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(54) **Indicating element for a pushbutton**

(57) An indicating element (1, 10) for a pushbutton (2, 20), comprises a cover body (4) suitable for covering at least part of said pushbutton (2, 20), information means (14, 24) provided on said cover body (4) for distinguishing a function associated with said pushbutton (2, 20), and connecting means (14, 15, 16, 21) configured for connecting said cover body (4) to said pushbutton (2, 20).

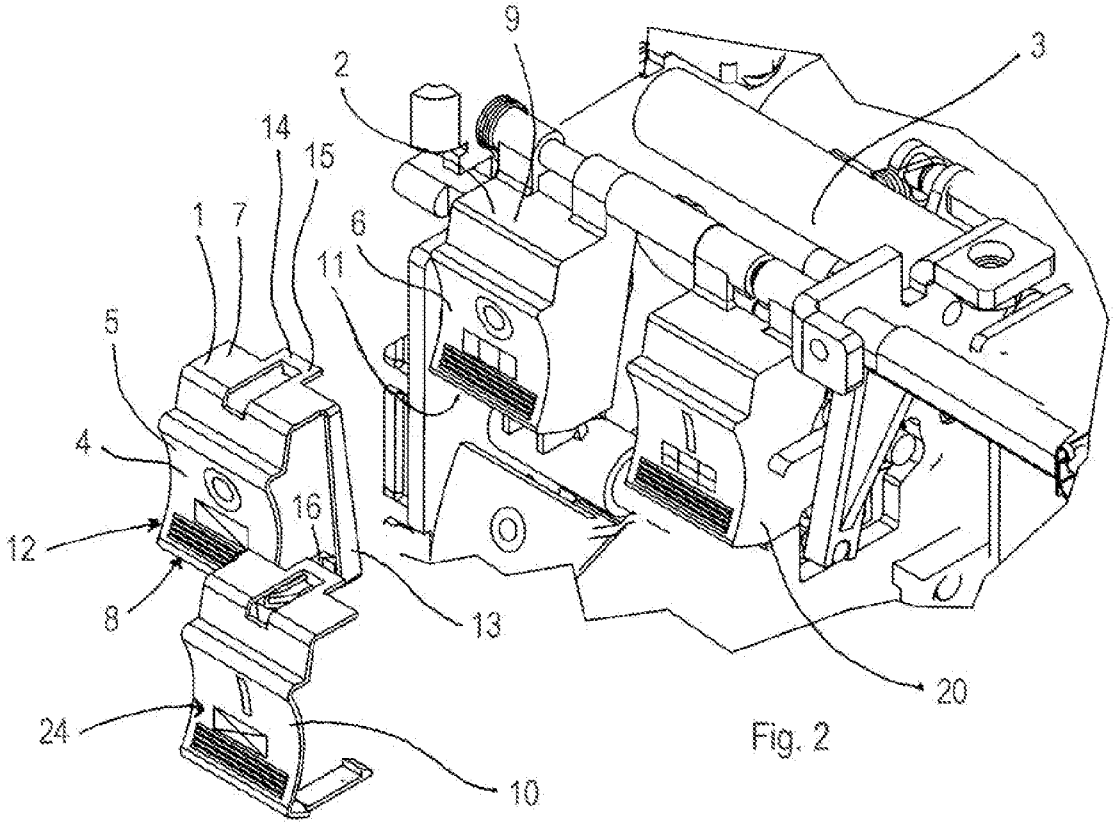


Fig. 2

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## Description

**[0001]** The present disclosure relates to an indicating element suitable for being applied to a pushbutton of an apparatus, in order to provide the pushbutton with any desired information. The indicating element may for example indicate an operative status in which the apparatus is put upon a pushing action on the pushbutton, or may indicate a function or driving operation which is activated on the apparatus by acting on such a pushbutton.

**[0002]** The indicating element enables an already existing pushbutton to be adapted to particular standard requirements, i.e. to be easily provided with a desired mark or symbol representing a closing or opening status of an electric circuit, such a status being decided by acting on the corresponding pushbutton. In particular, the indicating element of the present disclosure is suitable to be used in connection with a mechanical actuator connected to a circuit breaker of a medium voltage switching apparatus. For the purposes of the present application, the term medium voltage refers to applications in the range from 1kV up to some tens of kV, e.g. 30 kV.

**[0003]** In the prior art, a circuit breaker of a switchgear can be electrically opened or closed remotely by driving coils or locally by manually exerting a pushing action on an opening pushbutton or on a closing pushbutton. The opening pushbutton and the closing pushbutton are distinguished from one other by respective different symbols and/or colours and/or words. For example the closing pushbutton may be of a green colour, and may be provided with an "I" mark or also with an "ON" word.

**[0004]** Analogously, the opening pushbutton may be of a red colour, and may be provided with an "O" mark or also with an "OFF" word.

**[0005]** Often, the colour, the word, the symbol or mark of each pushbutton may be different according to particular standard requirements and regulations which may vary in the time and/or for different geographical areas or countries. Furthermore, it may be required to change the function or application associated with a given pushbutton and consequently it is necessary to adapt the suitable colour, and/or word, and/or symbol and/or mark to be provided on the pushbutton. All this implies that during the production assembly/storage it is necessary to manage a large number of types of mechanical actuators or similar devices, each having a small difference with respect to the others, due for example to different colours or symbols etc.. Therefore, very high costs are involved in the production, assembly, and storage procedures of these mechanical actuators.

