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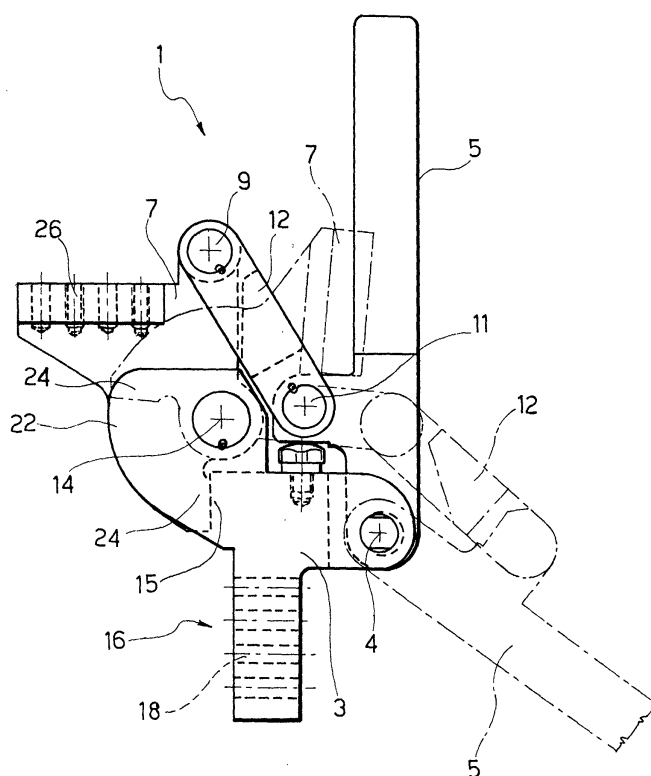
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(54) **Manual locking system for assemblings**

(57) A manual locking system (1) for assemblings is disclosed comprising: a support body (3); an actuating lever (5); a support member (7) for locking elements that is connected to the actuating lever (5) and hinged to the support body (3); front securing and adjusting means

(16) for the locking system (1), embedded into the body (3); and protecting means (22) that prevent inserting the operator's hands into the space between a centering lever (24) of the support member (7) and the body (3) during the system (1) closure operation.

FIG. 1



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Description

[0001] The present invention refers to a manual locking system for assemblies, that can be used in particular on assembling tools and for locking body parts for any type of vehicles.

[0002] Various locking systems of this type are known in the art, and they allow securing the body elements, for example of motor vehicles, into their desired final positions and performing thereon certain welding operations or the like, adapted to assemble such elements. The known locking systems are both of the manual type, and of the pneumatic, and therefore semi-automated, type.

[0003] These locking systems however are not satisfactory and have the following problems:

- in addition to the horizontal adjustment of the locking elements that they support, such systems must also be adjusted vertically, that is transversally with respect to the vehicle to be locked: in order to perform such vertical adjustment, the current systems use small external squares that must be drilled and connected to the system body, thereby increasing both manufacturing costs and manufacturing times of the global system;
- the centering lever of the system support member passes from the system opening position to the system closing position (in which it abuts onto the support body) with a rotary movement with a very quick snap (even quicker when the system is actuated pneumatically) and have serious dangers of cutting the operator's fingers, if they are inadvertently inserted into the space in which the centering lever moves when it snappingly rotates for closing;
- finally, the known systems allow realising a maximum opening angle of 90° , that could be insufficient for some applications.

[0004] Object of the present invention is solving the above prior-art problems, by providing a manual locking system that is equipped with vertically (that is transversally) adjusting means embedded into its support body, thereby allowing to save parts, costs and times for its manufacturing.

[0005] A further object of the present invention is providing a locking system as above, that is further equipped with protecting means that prevent injuries and cutting of the operator's hands when closing.

[0006] A further object of the present invention is providing a locking system as above, that further allows realising a maximum coverage angle of 95° , with a possible further increase of about 3° , in order to widen the system application range.

[0007] The above and other objects and advantages of the invention, as will appear from the following description, are obtained by a manual locking system as claimed in Claim 1. Preferred embodiments and non-

trivial variations of the present invention are claimed in the dependent Claims.

