections 55 is prevented by
5 means of the stop 54.

Actuation of the lock 51, in addition to causing rotation of the component carrying the projections 55 also causes the projection from a rearmost part of the lock 51 of a dead bolt 57, which can then secure the
10 door 52 (in which the lock 51 is securely located) to a container (not shown) to be closed by the door 52. The lock 51 illustrated in Figure 19 is of the type requiring actuation by a key and, as with other types of lock already described which require the use of a
15 key, the lock, with the key in position, can be inserted into the hole 53, without the need for prior removal of the key.

With regard to the embodiment illustrated in Figures 23 and 24, the lock of this particular locking
20 system in accordance with the present invention is generally indicated by the reference numeral 61. The lock can be dropped into its correct position in spaced-apart pockets 62, 63 provided in an edge region of a container 64 having an aperture 65 to be closed by
25 a door (not shown). Mounted on the front face of the lock 61 are buttons 66 carrying different indicia, in this case numerals, and visible on, and capable of projecting from, one side face of the lock 61 is a plurality of dead bolts 67.

30 When it is desired to secure valuables in the safe, the hotel guest can drop the lock 61 into the pockets 62, 63, place his valuables in the safe, close the door of the safe, and then set a suitable combination on the lock 61 by pressing suitable buttons 66.

35 Then when the lock is actuated the dead bolts 67 project from the lock 61 and engage in corresponding recesses in an edge region of the door (not shown). The projection of the dead bolts not only secures the

door with respect to the container, but also prevents
removal of the lock 61 from the container 64 and its
associated pockets 62,63. Only by correctly pressing
the right combination of buttons 66 are the dead bolts
5 67 caused to retreat into the lock 61, thereby freeing
the door to be opened and thereby permitting the lock
to be removed.

CLAIMS

1. An establishment comprising a plurality of locking systems, each locking system comprising:
- a container with an aperture;
 - 5 a closure member which may be moved so as to close the aperture;
 - a hole for accommodating a lock;
 - a lock locatable in the hole; and
 - actuating means for actuating the lock between a
 - 10 locked mode and an unlocked mode;
- the arrangement being such that, with the actuating means being in a position to actuate the lock, the lock may be introduced into the hole whereupon, with the closure member closing the aperture, suitable operation
- 15 of the actuating means not only causes the lock to secure itself with respect to the container or the closure member or to an element associated with either thereof, but also causes the closure member to be locked with respect to the container:
- 20 wherein the locks are interchangeable such that, in use, in the establishment, persons requiring locks can be issued with locks and their respective keys on a random basis, thereby enhancing security.
2. An establishment comprising a plurality of
- 25 locking systems, each locking system comprising:
- a container with an aperture;
 - a closure member which may be moved so as to close the aperture;
 - a hole in a front face of the closure member for
 - 30 accommodating a lock; the hole being away from the edge of the closure member;
 - a lock locatable in the hole; and
 - actuating means for actuating the lock between a
 - locked mode and an unlocked mode;
- 35 the arrangement being such that, with the actuating means being in a position to actuate the lock, the lock may be introduced into the hole perpendicularly or substantially perpendicularly to the front face

whereupon, with the closure member closing the aperture, suitable operation of the actuating means not only causes the lock to secure itself with respect to the closure member or to an element associated therewith, but also causes the closure member to be locked with respect to the container:

5 wherein the locks are interchangeable such that, in use, in the establishment, persons requiring locks can be issued with locks and their respective keys on a random basis, thereby enhancing security.

10 3. An establishment according to claim 2, wherein the hole is a non-circular slot, into which a non-circular portion of the lock may fit and be prevented from rotation, and through which a rotatable portion of the lock may pass.