**[0006]** Alternatively, it is also known to glue suitable stickers to the pushbutton so as to provide the latter with the desired symbol, word or mark in order to comply with particular standard requirements and regulations. However, the glued stickers are not able to cover a pushbutton in an effective and satisfactory way. Zones of the pushbutton may remain uncovered, especially top and bottom surfaces of the pushbutton, and this may constitute a serious problem when the standard regulations impose to have a particular colour for the visible external surfaces of the pushbutton. Furthermore, the glued stickers, with the passing of time and the use often in harsh working conditions, are prone to separate from the pushbuttons and the graphic quality of the symbols or words which are printed thereon deteriorates.

**[0007]** It would be desirable to overcome all the above mentioned drawbacks. This is achieved owing to an indicating element as defined in claim 1.

**[0008]** The present disclosure encompasses also an electrical switching apparatus, e.g. a circuit breaker, comprising at least a pushbutton and at least one indicating element of the type described hereinafter and as defined in the appended claims which is associated to such pushbutton.

**[0009]** Characteristics and advantages of the present disclosure will result from the description and from claims.

**[0010]** The present disclosure can be better understood and implemented with reference to the attached drawings that illustrate some embodiments thereof by way of non-limiting example, in which:

Figure 1 is a perspective view of a mechanical actuator together with two different versions of the indicating element of the present disclosure intended to be applied to pushbuttons of such a mechanical actuator;

Figure 2 is a fragmentary and enlarged view of part of Figure 1 which better shows the indicating elements according to the present disclosure which are separated from the respective pushbuttons;

Figure 3 shows part of the mechanical actuator with the indicating element of the present disclosure coupled with the respective pushbuttons;

Figure 4 is a perspective view of a first exemplary embodiment of an indicating element according to the present disclosure;

Figure 5 is a front view of the first exemplary embodiment of an indicating element according to the present disclosure;

Figures 6 and 7 are a bottom view and a top view respectively of the first exemplary embodiment of an indicating element according to the present disclosure;

Figures 8 and 9 are a right side view and a left side view respectively of the first exemplary embodiment of an indicating element according to the present disclosure;

Figure 10 is a rear view of the first exemplary embodiment of an indicating element according to the present disclosure;

Figure 11 is a perspective view of a second embodiment of an indicating element according to the present invention;

Figure 12 is a front view of the second embodiment of an indicating element according to the present dis-

closure

Figures 13 and 14 are a bottom view and a top view respectively of the second embodiment of an indicating element according to the present invention;

Figures 15 and 16 are a right side view and a left side view respectively of the second embodiment of an indicating element according to the present invention;

Figure 17 is a rear view of the second embodiment of an indicating element according to the present invention;

Figure 18 is a perspective view of the first embodiment of an indicating element according to the present invention which is coupled with a pushbutton;

Figure 19 is a front view of the indicating element which is coupled with the pushbutton;

Figures 20 and 21 are a bottom view and a top view of the indicating element coupled with the pushbutton;

Figures 22 and 23 are a right side view and a left side view respectively of the indicating element coupled with the pushbutton;

Figure 24 is a rear view of the indicating element coupled with the pushbutton.

**[0011]** It should be noted that in the detailed description that follows, identical or similar components have the same reference numerals, regardless of whether they are shown in different embodiments of the present disclosure; it should also be noted that in order to clearly and concisely disclose the present disclosure, the drawings may not necessarily be to scale and certain features of the disclosure may be shown in somewhat schematic form.

**[0012]** With reference to the attached Figures, an indicating element 1, 10 is described which is suitable for being applied to a pushbutton 2, 20 in order to provide the latter with any information needed so as to comply with particular standards or desired requirements. In particular, any words or symbols already provided on the pushbutton 2, 20 for indicating, in a given way, an operative status may be covered by the indicating element 1, 10 which is configured for being applied on the pushbutton 2, 20 and which includes information means. The information means may include desired word/s and/or symbol/s and/or mark/s which indicate the above mentioned operative status but in a different desired way with respect to the form of indication given by the state of the art pushbuttons. Only the new desired word/s and/or symbol/s and/or mark/s and/or coloured surfaces of the indicating element 1, 10 result visible to a user once the indicating element 1, 10 has been applied to the pushbutton 2, 20.

**[0013]** In the non limitative example here described, two different versions of the indicating element according to the present disclosure are described, in particular an indicating element 1 and a further indicating element 10 which are suitable for being applied to a pushbutton 2 and a further pushbutton 20 respectively. The pushbutton 2 and the further pushbutton 20, in the example disclosed, comprise an opening pushbutton 2 and a closing pushbutton 20 respectively of a mechanical actuator 3 connected to a circuit breaker of a medium voltage switchgear. For the purposes of the present application, the term medium voltage refers to applications in the range from 1 kV up to some tens of kV, e.g. 30 kV.

**[0014]** The opening pushbutton 2 and the closing pushbutton 20, when pushed, have the function of electrically opening and closing the circuit breaker, respectively.

**[0015]** The indicating element 1 and the further indicating element 10 in this case have a shape substantially similar to one other. Due to the minor structural differences between the indicating element 1 and the further indicating element 10, only a more detailed description of the indicating element 1 will follow.

