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(71) Applicant: **Avocet Hardware PLC**
Brighouse, West Yorkshire HD6 2RW (GB)

(72) Inventors:
• **Rogers, John**
Quinton, Birmingham B32 1ER (GB)
• **Chang, Yh**
Huddersfield, West Yorkshire HD1 6EQ (GB)

(74) Representative:
Orr, William McLean
Urquhart-Dykes & Lord,
Tower House,
Merrion Way
Leeds LS2 8PA (GB)

(54) **Closure tilt lock**

(57) A closure tilt lock assembly, comprises a keep, for fastening to an inner part of a frame of an opening and a lock mechanism, for fastening to an inner part of a frame of a sash. The keep includes a lock formation and a pivot formation aligned along a longitudinal axis of the keep and the pivot formation being open at opposite ends along the longitudinal axis of the keep. The lock mechanism includes a driven member bearing a lock member and a pivot member. When the lock mechanism is presented to the keep, the lock mechanism is driveable along the longitudinal axis of the keep into a first position in which the lock member engages the lock formation, a second position in which the lock member and pivot member are not engaged, and a third position in which the pivot member engages the pivot formation such that the closure is in a locked, turnable and tiltable state respectively.

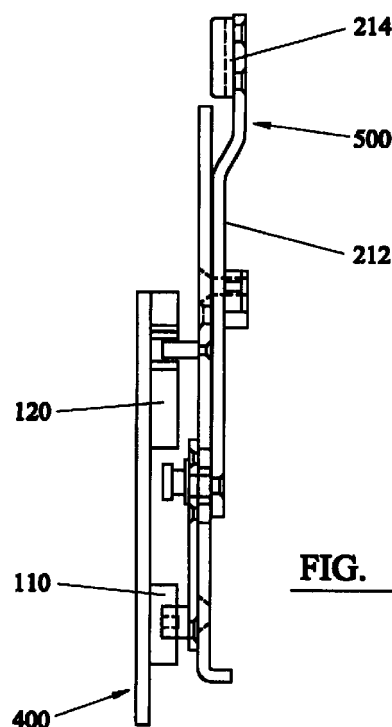


FIG. 6

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Description

[0001] According to the present invention there is provided a closure tilt lock and in particular, a closure tilt lock assembly having a keep suitable for tilt before turn and turn before tilt closure mechanisms.

[0002] Closure furniture is a well developed art. Closures, such as windows and doors, can be provided with furniture providing tilt and turn and tilt before turn facilities. Briefly, it is common to provide a three position handle at a side of a sash frame which operates a number of connected mechanisms to engage and disengage furniture by which the closure sash is connected to the frame of an opening. With the sash closed and the handle in a first position, the sash is locked to the frame. With the handle turned into a second position, the sash can be pivoted from the frame about a horizontal axis ('tilt'). With the handle turned into a third position, the sash can be pivoted about a vertical axis ('turn'), to be fully opened. Tilt and Turn and Tilt before Turn sashes differ in the order in which the tilting and turning are provided by the handle position. It will be appreciated that complex furniture mechanisms are required in order to provide such closures.

[0003] One part of tilt before turn and turn before tilt furniture is a mechanism which engages and disengages the tilt facility of the sash of the closure. Owing to the complexity of previous turn before tilt and tilt before turn mechanisms, it has been necessary to provide different closure furniture depending on whether the closure was to be tilt before turn or turn before tilt. This has required stocks of both tilt before turn and turn before tilt furniture to be designed, manufactured, stocked, supplied and provided at installation sites. There can be significant waste of materials, capital and time in over or under manufacturing or stocking tilt before turn and turn before tilt furniture or not having the correct furniture available when installing a closure at a site.

