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(54) **Title**: A SLIP CLUTCH MECHANISM FOR A DOOR

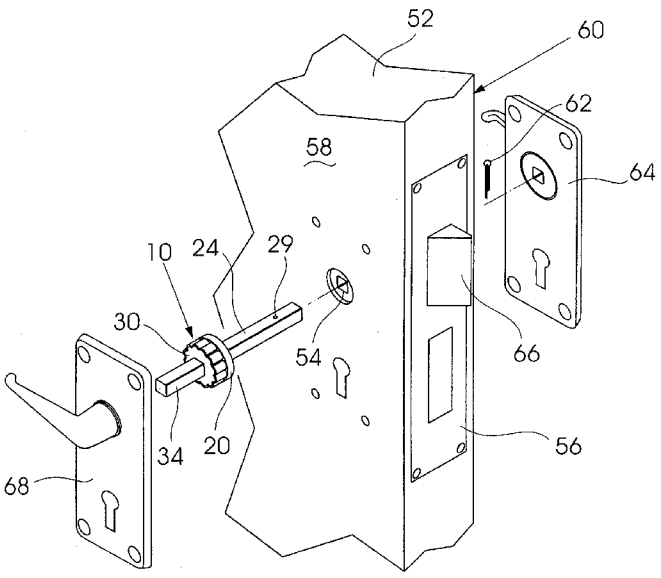

FIGURE 6

(57) **Abstract**: This invention relates to a slip clutch mechanism for a door. More specifically, the invention relates to a security device in the form of a slip clutch mechanism for coupling and decoupling an exterior door handle to or from a lock mechanism under different loading conditions. The slip clutch mechanism includes a first engaging member for connecting a control handle and a lock mechanism and a second engaging member for connecting to a slave handle. The first and/or second engaging members are at least partially resiliently deformable such that the first and second engaging members are resiliently deformable with respect to one another between a coupled condition and a decoupled condition, dependent on the force difference applied on the slave and control handles. In the coupled condition, the first and second engaging members are correspondingly engageable to move in unison so as to transfer rotational movement of the slave handle to the look mechanism. In the decoupled condition, the first and second engaging members, through relative deformation, slip with respect to one another thereby preventing transfer of rotational movement of the slave handle to the lock mechanism. In this way, the locking mechanism is capable of being actuated by the control handle at all times, while the slave handle only in the event giving rise to the coupled condition.

A Slip Clutch Mechanism for a Door

BACKGROUND OF THE INVENTION

THIS invention relates to a slip clutch mechanism for a door. More specifically, the invention relates to a security device in the form of a slip clutch mechanism for coupling and decoupling an exterior door handle to or from a lock mechanism under different loading conditions.

Many different devices for the coupling and decoupling of door handles from a lock mechanism are well known. One such device is disclosed in United States patent number 4,667,994 in the name of Best Lock Corporation ("Best Lock Corporation patent"). The Best Lock Corporation patent shows a spindle having a frangible portion that is configured to break on application of a torque in excess of a predetermined amount thereby rendering at least one of the door handles useless for actuating the lock mechanism. Although this invention is particularly interesting from a simplicity point of view, it is not practical requiring that the frangible spindle be replaced after just a single use.

Other prior art devices of interest are disclosed in United States patent numbers 5,70,014 and 5,787,744 in the name of Securitech Group, Incorporated ("Securitech patent"). The Securitech patents show a slip clutch type mechanism utilizing spherical ball connectors in co-operating detents that work in unison to transmit torque under a first loading condition, or slip over each other under an excessive loading condition to prevent the transmission of torque. These devices consist of many working parts making them complex, expensive and unsuitable particularly for the retrofit market.

Accordingly, it is an object of the present invention to provide a slip clutch mechanism for doors that addresses the aforementioned disadvantages.

SUMMARY OF THE INVENTION

According to the invention there is provided a slip clutch mechanism for a door including:

a first engaging member for connecting a control handle and a lock mechanism;

a second engaging member for connecting to a slave handle, one or more of the engaging members being at least partially resiliently deformable such that the first and second engaging members are resiliently deformable with respect to one another between a coupled condition, wherein the first and second engaging members are correspondingly engageable to move in unison so as to transfer rotational movement of the slave handle to the lock mechanism, and a decoupled condition, wherein the first and second engaging members through relative deformation slip with respect to one another thereby preventing transfer of rotational movement of the slave handle to the lock mechanism, the coupled condition arising in the event of a force difference between a force applied to the slave handle and a force applied to the control handle being less than a predefined threshold, and the decoupled condition arising in the event of a force difference between a force applied to the slave handle and a force applied to the control handle being greater than the predefined threshold;

such that the locking mechanism is capable of being actuated by the control handle at all times and by the slave handle only in the event giving rise to the coupled condition.

The first and second engaging members are typically positionable between the lock mechanism and the slave handle.

Generally, the first or second engaging member is a male engaging member and the other of the first or second engaging member is a female engaging member in which the male engaging member is receivable.

The male engaging member may comprise a male base from which a first spindle member is axially extendible, a first free end located axially on an opposite side of the male base than a side from which the first spindle member is extendible and a radially outer engaging surface extending between the male base and the first free end. The female engaging member may comprise a female base from which a second spindle member is axially extendible, a second free end located axially on an opposite side of the female base than a side from which the second spindle member is extendible and a radially inner engaging surface extending between the female base and the second free end. Typically, the male engaging member is receivable at least partially within the female engaging member such that the engaging surfaces of the male and female engaging members are capable of transferring rotational motion between the first and second engaging members in the coupled condition, and of slipping over one another in the decoupled condition. Preferably, the radlially outer engaging surface of the male engaging member and the radially inner engaging surface of the female engaging member are complimentary toothed surfaces.