**[0016]** The indicating element 1 comprises a cover body 4 which is shaped for covering at least a part of the associated opening pushbutton 2.

**[0017]** With reference to Figures 2 to 10, the cover body 4 comprises a front wall 5, which is intended to be applied to a front surface 6 of the opening pushbutton 2.

**[0018]** The front wall 5 is intended to receive a pushing action by a user desiring to act on the pushbutton 2.

**[0019]** The cover body 4 further comprises a top wall 7 and a bottom wall 8, which are transversely arranged with respect to the front wall 5 and which are intended to be applied to a top surface 9 and a bottom surface 11 of the opening pushbutton 2 respectively.

**[0020]** The cover body 4 further comprises side wall means 13 which extend from the top wall 7 to the bottom wall 8. The side wall means 13, in particular, comprises one side wall 13 connecting the top wall 7 to the bottom wall 8. In the exemplifying version which is shown in the attached drawings, the side wall 13 is in the form of a band wall 13 linking a peripheral zone of the top wall 7 with a further peripheral zone of the bottom wall 8. However, the side wall 13 may also have different geometrical shapes, for example may be shaped so as to cover the whole side surface of the opening pushbutton 2, and/or can be realized in a different number of parts or pieces; for instance, the indicating element 1 may comprise a pair of side walls provided at opposite lateral side with respect to each other.

**[0021]** On the cover body 4 information means 12 are provided, as already mentioned above, for indicating a function associated with the opening pushbutton 2.

**[0022]** The function of the opening pushbutton 2, in this exemplifying case, is to put the circuit breaker in an electrical opening status. Accordingly, the information means 12, in this case, acts for indicating the electrical opening function of the opening pushbutton 2.

**[0023]** In the exemplary embodiment illustrated, the information means 12 are of the visual type and may comprise visual information marks which are printed or

moulded on the cover body 4. In particular, the visual information marks can be printed or moulded on the front wall 5.

**[0024]** The information means 12 of the indicating element 1 may comprise any desired word/s, and/or mark/s and/or symbol/s and/or coloured surface/s which is/are different from the word/s and/or mark/s and/or symbol/s and/or coloured surface/s already present on the opening pushbutton 2. The indicating element 1 so configured enables to easily and effectively adapt the existing mechanical actuator 3 so as to comply with any standard regulations of a particular geographic area or country and/or to meet specific requirements of a user.

**[0025]** It is possible to have a set of several suitable indicating elements 1 each provided with a particular combination of word/s and/or mark/s and/or symbol/s and/or coloured surface/s for meeting different desired requirements.

**[0026]** For example, if the opening button 2 has a red colour and a particular standard of a country requires for the opening pushbutton 2 to have a green colour, a green coloured indicating element 1 can be chosen from the above set of indicating elements 1. Again, for example, if the opening button 2 has an inscription such as "push off" and a particular user desires to have a different inscription, such as the word "open" or "OFF" or desires to have only a "O" symbol on the opening pushbutton 2, this can be achieved through an appropriate indicating element 1 which can be chosen from the above set.

**[0027]** The indicating element 1 can be obtained from a material having a desired colour. For example the indicating element 1 can be obtained by moulding a coloured plastics material. The desired coloured aspect of the indicating element 1 so given acts as visual information means included in the indicating element 1. In an alternative version, a dye of a specific colour can be applied on the cover body 4, such a dye acting as visual information means included in the indicating element 1. For example, the dye may give the indicator element 1 an external red or green coloured aspect, which is indicative of a the specific operative status in which the circuit breaker can be put by acting on the corresponding pushbutton.

**[0028]** The indicating element 1 comprises connecting means 14 configured for connecting the cover body 4 to the opening pushbutton 2.

**[0029]** The connecting means comprises snap-fitting means 14 configured for mechanically joining the cover body 4 to the pushbutton 2.

**[0030]** The snap-fitting means 14, in the exemplifying version here described, comprises hooking-protrusion-means 14 which protrude from the cover body 4 and are so configured as to removably engage with edge zones of the pushbutton 2.

**[0031]** If requirements for the visual information change, owing to the removable connection it is possible to remove an already coupled indicating element 1 from the corresponding pushbutton and replace it with a new indicating element having differently configured information means with comply with the new requirements.

**[0032]** The hooking-protrusion-means comprise a top-hooking-protrusion 15, projecting from a peripheral edge of the top wall 7 and a pair of bottom-hooking-protrusions 16, projecting from a peripheral edge of the bottom wall 8.

**[0033]** The top-hooking-protrusion 15 and the bottom-hooking-protrusions 16 project from the cover body 4 in a direction away from the front wall 5, so as to be able to engage with rear edge zones of the opening pushbutton 2.

**[0034]** The two bottom-hooking-protrusions 16 are mutually parallel and spaced apart from one other. In particular, the bottom-hooking-protrusions 16 project from respective opposite end zones of the peripheral edge of the bottom wall 8. The top-hooking-protrusion 15 projects from a middle zone of the top peripheral edge of the top wall 7.

