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(54) Title: SUPPORT STRUCTURE FOR CLOCKMAKING AND CLOCK COMPRISING SUCH STRUCTURE

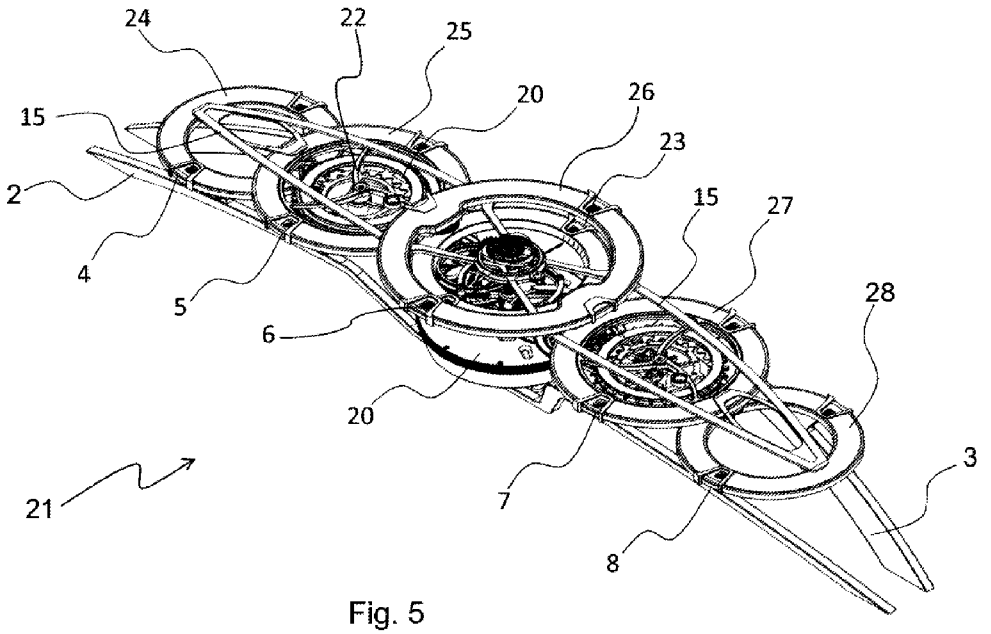


Fig. 5

(57) Abstract: The invention relates to a support structure (1) for table clocks, in which the activation mechanisms (20) of the hands (22), rotating discs (23), faces (24-28) and the like are housed. The structure (1) substantially configured like a frame in which a series of elements (2, 3, 4-8, 9, 12, 15) are present, which cooperate with one another to obtain a desired structural rigidity and that support the mechanisms.

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[Continued on next page]

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Title: **"Support structure for clockmaking and clock comprising such structure"**

DESCRIPTION

The present invention relates in a more general aspect thereof to clocks, i.e. that are usually placed or arranged on pieces of furniture or surfaces in general, such as tables, desks, cabinets or the like, or that hang on or are applied to walls.

Below, although reference is mainly made to table clocks, this is not however to be understood in a limiting way and the disclosure must also be considered valid, *mutatis mutandis*, for the other types of clocks mentioned above.

It is also appropriate to specify immediately that the present invention is preferably intended for mechanically operated clocks, i.e. those with a manually loaded spring, for the reasons that will emerge more clearly below; however, it must not be considered limited thereto but can also be extended to other clocks that have mechanical parts (e.g. hands) controlled by quartz or electronic or digital clocks, etc.

Now therefore, it can be stated that clocks of the type considered herein that are currently known, are generally comprised of a box-like structure that constitutes the housing case of the various components (mechanical, electrical, etc.), delimited frontally by the face on which the time-related information is displayed.

The faces can be of various types and shapes (circular, square, concave, convex and so on) according to the clocks, but generally comprise a surface on which the hours and/or minutes are written, and along which the indicator elements move, which are typically hands.

However, they can have different shaped indicator elements, according to the multiple possible solutions; these include ones in which the faces are comprised by rotating discs and where the information reported thereon is indicated upon the passage in front of (or behind) predefined references, following their rotation.

This is the typical case of calendars or date displays associated with clock faces, which usually have openings or windows behind which the date (i.e. the number) and/or the name of the day marked on rotating discs appear; similar solutions are also adopted for other information reported by clocks, such as lunar phases, star signs, chronometers and the like.