15 4. An establishment comprising a plurality of locking systems, each locking system comprising:
a container with an aperture;
a closure member which may be moved so as to close
20 the aperture;
a hole at an edge region of the front face of the closure member, for accommodating a lock;
a lock locatable in the hole; and
actuating means for actuating the lock between a
25 locked mode and an unlocked mode;

the arrangement being such that, with the actuating means being in a position to actuate the lock, the lock may be introduced into the hole in a direction parallel to the front face whereupon, with the closure member
30 closing the aperture, suitable operation of the actuating means not only causes the lock to secure itself with respect to the closure member or to an element associated therewith, but also causes the closure member to be locked with respect to the
35 container:

wherein the locks are interchangeable such that, in use, in the establishment, persons requiring locks can be issued with locks and their respective keys on a

random basis, thereby enhancing security.

5. An establishment according to claim 4, wherein the hole is in the form of a non-circular slot an an edge region of the closure member.

5 6. An establishment comprising a plurality of locking systems, each locking system comprising:
a container with an aperture;
a closure member which may be moved so as to close the aperture;

10 a pocket provided on the container or closure member for accommodating a lock;
a lock locatable in the pocket; and
actuating means for actuating the lock between a locked mode and an unlocked mode;

15 the arrangement being such that, with the actuating means being in a position to actuate the lock, the lock may be introduced into the pocket whereupon, with the closure member closing the aperture, suitable operation of the actuating means not only causes the lock to
20 secure itself with respect to the pocket, but also causes the closure member to be locked with respect to the container:

wherein the locks are interchangeable such that, in use, in the establishment, persons requiring locks can
25 be issued with locks and their respective keys on a random basis, thereby enhancing security.

7. An establishment according to claim 6, wherein the pocket is provided in the container.

30 8. An establishment according to any preceding claim, wherein the closure member is a door pivotally mounted with respect to the container, or is a drawer which can be slid into and out of the container.

35 9. An establishment according to any preceding claim, wherein the actuating means is a key which is removable from the lock, or is a combination device which remains permanently associated with he lock.

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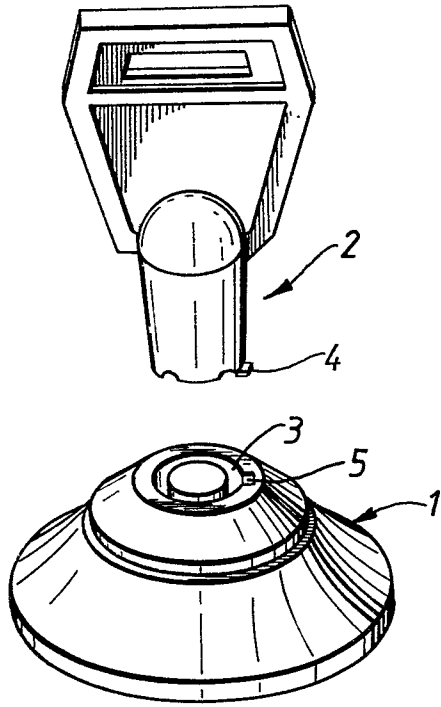


FIG. 1.

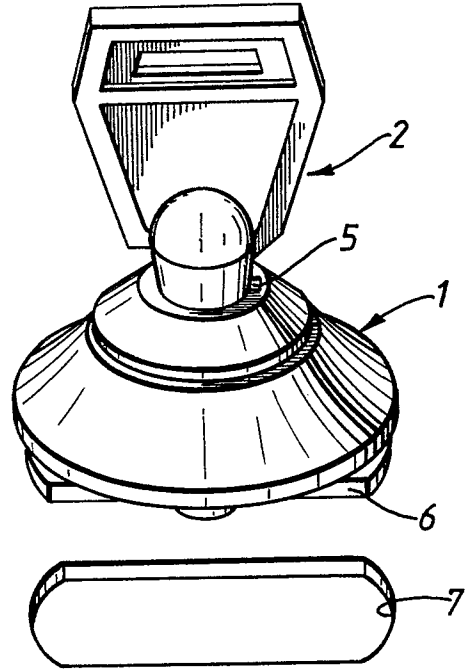


FIG. 2.