In one preferred embodiment of the invention, the radially outer engaging surface of the male engaging member may be made up of a plurality of engaging posts extending axially outwardly from the male base in the direction of the first free end, the engaging posts being resiliently flexible relative to the male base between an engaged condition, wherein the radially inner and outer engaging surfaces engage one another in the coupled condition, and a disengaged condition, wherein the engaging posts flex radially inwardly relative to the radially inner engaging surface of the female engaging member to enable slip between the male and female engaging members in the decoupled condition, the engaging posts being biased toward the engaged condition.

In an alternative embodiment, the radially inner engaging surface of the female engaging member may be made up of a plurality of engaging posts extending axially outwardly from the female base in the direction of the second free end, the engaging posts being resiliently flexible relative to the female base between an engaged condition, wherein the radially inner and outer engaging surfaces engage one another in the coupled condition, and a disengaged condition, wherein the engaging posts flex radially outwardly relative to the radially outer engaging surface of the male engaging

member to enable slip between the male and female engaging members in the decoupled condition, the engaging posts being biased toward the engaged condition.

In yet another embodiment, the radially outer engaging surface of the male engaging member and the radially inner engaging surface of the female engaging member may be both made up of engaging posts being radially flexible relative to each other between the engaged and disengaged conditions.

Preferably, the radially outer engaging surface of the male engaging member tapers from the male base toward the first free end.

The first engaging member is generally connectible to the control handle and the locking mechanism by the first spindle member and the second engaging member is connectible to the slave handle via the second spindle member. The first engaging member may be releasably attachable to an end of the first spindle member opposite to an end thereof which is connectible to the control handle and the second engaging member may be similarly releasably attachable to an end of the second spindle member opposite to an end thereof which is connectible to the slave handle. Typically, the first and second engaging members are releasably attachable to the first and second spindle members respectively by a fastening means selected from a group consisting of clips, pins and grub screws.

Alternatively, the first engaging member is integral with the first spindle member and the second engaging member is integral with the second spindle member. Furthermore, the first engaging member may be located at an end of the first spindle member opposite to an end thereof which is connectible to the control handle and the second engaging member may be located at an end of the second spindle member opposite to an end thereof which is connectible to the slave handle.

Typically, the first spindle member is sized and shaped to be received within a spindle receiving formation defined by the lock mechanism such that the lock mechanism is capable of being directly actuated by the control handle.

The first spindle member may further comprise a means for retaining the first spindle member within the spindle receiving formation defined in the lock mechanism, thereby preventing the first spindle member from being pulled out of the lock mechanism from a slave handle side of the door. Preferably, the retaining means is positionable between the lock mechanism and the control handle and is selected from a group consisting of resilient clips, screws or pins receivable within a retaining aperture defined in the first spindle member.

Generally, the slip clutch mechanism further includes a means for limiting the axial movement of the first and second engaging members relative to one another. Preferably, the limiting means is a fastening member passing between the first and second engaging members. More preferably, the limiting means is from a group consisting of screws and bolts.

Alternatively, the axial limiting means is a primary limiting formation on the first engaging member and a secondary limiting formation on the second engaging member, the primary and secondary limiting formations being correspondingly engagable to releasable and axially secure the first and second engaging members to each other. More preferably, the primary and secondary limiting formations are corresponding clipping formations. Most preferably, the primary or secondary limiting formations are corresponding recess and lip formations.

The slip clutch mechanism may also include means for axially aligning the first and second engaging members relative to one another, the axial aligning means being a male aligning formation extending axially outwardly from the male or female engaging member and a female aligning member defined in the other of the male or female engaging members in which the male aligning formation is receivable. Typically, the corresponding clipping formations are located proximate a base of the male aligning formation and an opening of the female aligning formation.

The control handle may be an interior mounted handle on the door of a building or room and the slave handle is typically an exterior mounted handle.

The profiles of the radlially outer engaging surface of the male engaging member and the radially inner engaging surface of the female engaging member may be variable to vary the predefined threshold at which the male and female engaging members slip with respect to one another.

Preferably, the slip clutch mechanism is manufactured from a plastic-like material. More preferably, the slip clutch mechanism is manufactured from a moulding type process.

According to a second aspect of the invention, there is provided a lockset including a lock mechanism, a control handle, a slave handle and the slip clutch mechanism as described herein. According to a third aspect of the invention, there is provided a door including the lockset as described herein.

According to a fourth aspect of the invention, there is provided a method of installing the lockset as described herein, including the steps of:

(A) cutting holes in the door for accommodating the lock mechanism and through which the first and second spindle members are extendible;
(B) inserting the lock mechanism in the door;
(C) inserting the first spindle member through the spindle receiving formation in the lock mechanism from a slave side of the door such that the first engaging member is locatable on the slave side of the door and the end of the first spindle member to which the control handle is connectible extends out from an opposite control side of the door;
(D) connecting the control handle to the first spindle member and fixing the control handle to the control side of the door; and
(E) connecting the second spindle member to the slave handle and fixing the slave handle to the slave side of the door such that the first and second engaging members are engagable with one another and positioned between the lock mechanism and the slave handle.

The method may also include the step of connecting the first and second engaging members to the first and second spindle members respectively where the first and second engaging members are not integral with the first and second spindle members.

Typically, the method also extends to the step of clipping the first and second engaging members axially to one another. Preferably, the method includes the further step of retaining the fist spindle member in the lock mechanism by manipulating the resilient clip, tightening a screw or inserting a pin into the retaining aperture defined in the first spindle member.

According to a fifth aspect of the invention, there is provided a method of retrofitting the slip clutch mechanism as described herein, including the steps of

(A) removing the control handle form a control side of the door and/or the slave handle from the slave side of the door;

(B) removing the existing spindle;

(C) inserting the first spindle member through the spindle receiving formation in the lock mechanism from the slave side of the door such that the first engaging member is locatable on the slave side of the door and the end of the first spindle member to which the control handle is connectible extends out from the opposite control side of the door;

(D) connecting the control handle to the first spindle member and fixing the control handle to the control side of the door; and

(E) connecting the second spindle member to the slave handle and fixing the slave handle to the slave side of the door such that the first and second engaging members are engagable with one another and positioned between the lock mechanism and the slave handle.