[0008] The present invention will be better described by some preferred embodiments thereof, given as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 is a side view of an embodiment of the locking system according to the present invention;
- Figure 2 is a front view of the system in Fig. 1; and
- Figure 4 is a perspective view of the system in Fig. 1 assembled on a support.

[0009] With reference to the Figures, a preferred and non-limiting example of an embodiment of the manual locking system 1 of the invention is shown, that is adapted to be used, for example, as assembling tool or for vehicle body parts tool in general, but that can also be applied to any other type of locking. The locking system 1 of the invention substantially comprises:

- a support body 3, adapted to be connected, for example, to risers 2 placed next to the structures to be locked;
- an actuating lever 5 hinged (in 4) to the support body 3: such lever 5 has a vertical closing position (shown with a full line in Fig. 1) in which a locking is realised, and a downward slanting opening position (shown with dashed lines in Fig. 1);
- a support member 7 adapted to adjustably support locking elements (not shown, and typically composed of sliders that make the final piece tightening and are screwed onto such support member 7 when arranging the locking fixture): this support member 7 is operatively connected (in 9, 11) to the actuating lever 5 through at least one hinge member 12, and is hinged (in 14) to the support body (3).

[0010] Also the opening and closing positions of the support member 7 and the hinge member 12 are shown in Fig. 1, respectively with dashed lines and a full line: in a known way, the support member 7, with the centering lever 24 with which it is equipped, gets a closing position in which one face of the lever 24 abuts against the support body 3 in a vertical position (reference 15 in Fig. 1), such position preventing chips, working wastes or dust from penetrating into the contact space (15) between centering lever 24 and support body 3 and from impairing thereby the perfect closure of the locking system 1. This prior art innovation related to the vertical closure, however, has the cutting danger for the operator's hands, since the passage between opening position and closing position of the support member 7 always occurs with a snap, through a sudden rotary movement that is still quicker in case of a pneumatic control of the locking system 1: such potential danger is not present, as will be seen below, in the locking system 1 of the present invention.

[0011] According to a first innovative characteristic, the locking system 1 of the invention further comprises front securing and adjusting means 16 for the locking system 1, that are embedded into the support body 3 and allow a transverse adjustment of the locking system 1.

[0012] In particular, in the non-limiting embodiment shown, such front securing and adjusting means 16 are composed of a plurality of through-holes 18 that are vertically arranged with respect to the support body 3 base and are adapted to house corresponding comb-shaped shims 20 to adjust the working height of the locking system 1.

[0013] In order to realise an absolutely safe locking system for the operator (taking also into account that locking systems of this type are present in a high number in an assembling line and that therefore an operator is forced to carry out a high number of closure operations, often with a very short time at his disposal), the system 1 of the invention is further equipped with protecting means 22 for the support member 7, which protecting means 22 prevent the insertion of operator's hands into the space between the centering lever 24 of the support member 7 and the support body 3 during the closure operation of the locking system 1.

[0014] In particular, in the non-limiting embodiment shown, the protecting means 22 are composed of a shield shaped as a quarter of a circle, hinged (in 14) to the support body 3 and that covers the whole circular movement path of the centering lever 24 of the support member 7.

[0015] Moreover, the locking system 1 of the invention provides a double possible operating adjustment, since the support member 7 is equipped with horizontal locking adjusting means 26, that are usually composed of a plurality of holes adapted to receive corresponding comb-shaped shims for securing and horizontally adjusting the above mentioned locking elements on the support member 7.

[0016] Finally, due to its particularly simplified arrangement, the locking system 1 of the invention is adapted, as can be best seen in Fig. 1, to realise, when opening, an excursion angle equal to $95^\circ \pm 3^\circ$, in order to increase its possible operating application range.

[0017] Some preferred embodiments of the present invention have been shown and described: obviously, it will immediately appear to the skilled people in the art that numerous variations and modifications, that are functionally equivalent to the previous ones, can be made to the invention, such variations and modifications falling within the scope of the invention as pointed out in the enclosed Claims.

