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(71) Applicant(s)
Austral Lock Pty Ltd

(72) Inventor(s)
Watts, John Russell

(74) Agent / Attorney
Spruson & Ferguson, L 35 St Martins Tower 31 Market St, Sydney, NSW, 2000

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Abstract

A lock for a displaceable wing including an adjustable connecting member operably interconnecting a remote lock to an actuating means spaced from the remote lock,

said adjustable connecting member including overlapping longitudinally elongated first and second portions and means to restrain relative displacement therebetween,

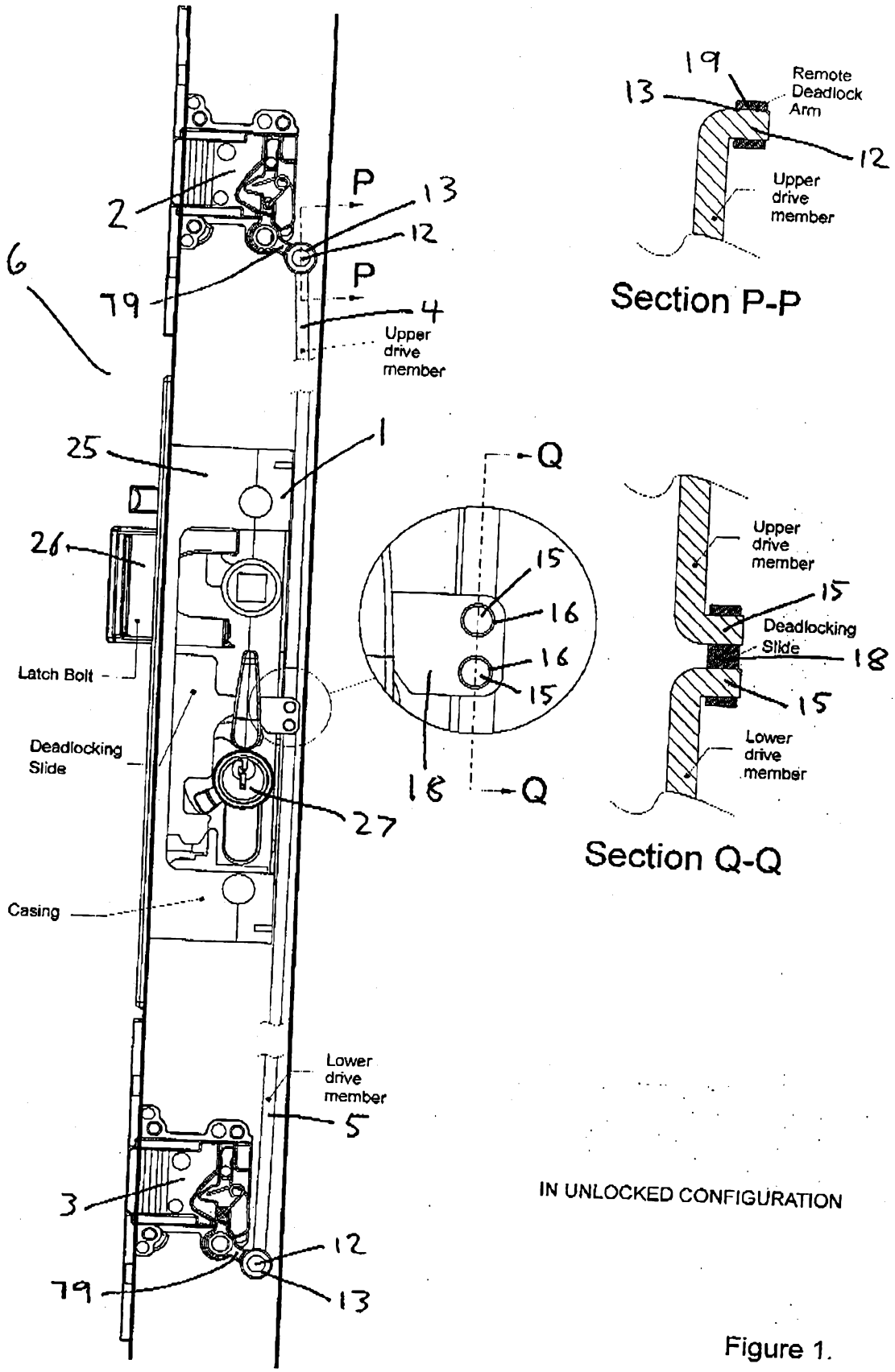
wherein the effective length of the adjustable connecting member is dependent on the lengths of the overlapping portions that may be electively set.

A method of setting the length of an adjustable connecting member to render it suitable for a remote lock spaced a known distance from an actuating means including:

aligning one end of the assembled adjustable connecting member relative to a first mark,

aligning the other end of the assembled adjustable connecting member relative to another mark spaced from the first mark a distance compatible with a connecting member suitable for the remote lock spaced a known first distance from the actuating means,

applying fastening means to relatively restrain the driven and remote portions.



IN UNLOCKED CONFIGURATION

Figure 1.

IMPROVEMENTS IN LOCKS

BACKGROUND

Many-types of conventional multipoint locks have a central controlling lock connected to slave remote locks by connecting members. A small number of different length connecting members have been developed to suit the range of common sized doors but sometimes, these are unsuitable and door manufacturers have resorted to cutting and bending standard length connecting members – a time consuming and often unsuccessful endeavor.

OBJECT

It is the object of the present invention to substantially overcome or at least ameliorate one or more of the above disadvantages or to provide a useful alternative.

SUMMARY

According to a first aspect there is disclosed herein a lock assembly including:

a centre lock including actuating means, the actuating means being operatively associated with a lock casing of the centre lock,

one or more remote lock(s) spaced from the lock casing;

one or more adjustable connecting member(s) operably adapted to connect the one or more remote lock(s) to the actuating means, the one or more adjustable connecting member(s) including overlapping longitudinal first and second portions wherein the effective length of the one or more adjustable connecting member(s) is adjusted by relative displacement of the overlapping first and second portions; and

one or more fastener(s) adapted for operative insertion between the overlapping first and second portions so as to restrain relative displacement of the overlapping first and second portions, thereby restraining adjustment of the effective length of the one or more adjustable connecting member(s).

According to another aspect of the invention, there is disclosed a lock for a displaceable wing including an adjustable connecting member operably interconnecting a remote lock to an actuating means spaced from the remote lock,

said adjustable connecting member including overlapping longitudinally elongated first and second portions and means to restrain relative displacement therebetween,

wherein the effective length of the adjustable connecting member is dependent on the lengths of the overlapping portions that may be electively set.

Preferably, the first portion is configured as a driven portion operably connected to the actuating means and the second portion is configured as a remote portion where each said portion is straddled by means cooperable with the first and second portions to restrain relative displacement therebetween.

Having regard to the distance between the remote lock and the actuating means; the normal operating forces; the need to fit within a limited space, the adjustable connecting member is preferably configured to be resistant to buckling.

Preferably, the wing comprises a substantially conventional Australian security door comprising a hollow outer frame and an infill.

Preferably, the actuating means comprises a substantially conventional Australian security door central lock.

Preferably, the longitudinal axii of the first and second portions are substantially coplanar.

Preferably, the first and second portions each include a substantially orthogonal return portion, said return portions configured to couple the first and second portions to the central and remote locks.

Preferably, means cooperable includes a clamp through which the first and second portions extend, said clamp including one or more fixing aperture(s) and one or more fastener(s) that on being displaced relative to the fixing recess acts to restrain the first portion relative to the second portion.

Preferably, the means cooperable includes threaded engagement.

Preferably, the first and second portions extend into separated longitudinally elongated apertures in the clamp between which the fixing aperture extends.

Preferably, the first and second portions extend into separated longitudinally elongated apertures in the clamp between which the fixing aperture extends to intersect said separated longitudinally elongated apertures.

Preferably, each separated longitudinally elongated apertures is connected to an associated side recess disposed from the fastener configured to enable the driven or remote portion within the said longitudinally elongated aperture to be displaced in-part sideways into the side recess and giving rise to frictional forces.

Preferably, there the fixing recess is configured to receive an expandable sleeve having an axial aperture into which the fastener can be forced to expand the sleeve to displace the driven and remote portions into respective side recesses.

Preferably, the fastener comprises a rivet or pin.

Preferably, the fastener comprises a broaching-pin that during application cuts a side channel in each of the driven and remote portions.

Preferably, the adjustable connecting member operably interconnects a remote engaging member within the remote lock to a slide within the actuating means, said remote engaging member displaceable to and from an operative configuration by displacement of the slide.

Preferably, the lock includes an upper adjustable connecting member operably interconnecting an upper remote engaging member within an upper remote lock to the slide and a lower adjustable connecting member operably interconnecting a lower remote engaging member within a lower remote lock to the slide,

said remote engaging members displaceable together to and from their respective operative configurations by displacement of the slide.

Preferably, the axis of the remote portion is offset from that of the driven portion.

According to another aspect of the invention, there is provided a method of setting the length of

an adjustable connecting member to render it suitable for a remote lock spaced a known distance from an actuating means, the actuating means being operably associated with a lock casing spaced from the remote lock, the method including:

aligning one end of the assembled adjustable connecting member relative to a first mark,

aligning the other end of the assembled adjustable connecting member relative to another mark spaced from the first mark a distance compatible with a connecting member suitable for the remote lock spaced a known first distance from the actuating means, and

applying fastening means to relatively restrain the driven and remote portions.