[0004] According to the present invention, there is provided a closure tilt lock assembly, comprising a keep, for fastening to an inner part of a frame of an opening, and a lock mechanism, for fastening to an inner part of a frame of a sash, in which the keep includes a lock formation and a pivot formation aligned along a longitudinal axis of the keep and the pivot formation being open at opposite ends along the longitudinal axis of the keep, and in which the lock mechanism includes a driven member bearing a lock member and a pivot member, in which when the lock mechanism is presented to the keep, the lock mechanism is driveable along the longitudinal axis of the keep into a first position in which the lock member engages the lock formation, a second position in which the lock member and pivot member are not engaged, and a third position in which the pivot member engages the pivot formation such that the closure is in a locked, turnable and tiltable state respectively.

[0005] The present invention includes a universal

keep which can be used for both tilt before turn and turn before tilt closures. A pivot formation is open at both ends so that the universal keep can be used with differently configured lock mechanisms to provide both tilt before turn and turn before tilt closures. The relative positioning of the lock formation and the pivot formation and variation in the geometry of the lock member and pivot member allows the assembly to be configured to provide the alternative sequences of function: lock, tilt, turn; or lock, turn, tilt.

[0006] Previously a different keep has had to have been provided for every different tilt before turn and turn before tilt system, but the present invention provides a single keep and two alternative lock mechanism configurations which dramatically reduces down from hundreds the number of items that previously would have been kept stocked.

[0007] Preferably, when the lock mechanism is driven it can pass through the first, second and third positions in sequence. In this way a turn before tilt mechanism is provided.

[0008] Preferably, when the lock mechanism is driven it can pass through the first, third and second positions in sequence. In this way a tilt before turn mechanism is provided.

[0009] The assembly may be configured so that in the second position, the lock member and the pivot member are wholly located between the lock formation and the pivot formation. As neither the lock member nor pivot member are engaged this position allows the sash to be fully turned out of the plane of the opening.

[0010] The assembly may be configured so that, in the second position, the lock member is wholly positioned between the lock formation and a first open end of the pivot formation and the pivot member is located at the opposite open end of the pivot formation and does not engage the pivot formation. As neither the lock member nor pivot member are engaged this position allows the sash to be fully turned out of the plane of the opening.

[0011] The assembly may be configured so that, in the third position the pivot member engages the pivot formation and the lock member does not engage the lock formation. Such a configuration allows the sash to be pivoted out of the plane of the opening.

[0012] Preferably, lock mechanism includes a face plate and the driven member slidably engages the face plate and includes a support bearing the lock member and the pivot member at a fixed separation. The fixed separation of the pivot member and the lock member relative to the geometry of the keep determines whether the lock mechanism provides tilt before turn or turn before tilt operation.

[0013] Preferably, the keep includes a support plate bearing the lock formation and the pivot formation at a fixed separation. The geometry of the keep stays the same for either tilt before turn or turn before tilt, and how the pivot member and lock member should be spaced to

provide the alternative modes of operation is determined by the separation of the pivot formation and lock formation.

[0014] Preferably, the separation of the lock member and pivot member is less than the separation of the lock formation and the pivot formation. Hence the lock member and pivot member can entirely pass between the lock formation and pivot formation allowing the sash to open fully and provide the turn operation.

[0015] Preferably, the separation of the lock member and the pivot member is greater than a longitudinal length of the pivot formation. Hence the lock member and pivot member can entirely pass either end of the pivot formation allowing the sash to open fully and provide the turn operation.

[0016] The lock member can be a mushroom cam and the lock formation can have recesses which mate with the head of the mushroom cam when the lock member and lock formation are slidingly driven into engagement. This arrangement provides a secure means of locking the sash and frame in the closed position.

[0017] The lock formation can have walls defining an open and a closed end and ends of the walls defining the open end can be chamfered. Chamfered wall ends help to guide the lock member into the lock formation and ease closure of the sash in the frame, especially if resilient seals are provided, e.g. for weather proofing.

[0018] An outer surface of a wall defining the closed end of the lock formation can be chamfered and the lock mechanism can include a tilt lifter which co-operates with the chamfered end of the lock formation in use. The chamfered end wall of the lock formation and the tilt lifter co-operate to ensure registration of the locking mechanism and keep when the sash is closed into the frame.