Preferably, the method includes the step of connecting the first and second engaging members to the first and second spindle members respectively where the first and second engaging members are not integral with the first and second spindle members. More preferably, the method also includes the step of cutting the existing spindle to form the first and second spindle members. Most preferably, the method extends to the step of clipping the first and second engaging members axially to one another. Even more preferably, the method extends to the step of retaining the fist spindle member in the lock mechanism by manipulating the resilient clip, tightening a screw or inserting a pin into the retaining aperture defined in the first spindle member.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows an exploded perspective view of a first embodiment of a slip clutch mechanism for a door in accordance with the present invention as viewed from a first direction;

Figure 2 shows an exploded view of the slip clutch mechanism of figure 1 as viewed from a second direction;

Figure 3 shows a perspective view of the slip clutch mechanism of figure 1 as viewed from the second direction;

Figure 4 shows an exploded cross-sectional side view of the slip clutch mechanism of figure 1;

Figure 5 shows a cross-sectional side view of the slip clutch mechanism of figure 1;

Figure 6 shows a perspective view of the slip clutch mechanism of figure 1 relative to a lockset and a door in which the lockset is mountable; and

Figure 7 shows an exploded perspective view of a second embodiment of a slip clutch mechanism relative to spindle members to which it is attachable;

DETAILED DESCRIPTION OF THE DRAWINGS

A slip clutch mechanism for a door according to a preferred embodiment of the invention is designated generally with the reference numeral 10 in figures 1 to 3. The slip clutch mechanism 10 comprises a first engaging member 20 and a second engaging member 30.

With specific reference to figure 1 and figure 2, the first engaging member 20 is in the form of a female engaging member comprising a female base 22, a first spindle member 24 extending axially outwardly from the female base 22, a first free end 26 located on a side of the female base 22 opposite the side from which the first spindle member 24 extends and a radially inner engaging surface 28 extending between the male base 22 and the first free end 26. Furthermore, the first engaging member 20 defines a retaining means in the form of a retaining aperture 29 in which a retaining pin (not shown) is receivable. This feature will be described in greater detail later in the specification.

The second engaging member 30 is in the form of a male engaging member being at least partially correspondingly receivable within the first engaging member 20. The second engaging member 30 comprises a male base 32, a second spindle member 34 extending axially outwardly from the male base 32, a second free end 36 located on a side of the male base 32 opposite the side from which the second spindle member 34 extends and a radially outer engaging surface 38 extending between the male base 32 and the second free end 36. The radially outer engaging surface 38 may be square, but is preferably tapered toward the second free end 36.

The radially outer engaging surface 38 of the second engaging member 30 and the radially inner engaging surface 28 of the first engaging member 30 are complimentary toothed surfaces 28,38 such that the first engaging member 30 is at least partially receivable within the second engaging member 20 as illustrated in figure 3. With reference also to figure 3, the radially inner engaging surface 28 of the first engaging member 20 is made up of a plurality of engaging posts 40 extending axially outwardly from the female base 22 in the direction of the first free end 26.

The engaging posts 40 are resiliently flexible with respect to the female base 22 between an engaged condition, wherein the radially inner and outer engaging surfaces 28,38 engage one another so as to transmit a rotational movement applied to the first or second engaging members 20,30 to the other of the first or second engaging members 20,30, and a disengaged condition, wherein the engaging posts 40 flex radially outwardly relative to the radially outer engaging surface 38 of the second engaging member 30 enabling slip between the first and second engaging members

20,30 so as to prevent the transmission of a rotational movement applied to the first or second engaging members 20,30 to the other of the first or second engaging members 20,30.

Although the first engaging member 20 has been described and illustrated as having the resiliently flexible engaging posts 40, it will be appreciated that the same result is possible by instead having the second engaging member 30 made up of resiliently flexible engaging posts being flexible radially inwardly relative to the radially inner engaging surface 28 of the first engaging member 20. Alternatively, the same result is possible by having both the first engaging member 20 and the second engaging member 30 made up of resiliently flexible engaging posts.

Reverting now back to the preferred embodiment as illustrated in figure 1 to 3, the first and second engaging members 20,30 include means for axially aligning the first and second engaging members 20,30 relative to one another. The axial aligning means may take many forms, but in the illustrated embodiment takes the form of a male aligning formation 42, extending axially outwardly from the second end 36 of the second engaging member 30, and a female aligning formation 44, defined by the first engaging member 20, in which the male aligning formation 42 is receivable. It will be appreciated that the same result is possible by instead having the male aligning formation 42 project axially outwardly from the first engaging member 20 and the female aligning formation 44 defined by the second engaging member 30. It will be appreciated further that the slip clutch mechanism 10 may also comprise of further aligning formations where necessary, for example a secondary aligning male formation 46 projecting axially outwardly from the male aligning formation 42.

To counteract the axial movement of the first and second engaging members 20,30 relative to one another as a result of forces acting therebetween in the disengaged condition, and with specific reference now also to figures 4 and 5, the first engaging member 20 and the second engaging member 30 further include a means for limiting the axial movement of the first and second engaging members 20,30 relative to one another. The axial limiting means may take many forms, but is preferably in the form of a primary limiting formation 48 on the first engaging member 20 and a correspondingly engagable secondary limiting formation 50 on the second engaging member 30. In the

preferred illustrated embodiment, the axial limiting means takes the form of clipping formations wherein the primary limiting formation 48 is a lip running about an opening of the female aligning formation 44 and the secondary limiting formation 50 is a recess defined in the male aligning formation 42. It will be appreciated that in the event of bringing the first and second engaging members together, the lip 48 clips into place within the recess 50 thereby releasable and axially securing the first and second engaging members 20,30 to each other.