**[0035]** In particular, the top-hooking-protrusion 15 and the bottom-hooking-protrusion 16 comprise holding tips 21 (see Figures 4 and 9) which are configured for clasping the cover body 4 at a top-rear-edge 17 and at a bottom-rear-edge 18 of the opening pushbutton 2. In other words, during a coupling operation of the indicating element 1 with the opening pushbutton 2, the top-hooking-protrusion 15 and the bottom-hooking-protrusion 16 elastically flex for enabling positioning of the holding tips 21 on a rear surface 22 of the opening pushbutton 2. The holding tips 21, once in the proper position with respect to the pushbutton, hold the cover body 4 firmly coupled with pushbutton, as can be clearly seen in Figures 18 to 24.

**[0036]** In Figures 11 to 17 the further indicating element 10 is better shown, which is functionally and structurally substantially analogous to the indicating element 1 above described. Parts of the further indicating element 10 which are the same as in the indicating element 1 are indicated by the same reference number.

**[0037]** Differently from the indicating element 1, the further indicating element 10 comprises a left side wall 23 provided on the left side thereof.

**[0038]** The further indicating element 10 comprises further information means 24 which have a function analogous to the information means 12. In the particular exemplifying version, the further information means 24 acts for indicating the electrical closing function of the closing pushbutton 20. Also the further indicating element 10, like the indicating element 1, enables to adapt the mechanical actuator 3, in particular the closing pushbutton 20, so as to comply with given standard regulations of a particular geographic area or country or so as to meet specific requirements of a user. The further indicating element 10, in the same way as the indicating element 1, covers at least the whole front surface of the closing pushbutton 20, thus replacing the already existing inscription/s and/or mark/s and/or symbol/s and or coloured surface/s of the closing pushbutton 20 with new ones, according to the desired requirements.

**[0039]** It is possible to prepare a set of further indicating

elements 10 for visually indicating in several possible ways the closing function of the pushbutton 20.

**[0040]** For example, if the closing pushbutton 20 has a green colour and a particular standard of a country requires for the closing pushbutton 20 to have a black colour, a black coloured indicating element 1 can be chosen from the above set of indicating elements 10. Again, for example, if the closing pushbutton 20 has an inscription such as "push on" and a particular user desires to have a different inscription, such as the word "close" or "ON" or desires to have only a "I" symbol on the closing pushbutton 20, this can be achieved through an appropriate indicating element 10 which can be chosen from the above set.

**[0041]** Several combinations of visual information items can be provided on the indicating elements of the present disclosure which are therefore ready to be chosen according to the particular exigencies thus making the pushbutton consistent with the given requirements.

**[0042]** Thanks to the indicating element 1, 10 of the present disclosure, there is no longer need for managing a large number of types of mechanical actuators or similar devices, each having a small difference with respect to the others, due for example to different colours or symbols required for the pushbuttons.

**[0043]** Furthermore, owing to the indicating element of the present disclosure, it is also possible to assemble a mechanical actuator with one or more pushbuttons which have a neutral colour and/or which are devoid of any words, marks and symbols, thus noticeably reducing the overall production costs thereof. Once particular requirements or requests for the visual aspect of the pushbuttons have to be met, the most appropriate indicating elements 1 can be applied on the pushbuttons, such indicating elements being chosen from a pre-established set comprising a variety of indicating elements.

**[0044]** Therefore, the costs involved in the production, assembly, and storage procedures of the mechanical actuators are noticeably reduced.

**[0045]** In other words, the indicating element of the present disclosure allows to reduce the mechanical actuator typologies, and to configure in the right way any pushbutton colour/symbol at the end of a production phase.

**[0046]** The indicating element of the present disclosure, suitably configured, may also be used for buttons having functions other than closing or opening a circuit breaker, for example for buttons intended to activate a particular procedure in an apparatus.

**[0047]** Owing to the mechanical strength of the indicating element 1, 10, in particular of the cover body 4 and of the connecting means 14, any pushbutton may be covered in an effective, reliable and satisfactory way. In particular, problems of the prior art glued stickers tending to separate from the pushbuttons are overcome by the indicating elements 1, 10 of the present disclosure. The functionality of the mechanical actuator 3 is not compromised by the applied indicating elements, due to snap fitting connecting configuration, and high safety condition are guaranteed owing to the present disclosure.

## Claims

1. Indicating element (1, 10) for a pushbutton (2, 20), comprising:

   — a cover body (4) suitable for covering at least part of said pushbutton (2, 20),
   — information means (14, 24) provided on said cover body (4) for indicating a function associated with said pushbutton (2, 20), and
   — connecting means (14, 15, 16, 21) configured for connecting said cover body (4) to said pushbutton (2, 20).

2. Indicating element (1, 10) according to claim 1, wherein said connecting means comprises snap-fitting means (14, 15, 16, 21) integral with said cover body (4) and configured for mechanically joining said cover body (4) to said pushbutton (2, 20).

3. Indicating element (1, 10) according to claim 2, wherein said snap-fitting means comprises hooking-protrusion means (14, 15, 16, 21) protruding from said cover body (4) and configured so as to removably engage with edge zones (17, 18) of said pushbutton (2, 20).

4. Indicating element (1, 10) according to any one of claims 1 to 3, wherein said cover body (4) is defined by a front wall (5) intended to be applied to a front surface (6) of said pushbutton (2, 20), a top wall (7) and a bottom wall (8) which are transversely arranged with respect to said front wall (5) and intended to be applied to a top surface (9) and to a bottom surface (11) of said pushbutton (2, 20) respectively.