[0019] The pivot member can be a cam and the pivot formation can have two walls each extending along the longitudinal axis of the keep and ends of the walls define the open ends of the pivot formation. Preferably, the ends of the walls are chamfered to aid the passage of the pivot member through the pivot formation. Chamfered wall ends help to guide the pivot member into the pivot formation and ease engagement of the pivot member and pivot formation if the sash and frame are not precisely in registration.

[0020] An internal surface of the pivot formation walls can be curved to provide a recess accommodating the pivot member when the assembly is in the third position and the sash has been tilted out of a plane of the opening. The recess in the curved walls of the pivot formation help to prevent the pivot member from escaping from the pivot formation and also helps to accommodate play in the sash and frame which can be required to ensure ease of operation.

[0021] The invention will now be described, by way of example only, and with reference to the accompanying drawings, in which:

Figure 1 shows a view of a keep part of the assembly of the current invention;

Figure 2 shows a front view of a lock mechanism part of the assembly of the current invention configured to provide turn before tilt operation of a sash;

Figure 3 shows a side view of a closure tilt lock assembly according to the invention in a turn position;

Figure 4 shows a view of the keep;

Figure 5 shows a front view of a lock mechanism part of the assembly of the current invention configured to provide tilt before turn operation of a sash; and

Figure 6 shows a side view of a closure tilt lock assembly according to the invention in a tilt position.

[0022] The same parts in different Figures have common reference numerals. Hidden parts are shown in ghost lines in the Figures.

[0023] Figure 1 shows a keep part, designated generally by reference numeral 100, of a closure tilt lock assembly. The keep 100 includes a pivot formation 110 and a lock formation 120. The pivot formation and lock formation are mounted on a common support plate 102. Recessed holes 104 are provided in the support plate for receiving a fixing by which the keep can be fastened to an inner surface of the frame of an opening. The lock formation and pivot formation are separated by a fixed distance along the support plate. The pivot formation and lock formation are aligned along a longitudinal axis of the keep.

[0024] The pivot formation has a first open end 112 and a second open end 114 at opposite ends. The pivot formation has a first side wall 116 and a second side wall 118. The ends of the side walls define the open ends of the pivot formation. The ends of the side walls are all chamfered. An inner surface of the side walls is curved to provide a recess 117, 119 on each side of the pivot formation.

[0025] The lock formation 120 has a first wall defining a first side wall 121, a second wall defining a second side wall 122 and a third wall defining an end wall 123. Free ends of the side walls define an open end of the lock formation. The free ends of the side walls are chamfered. The end wall 123 has an external side chamfered and is generally curved. The side and end walls have a recess in them for receiving a head of a co-operating mushroom cam as will be described later.

[0026] Figure 2 shows a lock mechanism part, designated generally by reference numeral 200, of a closure tilt lock assembly according to the invention. The lock mechanism is configured to provide turn before tilt operation. The lock mechanism includes a face plate 210 and a drive rod 212 which slidingly engages and is secured to the face plate. In use the face plate is fixed to an inner surface of a sash frame and the drive rod can be driven by actuation of a handle connected to the

drive rod so as to slide relative to the face plate. A drive rod connector 214 is attached to a free end of the drive rod by which the drive rod can be connected to a closure operating handle by drive means (not shown).

[0027] The lock mechanism includes a lock member 220 and a pivot member 224 on a common driven member 226. The lock member is in the form of a mushroom cam. The pivot member is in the form of a cam 224. Various stops are provided on the lock mechanism to prevent disengagement of the drive rod and face plate. The lock mechanism also includes a tilt lifter 230 which co-operates with the keep as will be described later. The lock member and pivot member have a fixed separation on the driven restrictor arm plate 226 and move in unison when the drive rod is driven. The pivot member and lock member are aligned along a longitudinal axis of the lock mechanism.