If from a general point of view the structure of table or wall clocks with a case and a face is to be consolidated over time and reliable, it can sometimes be inadequate in relation to the functions of higher level clocks, especially those of the mechanical type.

In fact, in high range clocks such as those made by the present Applicant, very strict conditions are required not only in relation to precision but also reliability, ease of reading and completeness of information.

In fact, when clocks are required that are able to provide indications not only on hours and minutes, but also on the days of the week, the months of the year, the number of years and so on, such as perpetual calendars, for example, the complexity of the mechanisms involved becomes inevitable.

In these cases, in order to have a complete and legible view of all the information, rather large faces are necessary, on which there are openings or windows that allow the days of the week, the months, the years, etc. to be indicated.

Furthermore, the activation mechanisms and gear wheels of the indicator members (hands, rotating disks and the like) can be housed in the clock case and therefore are not accessible from the outside, so that in the event of breakdowns or maintenance to be performed they need to be removed to be extracted from the case, thus requiring the disassembly and re-assembly of parts, which may not always be easy.

A representative example of this state of the art is described in European patent application published as EP 1 351 104, which is also applicable to watches.

In a more specific aspect thereof, the present invention therefore relates to a support and/or housing structure for clock mechanisms.

In particular, in light of the previous close examination on the state of the art, it can be said that a technical problem underlying the present invention is that of providing a clock with structural and functional characteristics such as to overcome the drawbacks outlined above with reference to known clocks.

The idea of the solution to this technical problem is that of providing a support structure for clocks and/or mechanisms thereof, which is substantially configured like a frame and that enables the arrangement of the faces on which the time information (hours, minutes, days, months, etc.) is displayed, similar to a dashboard.

In this way, not only better exposure of the faces and clearer reading of information is

obtained but also a configuration of the clock that enables the visibility of the internal mechanisms and, therefore, the possibility also to visually verify the operating status.

The characteristics of the clock according to the invention are stated more specifically in the claims appended to this description; such characteristics will become clearer from the following description showing a preferred and non-exclusive example of an embodiment of the invention, shown in the appended drawings by way of non-limiting example, wherein:

Fig. 1 shows a perspective view of a clock structure according to the invention;

Fig. 2 is a plan view of the structure of Fig. 1;

Fig. 3 and 4 respectively show a front and lateral view of the structure of Fig. 1;

Fig. 5 is a perspective view of a clock comprising the structure of the previous figures;

Fig. 6 and 7 show respective details of the clock of the previous figure.

With reference to the drawings just listed, the reference number 1 therein indicates overall a structure according to the invention, intended for the support and housing of the components of a clock.

Before entering into the explanations in detail, it is appropriate to mention that reference made below to an "embodiment" within this description means that a particular configuration, structure or characteristic is comprised in at least one embodiment of the invention. Therefore, the term "embodiment" used in different parts of this description, does not necessary always refer to the same embodiment. Furthermore, particular configurations, structures or characteristics can be combined in any suitable way in one or more embodiments.

Therefore, considering this premise, it can be stated that the structure 1 is of the type intended to rest on surfaces, such as tables, cabinets and pieces of furniture in general; it comprises two shaped side members 2, 3, arranged flanked to one another and connected transversally at the top by a series of supports 4, 5, 6, 7, 8, and at the bottom by a support base 9 for the mechanisms.

The structure 1 with the side members 2, 3, the supports 4-8, the base 9 is preferably made of metal material, e.g. steel, aluminium, magnesium, metal alloys or the like; in this way, the structure is able to guarantee good mechanical properties of resistance and rigidity, as well as contained weight.

Preferably, the side members 2, 3 have an arched configuration and even more preferably they have a lowered central portion 2a, 3a with respect to their arched profile, where the base 9 is present.

In the embodiment of the invention shown in the drawings, the base 9 supports two columns 10, 11 which in turn support a transverse plate 12 which extends horizontally below the central support 6, up to the adjacent ones thereto 5 and 7.

In accordance with a preferred embodiment of the invention, the supports 4-8 and the base 9 are rigidly associated with the side members 2 and 3, e.g. by welding, fixing or they are made as a single part therewith.

In the example shown in the drawings, the supports 4, 5, 7 and 8 are provided respectively with pairs of connecting feet 4a, 4b, 5a, 5b, 7a, 7b, 8a, 8b, to the side members 2, 3, which enable the supports to be sustained above the extrados of the side members 2, 3, offset with respect to the others on different levels following the profile of the side members, 2 and 3, i.e. sloping from the centre of the structure 1 towards the ends.