Preferably, the other mark is designated the known distance.

Preferably, there are multiple marks spaced from the first mark corresponding to different known distances between the remote locks and actuating means and designated the different known distances.

Preferably, correspondingly spaced recess are provided for each mark,

wherein a first return is inserted into the first recess and the other return is inserted into that other recess spaced from the first recess and designated the known distance for which the adjustable connecting member is being configured.

The elements relating to the various aspects of the invention claimed within are identified within the specification as follows: where unless the context requires otherwise,

- "Locks" or variations such as "lock" will be understood to include complete locks for and improvements in locks for wings that are transportable into other devices without being limited to the complete locks described herein.
- "Comprise" or variations such as "comprises" or "comprising" will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers,
- Positional prepositions such as “rear" and "forward" are used to assist in description of the preferred embodiments and with reference to the accompanying drawings and have in general, no absolute significance,
- Overlap and derivations such as "overlaps” implies at least in-part,

occupying a same plane as.

- "Meshes with" implies being engaged with - for example, an angularly displaceable shaft meshing with a recess in an angularly displaceable pinion so as to angularly displace together; this not precluding the shaft displacing longitudinally to and from the recess,
- "Extent" will be understood to embrace area, form and shape.
- Headings are included for convenience only and not to affect on interpretation.
- "Preferably" or variations such as "prefer" does not imply that the form of an integer is restricted to that referred to as preferred, but implies adequate and if need be, able to adequately perform a function required by the invention
- "Alternative" or variations such as alternatively does not imply that the form of an integer is less preferred but simply implies adequate and if need be, able to adequately perform a function required by the invention.
- "Wing" or variations such as "wings" includes complete wings and improvements in wings without being limited to those described herein and more particularly, wings embraces wings configured as "doors", "windows", "shutters", "screens",
- "Structure" or variations such as "structures" implies a man-made fabrication consisting of one or more members and embraces complete structures and improvements in structures without being limited to the forms described herein, structures more particularly embracing wings and wings configured as doors or window screens,
- "Member" is an identifiable entity having material form that may include one or more identifiable components,
- "Material" includes elements, alloys, plastics and other substances.
- "Aperture" and "recess" embrace a hole that extends from a surface while "aperture" in some contexts more particularly implies a hole that extends between surfaces.
- "Furniture" includes door furniture that includes a "handle assembly" that includes a handle supported by a base that together in one form comprise a disengaging handle supported by a back-plate or base;
- "Handle" includes a knob and lever;
- "Disengaging Handle" includes a lever or knob that is hand operable to cause an engaging member to become disengaged and/or retracted,

- "Base" includes a Rose that may include a surface mounted member having a recess on the underside and it includes a back plate,
- "Back Plate" (or "back-plate") includes a surface mounted box-like member having a recess on the underside.
- "Engaging Member" is a member displaceable to and from an operative configuration, a configuration the engaging member assumes when participating in engagement with an engageable means and a configuration where the engaging member is at least substantially fully displaced; within this specification, and for ease of description with respect to the engaging member, fully displaced embraces operative.
- "Latching" implies displacement of an "engaging member" into engagement with an "engageable member" under the action of biasing means.
- "To engage" implies displacement of an "engaging member" into engagement with an "engageable member".
- "To disengage" means to withdraw from engagement or withdrawal from the operative disposition to an inoperative disposition removed from the said engagement. Within this specification, and for ease of description, with respect to the engaging members, retracted embraces inoperative,
- "Latch-Bolt" or "latch bolt" is an outwardly biased bolt capable of executing (or participating in) latching and includes bolts having a leading end that is chamfered or otherwise profiled on one or both sides.
- "Auxiliary bolt" is a plunger that is operably associated with a latch bolt.
- "Unlatching" means withdrawal of the engaging member from engagement.
- "Locking" means the act of configuring the lock to restrain it from being disengaged and in some forms of locks employing deadlocking slides, it means restraining the deadlocking slide to restrain the bolt from being inwardly displaced in response to operation of the disengaging lever.
- "French Door" means a door including a frame and a glass in-fill.
- "Screen door" means a door including a frame and an insect restraining in-fill such as fiberglass mesh, woven mesh or perforated metal mesh;
- "Lock Body" includes an engaging member and a lock casing and an Australian conventional security door lock (or Australian conventional security door central lock) includes a lock body that is able to fit within an industry-standard door preparation having a recess formed by a channel depth 40 MM, a

closing edge slotted aperture of length 160 MM the channel having a width 16 MM

- "Mortise Lock" means a lock including a lock body, a strike plate, a pair of handle assemblies and a cylinder where the lock body is configured to be fitted within the frame of the structure.
- "Single cylinder" means a substantially conventional lock cylinder comprising a separate sub-assembly that includes a key operable barrel within a cylinder housing.
- "Double-Cylinder" comprises a substantially conventional double lock cylinder being a separate sub-assembly that includes opposed coaxially supported barrels each operably connected to the same angularly displaceable "first cam" having a "first cam arm" characterized by a "free end" that extends radially to a "peripheral surface" defined in part by a common radial distance from the first cam pivotal axis and where in a conventional double cylinder this radial distance is 15.0 MM.
- "Cross-Sectional View" in relation to figures should be interpreted as an orthogonal cross-sectional view defined by a plain orthogonal to the longitudinal axis of the member in consideration.
- Patent Specification implies inclusion of: a Body including a Title, a Description of Preferred Embodiment/s, an Abstract and a Summary of the Invention] and a specification will include Claims,

Unless the context requires otherwise, any prior publications and usage referred to herein, is not an assertion that any of this material forms part of the common general knowledge in the art in any other country at the priority date of any claim herein (or the priority date of any future claim derived at least in part from this specification).

The integers described within include those related to the various aspects of the invention claimed within and they include those related to the various aspects of other inventions to be claimed in future divisional applications and continuations in part.

Where an integer is attributed with attributes different from those attributed in an earlier application on which this application relies for priority, the integer will be considered to be the same integer in a different form; where there is actual inconsistency, the latest description will prevail.

Description of the Figures

Notwithstanding any other forms that may fall within its scope one preferred form of the invention will now be described by way of example only with reference to the drawings in which:

Figure 1 is a schematic side view of a multipoint lock including a central lock connected to an upper remote lock and a lower remote lock by an upper connecting member and a lower connecting member respectively; the central lock being in the unlocked configuration;

Figure 2 is the lock of Fig 1 in the snib locked or second locked configuration;

Figure 3 is the lock of Fig 1 in the key locked or first locked configuration;

Figure 4 is a schematic view of an adjustable connecting member including a clamp that can be adapted to have a different length;

Figure 5 is an engineering drawing of the clamp;

Figure 6 is a schematic view of a method of adjusting a connecting member,

Figure 7 is an exploded isometric view of the clamp,

Figure 8 is cross-sectional view AA of Fig 7,

Figure 9 is an isometric view of an alternative clamp;

Figure 10 is an isometric view of an alternative clamp

Figure 11 is an isometric view of an alternative clamp

Figure 12 is an isometric view of an alternative clamp

Figure 13 is an isometric view of an alternative clamp

Detailed Description of Embodiments Consistent with Concepts of the Invention as Claimed

The inventions within (although not limited to) are particularly relevant to locks that include remote bolts spaced from a central lock each operably connected by a respective connecting member to a displaceable slide within the central lock; this slide being displaceable by operation of a cylinder and/or by operation of a hand operable member to displace the remote bolts between an operative and an inoperative configuration.

In particular forms of such locks, the slide takes the form of a deadlocking slide that also acts to deadlock a bolt in the central lock. A more particular form of such a central locks is described in 77719/94 and its divisional applications, in 49195/93 and its divisional applications, in 40311/95 and its divisional applications, 2004 250982 and 2005 250050 all of which are hereby included by reference. It

should be noted that some of the central locks described in these patent specifications may requiring minor adaptation to become compatible with inventions described within.

The inventions within will be described by way of example only with reference to and in the context of a central lock having the deadlocking slide referred to above, however the inventions subject of this application are not limited to these particular applications.

The inventions relate to a **lock 6** including an **actuating means 1** connected to an **upper remote lock 2** and/or a **lower remote lock 3** by an **upper connecting members 4** and a **lower connecting members 5** respectively where at least one of the connecting or drive members is adjustable in length, as shown in Fig 1 to 3. In some forms the actuating means 1 comprises a **central lock 25** that includes an engaging member configured as a **latch bolt 26** and a **cylinder 27** that is operable to actuate the connecting members to operate the remote locks.

In some forms, the remote end of the connecting member is configured to connect to the associated remote lock having a remote engaging member and in one form, the connecting member includes a **return portion 12** that is received in an **aperture 13** in the remote lock that in some forms is within a **moveable member 79** operably associated with the remote engaging member; in some forms, the moveable member comprises an arm of a pivotal rocker.

In some forms, the driven end (meaning the end nearest the central lock end) of the connecting member is configured to connect to the actuating means and in one form it includes a **return portion 15** that is received in an **aperture 16** in a **moveable member 18** of the actuating means, that in some forms comprises a deadlocking slide of a central lock and in some forms the deadlocking slide extends rearwardly to protrude from rear wall of the lock casing - the aperture/s 16 being in that protruding portion.

In one form, as shown in Fig 4, the adjustable connecting member includes a **remote portion 19** that will be connected to the remote lock and a **driven portion 20** that will be connected to the central lock, these portions connected by **a clamp 21,** as shown in Fig 5, to in effect provide a telescopic joint wherein the overall length of the adjustable connecting member can be adjusted by varying the distance the portions extend from the clamp; in these forms, the outer ends of the adjustable connecting member are adapted to be connected to the remote lock and actuating means.