[0028] Operation of the assembly will now be described with reference to Figure 3. When the sash is closed in the frame, the keep and lock member are presented to each other as shown in Figure 3. The longitudinal axis of the keep and of the lock mechanism coincide, in a plane of the sash. The lock mechanism is driven by actuation of a sash handle which is connected to the drive connector 214, to drive the drive rod 212. With the sash handle in a locked position, the drive rod is driven upward in Figure 3 and the restrictor arm plate slides up the face plate and the mushroom cam engages the recesses in the lock formation thereby locking the sash to the frame. This defines a first position of the lock mechanism. The chamfered ends of the lock formation help to guide the mushroom cam into the lock formation owing and can ease operation of the lock owing to imperfect registration of the sash and frame, e.g. owing to resilient weather proofing seals.

[0029] By operating the sash handle into a turn position, the drive rod is driven down and the driven plate 226 slides downward and mushroom cam 220 disengages the lock formation. The separation of the lock member and pivot member is less than the separation of the lock formation and pivot formation and so the lock member and pivot member are wholly located between the lock and pivot formations as shown in Figure 3.

[0030] This defines a second position of the lock mechanism. As neither the lock member or pivot member are engaged, the sash can now be pivoted fully out of the plane of the opening about a vertical axis, providing the turn operation of the closure. When closing the sash back into the plane of the opening, the tilt lifter 230 can engage the curved end wall of the lock formation to lift the sash back into perfect registration with the frame.

[0031] When the sash is closed, the handle can be operated into a tilt position. The drive rod is driven further down and the cam enters the pivot formation via the first open end. The separation of the lock member and pivot member are such that the lock member is not engaged by the pivot formation. This defines a third position of the lock mechanism. As the pivot member

engages the pivot formation, they co-operate and, together with a pivot provided on an opposite side of the sash, provides a horizontal axis about which the sash can tilt out of the plane of the opening. The recess in the wall of the pivot formation helps to prevent the cam from escaping from the pivot formation. The chamfered end of the walls helps to guide the cam into the pivot formation. When closing the sash back into the plane of the opening, the tilt lifter 230 can engage the curved end wall of the lock formation to lift the sash back into perfect registration with the frame.

[0032] Owing to the positioning and separation of the lock member and pivot member on the driven plate, the tilt lock assembly shown in Figure 3 can provides the sequence of operations: lock, turn, tilt. Hence the assembly provides a turn before tilt closure.

[0033] A closure tilt lock assembly according to the invention providing tilt before turn will now be described with reference to Figures 4 to 6. The keep 400 shown in Figure 4 is identical to that shown in Figure 1. The lock mechanism 500 shown in Figure 5 is substantially the same as that shown in Figure 2, except for the separation of the pivot member 524 and lock member 520 on an extended driven support plate 526.

[0034] Operation of the assembly will now be described with reference to Figure 6. When the sash is closed in the plane of the frame, the keep and lock member are presented to each other as shown in Figure 6. Figure 6 shows the lock mechanism in a tilt position, but with the sash closed in the plan of the frame. The longitudinal axis of the keep and of the lock mechanism coincide, in a plane of the sash. The lock mechanism is driven by actuation of a sash handle which is connected to the drive connector 214, to drive the drive rod 212. With the sash handle in a locked position, the drive rod is driven upward in Figure 6 and the restrictor arm plate 526 slides up the face plate and the mushroom cam 520 engages the recesses in the lock formation thereby locking the sash to the frame. This defines a first position of the lock mechanism. The chamfered ends of the lock formation help to guide the mushroom cam into the lock formation owing and can ease operation of the lock owing to imperfect registration of the sash and frame, e.g. owing to resilient weather proofing seals.