For that purpose, the central support 6 is sustained in position above the others, by a bridge 15 (visible in Fig. 5) which extends longitudinally to the structure 1; it is however appropriate to point out that as an alternative to this solution, the central support 6 can also be arranged at a lower level with respect to the adjacent ones 5 and 7. Furthermore, the central support 6 can also be fixed with feet or columns to the adjacent supports 5 and 7, or also to the transverse plate 12.

As can be seen from the drawings, in this example the supports 4-8 have a round annular shape; such shape is preferable as it corresponds to that of the faces 24, 25, 26, 27 and 28 of the clock 21, both because it allows the housing and connection of the various activation means (mechanisms, gear wheels, springs, escapement, gears, etc.) 20 of the indicator elements such as hands 22, rotating discs 23 and the like, to display the clock information (i.e. hours, minutes, days of the week and/or month, years and so on).

Figures 6 and 7 show two possible embodiments for the faces 24-28 of the clock 21, which show information in reverse with respect to a median axis X-X so as to be advantageously read from opposite sides of the clock, i.e. those of the two side members 2 and 3.

The shape of the supports 4-8 could however be different from the circular geometric annular one, according to the circumstances; for example polygonal (square, hexagonal, etc.) or with complex lines (e.g. lobes, star shaped) in the event of different faces from circular ones.

Regardless of the embodiments, what is significant is that in a preferred form of the invention, the supports 4-8 and/or the base 9 cooperate with the side members 2, 3 in order to grant the support structure 1 suitable mechanical characteristics for the circumstances.

In fact, to obtain the required precision and reliability for high level clocks, it is necessary to guarantee a stable housing for the clock mechanisms, i.e. that does not suffer from possible deformations, strain, vibrations, etc. induced by the surfaces on which the clock 21 rests.

In this context it is necessary to highlight how the shape of the side members 2, 3 contributes positively to obtaining the desired mechanical characteristics for the structure 1, considering that the arch-shaped configuration, as well as successfully supporting the weight of the mechanical components of the clock, is balanced and symmetrical with respect to the central, lowered portion 2a, 3a thereof.

From what has been described up to now, it is possible to understand how the structure 1 of the clock according to the invention enables the underlying technical problem outlined above to be resolved.

In fact, it substantially operates like a frame, i.e. like a structural backbone comprised of various elements such as side members 2, 3, supports 4-8, the base 9, the cross member 12, etc., which cooperate with one another to form a rigid reinforcement; the structure 1 thus conceived is able not only to support and house the various mechanical components of the clock, but also to make it possible to access them from the outside, so as to facilitate the maintenance, repair, replacement etc. thereof.

Furthermore, the clock mechanisms are visible from the outside, so as to enable the operation thereof to be observed and any abnormalities or however the operating status to be visually checked.

None of this is possible with the cases of the clocks known in the state of the art, as they are substantially closed casings in which the mechanical components are housed, closed

frontally by the faces; furthermore, the cases of known clocks being casings, do not cooperate or however only in a minimal way, with individual parts of the clock but are used to house everything together.

The structure 1 is instead of the open type and allows the various parts of the clock to be supported, including the related faces, according to an arrangement that reproduces that of an automotive dashboard and the like, so as to make the reading of the clock more immediate and easy.

As mentioned, the latter comprises the necessary activation means 20 for the operation thereof, comprising various mechanisms and more generally all the components such as the escapement, gear wheels, transmissions, springs, gears and the like, generally visible in Figure 5, not described in further detail herein as they are not necessary for the understanding of the invention.

It is however appropriate to point out that although the clock 1 portrayed in the drawings is preferably of the manual loaded mechanical type, it could be of any other type, e.g. quartz, electrical, electronic or otherwise; in that case, the activation means 20 may also comprise electrical power supply batteries or other appropriate devices.

Naturally, possible variants of the structure of the invention are possible with respect to the one considered above and shown in the drawings.

Thus, as well as what is mentioned above in relation to the configuration and arrangement of the supports 4-8, it must be considered that also the frame formed thereby together with the side members 2, 3 could undergo changes.