5. Indicating element (1, 10) according to claim 4, wherein said hooking-protrusion means comprise top-hooking-protrusion means (14, 15, 21) protruding from said top wall (7) for engaging with a top edge (17) of said pushbutton (2, 20) and bottom-hooking-protrusion means (14, 16, 21) protruding from said bottom wall (8) for engaging with a bottom edge (18) of said pushbutton (2, 20).

6. Indicating element (1, 10) according to one or more of the preceding claims wherein said cover body (4) further comprises side wall means (13, 23) connecting said top wall (7) to said bottom wall (8).

7. Indicating element (1, 10) according to one or more of the preceding claims wherein said top-hooking-protrusion means comprises a top-hooking protrusion (15) projecting from a middle zone of a top pe-

ripheral edge of said top wall (7) and said bottom-hooking-protrusion means comprises a pair of bottom-hooking protrusions (16) spaced apart from one other and projecting from respective end zones of a bottom peripheral edge of said bottom wall (8) .

**8.** Indicating element (1, 10) according to one or more of the preceding claims wherein said information means comprises visual information marks (12, 24) which are printed or moulded on said cover body (4).

**9.** Indicating element (1, 10) according to one or more of the preceding claims wherein said information means (12, 24) are printed or moulded on said front wall (5) for indicating an electrical closing or opening function of said pushbutton (2, 20).

**10.** Indicating element (1, 10) according to one or more of the preceding claims wherein said information means (12, 24) are in the form of a dye applied to said cover body (4) or in the form of a coloured material which said cover body (4) is made of.

**11.** Indicating element (1, 10) according to one or more of the preceding claims wherein cover body (4) is made of a plastics material.

**12.** Indicating element (1, 10) according to one or more of the preceding claims and dimensioned for being applied to a pushbutton (2, 20) of a mechanical actuator (3) for opening and closing a circuit breaker of a medium voltage switching apparatus.

**13.** An electrical apparatus comprising at least one pushbutton and at least one indicating element according to one or more of the preceding claims which is connected to said pushbutton.

