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(71) Applicant: **C.I.C.A. S.r.l.**
50025 Montespertoli (FI) (IT)

(72) Inventor: **Spillantini, Pietro**
50026 San Casciano Val Di Pesa, Firenze (IT)

(74) Representative: **Lanzoni, Luciano**
Bugnion S.p.A.
Via dei Rustici, 5
50122 Firenze (FI) (IT)

(54) **Row-limiter device for the orderly storage of trolleys and the like**

(57) Row-limiter device for the orderly storage of a plurality of trolleys provided with safety lock, comprising an extended box-shaped bar (1); at least two pulleys (2) and respective chains (16) wound without slipping around corresponding pulleys (2) to be able to shift reversibly from a locking position to an unlocking position.

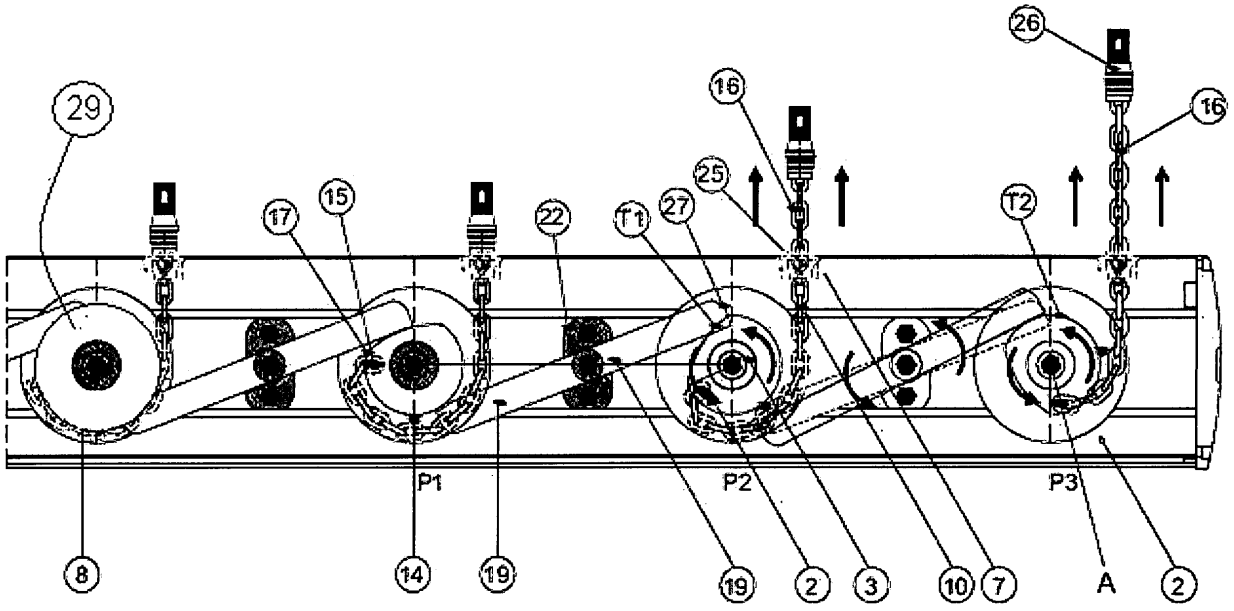

FIG. 1

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Description

SPECIFICATION

[0001] The object of the present invention is a row-limiter to be used in the storage of trolleys and the like of a type provided with safety locks operable by inserting a coin which remains on board thereof.

[0002] It is known that trolleys used by clients of shops or shopping centres require the provision of storage lanes (usually disposed within parking areas) where the clients of the shopping centres can return the trolley, get back the coin used to pull it out and let the same trolley at the disposal of further clients.

[0003] In a known solution, the chains carrying the locks's keys are fixed to the same trolleys, and the coin aboard one trolley can be collected only by placing another trolley nested into the first one and fixing the key into the corresponding lock.

[0004] It is thus likely that rows of trolleys be formed close to one another in such a way that they are in the way of persons or cars.

[0005] To avoid this problem, it has long been known the use of bars (row-limiter bars) disposed at the sides of storage lanes, said bars being provided with chains to which the trolleys must be fixed to recover the coin inserted into the lock.