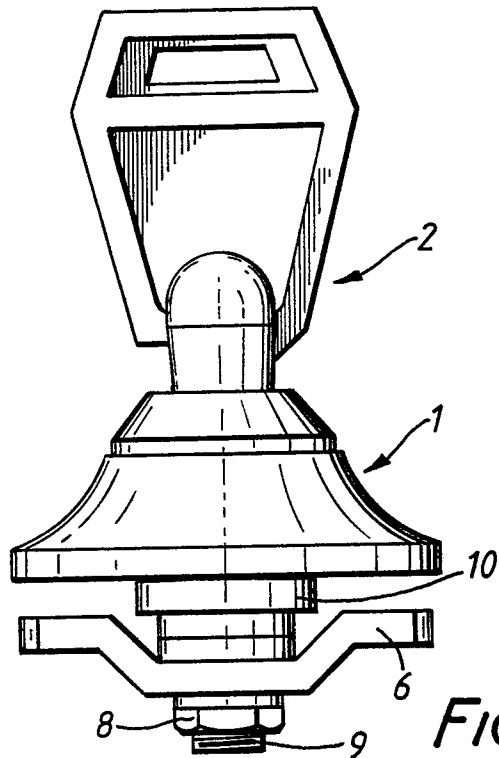


FIG. 3.

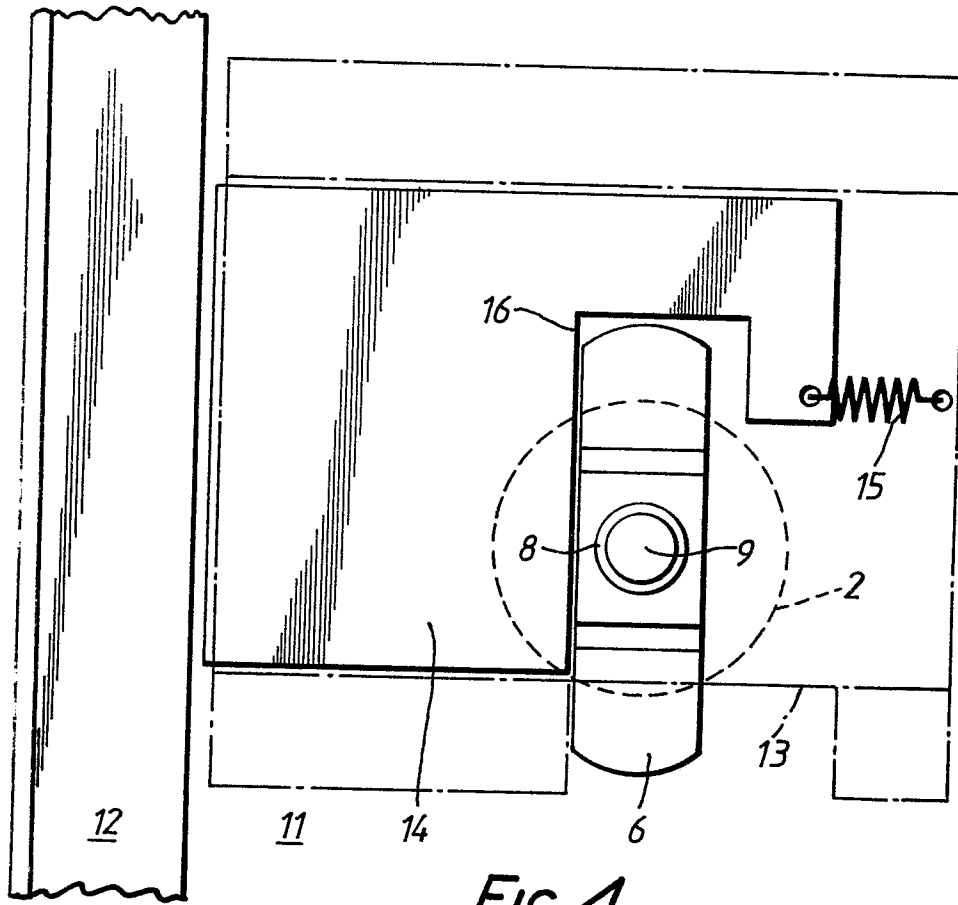


FIG. 4.

