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(54) **Adaptable square bar steel shaft with clutch for electromechanical locks**

(57) An adaptable square bar steel shaft with a clutch for electromechanical locks, characterised in that the tubular shaft (4) has no means of axial locking relative to the clutch body (3), whilst at the same time, relative to the dorsal face of the case of the lock (13), this clutch body (3) has a cylindrical extension (8) which projects from this dorsal face and which is provided with a male thread for the inside of a nut (9) in the form of a housing which, at its bottom, has a hole of a size that is larger than the contour of the tubular shaft (4) and smaller than the outside diameter of the cylindrical extension (8), there

being an open ring (10) which is mounted in a circumferential groove (11) of the tubular shaft (4) which, on its inside, lies flush with the projecting face of the cylindrical extension (8) of the clutch body (3), and whose open ring (10) has an outside diameter that is smaller than the said face of the cylindrical extension (8), and there being an elastoplastic seal (12) which is installed in the bottom of the housing nut (9) and has an inside diameter which is smaller than the outside diameter of the face of the cylindrical extension (8) and which is larger than the outside diameter of the open ring (10).

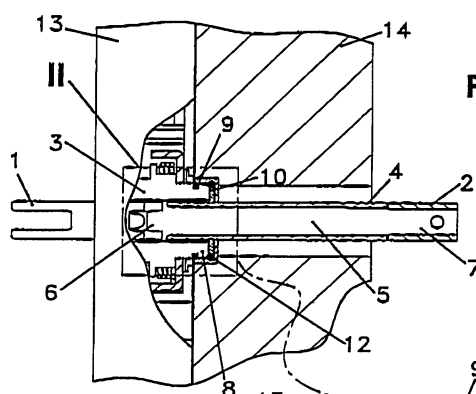


Fig.1

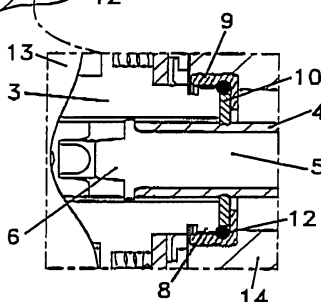


Fig.2

Description

SCOPE OF THE INVENTION

[0001] This invention relates to a square bar steel shaft with a clutch for electromechanical locks whose width can be adapted according to the thickness of the door and to the method of installation of the same.

[0002] In particular, this invention is applicable to an electromechanical lock provided with a split square bar steel shaft which is integrated by an inner square bar steel shaft for installing an inner knob or lever type handle, an outer square bar steel shaft for installing an outer handle, a clutch body rotatably connected to an inner shaft, a tubular shaft, a clutch shaft with a cylindrical central section which rotates adjustably inside the tubular shaft and which lies between an inner end that can be coupled to the clutch body and an outer end with a square cross-section corresponding to an axial cavity of the outer shaft, the designations of the inner and outer shafts relating to the respective inner and outer sides of the lock.

PRIOR ART

[0003] Within this scope of the invention a solution is known in which is incorporated a clutch shaft, a sliding clutch coupler, a sliding ring and a tubular shaft, where the clutch body is rotatably connected to the inner square bar steel shaft and is a housing which is rotatably mounted integral with the inner shaft and which provides a co-axial cavity of polygonal cross-section whose wall forms on the outside a cylindrical crown which is provided with two axially split and diametrically opposed windows, where the clutch shaft has a cylindrical section delimited between the outer and inner ends so that the outer end has a square cross-section which corresponds to the axial cavity of an outer square bar steel shaft, which is tubular and has a transversal drilled hole for a first pin fitted through this outer shaft, and where the inner end has a clutch head that is troncopyramidal in shape, where the sliding clutch coupler is crossed by a recessed hole for a second pin, in an adjustable sliding action, passes through the split windows of the clutch body and has a recess which is faced and corresponds to the clutch head, where the sliding ring is provided with a circumferential channel, has a sliding adjustment relative to the crown of the clutch body and has a pair of openings for the recess of the second pin, where the tubular shaft is the shaft which rotatably pulls the follower of the lock, has a cylindrical cavity with a rotatable adjustment relative to the cylindrical section of the clutch shaft and has an outside with a square cross-section preferably identical to that of the outer square bar steel shaft, and where this tubular shaft has two drilled holes for several third pins connected through the lateral wall of the housing formed by the clutch body.

[0004] This composition has an assembly in which the inner shaft, the clutch shaft, the sliding coupler and the

tubular shaft rotate integrally, the first two because they constitute the same piece or two pieces linked together; the clutch body and the sliding coupler because they are linked by means of the second pin; and the clutch body and the tubular shaft because they are linked by means of the third pins. For its part, the outer shaft is connected rotatably to the outer square bar steel end belonging to the clutch shaft, whose cylindrical section is located with rotatable adjustment inside the cylindrical cavity of the tubular shaft.