With specific reference now to figure 6, the slip clutch mechanism is fitted to a door 52 by pushing the first spindle member 24 of the first engaging member 20 through a spindle receiving aperture 54 defined in a lock mechanism 56 from a slave side 58 of the door 52, such that the first spindle member 24 extends outwardly from a control side 60 of the door 52. In this position, a retaining pin 62, in the form of a split pin, is pushed through the retaining aperture 29 so as to prevent the first engaging member 20 from being pulled out of engagement with the lock mechanism 56 from the slave side 58 of the door 52.

A control handle 64 is then connectible to the extending end of the first spindle member 24 and secured to the control side 60 of the door 52. It will be appreciated that the control handle 64 is typically a handle positioned on an interior side of a building or room door and through direct contact with the lock mechanism 56, is capable of actuating a lock bolt 66 of the lock mechanism between its extended and retracted positions.

Returning now to the slave side 58 of the door 52, the second engaging member 30 is clipped into the first engaging member 20 and a slave handle 68 is then connectible to an end of the second spindle member 34 extending outwardly from the slave side 58 of the door 52. The slave handle is then secured to the slave side 58 of the door 52 such that the slip clutch mechanism 10 is positioned between the slave handle 68 and the slave side 58 of the door 52. It will be appreciated that the slave handle 68 is typically a handle positioned on an exterior side of a building or room door and capable of actuating the lock bolt 66 of the lock mechanism 56 indirectly through the slip clutch mechanism 10. It will be appreciated further that the invention extends to a slip clutch mechanism that can be retro-fitted to existing doors, included in a lockset for doors or

included in a door.

In use, the first and second engaging members 20,30 of the slip clutch mechanism 10 are resiliently deformable with respect to one another, as a results of the resiliently flexible engaging posts 40, between a coupled condition, wherein the first and second engaging members 20,30 are correspondingly engageable to move in unison so as to transfer rotational movement of the slave handle 68 to the lock mechanism 56, and a decoupled condition, wherein the first and second engaging members 20,30 through relative deformation slip with respect to one another thereby preventing transfer of rotational movement of the slave handle 68 to the lock mechanism 56.

Slip between the first and second engaging members 20,30 arises as a result of the engaging posts 40 of the first engaging member 20 flexing radially outwardly relative to the second engaging member 30, causing a reduction in contact area between the radially inner engaging surface 28 of the first engaging member 20 and the radlially outer engaging surface 38 of the second engaging member 30, reducing the contact area between the engaging surfaces 28,38 resulting in insufficient friction force acting between the first and second engaging members 20,30 to transfer rotational movement therebetween.

It will be appreciated that the coupled condition corresponds to the engaged condition of the first and second engaging members 20,30 and arises in the event of a force difference between a force applied to the slave handle 68 and a force applied to the control handle 64 being less than a predefined threshold. It will be appreciated that the decoupled condition corresponds to the disengaged condition of the first and second engaging members 20,30 and arises in the event of a force difference between a force applied to the slave handle 68 and a force applied to the control handle 64 being greater than the predefined threshold. As such, the locking mechanism 56 is capable of being actuated by the control handle 64 at all times and by the slave handle 68 only in the event giving rise to the coupled condition.

The slip clutch mechanism 10 provides a defence against intruders and vandals, which can best be described by example scenarios. In a first scenario, a victim may prevent an intruder from entering a building by simply applying a relatively small upward force

to the control handle 64 against a downward force applied to the slave handle 68 by the intruder. The difference in forces will cause the slip clutch mechanism 10 to slip, preventing the intruder from actuating the lock mechanism 56 through the slave handle 68 and providing the victim with time to then lock the lock mechanism 56.

Assuming now that the first scenario escalates into a second scenario wherein the intruder now jams the slave handle 68, i.e. with a broom, and proceeds to set the building on fire. To exit the building, the victim simply applies a downward force on the control handle 64 against the force acting on the jammed slave handle 68 causing the slip clutch mechanism 10 to slip and allowing the control handle 64 to actuate the locking mechanism 56.

The slip clutch mechanism 10 is preferably manufactured from a plastic-like material enabling the first and second engaging members 20,30 to be produced by a moulding type process. Although the slip clutch mechanism 10 has been described and illustrated with the first and second engaging members 20,30 having integral first and second spindle members 24,34 respectively, it will be appreciated that according to second embodiment of the slip clutch mechanism 110, the first and second engaging members 120,130 may be attached to independent first and second spindle members 124,134 as illustrated in figure 7. The first and second engaging members 120,130 may be attached to the independent first and second spindle members 124,134 by grub screws, welding, gluing, clipping or by any other means.

Although the invention has been described above with reference to preferred embodiments and examples, it will be appreciated that many modifications or variations of the invention are possible without departing from the spirit or scope of the invention. For example, the profile of the engaging surface 28,38 may be varied to vary the torque threshold required to cause the first and second engaging members 20,30 to slip relative to one another. Furthermore, the male and female engaging members may be swopped between the first and second spindle members. Even further, the limiting means may be a fastening member passing between the first and second engaging members. More preferably, the limiting means is from a group consisting of screws and bolts.

CLAIMS

1. A slip clutch mechanism for a door including:

a first engaging member for connecting a control handle and a lock mechanism;

a second engaging member for connecting to a slave handle, one or more of the engaging members being at least partially resiliently deformable such that the first and second engaging members are resiliently deformable with respect to one another between a coupled condition, wherein the first and second engaging members are correspondingly engageable to move in unison so as to transfer rotational movement of the slave handle to the lock mechanism, and a decoupled condition, wherein the first and second engaging members, through relative deformation, slip with respect to one another thereby preventing transfer of rotational movement of the slave handle to the lock mechanism, the coupled condition arising in the event of a force difference between a force applied to the slave handle and a force applied to the control handle being less than a predefined threshold, and the decoupled condition arising in the event of a force difference between a force applied to the slave handle and a force applied to the control handle being greater than the predefined threshold;

such that the locking mechanism is capable of being actuated by the control handle at all times and by the slave handle only in the event giving rise to the coupled condition.