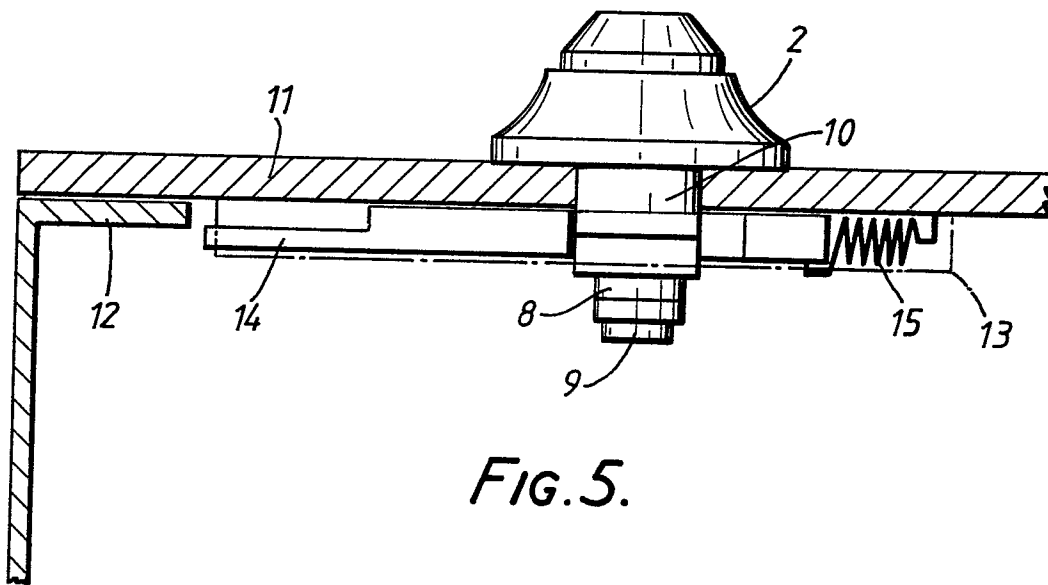
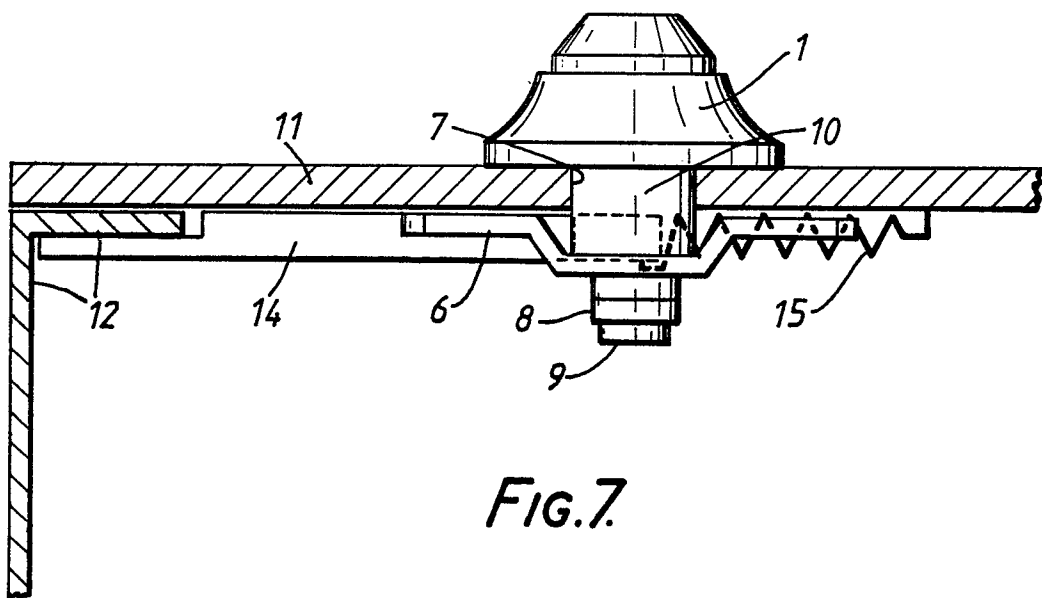