[0006] Also this solution however exhibits the drawback that a disorderly storage (for example, in which a trolley is fixed to the chain externally of the bar) would prevent the full exploitation of the storage sites, thereby leaving a number of trolleys with no constraint.

[0007] To overcome such a drawback, row-limiter bars are known provided with an internal device for the return of chains coming out of the bar, said device preventing the use of a chain until the previous one closest to the leading side of the storage lane is used.

[0008] A known solution of this type of limiter bar is disclosed in the patent application No. FI2005A000050 in the name of the same applicant, the object of this patent being a row-limiter device comprising a box-shape bar having therein a plurality of pulleys operatively connected by levers for causing one pulley to shift from a locking position to a release position with respect to the next one.

[0009] This solution has proved to be effective for eliminating the above described problems of the prior art.

[0010] However, the applicants have found some drawbacks as to the reliability of the device in case of a forced use thereof by the users, such as when, for example, the chains should be taken out with excessive force or rapidity thereby tending to become locked during the withdrawal.

[0011] A first object of the present invention is therefore to propose an improved apparatus for reliable operation under any operating condition.

[0012] The proposed objects are achieved by an apparatus according to the attached claims.

[0013] The technical characteristics of the invention, according to the above objects and the advantages thereof will be better understood by a reading of the detailed description that follows in conjunction with the accompanying drawings which illustrate an exemplary and not limiting embodiment of the same invention. In the drawings:

- Fig. 1 shows a first embodiment of the invention in side view with some parts being taken away for the sake of exposition;
- Fig. 1a is a sectional front view of the invention of Fig. 1;
- Fig. 2 is a sectional front view of a structural shape for housing the apparatus shown in Fig. 1;
- Fig. 3 shows in detail a chain-carrying pulley of the invention with relevant means for fastening it to the structural shape;
- Fig. 3a is a top view of the fastening means shown in Fig. 3;
- Figs. 4a, 4b, 4c are respectively a plan view, a side view and a sectional view of the pulley shown in Fig. 3;
- Figs. 5a and 5b are respectively a front view and a top view of a lever for connecting successive chain-carrying pulleys of the invention; and
- Fig. 6 shows in detail a chain guide according to the invention.

[0014] Described herebelow with reference to the accompanying figures is a preferred embodiment of the invention, comprising a bar 1 of longitudinal development wherein a plurality of pulleys 2 can be inserted in succession. The pulleys are preferably carried by a T-shape support 3 consisting of a cylindrical journal 4 for the rotation of the pulley, and flat base 5 able to be close-fit inside a longitudinal profile 6 for sliding therein (as best seen in section in Fig. 2) and be fixed in place by means of pressure screws 7.

[0015] Preferably, the bar 1 is provided with ribs 31 for longitudinally stiffening the structure during the operation of the pulleys 2.

[0016] Illustrated in greater detail with reference in particular to Figs. 4a-4c is a pulley 2 according to the invention.

[0017] The pulley 2 is made up of a cylindrical body with a central T-shape hole 10 for receiving the rotary journal 4, and comprises a slotted section 9 around which it is possible to wind up a chain 16, the latter being possibly fixed by one end 17 thereof to a stationary point 15 of the pulley and exiting from the bar 1 with its free end (carrying the key 26) through holes 25 formed to shape in correspondence of the various pulleys 2.

[0018] Formed on a face of the slotted section 9 is a relief having a cam-like surface 8 comprising a circular length T2 having radius R2 coaxial to the axis A of the pulley, and a length T1 lying at reduced radial distance from axis A, preferably of circular shape with radius R1.

[0019] Also provided on the slotted section 9, abutting on the cam 8, is a stop means 14 consisting, for example,

of a screw pivot.

[0020] Illustrated with reference to Figs. 5a and 5b in particular, is a locking element 18 according to the present invention.

[0021] The element 18 is made up of a lever having a central fulcrum 19 and pivoting about a journal 20 against the action of a return spring 21.