The inventions within include a method of adjusting the connecting member as shown in Fig 6, where a special ruler shows adapted lengths of connecting members corresponding to the actual measurable lengths of the distances between the centre of the central lock and an edge of the associated remote lock, ie the lengths of connecting members are not actual but as required to result in remote locks separated by a desired distance form a central lock. Where the connecting members include parallel returns, as shown in Fig 6, the ruler is on **a planar board 41** that has a **recess 42** at one end (orthogonal to its plane) to receive one return and multiple **recesses 43** spaced from this at pre-determined distances likely to be encountered in configuring connecting member lengths.

In usage, one return is inserted in recess 42 and the other return is placed in an appropriate recess 43 the clamp is aligned so that the fastener recess is orthogonal to the plane of the board at which point the fastener is applied. One of the advantages of this method, is that the return portions can be correctly relatively orientated with certainty because the portions 19,20 cannot be rotated relative to the tubular portion as the fastener is applied.

Before describing multiple forms of connecting members and clamps, we will describe a particularly limiting environment for which an adjustable connecting member was sought; that of a substantially conventional Australian security door framed by members characterized by an elongated hollow substantially 16 MM wide and 40 MM deep into which the central and remote locks is fitted.

Given the sizes of common security door locks in Australia where the central lock body extended into the hollow to within a small distance of the rear wall of the hollow (and not greatly exceeding the diameter of a cylindrical wire rod having a diameter of about 4.5 MM from which commonly employed connecting members are constructed) and where the remote locks extended into the hollow to a greater but still small distance of the rear wall of the hollow and having as one of the objectives of the inventions within to provide an adjustable connecting member for existing common central locks, solutions were sought where 1) the adjustable connecting member did not protrude more that a small distance from the rear of the central lock body and 2) not more that a greater but still small distance from the rear of the remote lock bodies and 3) could fit within the width of 16 MM of the hollow. Having regard to the above constraints and to the facts that 1) the construction of the central and remote locks requires connecting members to be disposed sideways relative to the 16 MM wide hollow, 2) remote locks are disposed up to about 1 meter

from the central lock and 3) the connecting members need to be resistant to buckling when subjected to the force corresponding to the point where further turning of the key shears the head off points us towards a solution comprising commonly employed cylindrical wire rods having a diameter of about 4.5 MM and where the remote portion 19 and driven portion 20 lie in a plane parallel the face of the door so as to occupy minimum width within the channel. Of the various connecting members conceived and described within, that described immediately below is best suited to Australian security doors.

Some forms of connecting member, as shown in Fig 7 and 8, include the **remote portion 19** and **driven portion 20** described above and a **clamp 21** that includes adjacent longitudinally **elongated apertures 23** defined by substantially parallel longitudinal axii and between them is a **lateral aperture 22** that in one form is defined by an axis that passes between the portions in a direction substantially orthogonal to the plane defined by the substantially parallel longitudinal axii, this lateral aperture 22 intersecting each of the elongated apertures 23 to form openings to the elongated apertures 23 or to form thin deformable walls between the lateral aperture 22 and the elongated apertures 23. The lateral aperture 22 is configured to receive a **fastener 24** such that when the fastener is inserted, it extends into the **apertures 23A and 23B** to engage the **remote portion 19** and a **driven portion 20** that in some forms are identical.

Trials have shown that in some cases, using some adjusting methods, the act of inserting the fastener 24 causes the portions to rotate relative to the clamp so in some forms, an expandable hollow cylindrical **tube 25** that may comprise a substantially conventional **roll-pin 32** is driven into the lateral aperture 22 to be deformed by being pressed sideways by the portions and to give rise to reactionary force/s that act on the sides of the portions to urge them apart and against the walls of the apertures 23A, B and give rise to frictional forces that act to restrain relative displacement between the portions and the clamp and in a particular form the diven and remote portions are held slightly pressed on by the tube 25 but such that they can be displaced but with minimal force to facilitate adjustment. Subsequently, a fastener 24 is inserted by force into the axial **aperture 26**, in the roll pin to force it to assume a large internal and external diameter whereby to urge the portions apart and without urging the portions to rotate.

In some forms, the apertures 23A is connected to an outwardly disposed **side opening 27A** that leaves a portion of the remote portion within exposed and

the apertures 23B is connected to an outwardly disposed **side opening 27B** that leaves a portion of the driven portion within exposed **23B**. The side openings 27A,B are each configured such that the sideways forces exerted on the driven and remote portions by the insertion of the fastener cause the exposed portions in-part to displace sideways away from each other and into their associated side openings 27A, B; this displacement in-part being enabled by deformation of the driven and remote portions that as a consequence gives rise to reactionary force/s that act of the sides of the tube 25 and on the walls of the apertures 23A, B that cooperate to hold the remote portion 19 and driven portion 20 elastically deformed and as a consequence giving rise to frictional forces that act to restrain relative displacement between the remote portion 19 and driven portion 20 and clamp under normal operating loads. Obviously, the further the driven and remote portions are displaced (in-part) into their associated side openings 27A, B the larger will be the frictional force. Trial and error has proved that the clap shown in Fig 6 is well suited to security door lock applications.

The clamp described immediately above is also particularly well suited to driven and remote portions having a tolerance on diameter that is relatively large, the deflection into the side openings accommodating tolerance in excess of the minimum diameter.

In a particular form, the driven and remote portions are constructed from resilient elastically deformable material such as partly hardened steel wire or rod. In this case, the insertion of the roll-pin urges the driven and remote portions apart till they abut against the walls of the apertures 23A, B whereupon insertion of the fastener 24 urges the exposed portions of the driven and remote portions apart to deform the driven and remote portions as they are displaced into side openings 27A, B and giving rise to reactionary forces that act inwardly on the opposite sides of the roll-pin and giving rise to increased frictional forces that act to restrain relative displacement between the clamp and driven and remote portions. In a particular form, the driven and remote portions comprise round bars and the apertures 23A and 23B are substantially cylindrical.

In a particular form of side opening 27A, BA extend inwardly to meet the apertures 23A and 23B and they have a width equal to the diameter D of the apertures 23A and 23B. In a particular form, the side opening 27B, A are substantially identical in form, opposed and extend equal distances longitudinally in

both directions away from the lateral aperture 22 to terminate before the respective ends of the clamp.

This embodiment can be represented by the following, as shown in Fig 8: if the driven and remote portions have a diameter d1, the undeformed tube 25 (roll-pin) has an inner diameter d4 and an outer diameter d3 (and an effective wall thickness (d3-d4)/2 and the outer surfaces of the driven and remote portions are separated by a distance of L, then in a configuration where the tube 25 is held slightly compressed (by being compressed to an effective diameter $d3_{delta}$) such that the first members can be displaced but with minimal force can be represented by:

$d1 + d3 - d3_{delta} + d1 = L$ assuming the driven and remote portions are not deformed by the insertion of the tube 25.

When the fastener 24 having a diameter d5 has been installed,

$d1 + d5 + (d3-d4) + d1 \sim L + 2\ L_{delta}$

where L_{delta} is the distance the driven and remote portions are displaced into a respective side opening 27A, B and assuming the sides of the tube 25 and sides of the driven and remote portions remain substantially undeformed and for this to occur the hardness of the tube 25 the driven and remote portions are comparable.

In a preferred form, lateral aperture 22 is bounded by a **tube shoulder 33** being a portion of the lateral recess of lesser diameter that prevents the tube 25 from being driven further into the clamp while providing passage for the fastener 24 and so when the fastener is driven in, the tube 25 expands without longitudinally displacing and without exerting a moment on the driven and remote portions urging them to rotate.

In a particular form, as shown in Fig 5, that is suitable for conventional Australian security door and is adaptable to suit common Australian security door locks: L= 13.50, d1=4.50, d5 +(d3-d4) = 3.2, the axii of the elongated apertures 23 are separated by 6.25 requiring the driven and remote portions to be displaced into the side recesses as the fastener is inserted, the walls of the clamp surrounding the lateral aperture 22 are minimized within practical limits and the width of the clamp is 9 MM enabling it to fit within the 16 MM width (even when offset as required by common Australian security door locks) and to be compatible with common Australian security door locks.

In some forms, the roll-pin 32 and fastener 24 described above are combined into a single **pin 28** that is simply driven into the lateral aperture 22 to urge the exposed portions of the driven and remote portions apart to deform the

driven and remote portions as they are displaced into side openings 27A, B and giving rise to reactionary forces that act inwardly on the opposite sides of the roll-pin and giving rise to increased frictional forces that act to restrain relative displacement between the clamp and driven and remote portions. In this case, the rods need to be restrained against rotation as the pin is driven in.

In some forms, as shown in Fig 9, the pin is configured as a **broaching-pin 29** having a hardness in excess of the hardness of the driven and remote portions to facilitate cutting and it has at least one peripheral sharp **cutting shoulder 30** that overlaps the **apertures 23A and 23B** and configured so that during insertions grooves are broached in the sides of the driven and remote portions to better retain the driven and remote portions against relative displacement. In a particular form, the broaching pin 29 is substantially cylindrical having a diameter D and the cutting shoulder 30 is defined in part by this diameter D. In some forms, the broaching pin has a generally tapered leading end and multiple spaced circular **cutting shoulders 31** having diameters that get progressively larger so insertion causes the cutting shoulder/s to cut orthogonal channels in a side of the driven and remote portions. The mechanism is such that the broaching-pin 29 will continue to cut/deepen the orthogonal channels till the outwardly directed component of force associated with cutting exceeds the inwardly directed forces resulting from deformation of the first members at which time, the first members will deform away from the cutting-pin 29 as the exposed portions displace further into the **side opening 27A, B**. Where the cutting-pin is configured to have multiple cutting shoulders, a tapered side of the leading end of the cutting-pin may at some time during this process act directly on the first members to urge them apart.