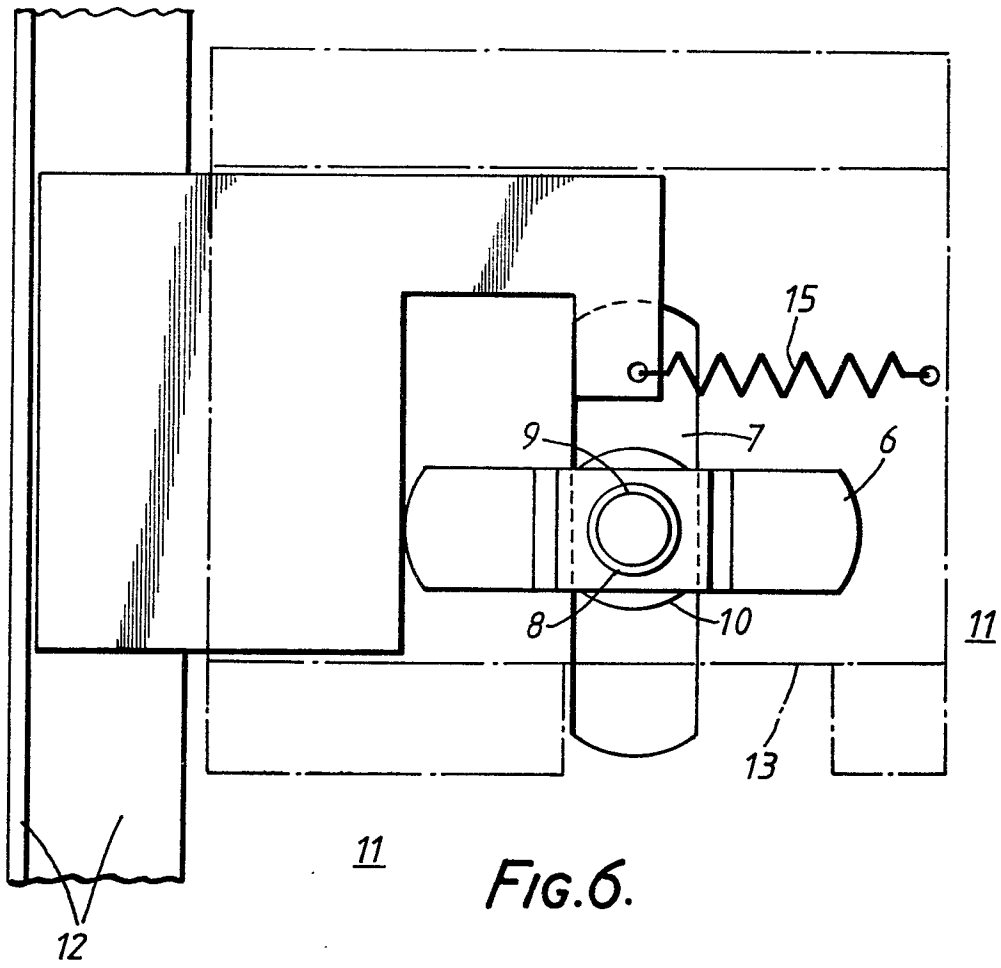