[0022] In case of rapidly handling the chain 16, the levers 19 oscillate fast and tend therefore to deviate laterally from the point of contact with the cam 8.

[0023] Advantageously, the present invention provides for disposing lateral retaining flanges 29 on the pulleys 2, in close proximity of cam 8, which are able to maintain the lever 19 in place also under conditions of high stress.

[0024] In particular, the flange 29, by being disposed in contact with, or anyway in close proximity of cam 8, but exhibiting greater radial dimensions, defines a seat 30 so dimensioned as to allow the lever 19 to be housed therein for a free movement thereof without interference.

[0025] Preferably, the journal 20 makes part of a T-shape support 22 comprising a flat base 23 that can be slidably inserted with precision along the restrained joint profile 6 of bar 1, and fixed in place by means of pressure screws 24.

[0026] Advantageously, by having adopted a mechanism-carrying guide of a type adjustable by clamping, it is possible to adopt any type of trolley with any distance between the site of placements.

[0027] By referring again in particular to Fig. 1, the assembling of the apparatus requires the insertion in sequence along the restrained joint 6 of a first T-shape support 5 for one pulley, a T-shape support 22 for a lever 19, and then a second pulley support 5 being spaced by a predetermined extent from the first one.

[0028] The succession of supports 5 and 22, which are fixed in place by corresponding pressure screws 7 and 24, is then repeated until the bar is completed with a desired number of trolley placements, a corresponding number of holes 25 being formed on the bar 1 (usually spaced by 22 to 26 cm from each other) to allow the end 16 of chains carrying the keys 26 to pass outside therethrough.

[0029] Advantageously, in one embodiment of the present invention, the holes 25 have a chain-guide 30 of extended shape formed inside the bar 1.

[0030] Preferably, the inner section of the chain-guide 30 is cylindrical or slightly conical and extends over a length approximately equal to a ring of the chain 16 to facilitate a linear sliding of the same chain upon quick displacements.

[0031] Once the pivots are fixed in place, the pulleys can be mounted on the pivots 4, along with respective springs 11, and the levers 19 can be mounted on pivots 20, also with respective springs 21, to result disposed at an inclination and in contact with the cams 8 of two adjacent pulleys.

[0032] In greater detail, and with reference to the configuration of the bar illustrated in Figs. 1 and 5a, each lever 19 results into abutment, with a first end 27 thereof, onto the upper part of cam 8 of the pulley being on its right side, and by the second end 28 thereof onto the lower part of cam 8 of the pulley on its left side.

[0033] Moreover, the lever is housed laterally, between the pulley 2 and the flange 29, within the seat 30.

[0034] Preferably, the end 28 of lever 19 exhibits a circular profile conjugated to the radius R2 of the length T2 of cam 8.

[0035] Upon operation of the apparatus, the chains 16 are all initially wound onto the pulleys 2 in the configuration of pulley P1 shown in Fig. 1, hereinafter to be referred to, for the sake of clarity, as "external" pulley, that is, inserted into the bar 1 following an "internal" pulley P3 and an "intermediate" pulley P2 being there between in the direction of insertion of the trolleys into the corresponding storage sites.

[0036] In this configuration, the chain 16 is wound onto the pulley P1 and the locking lever 19 is in contact, on one side, with the length T1 of the cam 8 of the adjacent pulley P2 immediately internal thereto (the latter being in wound chain asset as well), and on the other side, with a portion of the cam 8 of the pulley P1 close to the striker or stop means 14.

[0037] In this position of the lever 19 (locking position), should the chain 16 of pulley P1 be withdrawn, the pulley would tend to rotate in clockwise direction (arrow of Fig. 1) thereby moving the stop means 14 into abutment against the end 28 of lever 19 and preventing the chain from being taken out any further.

[0038] With reference to Fig. 1, the internal pulley P3 can be seen rotated in anticlockwise direction, with the chain 16 already taken out, and the end 27 of the lever 19 in contact with the length T2 of cam 8.

[0039] In this position (unlocking position), the lever 19 has been rotated in anticlockwise direction with respect to the locking position (dashed line) and its end 28 has moved away radially with respect to the stop means 14 of the pulley P2 which is now free to rotate.