[0035] By operating the sash handle into a tilt position, the drive rod is driven down and the driven plate 526 slides downward and mushroom cam 520 disengages the lock formation. The separation of the lock member and pivot member is greater than the separation of the lock formation and pivot formation and so the lock member disengages the lock formation and the pivot member engages the pivot formation via the open end as shown in Figure 6. This defines a third position of the lock mechanism. As the pivot member engages the pivot formation, they co-operate and, together with a pivot provided on an opposite side of the sash, provides a horizontal axis about which the sash can tilt out of the plane of the opening. The recess in the wall of the pivot

formation helps to prevent the cam from escaping from the pivot formation. The chamfered end of the walls helps to guide the cam into the pivot formation. When closing the sash back into the plane of the opening, the tilt lifter 230 can engage the curved end wall of the lock formation to lift the sash back into perfect registration with the frame.

[0036] When the sash is closed, the handle can be operated into a turn position. The drive rod is driven further down and the cam leaves the pivot formation via the second open end. The separation of the lock member and pivot member are such that the lock member and pivot member are situated at each end of the pivot formation with the pivot formation between them. The separation of the lock member and the pivot member is greater than the longitudinal length of the pivot formation. Neither the lock member nor the pivot member are engaged. This defines a second position of the lock mechanism. As neither the lock member nor pivot member are engaged, the sash can now be pivoted fully out of the plane of the opening about a vertical axis, providing the turn operation of the closure. When closing the sash back into the plane of the opening, the tilt lifter 230 can engage the curved end wall of the lock formation to lift the sash back into perfect registration with the frame.

[0037] The separation of the lock member and pivot member is greater than the separation of the lock and pivot formations and greater than the length of the pivot formation. Owing to the positioning and separation of the lock member and pivot member on the driven plate, the tilt lock assembly shown in Figure 6 can provide the sequence of operations: lock, tilt, turn. Hence the assembly provides a tilt before turn closure.

[0038] It will be appreciated that considerable savings are provided by a flexible tilt before turn and turn before tilt lock assembly that has a common key and is suitable for use with a variety of closures.

Claims

1. A closure tilt lock assembly, comprising:

a keep, for fastening to an inner part of a frame of an opening; and
a lock mechanism, for fastening to an inner part of a frame of a sash, in which the keep includes a lock formation and a pivot formation aligned along a longitudinal axis of the keep and the pivot formation being open at opposite ends along the longitudinal axis of the keep, and in which the lock mechanism includes a driven member bearing a lock member and a pivot member, in which when the lock mechanism is presented to the keep, the lock mechanism is driveable along the longitudinal axis of the keep into a first position in which the lock member engages the lock formation, a second position in which the lock member and pivot member

are not engaged, and a third position in which the pivot member engages the pivot formation such that the closure is in a locked, turnable and tiltable state respectively.

2. An assembly as claimed in claim 1, in which when the lock mechanism is driven it can pass through the first, second and third positions in sequence.
3. An assembly as claimed in claim 1, in which when the lock mechanism is driven it can pass through the first, third and second positions in sequence.
4. An assembly as claimed in claim 1, in which in the second position the lock member and the pivot member are wholly located between the lock formation and the pivot formation.
5. An assembly as claimed in claim 1, in which in the second position the lock member is wholly positioned between the lock formation and a first open end of the pivot formation and the pivot member is located at the opposite open end of the pivot formation and does not engage the pivot formation.
6. An assembly as claimed in claim 1, in which in the third position the pivot member engages the pivot formation and the lock member does not engage the lock formation.
7. An assembly as claimed in claim 1, in which the lock mechanism includes a face plate and the driven member slidably engages the face plate and includes a support bearing the lock member and the pivot member at a fixed separation.
8. An assembly as claimed in claim 7, in which the keep includes a support plate bearing the lock formation and the pivot formation at a fixed separation.
9. An assembly as claimed in claim 8, in which the separation of the lock member and pivot member is less than the separation of the lock formation and the pivot formation.
10. An assembly as claimed in claim 8, in which the separation of the lock member and the pivot member is greater than a longitudinal length of the pivot formation.
11. An assembly as claimed in claim 1, in which the lock member is a mushroom cam and the lock formation has recesses which mate with the head of the mushroom cam when the lock member and lock formation are slidably driven into engagement.
12. An assembly as claimed in claim 11, in which the lock formation has walls defining an open and a

closed end and ends of the walls defining the open end are chamfered.