FIG. 5.



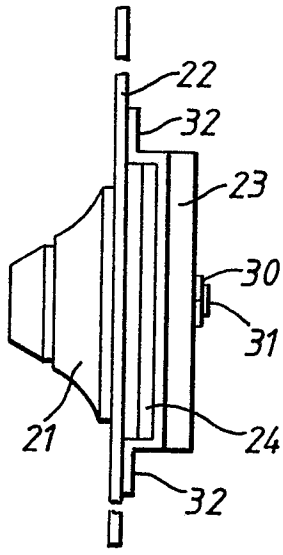


FIG. 8.

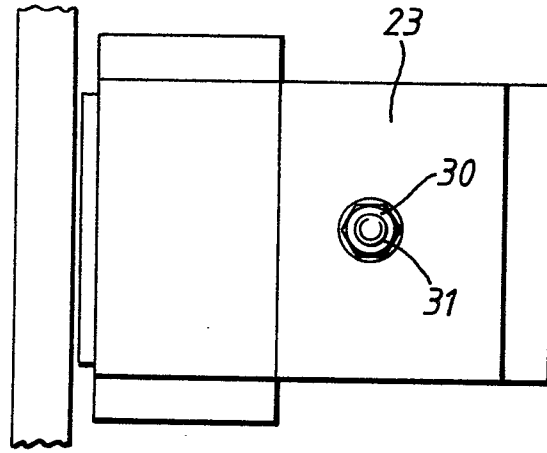


FIG. 9.

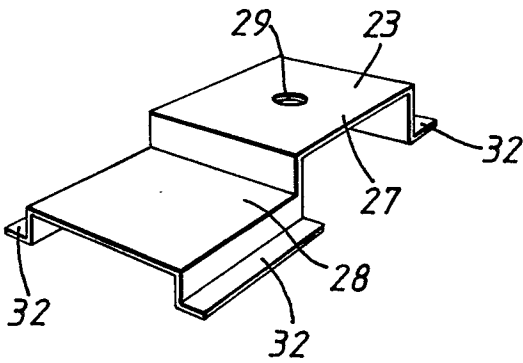


FIG. 10.

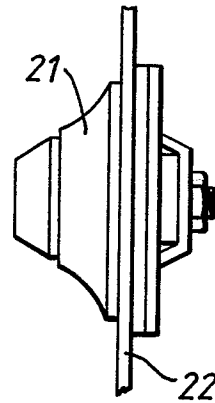


FIG. 11.

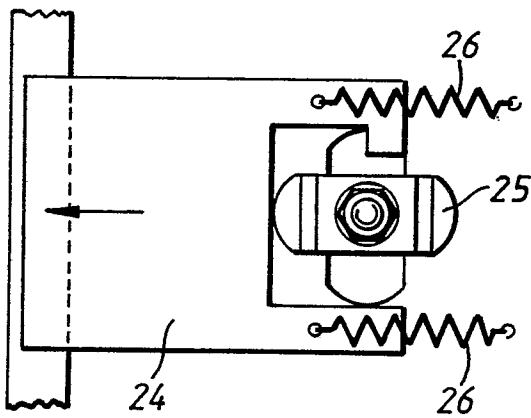


FIG. 12.