First of all, it is to be pointed out that the number of supports 4-8 of which there are five in the structure 1, could also be different, either less or more; the arrangement thereof may also be different with respect to the aligned one, e.g. at the vertices of a polygon or in staggered rows, even if what is highlighted is however their function to cooperate with the rest of the support structure 1 to improve the mechanical properties thereof.

However, these variants fall within the scope of the following claims.

CLAIMS

1. Support structure (1) for clocks, of the type intended to rest on surfaces and to house an activation means (20) of the indicator elements and
the like, characterised in that it is substantially configured like a frame comprising a rigid backbone in which there is a plurality of elements (2, 3, 4-8, 9, 12, 15) that cooperate with one another to obtain desired mechanical properties and that support the activation means (20).

2. Structure according to claim 1, comprising a plurality of supports (4-8) adapted to support said activation means (20), associated with respective faces (24-28) of the clock and separate from one another.

3. Structure according to claims 1 or 2, comprising a plurality of supports (4-8) adapted to support said activation means (20), associated with respective faces (24-28) of the clock arranged substantially like a dashboard.

4. Structure according to any one of the preceding claims, comprising a plurality of supports (4-8) adapted to support said activation means (20), arranged on different levels with respect to the surface on which the structure rests.

5. Structure according to any one of the preceding claims, comprising a plurality of supports (4-8) adapted to support said activation means (20), having a substantially annular configuration.

6. Structure according to any one of the preceding claims, comprising a pair of side members (2, 3), arranged flanked, between which a plurality of supports (4-8) extends, adapted to support said activation means (20).

7. Structure according to claim 6, comprising a bridge (15) extending between the side members (2, 3) and that extends below the central support (6) and above the other supports (4, 5, 7, 8) lateral thereto.