[0005] A peculiarity of this composition of the prior art is that the lock leaves the production process provided with a square bar steel shaft of a certain length which is obviously suitable for a certain door thickness and type of installation but is not universally usable. One disadvantage of this is that it is necessary to produce as many different locks as the number of square bar steel shaft widths required to serve the market. This is a particularly serious disadvantage considering the high price of this type of lock. Other disadvantages relating to the above are that the stock that it is necessary to establish has a very high accounting value and requires a great deal of space. Moreover, its packing for marketing is highly complex, expensive and voluminous (higher cost of transport for distribution),

EXPLANATION OF THE INVENTION AND ADVANTAGES

[0006] In view of this situation, the invention of concern to us proposes a square bar steel shaft for a lock of the type whose composition has been described above, which consists in the fact that the tubular shaft has no axial locking means relative to the clutch body, whilst at the same time, relative to the dorsal face of the lock case, this clutch body has a cylindrical extension which projects from this dorsal face and which is provided with a male thread for the inside of a nut in the form of a housing which is provided at its bottom with a hole which is greater in size than the contour of the tubular shaft and smaller than the outside diameter of the cylindrical extension, an open ring being provided which is mounted in a circumferential groove of the tubular shaft which, on its inside, lies flush with the projecting face of the cylindrical extension of the clutch body and whose open ring has an outside diameter that is smaller than this face of the cylindrical extension, and an elastoplastic seal being provided which is installed in the bottom of the housing nut and has an inside diameter which is smaller than the outside diameter of the face of the cylindrical extension and which is larger than the outside diameter of the open ring.

[0007] The design philosophy of the proposed solution consists in dispensing with the impracticable compact assembly in that the tubular shaft (together with the clutch shaft and the outer shaft) still formed a package with the clutch body, a package which on its inside allowed the movement of a sliding coupler whose task it was to establish the rotatable coupling/uncoupling resulting from

the actuation of an electric motor.

[0008] To achieve this, the link hitherto provided by the third pins for this purpose is dispensed with, and instead of this a threaded assembly is established rendering it possible to separate the subassembly formed by the outer shaft, the clutch shaft and the tubular shaft relative to the cylindrical extension of the clutch body, i.e. relative to the lock case.

[0009] This embodiment of the prior art solves at once all the disadvantages listed above relating to the prior art design that has been described. It will now be sufficient to stock on the one hand assembled locks that were all identical, in the quantity required to meet the needs of our market, and on the other to stock external threadable subassemblies of square bar steel shafts in all the dimensions required for the different door thicknesses and types of lock installations.

[0010] This means that the permanent stock is reduced to a minimum and the storage space required is also reduced, thus rendering packing easier and more economical and reducing the cost of distribution transport. As far as the installation of the lock is concerned, it will be sufficient for the fitter to carry a full set of the threadable subassemblies of the square bar steel shafts according to the invention, the one suitable for the installation in progress being selected and positioned "in situ".

DRAWINGS AND REFERENCES

[0011] For a clearer understanding of the nature of the invention we represent, in the attached drawings, an industrial embodiment which assumes the nature of an example that is merely illustrative without restriction.

[0012] Figure 1 is an axial cross-section which shows a lock (13) installed in a door (14) by means of the square bar steel shaft according to the invention.

[0013] Figure 2 is an enlarged view of detail II which is shown surrounded in Figure 1.

[0014] Figure 3 is a merely illustrative perspective view of the circumferential groove (11) of the tubular shaft (4).

[0015] Figure 4 is an exploded perspective view which shows the object of the invention.

[0016] The following references are indicated in these figures:

- 1.- Inner shaft
- 2.- Outer shaft
- 3.- Clutch body
- 4.- Tubular shaft
- 5.- Clutch shaft
- 6.- Inner end of the clutch shaft (5)
- 7.- Outer end of the clutch shaft (5)
- 8.- Cylindrical extension of the clutch body (3)
- 9.- Housing nut
- 10.- Open ring
- 11.- Circumferential groove of the tubular shaft (4)
- 12.- Seal
- 13.- Lock

14.- Door

EXPLANATION OF A PREFERRED EMBODIMENT

[0017] With reference to the abovementioned drawings and references, a preferred embodiment of the object of the invention is illustrated in the attached drawings, relating to an adaptable square bar steel shaft with clutch for electromechanical locks, which is applicable to electromechanical locks provided with an anti-panic opening function which, as shown in Figure 1, comprise an inner shaft (1) of square bar steel for installing an inner knob or lever handle, an outer shaft (2) of square bar steel for installing an outer handle, a clutch body (3) rotatably connected to inner shaft (1), a tubular shaft (4), a clutch shaft (5) with a central cylindrical section which rotates adjustably inside tubular shaft (4) and which lies between an inner end (6) that can be connected to clutch body (3) and an outer end (7) with a square cross-section which corresponds to an axial cavity of outer shaft (2), where the designations inner and outer are given in relation to the respective inner and outer sides of the lock.