[0040] Consequently, it is possible to withdraw the chain 16 from the pulley P2 located immediately outside thereof so as to allow the cam 8 to shift the respective lever 19 to the unlocking position and to release therefore the pulley located immediately outside thereof, and so on, until the row is completed.

[0041] Advantageously, the geometry of cam 8 is such that once the lever 19 comes in contact with the length T2 thereof, the position of the same lever remains unchanged thus making it possible a withdrawal of the chain over an extent greater than in any other known solution.

[0042] An apparatus according to the present invention achieves major advantages.

[0043] A first advantage lies in the fact that, by utilizing the retaining flange 29, any lateral deviation or deformation of the levers 19 is prevented in case the latter are stressed in use by heavy loads and high speeds.

[0044] A second advantage of the apparatus accord-

ing to the present invention lies in the fact that, by utilizing chain-guides 30 of extended shape, there is ensured a correct sliding of the chain 16 through the holes 25 also in the presence of high speeds thereof.

[0045] The invention conceived as above described is obviously suited for industrial applications; it will be appreciated that the same invention may also be subjected to many modifications and changes without departing from the scope of the inventive idea; moreover, all its parts may be replaced by technically equivalent elements.

Claims

1. Row-limiter device for the orderly storage of a plurality of trolleys provided with safety lock, comprising:

   - an extended box-shaped bar (1) horizontally disposed at a predetermined level corresponding to the height of the trolleys locks;
   - at least two pulleys (2) rotatively received within the bar and having axes of rotation (A) spaced apart by a predetermined extent along the longitudinal axis of the bar;
   - at least two chains (16) provided at one external free end thereof with a key (26) for engagement with said locks, each chain (16) being wound without slipping around a corresponding pulley (2) to be able to shift reversibly from an extracted position to a position for the most part internal to said bar (1);
   - at least a locking element (19) disposed inside said bar (1) in a position intermediate between two successive pulleys (2) and comprising an oscillating lever with central pivot, the two ends (27, 28) of said lever interfering with two corresponding strikers provided on each pulley (2) and whose rotation is cause for the oscillation of the lever (19) between the locking and unlocking positions of the other pulley, said device being **characterized in that** it further comprises a side flange (29) which is applied to said pulley (2) and makes up a seat (30) for laterally housing said lever (19) during operation.

2. Device according to claim 1 wherein said flange (29) is removable with respect to said pulley (2).

3. Device according to any of the preceding claims, wherein said cam (8) exhibits a length (T2) of circular surface concentric with respect to the axis (A) and corresponding to the abutment of the lever in unlocking position.

4. Device according to any of the preceding claims, wherein said pulleys (2) are borne by a first T-shape support (3) sliding within a corresponding inner profile (6) of restrained joint of the bar (1) to adjust the longitudinal position of the pulleys (2) at will.

5. Device according to any of the preceding claims, wherein said lever (19) is borne by a second T-shape support (23) sliding with precision within a corresponding inner profile (6) of restrained joint of the bar (1) to adjust the longitudinal position of the lever (19) at will.

6. Device according to any of the preceding claims, wherein said bar (1) further comprises one or more longitudinal stiffening ribs (31).

7. Device according to any of the preceding claims, wherein said pulleys (2) and/or said lever (19) are able to rotate on respective supports against the action of a return spring (11, 21).

8. Device according to any of the preceding claims, wherein said bar (1) further comprises a plurality of holes (25) disposed in proximity of said pulleys (2) to allow respective chains (16) to pass therethrough.

9. Device according to claim 8 wherein said holes (25) are provided with respective chain (16)-guides of extended cylindrical shape.