Claims

1. Manual locking system (1) for assemblies comprising:

- a support body (3);
- an actuating lever (5) hinged (in 4) to said support body (3);
- a support member (7) adapted to adjustably support locking elements, said support member (7) being operatively connected (in 9, 11) to said actuating lever (5) through at least one hinge member (12), said support member (7) being hinged (in 14) to said support body (3);

characterised in that it further comprises front securing and adjusting means (16) for said locking system (1), said front securing and adjusting means (16) being embedded into said support body (3) and allowing a transverse adjustment of said locking system (1).

2. Manual locking system (1) according to Claim 1, **characterised in that** said front securing and adjusting means (16) are composed of a plurality of through-holes (18) that are vertically arranged and are adapted to house corresponding comb-shaped shims (20) to adjust the working height of said locking system (1).
3. Manual locking system (1) according to Claim 1, **characterised in that** it is further equipped with protecting means (22) for said support member (7), said protecting means (22) preventing the insertion of operator's hands into the space between a centering lever (24) of said support member (7) and said support body (3) during the closure operation of said locking system (1).
4. Manual locking system (1) according to Claim 3, **characterised in that** said protecting means (22) are composed of a shield shaped as a quarter of a circle, hinged (in 14) to said support body (3) and that covers the whole circular movement path of said centering lever (24) of said support member (7).
5. Manual locking system (1) according to Claim 1, **characterised in that** said support member (7) is equipped with horizontal locking adjusting means (26), said horizontal adjusting means (26) being composed of a plurality of holes adapted to receive corresponding comb-shaped shims for securing and horizontally adjusting the locking elements on said support member (7).
6. Manual locking system (1) according to Claim 1, **characterised in that** it is adapted to realise, when opening, an excursion angle equal to $95^\circ \pm 3^\circ$.