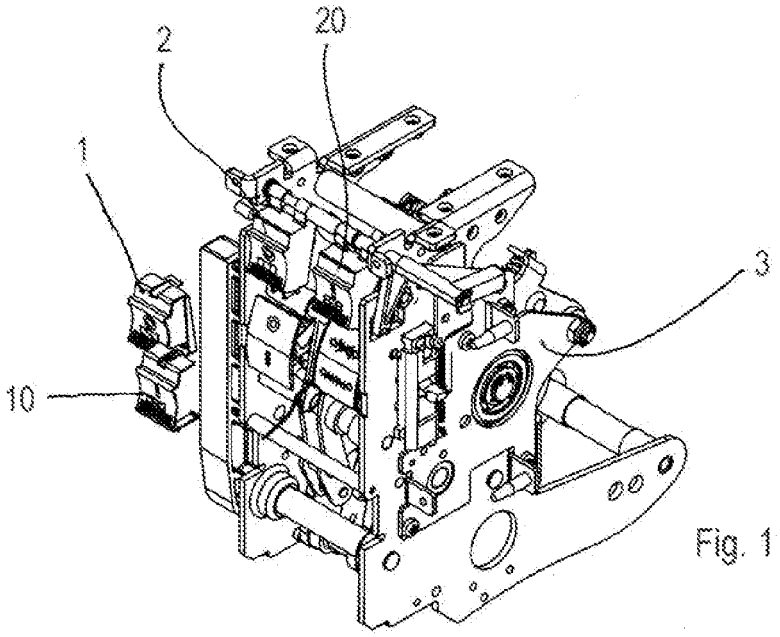


Fig. 1

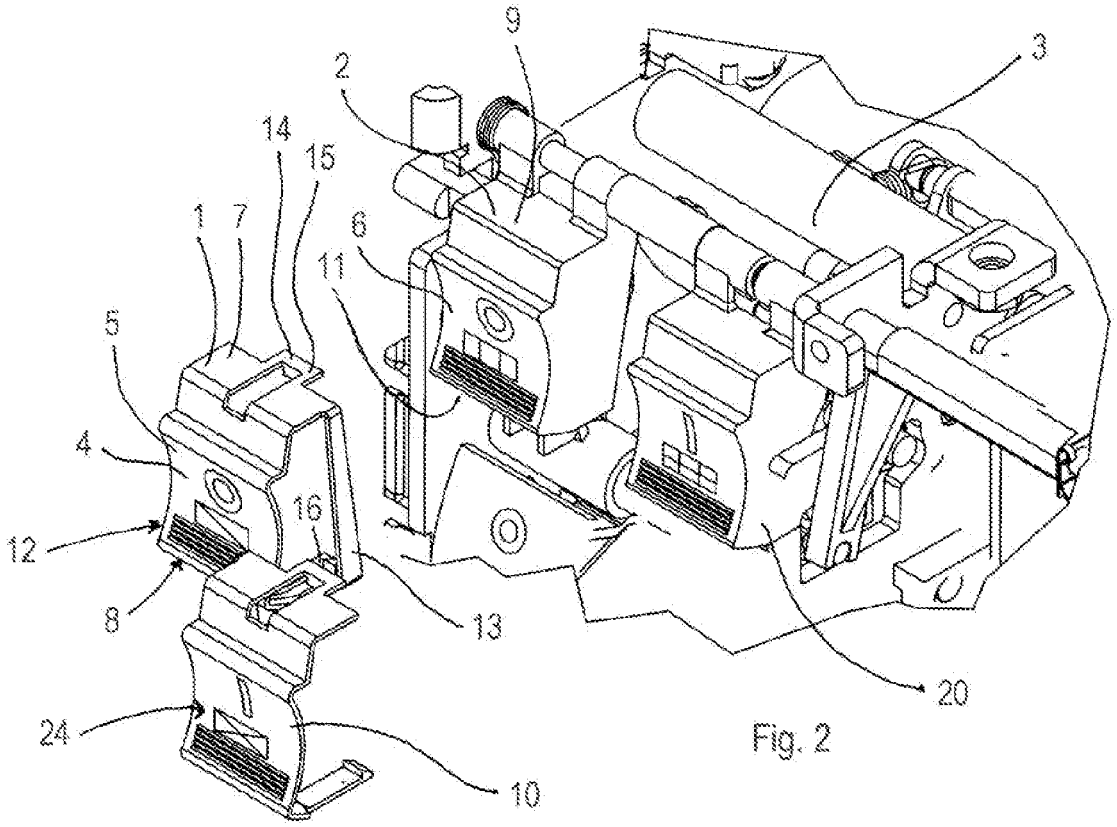


Fig. 2

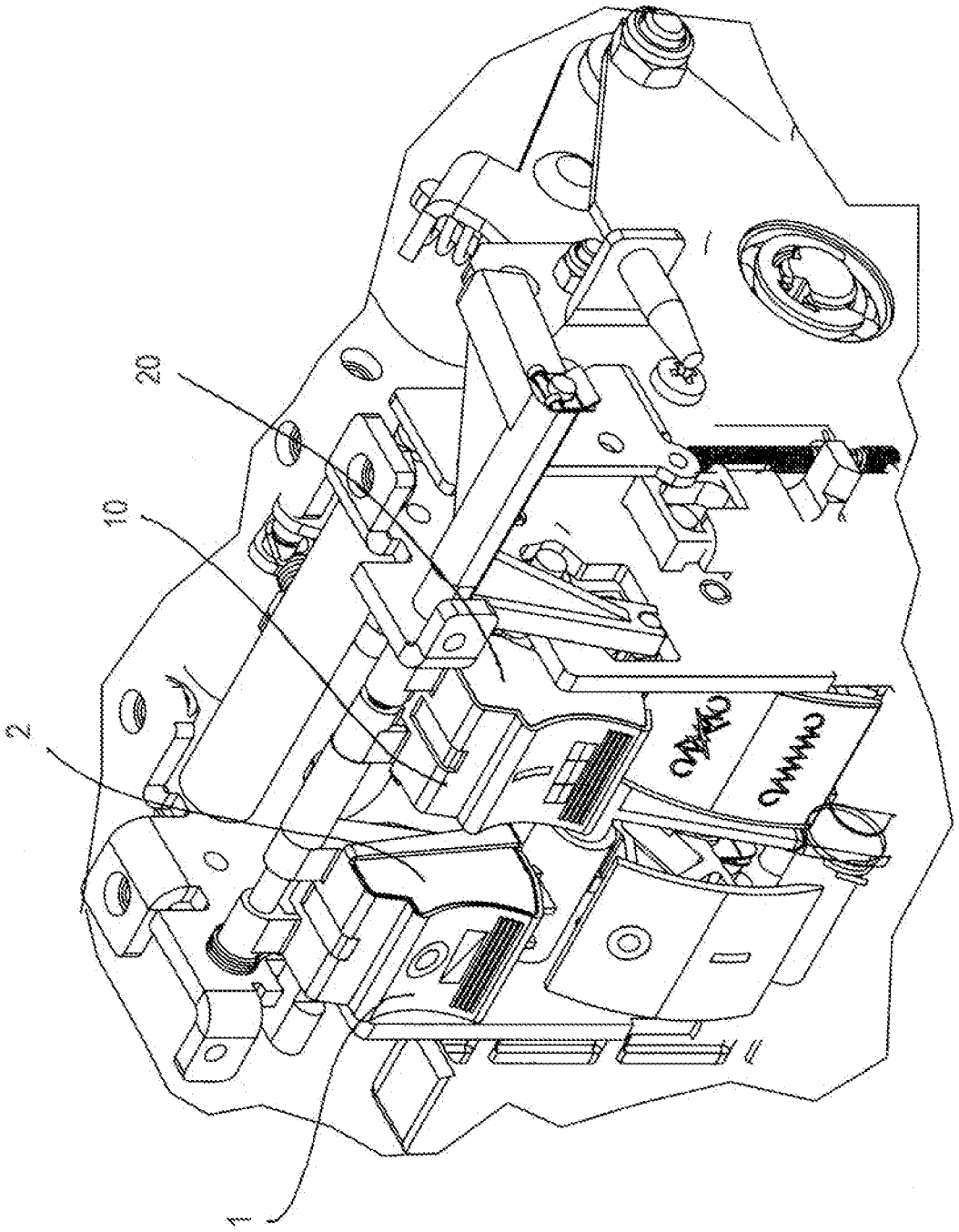


Fig. 3

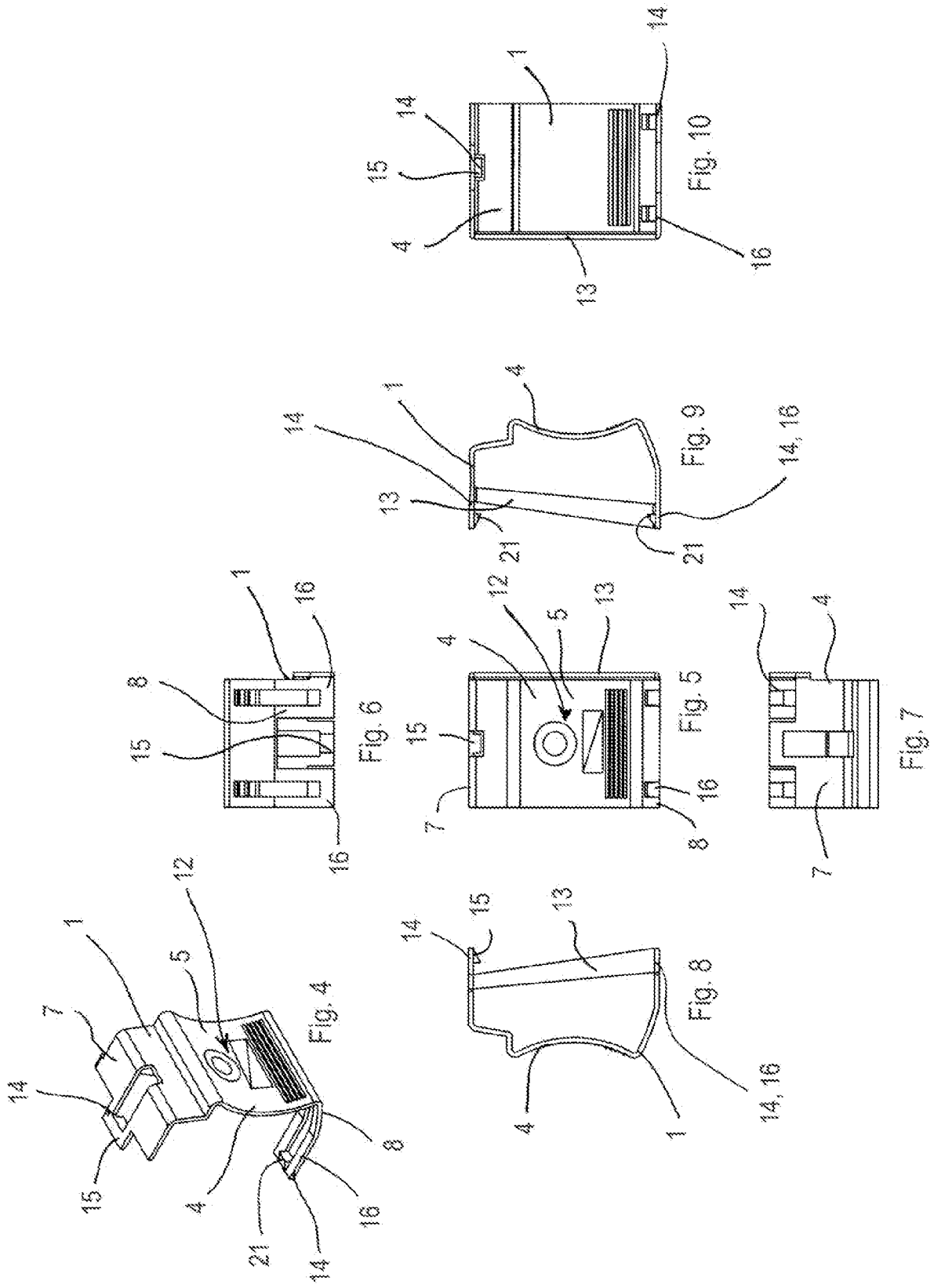


Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

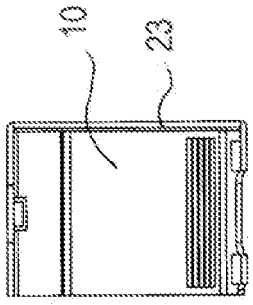


Fig. 17

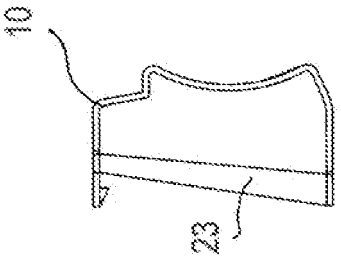


Fig. 16

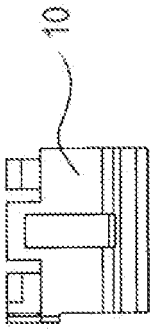


Fig. 14

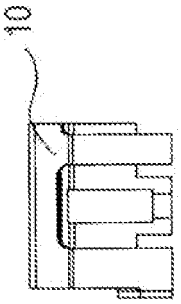


Fig. 13

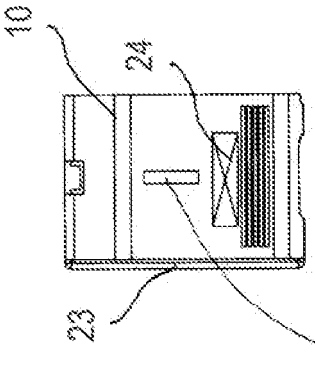


Fig. 12

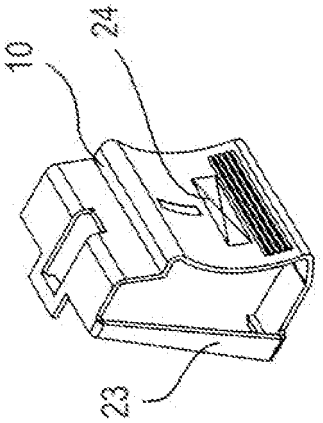


Fig. 11

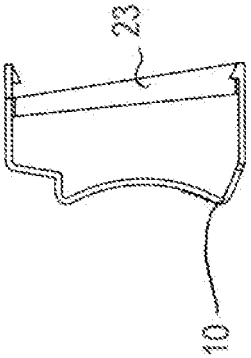


Fig. 15

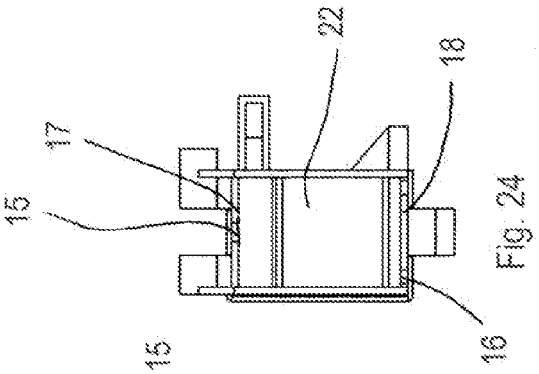


Fig. 24

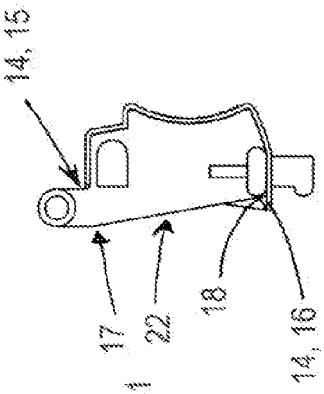