In some forms, as shown in Fig 10, the driven and remote portions comprise hollow tubes one of which extends into the other and in some forms, the internal diameter of one is substantially the same as the external diameter of the other but with working clearances and where they overlap they are straddled by a **sleeve 44** that includes an orthogonal **aperture 45** that extends to intersect a cylindrical **aperture 46** through which the driven and remote portions extend one inside the other and after the portions are adjusted to achieve the desired length, a **fastener 47** is driven inwardly through the orthogonal aperture to deform or puncture the walls of both the driven and remote portions to prevent relative displacement

In another similar form, as shown in Fig 11, the driven and remote portions have a cross-section having an external form that is substantially semi-circular so

that together in the assembled form, they occupy the **circular aperture 48** in a **sleeve 49** and where the fixing recess extends inwardly to intersect this circular recess 48 and after the portions are adjusted to achieve the desired length, a **fastener 50** is driven inwardly through the orthogonal aperture to puncture the walls of both the driven and remote portions to prevent relative displacement.

In another form, as shown in Fig 12, at least one of the driven and remote portions includes a **tubular portion 51** into which at least one **end portion 52** extends to effect a telescopic joint; the length of the adjustable connecting member being adjusted by varying the distance the at least one end portion extends from the tubular portion 51. In one form, the tubular portion 51 includes a longitudinally extended **side slot 53** that connects to a longitudinally extended longitudinal **bore 54** (that may be coaxial with the tubular portion) that extends longitudinally beside the side slot/s. In a particular form, the side slot extends for the entire length of this tubular member and the bore comprises an axially extended bore that similarly extends for the entire length of this tubular member. In some forms, one end of each **end portion 52** includes a through **fixing aperture 55** configured to receive a **fastener 56** – in some forms, the diameter of the fastener shank (which extends through the side slot) is configured to be substantially the same so that the end portion can be displaced into and from the bore while fastener slides longitudinally in the slide slot to restrain the end portion from angularly displacing relative to the tubular portion. Once assembled, the members are relatively aligned and adjusted to provide the desired length and the fastener is driven inwardly to deform or puncture the opposite wall of the tubular member to prevent any relative displacement. In some forms, the opposite wall has pre-drilled **apertures 57** to receive the fastener.

In other forms, as shown in Fig 13, each connecting member 2,3 includes a **first portion 60** and a **second portion 61** connected by a **threaded shaft 62**; the portions including an internally **threaded recesses 63 and 64** respectively that are engaged (or engageable with) with the threaded shaft 62; the length of the connecting rod being adjusted by rotating one or both portions relative to the threaded shaft 62. In some forms, each portion 60, 61 comprises an **elongated portion** attached to a nut or **threaded member 65**; where in a particular case the elongated portion has a diameter substantially the same as common connecting rods and the threaded member 12 comprises an elongated **sleeve nut 66** that is attached to the elongated portion by welding, soldering or other means. As is

common, each connecting rods has ends adapted to be connected to the central lock and remote lock.

The inventions described herein include the locks included herein by reference adapted to include an adjustable upper and an adjustable lower connecting members 4,5 having a form described herein. In one such case, the adjustable connecting member is used in conjunction with the locks described in 77719/94, 49195/93 by simply adapting the deadlocking slide to protrude through the rear of the casing so that **recesses 70** in this deadlocking slide are accessible and to receive the returns15 and 12 (ie. a recess for the upper and a recess for the lower connecting members). Similarly, the adjustable connecting member can be used in conjunction with the locks described in 250982 and 2005250050 by simply adapting the deadlocking slide to protrude through the rear of the casing as described above.

The adjustable connecting member can also be used in conjunction with the locks described in 40311/95 and the divisional applications by simply adapting the deadlocking slide to extend rearwardly from beneath the casing to protrude from the plane defining the rear of the casing so that **recesses 71** in this portion on the deadlocking slide are accessible to receive the returns15.

CLAIMS:

1. A lock assembly including:

a centre lock including actuating means, the actuating means being operatively associated with a lock casing of the centre lock,

one or more remote lock(s) spaced from the lock casing;

one or more adjustable connecting member(s) operably adapted to connect the one or more remote lock(s) to the actuating means, the one or more adjustable connecting member(s) including overlapping longitudinal first and second portions wherein the effective length of the one or more adjustable connecting member(s) is adjusted by relative displacement of the overlapping first and second portions; and

one or more fastener(s) adapted for operative insertion between the overlapping first and second portions so as to restrain relative displacement of the overlapping first and second portions, thereby restraining adjustment of the effective length of the one or more adjustable connecting member(s).

2. A lock assembly according to Claim 1, wherein the first portion is configured as a driven portion operably connected to the actuating means and the second portion is configured as a remote portion where each said portion is straddled by means cooperable with the first and second portions to restrain relative displacement therebeen.

3. A lock assembly according to Claim 1 or Claim 2, wherein the one or more adjustable connecting member(s) is configured to be resistant to buckling.

4. A lock assembly according to any one of the preceding claims, wherein the wing comprises a security door comprising a hollow outer frame and an infill.

5. A lock assembly according to Claim 4, wherein the actuating means comprises a security door central lock.

6. A lock assembly according to any one of the preceding claims, wherein the longitudinal axii of the first and second portions are substantially coplanar.

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7. A lock assembly according to any one of the preceding claims, wherein the first and second portions each include a substantially orthogonal return portion, said return portions configured to couple the first and second portions to the central and one or more remote lock(s).

8. A lock assembly according to any one of the preceding claims, including a clamp through which the first and second portions extend, said clamp including a fixing aperture wherein the one or more fastener(s) on being displaced relative to the fixing recess acts to restrain the first portion relative to the second portion.

9. A lock assembly according to claim 8, wherein the clamp includes one or more threaded portion(s).

10. A lock assembly according to Claim 8, wherein the first and second portions extend into separated longitudinally elongated apertures in the clamp between which the fixing aperture extends.

11. A lock assembly according to Claim 10, wherein the first and second portions extend into separated longitudinally elongated apertures in the clamp between which the fixing aperture extends to intersect said separated longitudinally elongated apertures.

12. A lock assembly according to Claim 11, wherein each separated longitudinally elongated apertures is connected to an associated side recess disposed from the fastener configured to enable the driver or remote portion within the said longitudinally elongated aperture to be displaced in-part sideways into the side recess and giving rise to frictional forces.

13. A lock assembly according to Claim 12, wherein the fixing recess is configured to receive an expandable sleeve having an axial aperture into which the fastener can be forced to expand the sleeve to displace the driven and remote portions into respective side recesses.

14. A lock assembly according to Claims 13, wherein the fastener comprises a rivet or pin.

15. A lock assembly according to Claim 12, wherein the fastener comprises a broaching-pin that during application cuts a side channel in each of the driven and remote portions.

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16. A lock assembly according to any one of the preceding claims, wherein the one or more adjustable connecting member(s) operably interconnect(s) a remote engaging member within the one or more remote lock(s) to a slide within the actuating means, said remote engaging member displaceable to and from an operative configuration by displacement of the slide.

17. A lock assembly according to Claim 16, including an upper adjustable connecting member operably interconnecting an upper remote engaging member within an upper remote lock to the slide and a lower adjustable connecting member operably interconnecting a lower remote engaging member within a lower remote lock to the slide, said remote engaging members displaceable together to and from their respective operative configurations by displacement of the slide.

18. A lock assembly according to Claim 6, wherein the axis of the remote portion is offset from that of the driven portion.

19. A lock assembly substantially as described herein with reference to and as illustrated in the accompanying drawings.

20. An adjustable connecting member substantially as described herein with reference to and as illustrated in the accompanying drawings.

21. A method of setting the length of an adjustable connecting member to render it suitable for a remote lock spaced a known distance from an actuating means, the actuating means being operably associated with a lock casing spaced from the remote lock, the method including:

aligning one end of the assembled adjustable connecting member relative to a first mark,

aligning the other end of the assembled adjustable connecting member relative to another mark spaced from the first mark a distance compatible with a connecting member suitable for the remote lock spaced a known first distance from the actuating means, and

applying fastening means to relatively restrain the driven and remote portions.

22. A method of adjusting the length of an adjustable connecting member according to Claim 21, wherein the other mark is designated the known distance.

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23. A method of adjusting the length of an adjustable connecting member according to Claim 22, wherein there are multiple marks spaced from the first mark corresponding to different known distances between the remote lock and actuating means and designated the different known distances.

24. A method of adjusting the length of an adjustable connecting member according to Claim 23, wherein correspondingly spaced recesses are provided for each mark,

wherein a first return is inserted into a first recess and the other return is inserted into a second recess spaced from the first recess and designated the known distance for which the adjustable connecting member is being configured.

25. A method of adjusting the length of an adjustable connecting member substantially as described herein with reference to and as illustrated in the accompanying drawings.