[0018] Based on this composition of the prior art, the object of this invention now consists, unlike the former, in that tubular shaft (4) has no means of axial locking relative to clutch body (3), whilst at the same time, in relation to the dorsal face of lock case (13), this clutch body (3) has a cylindrical extension (8) which projects from this dorsal face and which is provided with a male thread for the inside of a nut (9) in the form of a housing which has, at its bottom, a hole of a size that is larger than the contour of tubular shaft (4) and is smaller than the outside diameter of cylindrical extension (8), an open ring (10) being provided which, due to elastic displacement, is mounted in a circumferential groove (11) of tubular shaft (4), which on its inner side lies flush with the projecting face of cylindrical extension (8) of clutch body (3) and whose ring (10) has an outside diameter that is smaller than the said face of cylindrical extension (8), and there being an elastoplastic seal (12) which is installed in the bottom of housing nut (9) and has an inside diameter which is smaller than the outside diameter of the face of cylindrical extension (8), and which is larger than the outside diameter of open ring (10). The assembly of this composition of the prior art can be seen more clearly in the enlargement shown in Figure 2 and its details are illustrated very clearly in the perspective view in Figure 4; circumferential groove (11), without open ring (10), is shown in Figure 3.

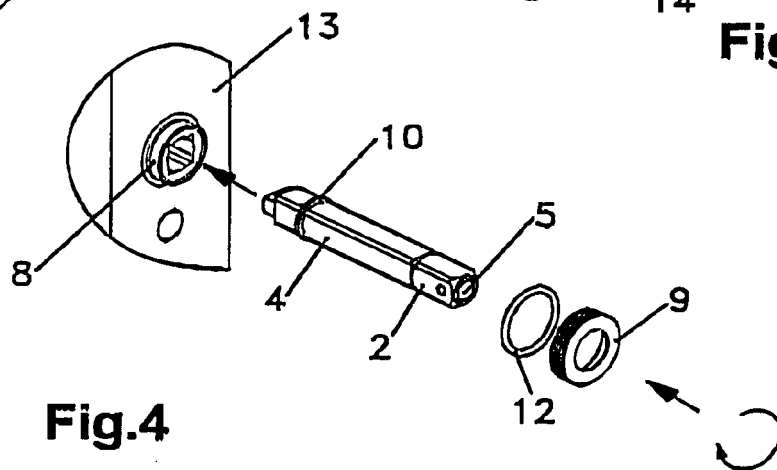
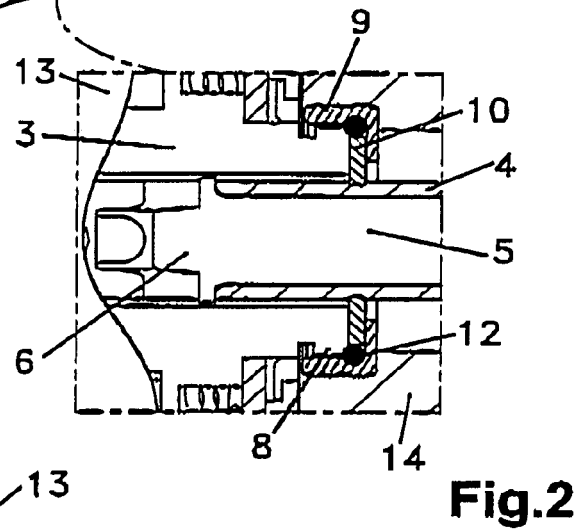
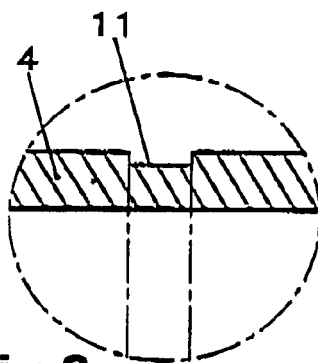
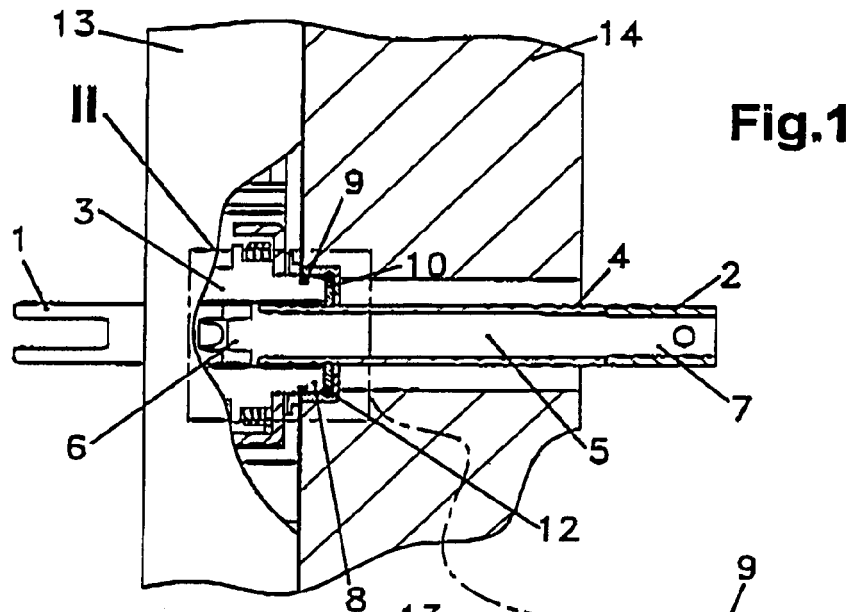
[0019] The assembly of the invention is simple, fast and requires no special tool. On one side we have a lock (13) which projects on its dorsal face from cylindrical extension (8) with its male thread, and on the other side we have nut (9), elastoplastic seal (12) and the package formed by outer shaft (2), clutch shaft (5) and tubular shaft (4) with open ring (10) installed in its circumferential groove (11). Inner end (6) of tubular shaft (4) is then inserted inside clutch body (3), via the face of cylindrical