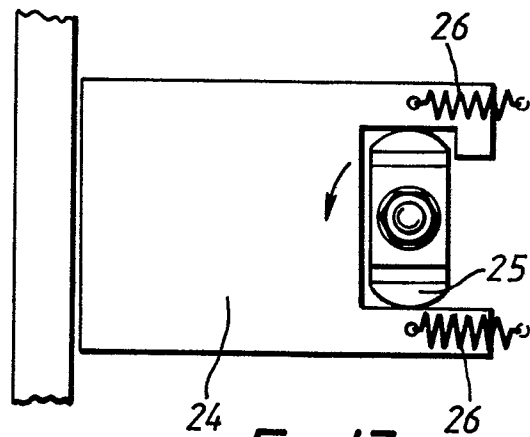
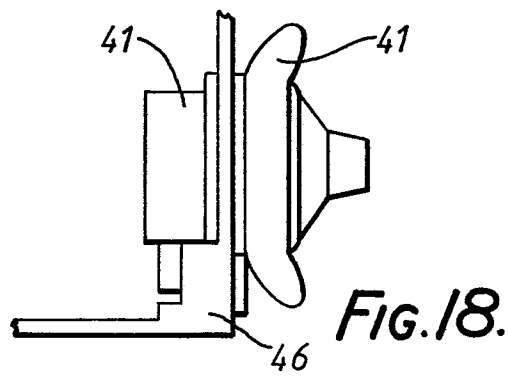
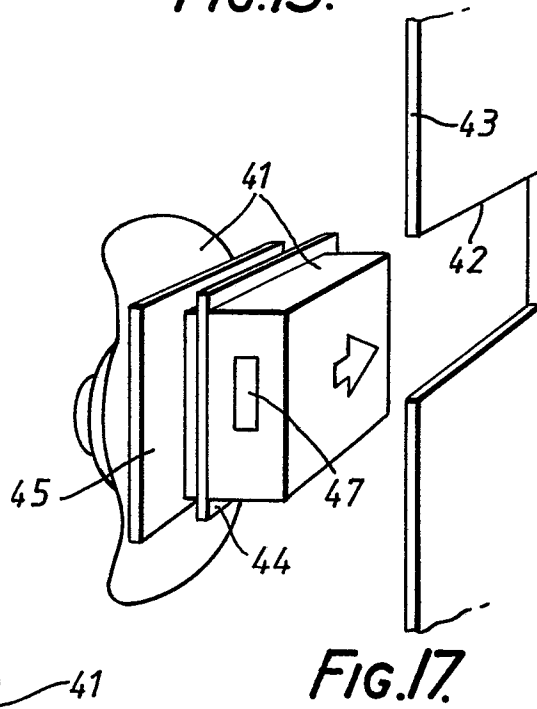
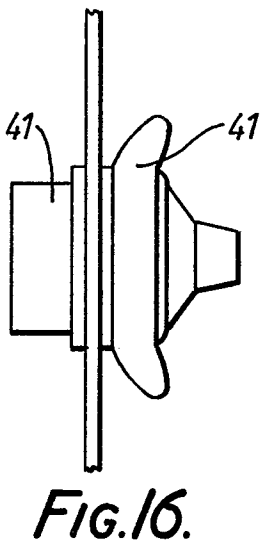
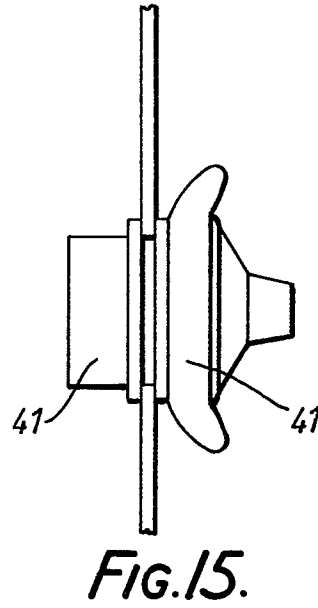
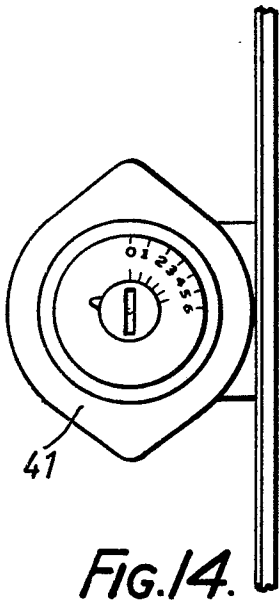


FIG. 13.



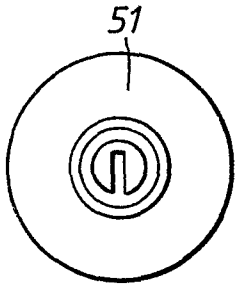


FIG. 19.