Austral Lock Pty Ltd
Patent Attorneys for the Applicant
SPRUSON & FERGUSON

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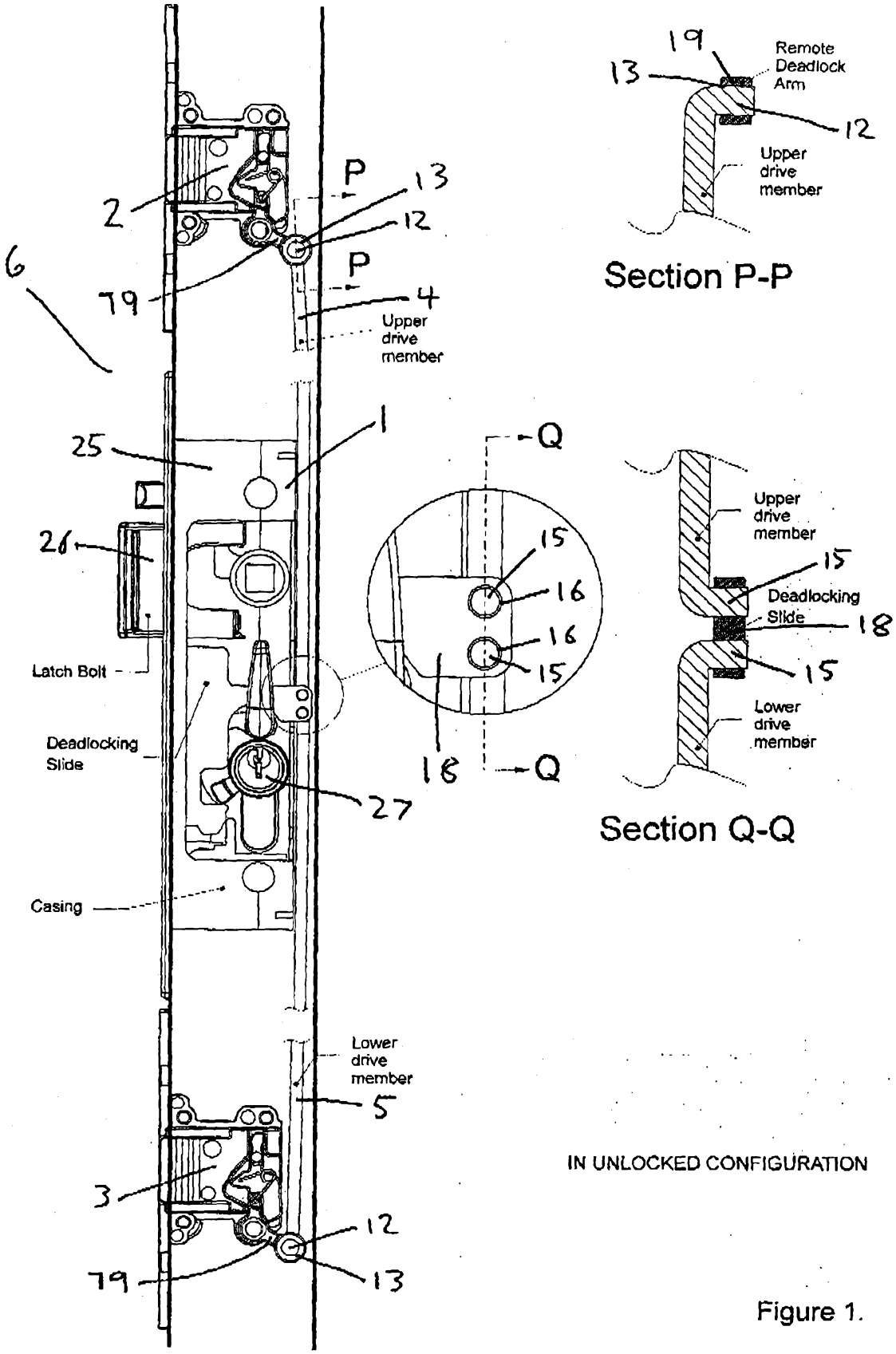
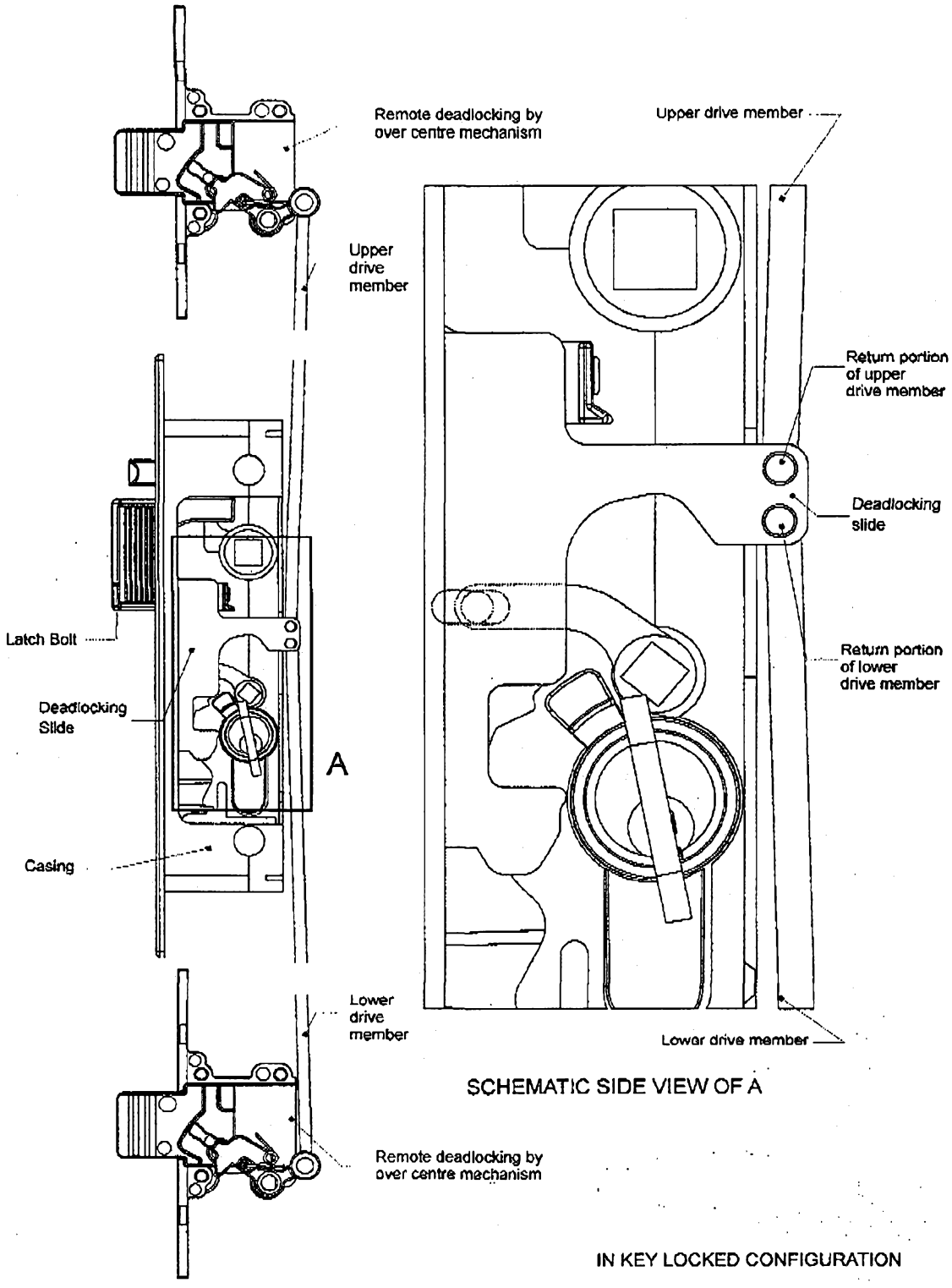