2. A slip clutch mechanism according to claim 1, wherein the first and second engaging members are positionable between the lock mechanism and the slave handle.

3. A slip clutch mechanism according to claim 1 or claim 2, wherein the first or second engaging member is a male engaging member and the other of the first or second engaging member is a female engaging member in which the male engaging member is receivable.

4. A slip clutch mechanism according to claim 3, wherein the male engaging member comprises a male base from which a first spindle member is axially extendible, a first free end located axially on an opposite side of the male base than a side from which the first spindle member is extendible and a radially outer engaging surface extending between the male base and the first free end, the female engaging member comprising a female base from which a second spindle member is axially extendible, a second free end located axially on an opposite side of the female base than a side from which the second spindle member is extendible and a radially inner engaging surface extending between the female base and the second free end, the male engaging member being receivable at least partially within the female engaging member such that the engaging surfaces of the male and female engaging members are capable of transferring rotational motion between the first and second engaging members in the coupled condition and of slipping over one another in the decoupled condition.

5. A slip clutch mechanism according to claim 4, wherein the radlially outer engaging surface of the male engaging member and the radially inner engaging surface of the female engaging member are complimentary toothed surfaces.

6. A slip clutch mechanism according to claim 4 or claim 5, wherein the radially outer engaging surface of the male engaging member is made up of a plurality of engaging posts extending axially outwardly from the male base in the direction of the first free end, the engaging posts being resiliently flexible relative to the male base between an engaged condition, wherein the radially inner and outer engaging surfaces engage one another in the coupled condition, and a disengaged condition, wherein the engaging posts flex radially inwardly relative to the radially inner engaging surface of the female engaging member to enable slip between the male and female engaging members in the decoupled condition, the engaging posts being biased toward the engaged condition.

7. A slip clutch mechanism according to claim 4 or claim 5, wherein the radially inner engaging surface of the female engaging member is made up of a plurality of engaging posts extending axially outwardly from the female base in the direction of the second free end, the engaging posts being resiliently flexible relative to the female base between an engaged condition, wherein the radially inner and outer

engaging surfaces engage one another in the coupled condition, and a disengaged condition, wherein the engaging posts flex radially outwardly relative to the radially outer engaging surface of the male engaging member to enable slip between the male and female engaging members in the decoupled condition, the engaging posts being biased toward the engaged condition.

8. A slip clutch mechanism according to claim 6 or claim 7, wherein the radially outer engaging surface of the male engaging member and the radially inner engaging surface of the female engaging member are both made up of engaging posts being radially flexible relative to each other between the engaged and disengaged conditions.

9. A slip clutch mechanism according to any one of claims 4 to 8, wherein the radially outer engaging surface of the male engaging member tapers from the male base toward the first free end.

10. A slip clutch mechanism according to any one of claims 4 to 9, wherein the first engaging member is connectible to the control handle and the locking mechanism by the first spindle member and the second engaging member is connectible to the slave handle via the second spindle member.

11. A slip clutch mechanism according to claim 10, wherein the first engaging member is releasably attachable to an end of the first spindle member opposite to an end thereof which is connectible to the control handle, the second engaging member being releasably attachable to an end of the second spindle member opposite to an end thereof which is connectible to the slave handle.

12. A slip clutch mechanism according to claim 11, wherein the first and second engaging members are is releasably attachable to the first and second spindle members respectively by a fastening means selected from a group consisting of clips, pins and grub screws.

13. A slip clutch mechanism according to claim 10, wherein the first engaging member is integral with the first spindle member and the second engaging member is integral with the second spindle member.

14. A slip clutch mechanism according to claim 13, wherein the first engaging member is located at an end of the first spindle member opposite to an end thereof which is connectible to the control handle, the second engaging member being located at an end of the second spindle member opposite to an end thereof which is connectible to the slave handle.

15. A slip clutch mechanism according to any one of claims 4 to 14, wherein the first spindle member is sized and shaped to be received within a spindle receiving formation defined by the lock mechanism such that the lock mechanism is capable of being directly actuated by the control handle.

16. A slip clutch mechanism according to claim 15, wherein the first spindle member comprises a means for retaining the first spindle member within the spindle receiving formation defined in the lock mechanism, thereby preventing the first spindle member from being pulled out of the lock mechanism from a slave handle side of the door.

17. A slip clutch mechanism according to claim 16, wherein the retaining means is positionable between the lock mechanism and the control handle and is selected from a group consisting of resilient clips, screws or pins receivable within a retaining aperture defined in the first spindle member.

18. A slip clutch mechanism according to any one of claims 4 to 17, wherein the slip clutch mechanism further includes a means for limiting the axial movement of the first and second engaging members relative to one another.

19. A slip clutch mechanism according to claim 18, wherein the limiting means is a fastening member passing between the first and second engaging members.

20. A slip clutch mechanism according to claim 19, wherein the limiting means is from a group consisting of screws and bolts.

21. A slip clutch mechanism according to claim 18, wherein the axial limiting means is a primary limiting formation on the first engaging member and a secondary limiting formation on the second engaging member, the primary and secondary limiting

formations being correspondingly engagable to releasable and axially secure the first and second engaging members to each other.

22. A slip clutch mechanism according to claim 21, wherein the primary and secondary limiting formations are corresponding clipping formations.

23. A slip clutch mechanism according to claim 22, wherein the clipping formations are corresponding recess and lip formations.

24. A slip clutch mechanism according to claim 21 or claim 23, wherein the slip clutch mechanism further includes means for axially aligning the first and second engaging members relative to one another, the axial aligning means being a male aligning formation extending axially outwardly from the male or female engaging member and a female aligning member defined in the other of the male or female engaging members in which the male aligning formation is receivable.