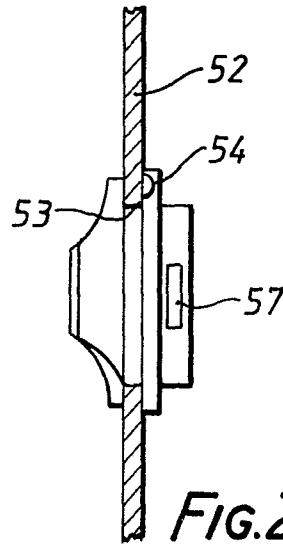


FIG. 20.

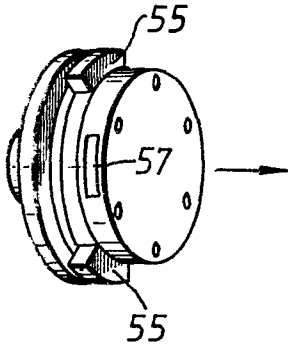


FIG. 21.

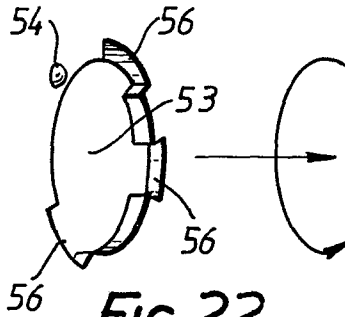


FIG. 22.

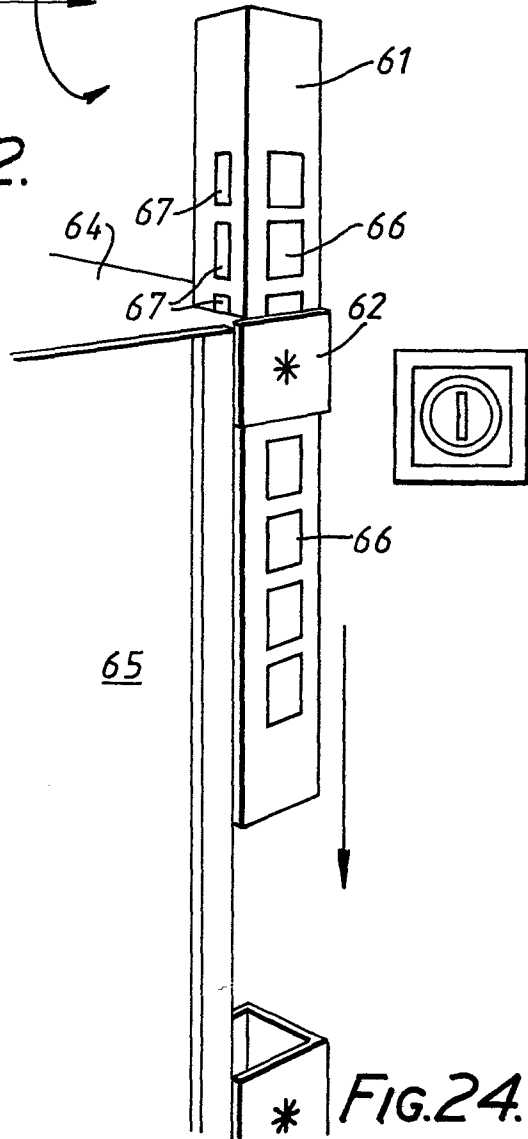


FIG. 24.

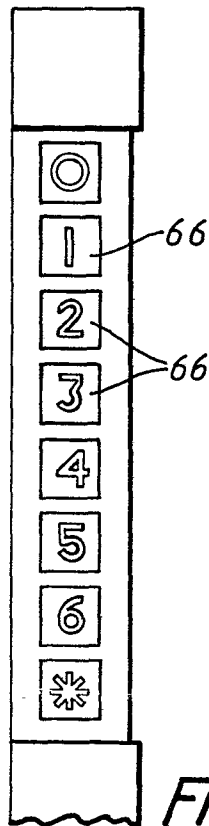


FIG. 23.