IN UNLOCKED CONFIGURATION

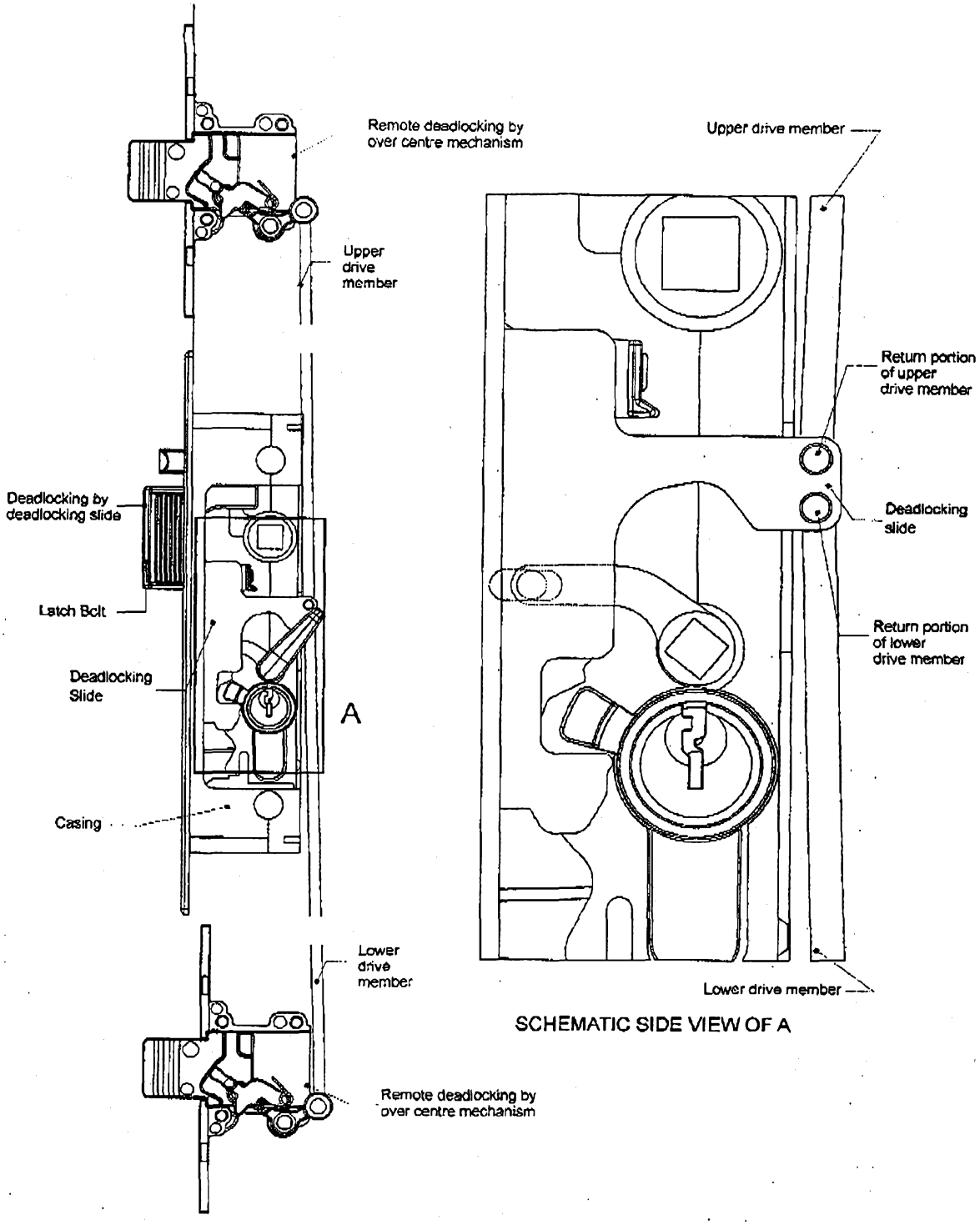
Figure 1.



SCHEMATIC SIDE VIEW OF A

IN KEY LOCKED CONFIGURATION

Figure 2.



SCHEMATIC SIDE VIEW OF A

IN SNIB LOCKED CONFIGURATION

Figure 3.

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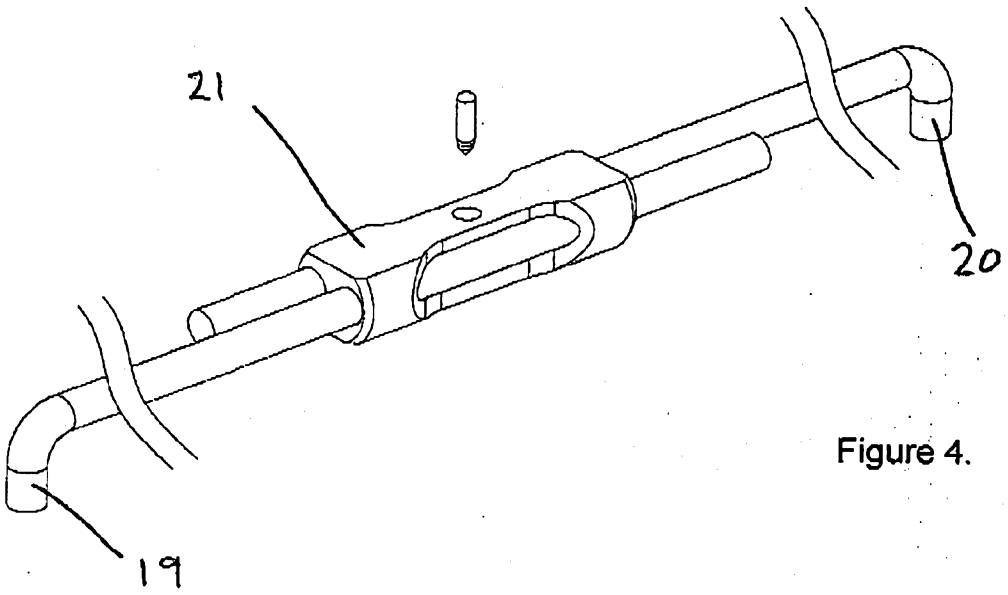


Figure 4.

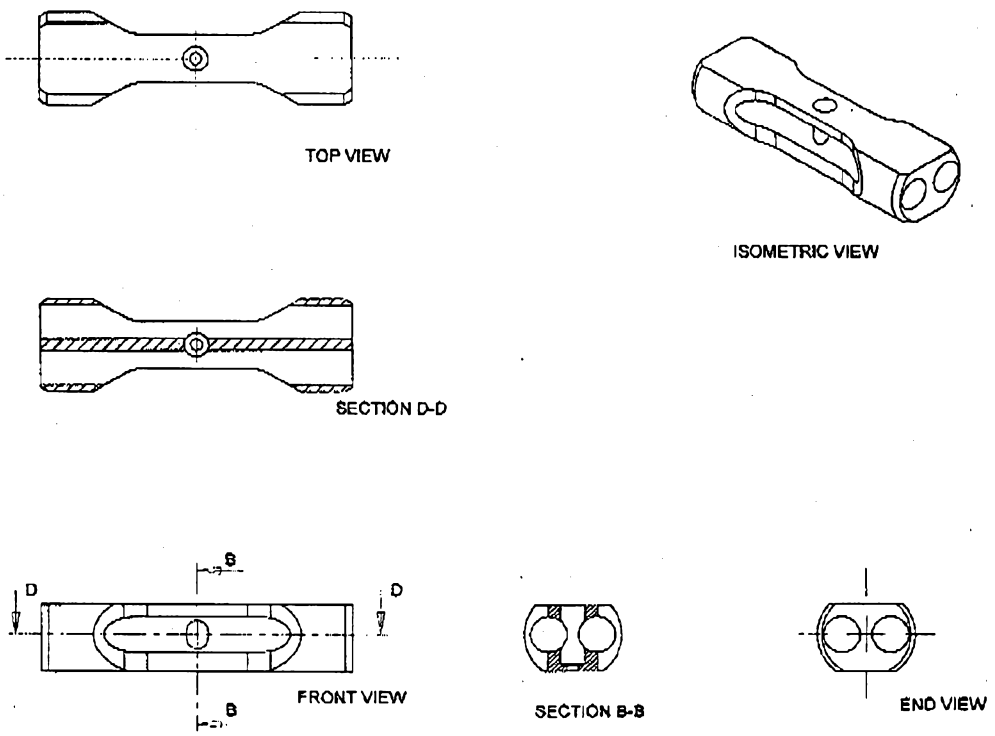
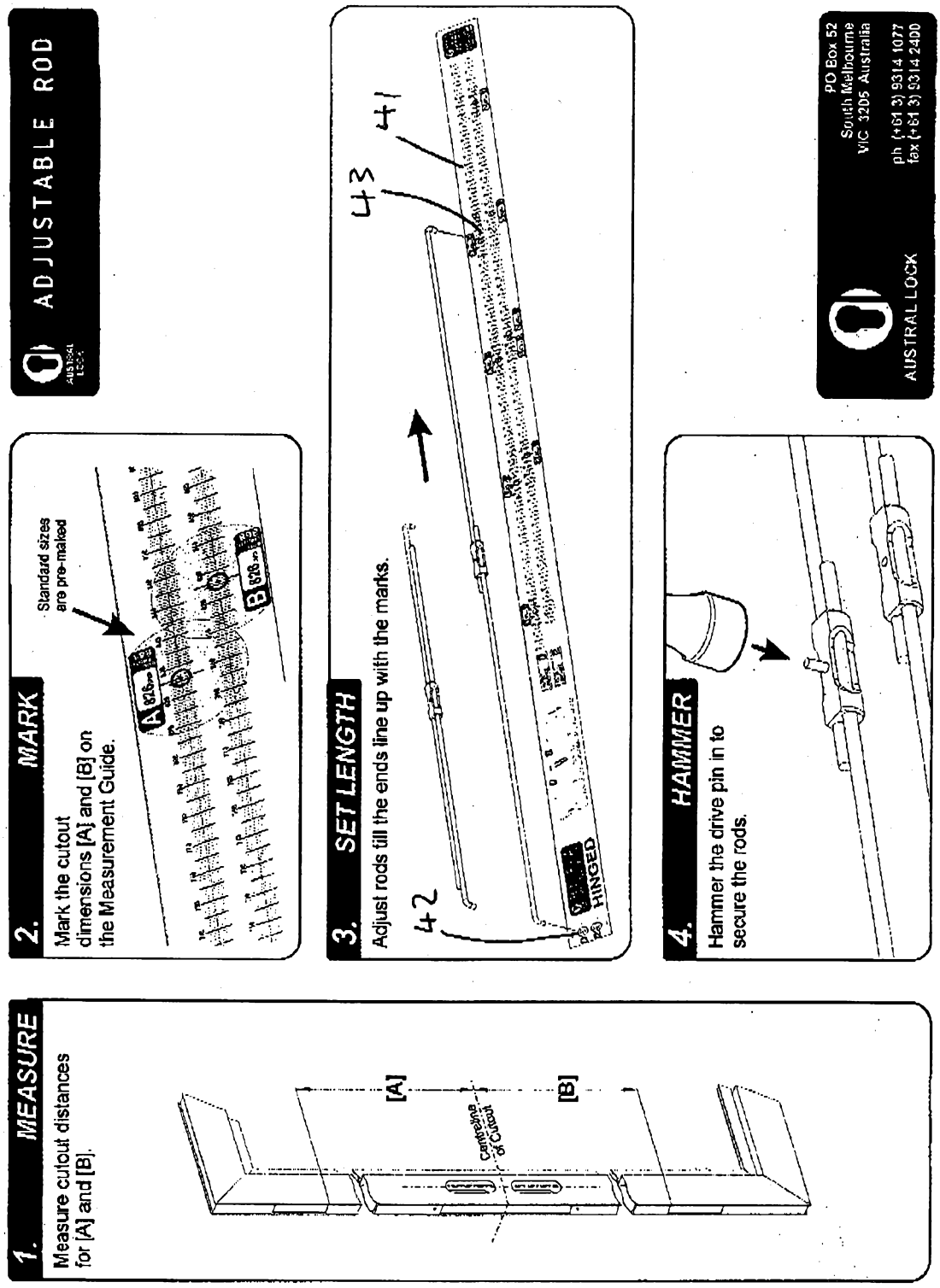


Figure 5.