25. A slip clutch mechanism according to claim 24, wherein the corresponding clipping formations are located proximate a base of the male aligning formation and an opening of the female aligning formation.

26. A slip clutch mechanism according to any one of claims 4 to 25, wherein the profiles of the radlially outer engaging surface of the male engaging member and the radially inner engaging surface of the female engaging member are variable to vary the predefined threshold at which the male and female engaging members slip with respect to one another.

27. A slip clutch mechanism according to any one of the preceding claims wherein the control handle is an interior mounted handle on the door of a building or room and the slave handle is an exterior mounted handle.

28. A slip clutch mechanism according to any one of the preceding claims wherein the slip clutch mechanism is manufactured from a plastic-like material.

29. A slip clutch mechanism according to any one of the preceding claims wherein the slip clutch mechanism is manufactured from a moulding type process.

30. A lockset including a lock mechanism, a control handle a slave handle and the slip clutch mechanism according to any one of claims 1 to 29.

31. A door including the lockset of claim 30.

32. A method of installing the lockset according to claim 31 including the steps of:

    (A) cutting holes in the door for accommodating the lock mechanism and through which the first and second spindle members are extendible;
    (B) inserting the lock mechanism in the door;
    (C) inserting the first spindle member through the spindle receiving formation in the lock mechanism from a slave side of the door such that the first engaging member is locatable on the slave side of the door and the end of the first spindle member to which the control handle is connectible extends out from an opposite control side of the door;
    (D) connecting the control handle to the first spindle member and fixing the control handle to the control side of the door; and
    (E) connecting the second spindle member to the slave handle and fixing the slave handle to the slave side of the door such that the first and second engaging members are engagable with one another and positioned between the lock mechanism and the slave handle.

33. A method of installing according to claim 32, including the step of connecting the first and second engaging members to the first and second spindle members respectively where the first and second engaging members are not integral with the first and second spindle members.

34. A method of installing according to claim 32 or claim 33, including the step of clipping the first and second engaging members axially to one another.

35. A method of installing according to claim 32, claim 33 or claim 34, including the step of retaining the fist spindle member in the lock mechanism by manipulating the resilient clip, tightening a screw or inserting a pin into the retaining aperture defined in the first spindle member.

36. A method of retrofitting the slip clutch mechanism according to any one of claims 1 to 29 including the steps of

    (A) removing the control handle form a control side of the door and/or the slave handle from the slave side of the door;
    (B) removing the existing spindle;
    (C) inserting the first spindle member through the spindle receiving formation in the lock mechanism from the slave side of the door such that the first engaging member is locatable on the slave side of the door and the end of the first spindle member to which the control handle is connectible extends out from the opposite control side of the door;
    (D) connecting the control handle to the first spindle member and fixing the control handle to the control side of the door; and
    (E) connecting the second spindle member to the slave handle and fixing the slave handle to the slave side of the door such that the first and second engaging members are engagable with one another and positioned between the lock mechanism and the slave handle.

37. A method of retrofitting according to claim 36, including the step of connecting the first and second engaging members to the first and second spindle members respectively where the first and second engaging members are not integral with the first and second spindle members.

38. A method of retrofitting according to claim 37, including the step of cutting the existing spindle to form the first and second spindle members.

39. A method of retrofitting according to claim 36, claim 37 or claim 38, including the step of clipping the first and second engaging members axially to one another.

40. A method of retrofitting according to any one of claims 36 to 39, including the step of retaining the fist spindle member in the lock mechanism by manipulating the resilient clip, tightening a screw or inserting a pin into the retaining aperture defined in the first spindle member.