extension (8) to achieve the position shown in Figure 2, in which the clutch is in the released position; this position is determined by the penetration stop which pushes open ring (10) onto the face of cylindrical extension (8); then, with elastoplastic seal (12) installed at the bottom of housing nut (9), the latter is threaded on to achieve the final assembly position shown in Figure 2; the provision of elastoplastic seal (12) favours maintenance of the final thread position and the execution and firm tightening of this thread are facilitated because nut (9) is provided with outer milling. All this clearly illustrates the major advantages of the invention described above: the final operative composition of the square bar steel shaft is established in the same place and at the same time as the installation following the assembly procedure explained; the number of locks in the warehouse of the manufacturer or distributor will be that strictly necessary to meet the requirements of the market, regardless of the thicknesses of doors (14) and the type of installation that is to be carried out, since it will be sufficient to carry one complete set of widths of tubular shaft (4) and the corresponding clutch shaft (5), and to select them according to the case; the cost of stocking and the storage space are reduced, packing is simpler and more economical and the distribution costs are also reduced.

that is smaller than the said face of the cylindrical extension (8), and there being an elastoplastic seal (12) which is installed in the bottom of the housing nut (9) and has an inside diameter which is smaller than the outside diameter of the face of the cylindrical extension (8) and which is larger than the outside diameter of the open ring (10).

Claims

1. Adaptable square bar steel shaft with a clutch for electromechanical locks, comprising an inner shaft (1) of square bar steel for the installation of an inner knob or lever handle, an outer shaft (2) of square bar steel for installing an outer handle, a clutch body (3) rotatably connected to the inner shaft (1), a tubular shaft (4), a clutch shaft (5) with a central cylindrical section which adjustably rotates inside the tubular shaft (4), and which is located between an inner end (6) that can be connected to the clutch body (3) and an outer end (7) with a square cross-section which corresponds to an axial cavity of the outer shaft (2), the designations inner and outer referring to the respective inner and outer sides of the lock, **characterised in that** the tubular shaft (4) has no means of axial locking relative to the clutch body (3), whilst at the same time, relative to the dorsal face of the case of the lock (13), this clutch body (3) has a cylindrical extension (8) which projects from this dorsal face and which is provided with a male thread for the inside of a nut (9) in the form of a housing which, at its bottom, has a hole of a size that is larger than the contour of the tubular shaft (4) and smaller than the outside diameter of the cylindrical extension (8), there being an open ring (10) which is mounted in a circumferential groove (11) of the tubular shaft (4) which, on its inside, lies flush with the projecting face of the cylindrical extension (8) of the clutch body (3), and whose open ring (10) has an outside diameter





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 25 2681

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		30 November 2007	Westin, Kenneth
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 07 25 2681

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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