Fig. 23

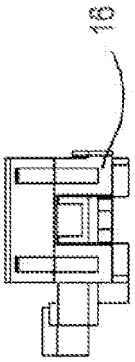


Fig. 20

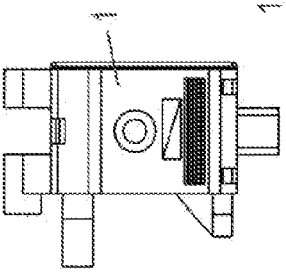


Fig. 19

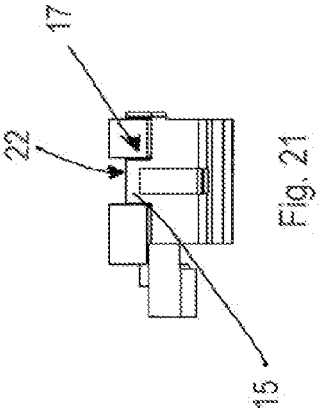


Fig. 21

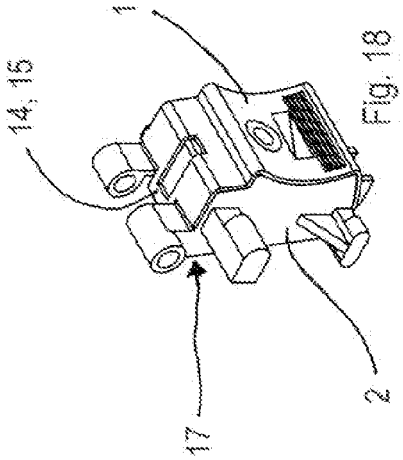


Fig. 18

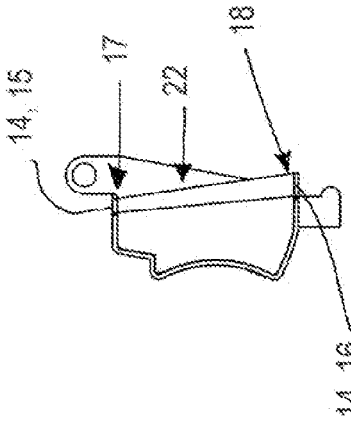


Fig. 22

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# EUROPEAN SEARCH REPORT

Application Number
EP 11 16 7360

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | DE 30 15 288 A1 (SIEMENS AG [DE]) 22 October 1981 (1981-10-22) * page 5, line 23 - page 8, line 4; figures 1-3 * | 1-13 | INV. H01H71/04 |
| X | EP 1 129 886 A2 (VALEO SCHALTER & SENSOREN GMBH [DE]) 5 September 2001 (2001-09-05) * paragraph [0015] - paragraph [0021]; figures 1-4 * | 1-13 | |
| X | DE 87 10 273 U1 (NIXDORF COMPUTER AG) 1 December 1988 (1988-12-01) * page 5 - page 6; figures 1-3 * | 1-13 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| | | | H01H |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 30 August 2011 | Nieto, José Miguel |

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30-08-2011

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| DE 3015288 A1 | 22-10-1981 | NONE | |
| EP 1129886 A2 | 05-09-2001 | DE 10010740 A1 | 06-09-2001 |
| | | US 2001019013 A1 | 06-09-2001 |
| DE 8710273 U1 | 01-12-1988 | NONE | |



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