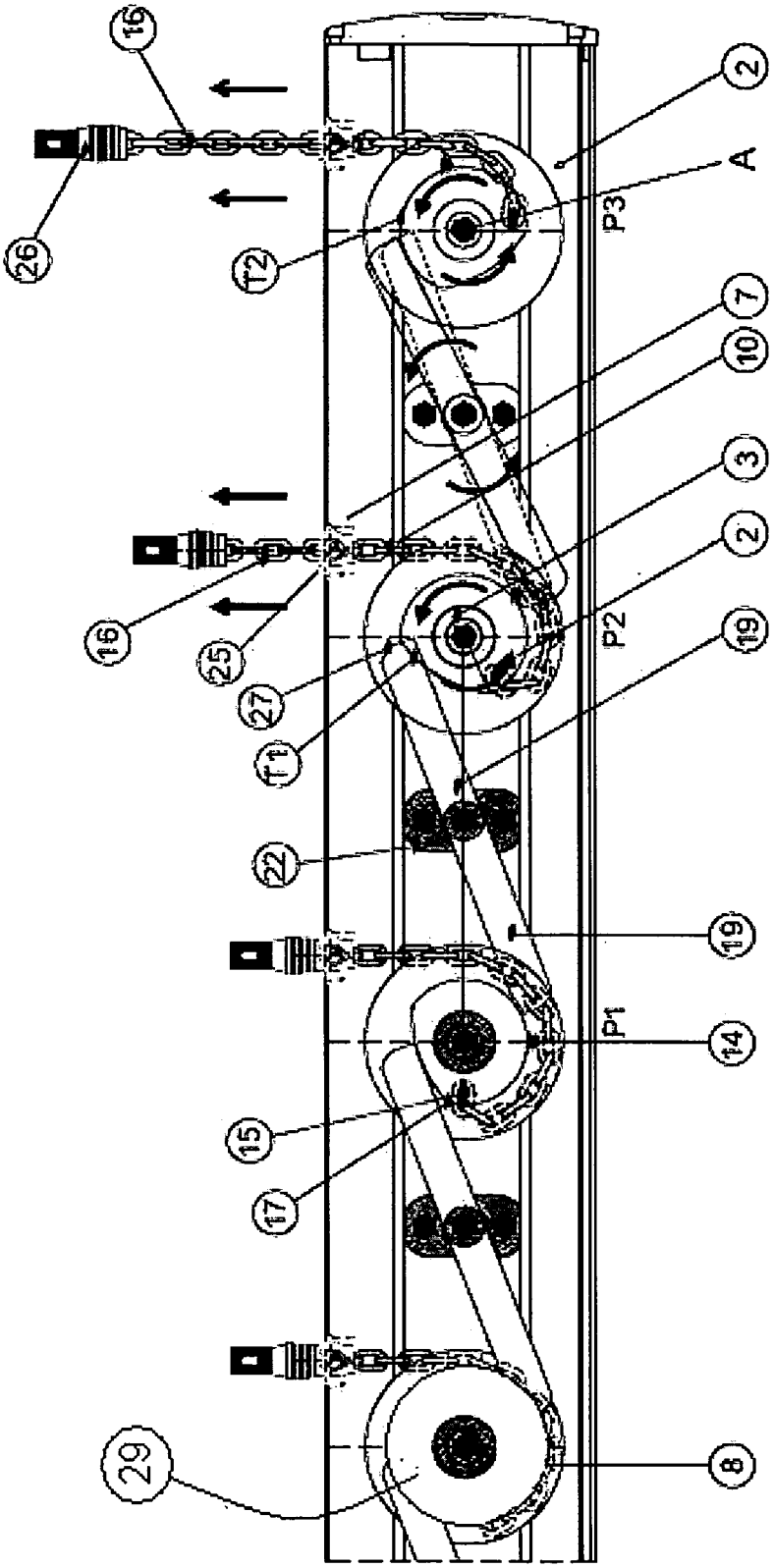

FIG. 1

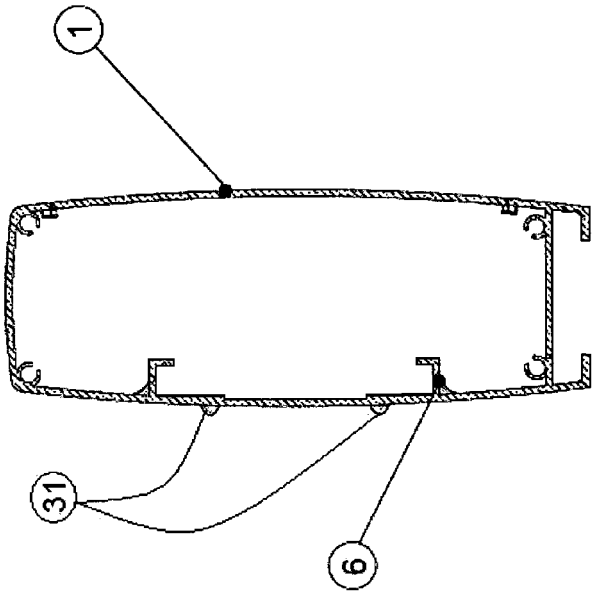

Fig.2

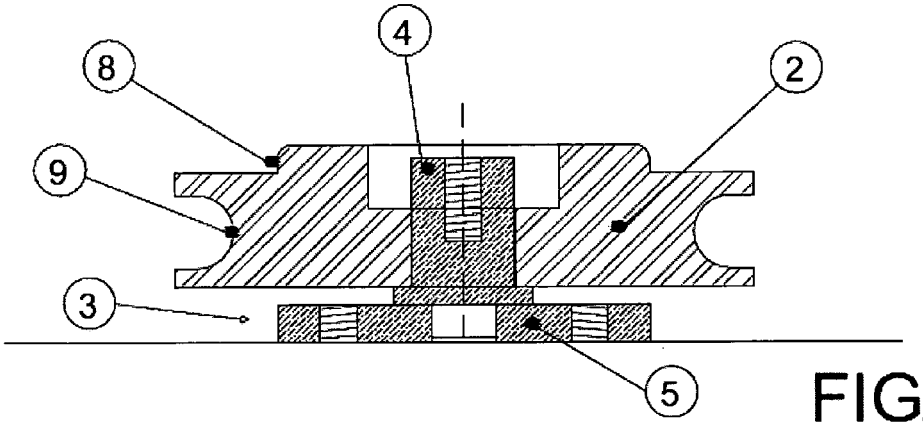

FIG. 3

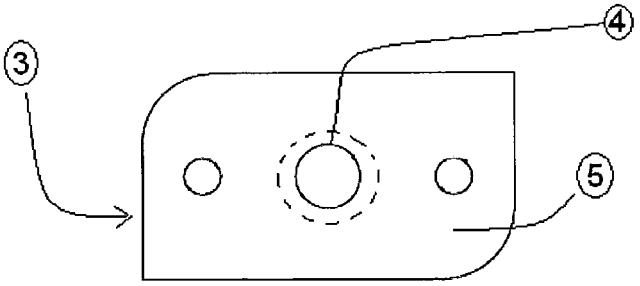

FIG. 3a

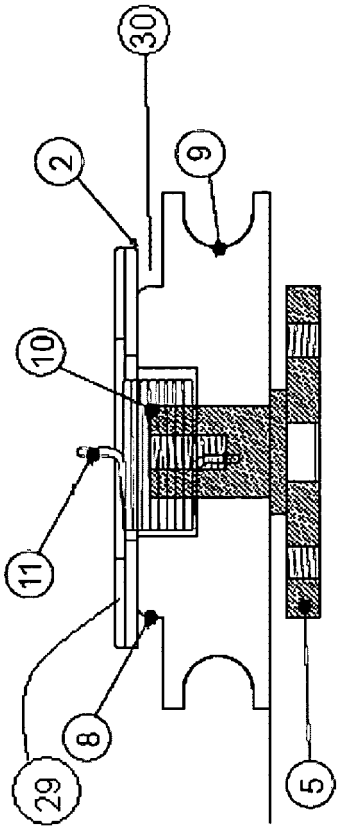

FIG. 4 c

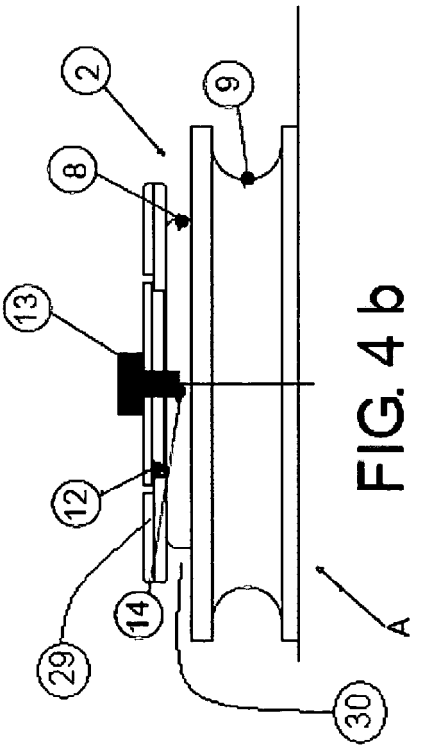

FIG. 4 b