13. An assembly as claimed in claim 12, in which an outer surface of a wall defining the closed end of the lock formation is chamfered and the lock mechanism includes a tilt lifter which co-operates with the chamfered end of the lock formation in use. 5
14. An assembly as claimed in claim 1, in which the pivot member is a cam and the pivot formation has two walls each extending along the longitudinal axis of the keep and ends of the walls define the open ends of the pivot formation. 10
15. An assembly as claimed in claim 14, in which the ends of the walls are chamfered to aid the passage of the pivot member through the pivot formation. 15
16. An assembly as claimed in claim 14, in which an internal surface of the pivot formation walls is curved to provide a recess accommodating the pivot member when the assembly is in the third position and the sash has been tilted out of a plane of the opening. 20
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FIG. 1

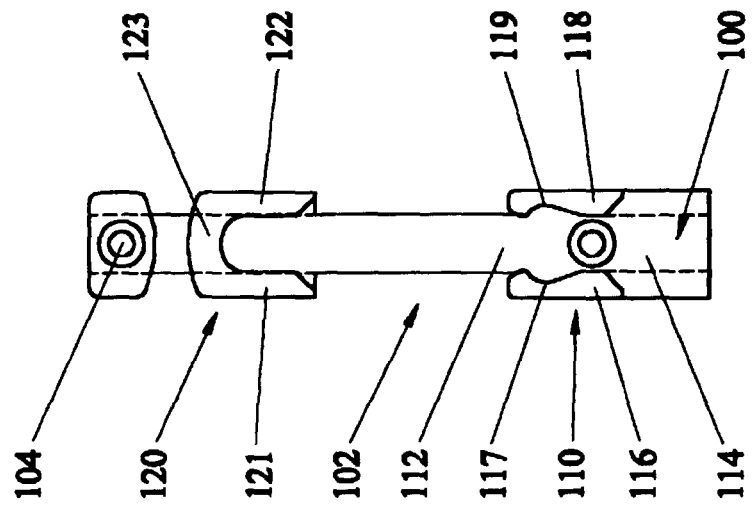


FIG. 2

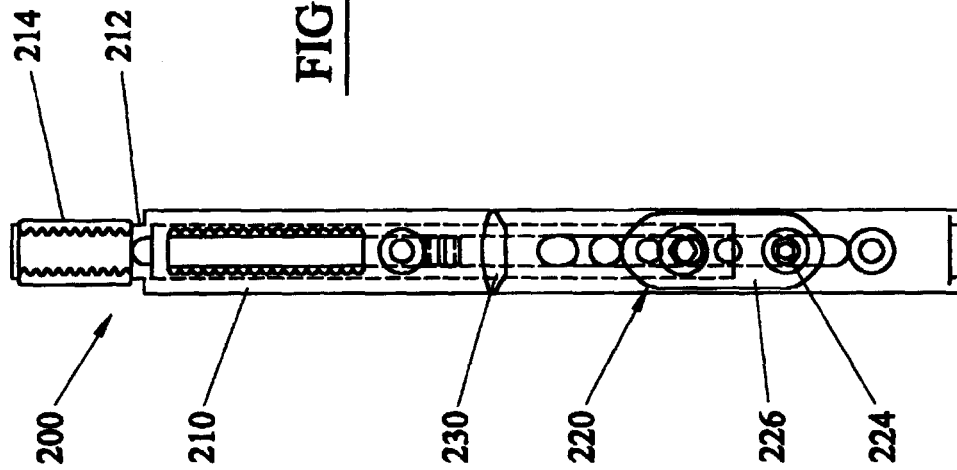


FIG. 3

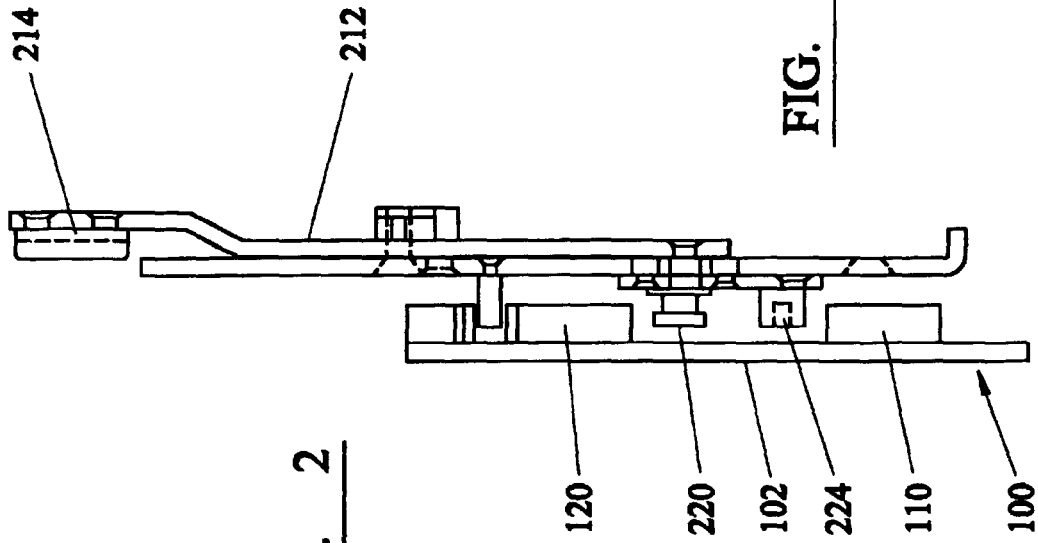


FIG. 4

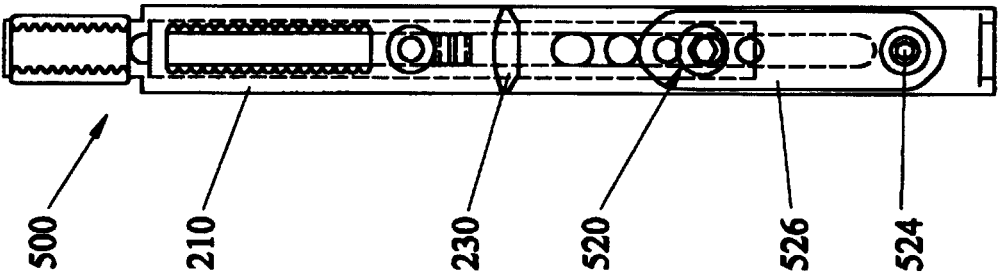
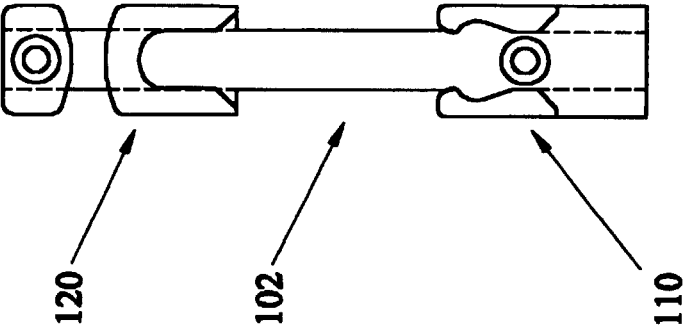