8. Table clock (21) comprising a structure (1) according to any one of the preceding claims.

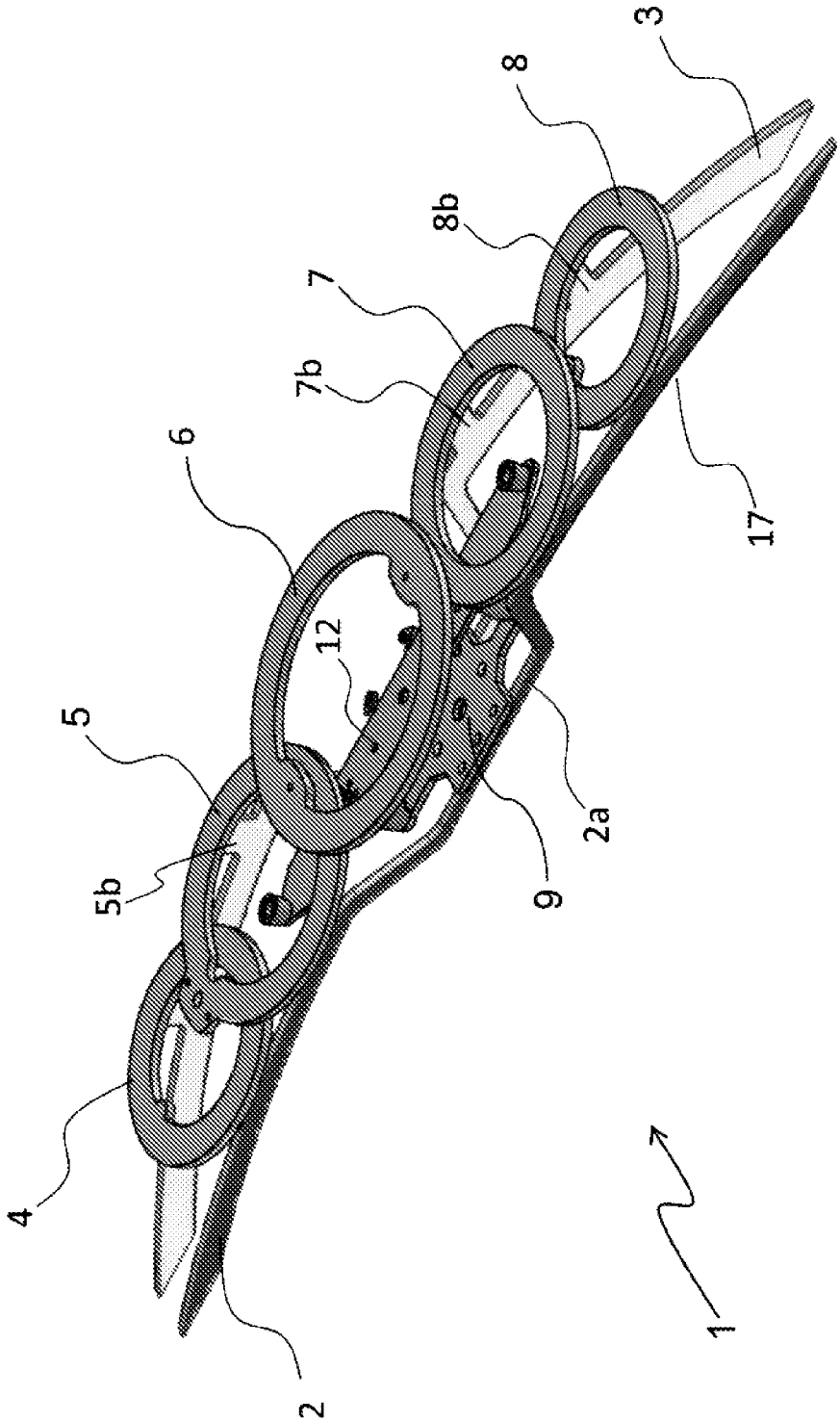