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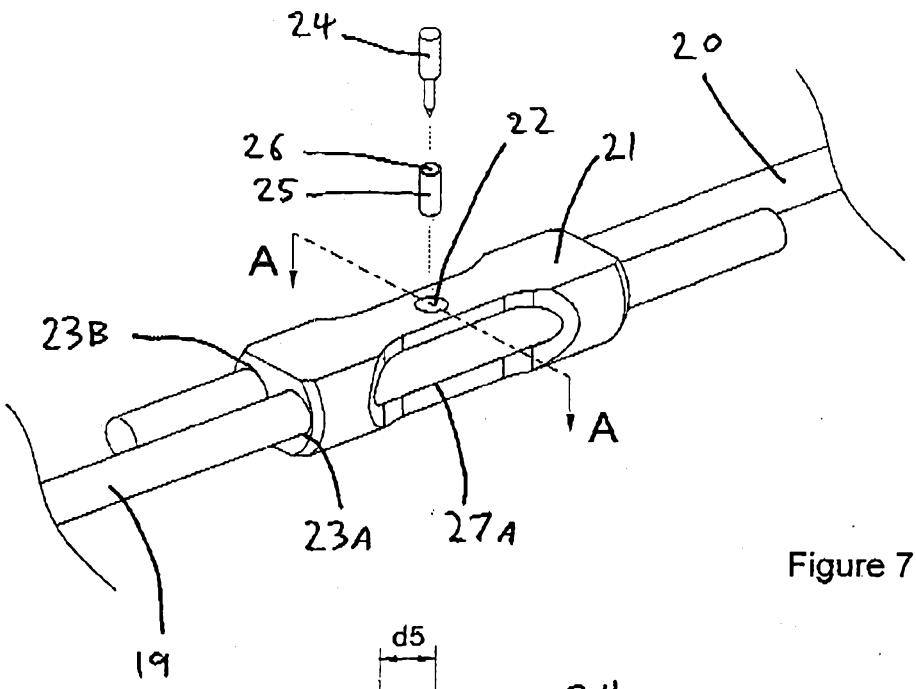

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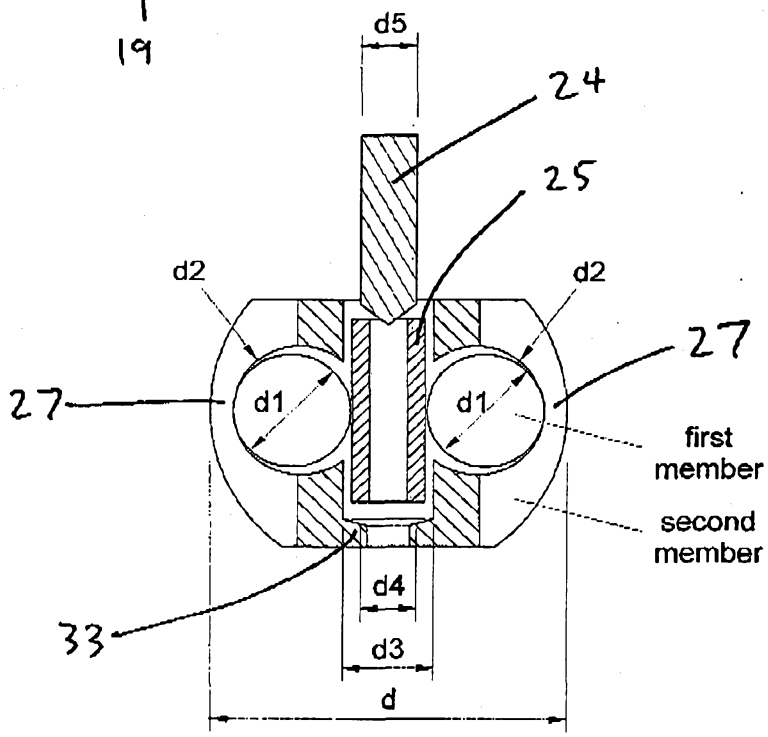

Figure 8.

d1 + d3 + d1 ~ d
d1 + d1 + d3 + (d5 - d4) > d

(d5 - d4) is the increase in diameter of the tube caused by insertion of the pin.

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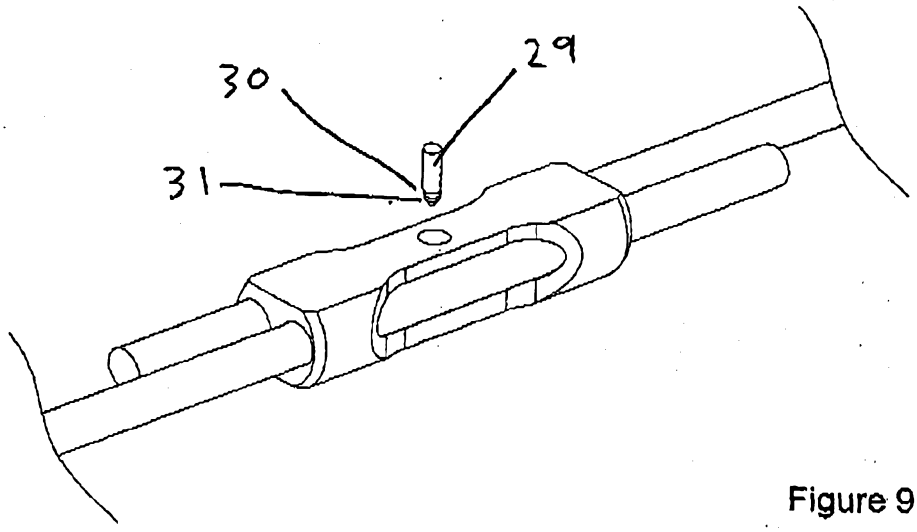

Figure 9.

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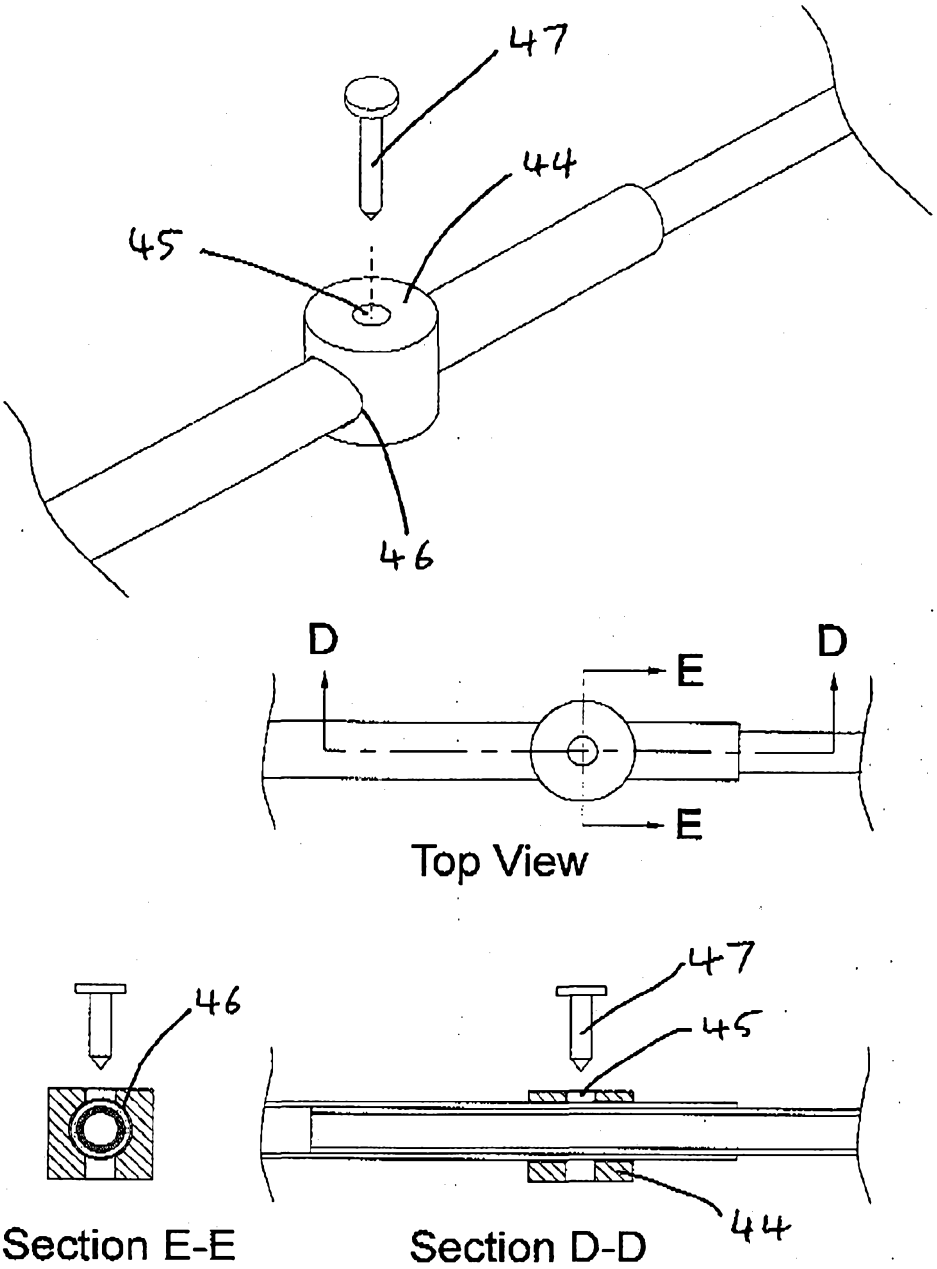

Figure 10.