FIG. 5

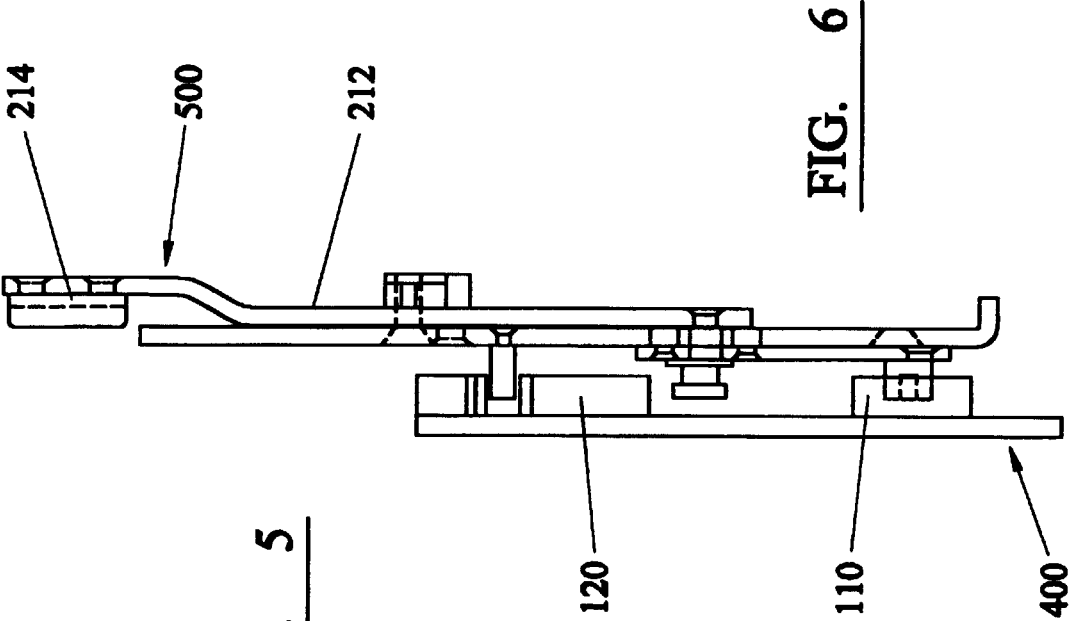


FIG. 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 30 1454

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 20 57 530 A (WINKHAUS) 25 May 1972 (1972-05-25)	1,3,5-8, 10,12, 14,15	E05D15/52
Y	* page 10, paragraph 2 - page 11, paragraph 1; figures 4-6 *	11,13,16	
Y	DE 44 20 312 A (BILSTEIN AUGUST GMBH CO KG) 14 December 1995 (1995-12-14) * column 2, line 61 - line 65; figures 3,4 *	11	
Y	AT 326 519 B (FRANK GMBH WILH) 10 December 1975 (1975-12-10) * page 4, line 1 - line 2 * * page 4, line 9 - line 13; figure 1 *	13	
Y	FR 2 213 684 A (SIEGENIA FRANK KG) 2 August 1974 (1974-08-02) * page 3, line 19 - line 26; figures 1,2 *	16	
A	FR 2 199 338 A (SIEGENIA FRANK KG) 5 April 1974 (1974-04-05) * page 6, line 6 - line 37; figures 2-4 *	2,4,9	TECHNICAL FIELDS SEARCHED (Int.Cl.7) E05D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 June 2000	Examiner Guillaume, G
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ON EUROPEAN PATENT APPLICATION NO.**

EP 00 30 1454

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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13-06-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2057530 A	25-05-1972	NONE	
DE 4420312 A	14-12-1995	DE 59503757 D	05-11-1998
AT 326519 B	10-12-1975	AT 440972 A	15-02-1975
FR 2213684 A	02-08-1974	DE 2300560 A	11-07-1974
		AT 366764 B	10-05-1982
		AT 949873 A	15-09-1981
		JP 52031800 B	17-08-1977
		JP 49102500 A	27-09-1974
FR 2199338 A	05-04-1974	DE 2243916 A	14-03-1974
		AT 380915 B	25-07-1986
		AT 585673 A	15-09-1980

EPO FORM P4459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82