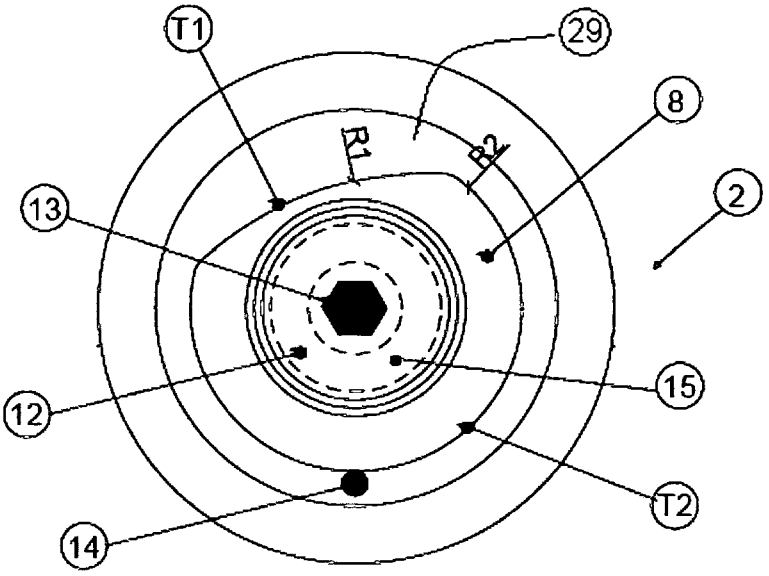

FIG. 4 a

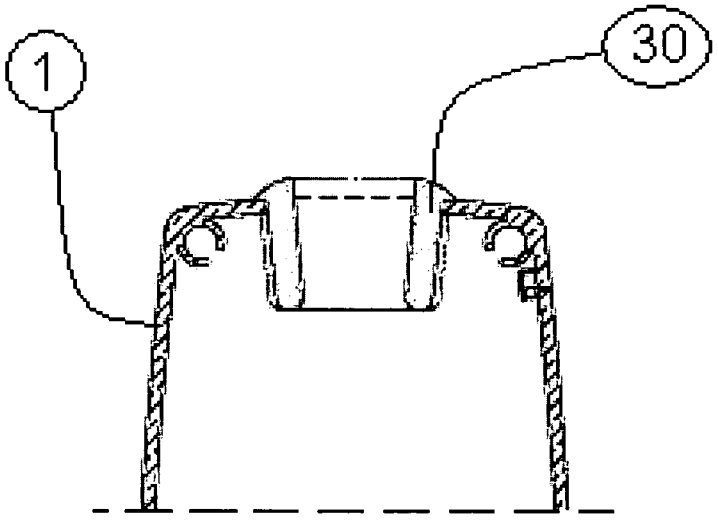

Fig.6

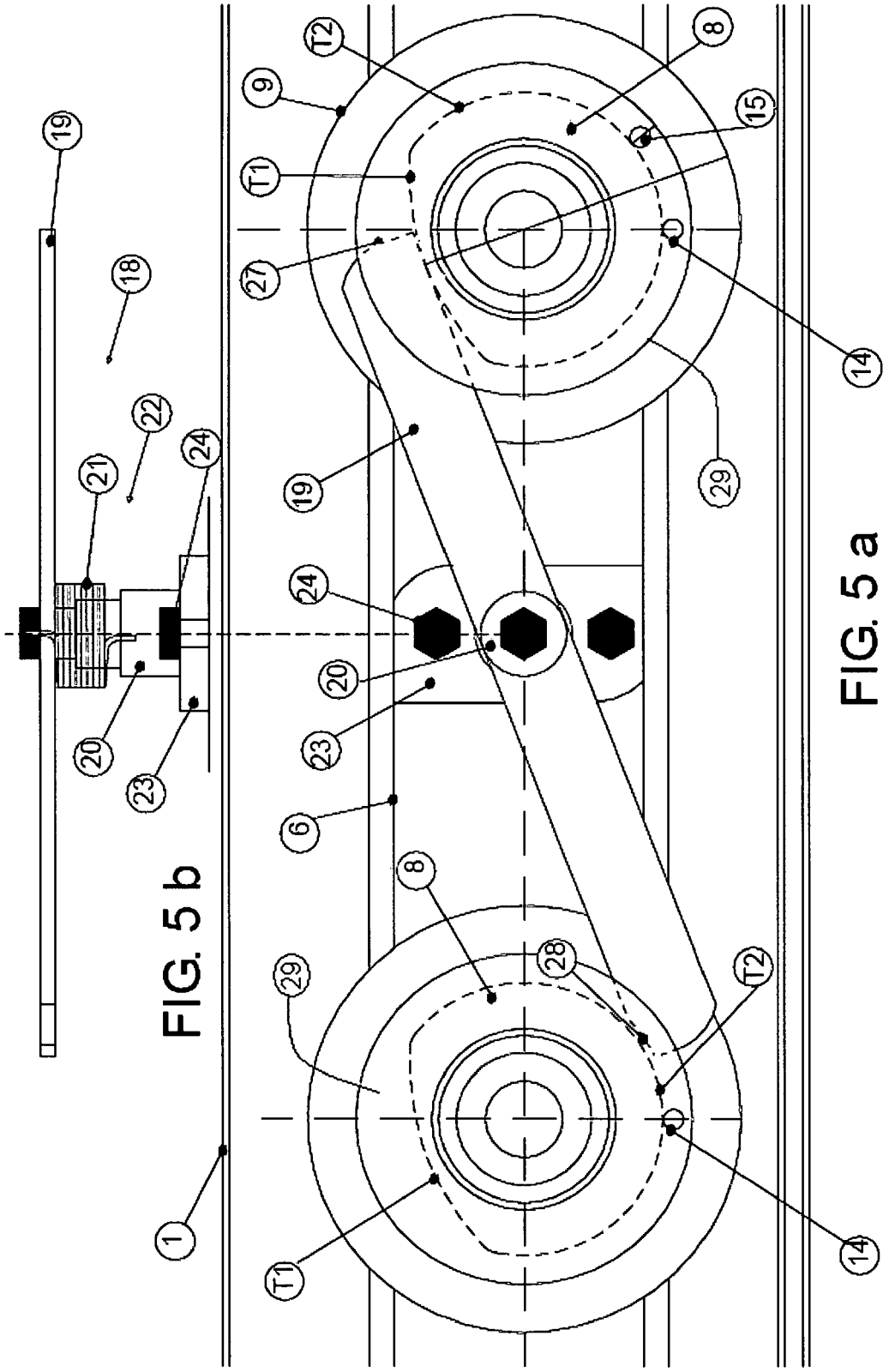

FIG. 5 b

FIG. 5 a

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EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5152

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 93 06 075 U1 (WANZL GMBH & CO ENTWICKLUNGS-KG, 8874 LEIPHEIM, DE) 9 June 1993 (1993-06-09) * the whole document *	1-9	INV. A47F10/04
A	FR 2 612 063 A (FAYOLLE FILS ENTREPRISE J [FR]) 16 September 1988 (1988-09-16) * the whole document *	1-9	
A	DE 43 30 255 A1 (WANZL ENTWICKLUNG GMBH [DE]) 9 March 1995 (1995-03-09) * the whole document *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 September 2009	Cardan, Cosmin

CATEGORY OF CITED DOCUMENTS

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04-09-2009

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

REFERENCES CITED IN THE DESCRIPTION

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