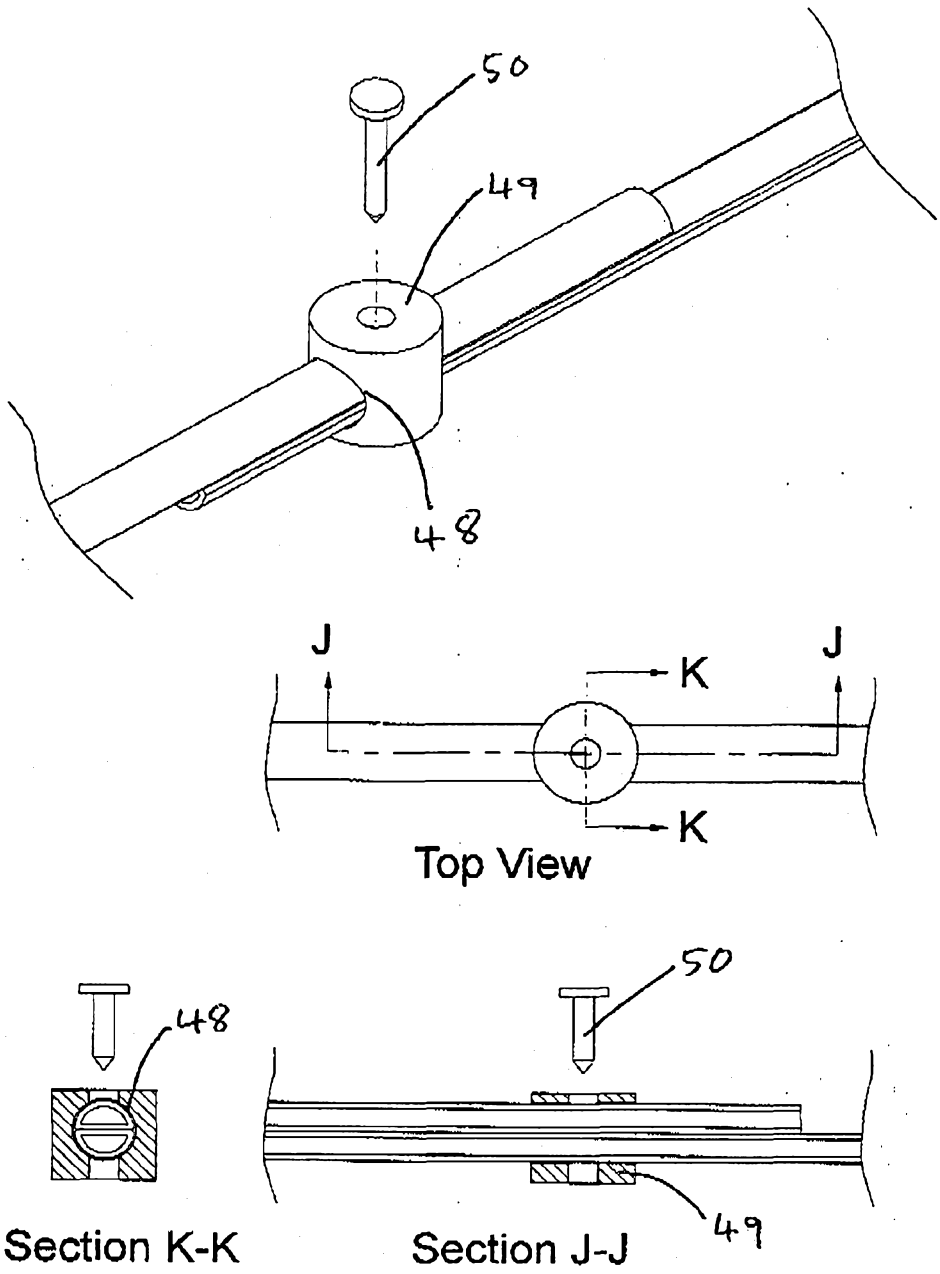

Figure 11.

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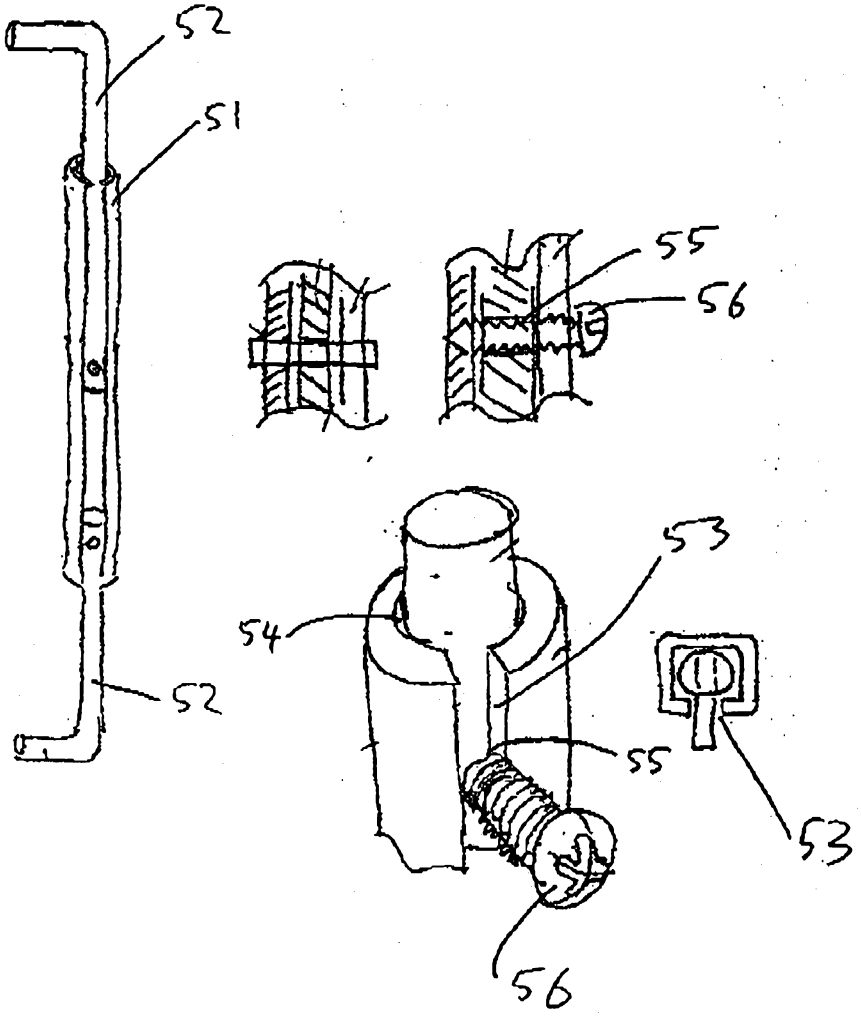

Figure 12.

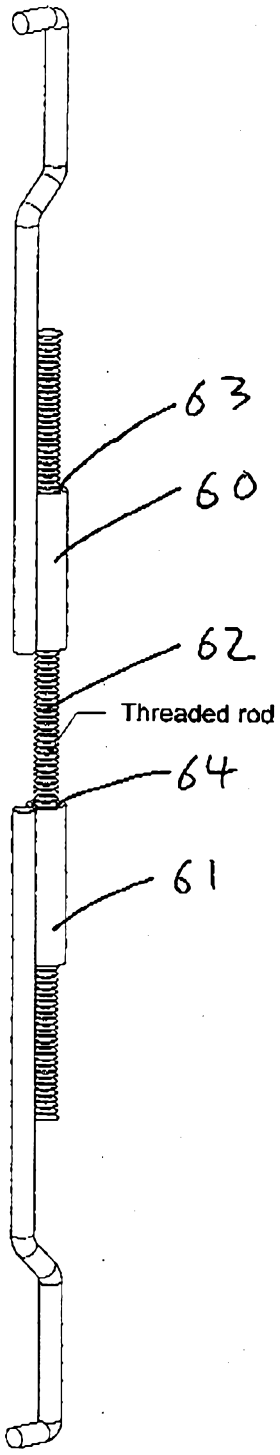

Figure 13.