FIG. 1

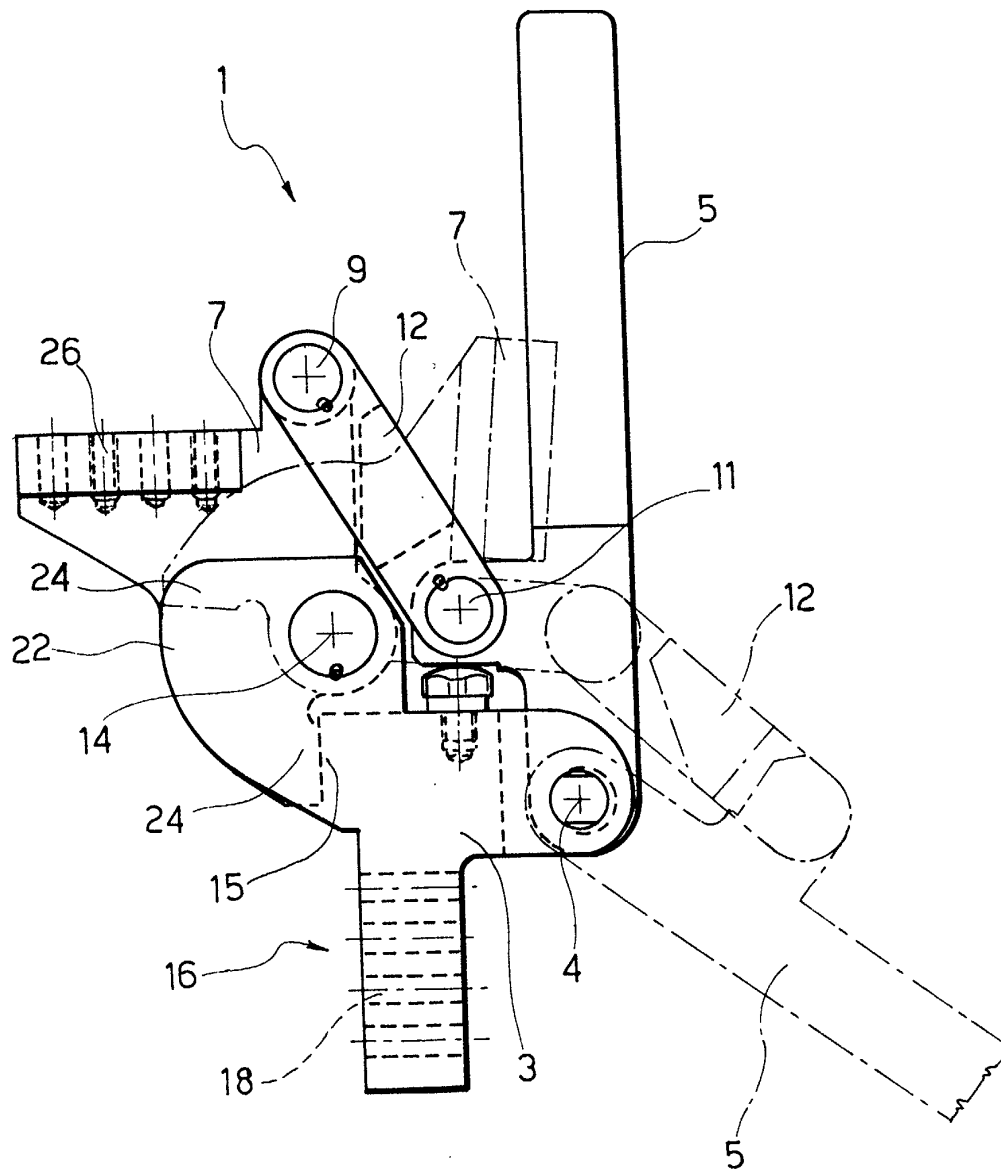


FIG. 2

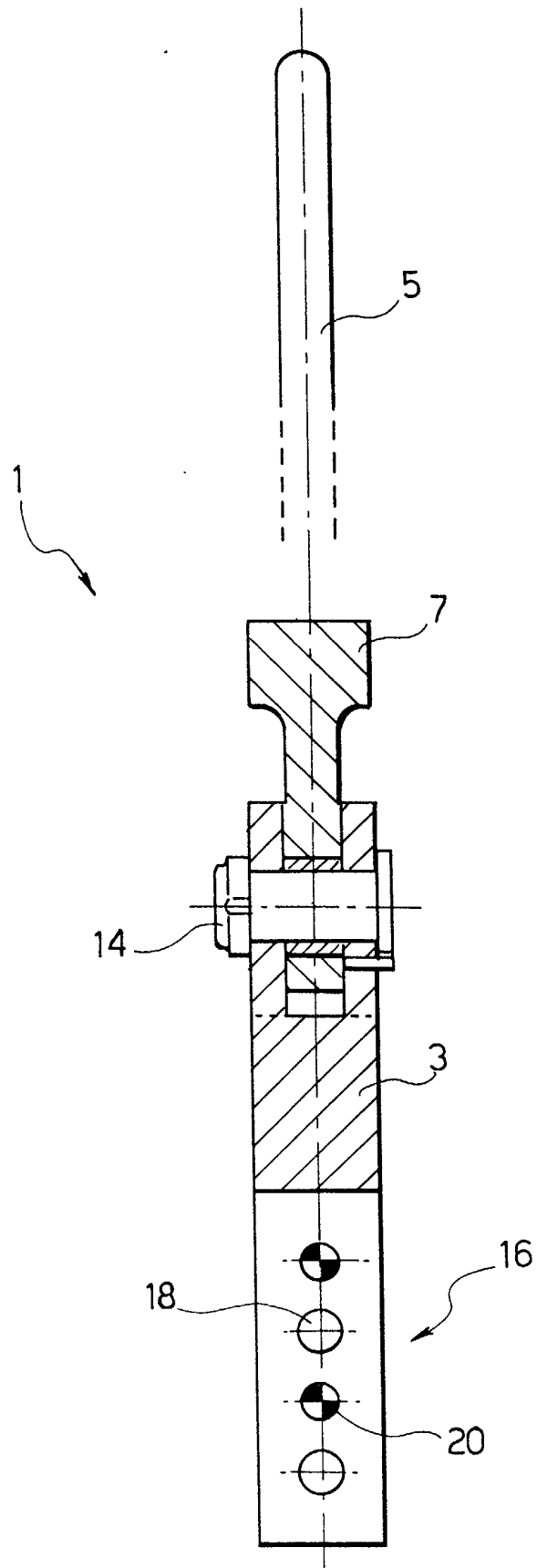


FIG. 3