41. A slip clutch mechanism substantially as herein described and illustrated.

42. A lockset substantially as herein described and illustrated.

43. A door substantially as herein described and illustrated.

44. A method of installing as herein described and illustrated.

45. A method of retrofitting as herein described and illustrated.

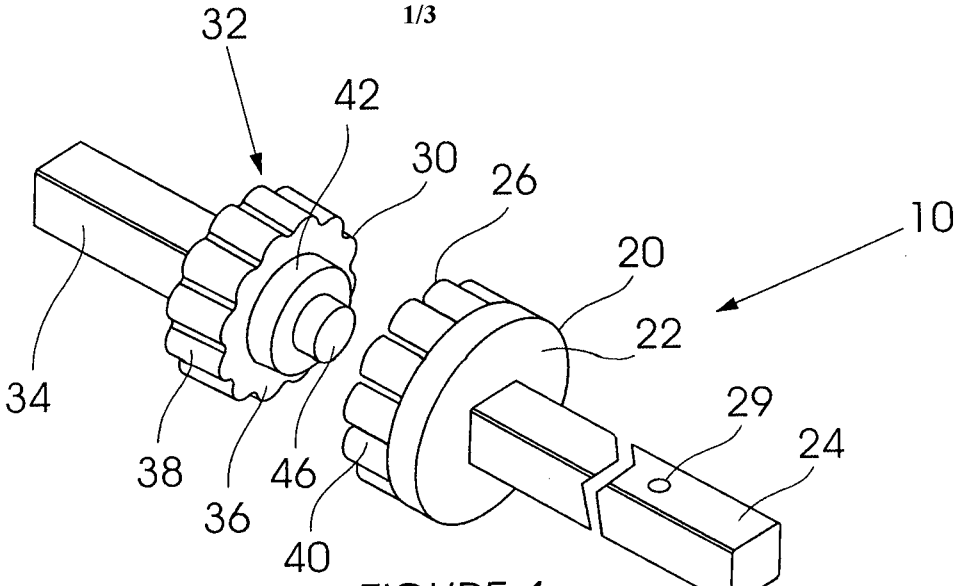

FIGURE 1

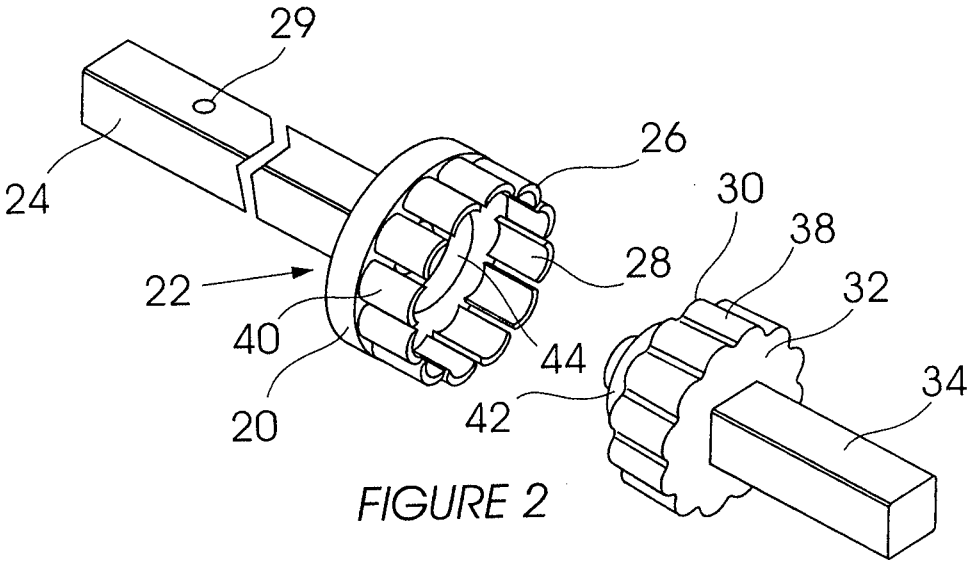

FIGURE 2

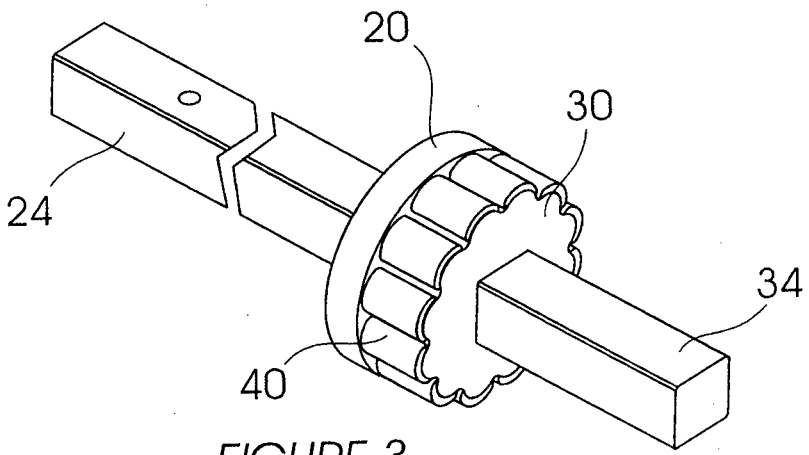

FIGURE 3

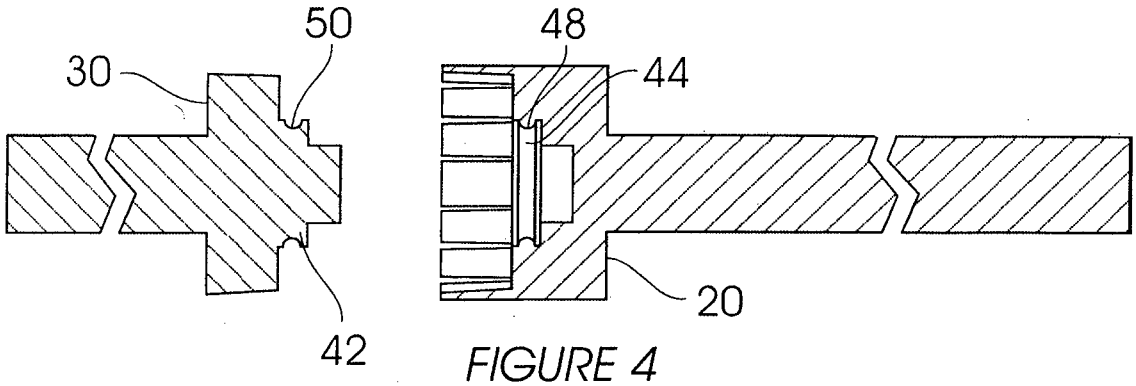

FIGURE 4

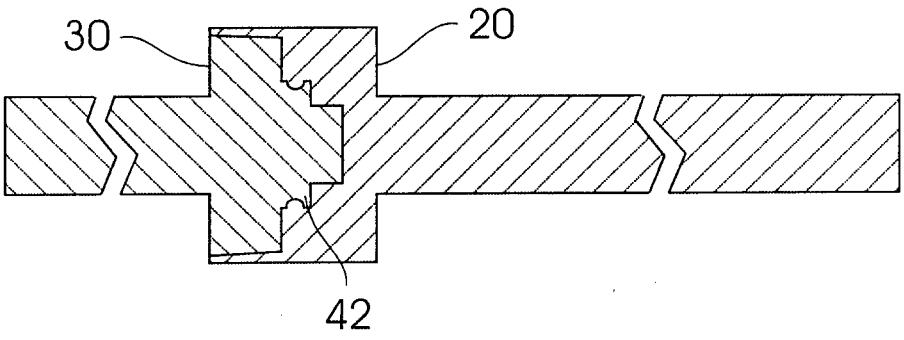

FIGURE 5

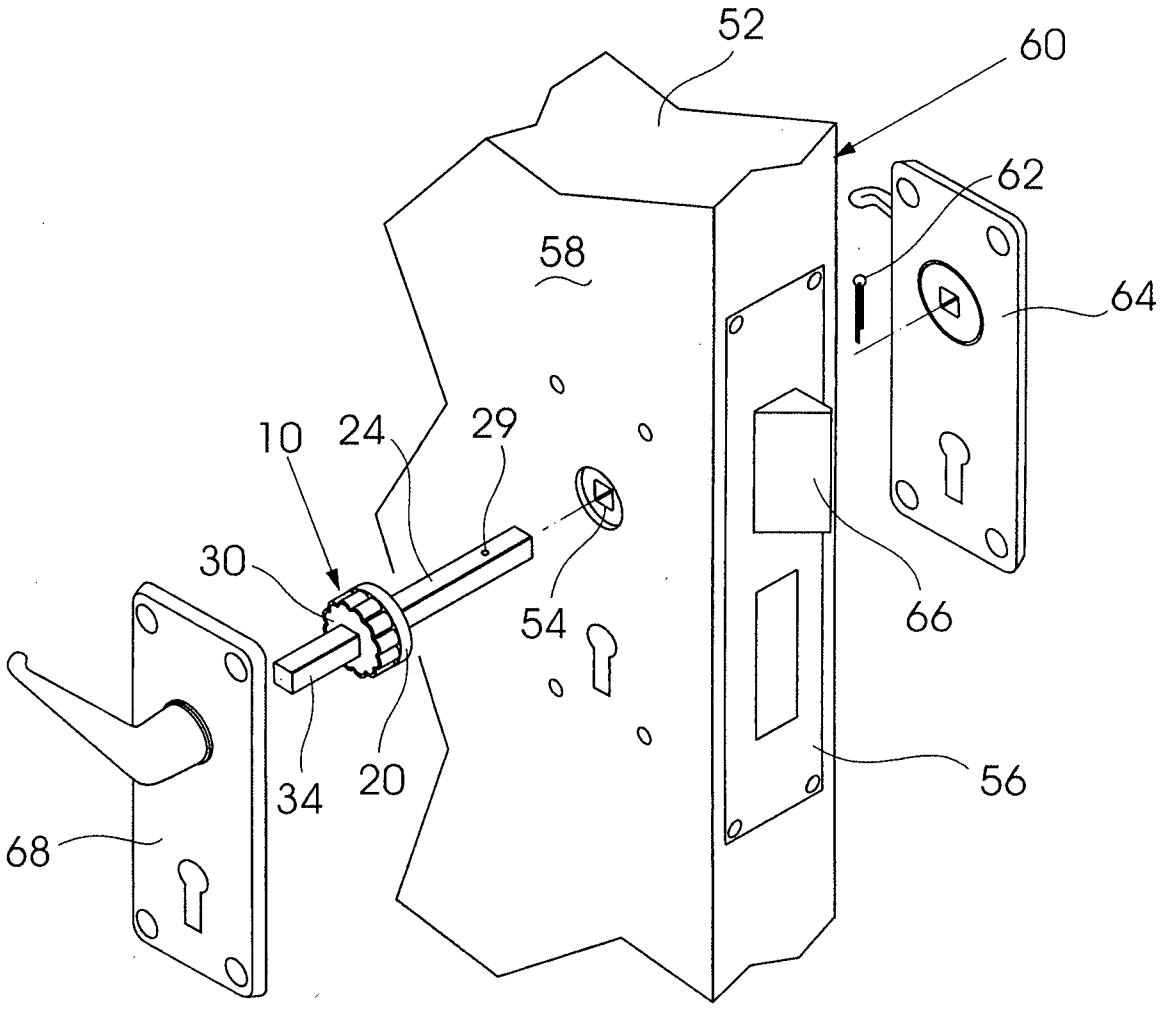

FIGURE 6

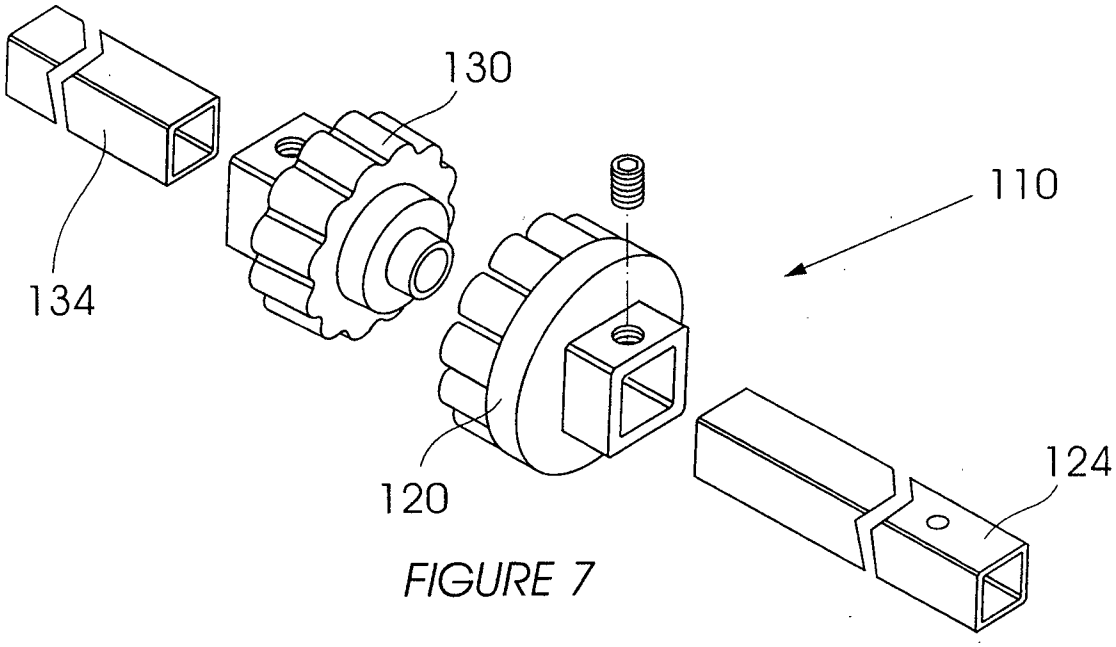

FIGURE 7