Fig. 1

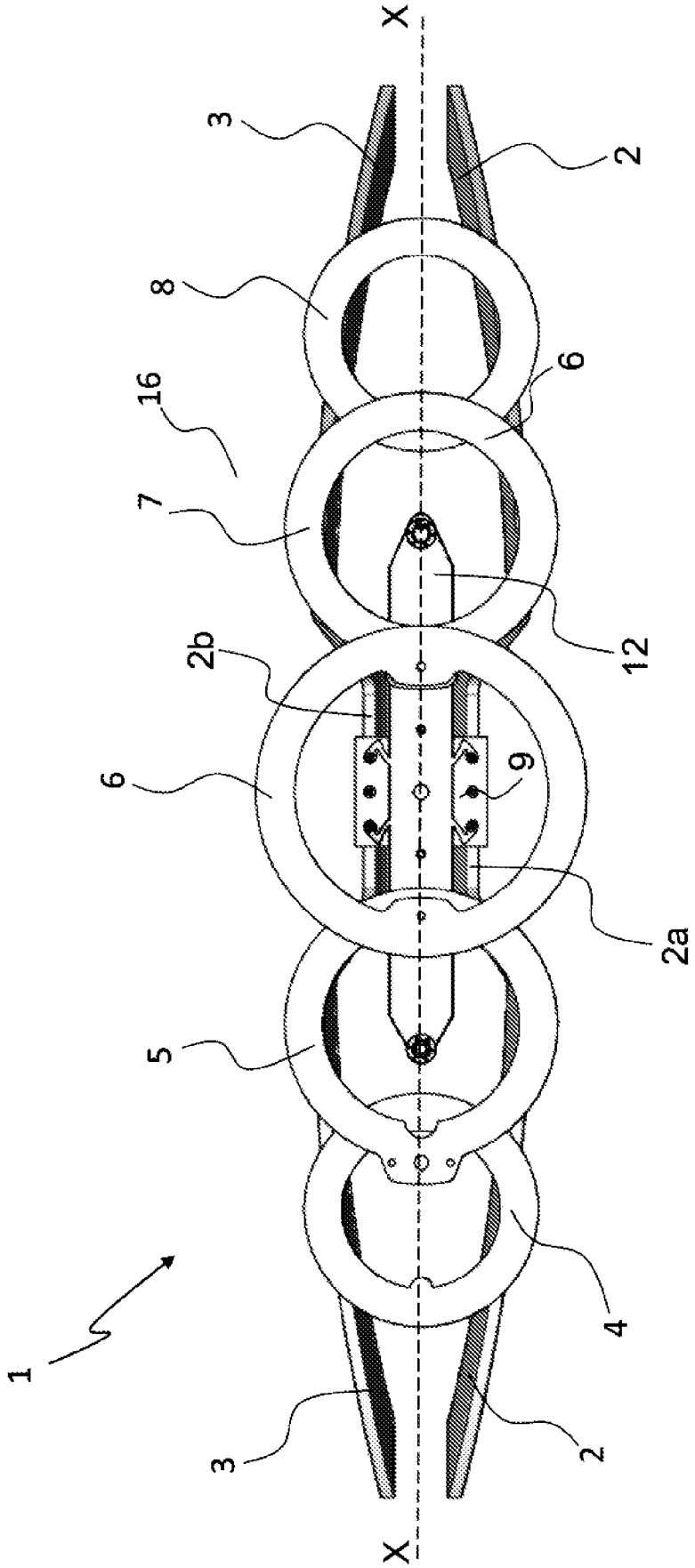


Fig. 2

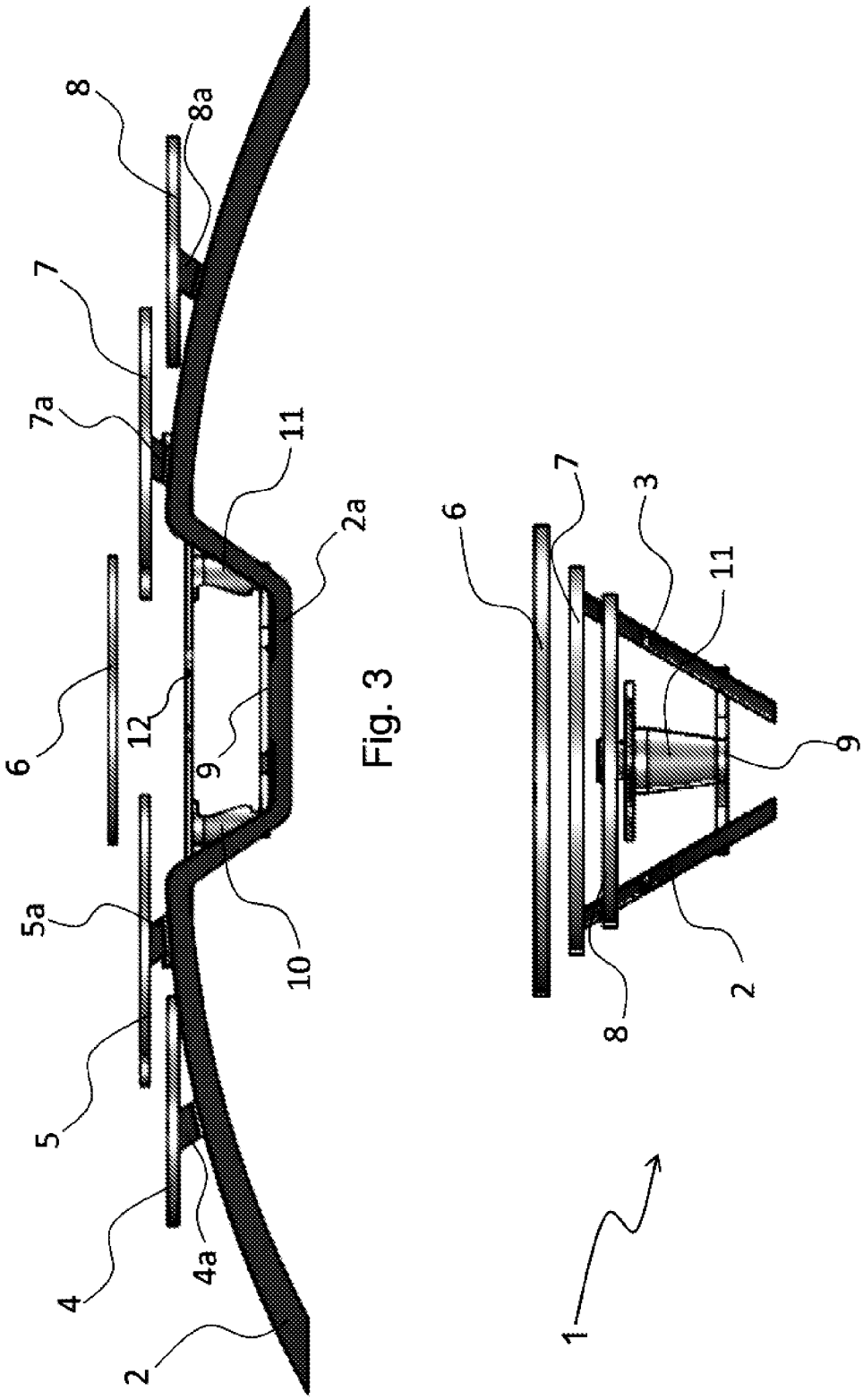


Fig. 3

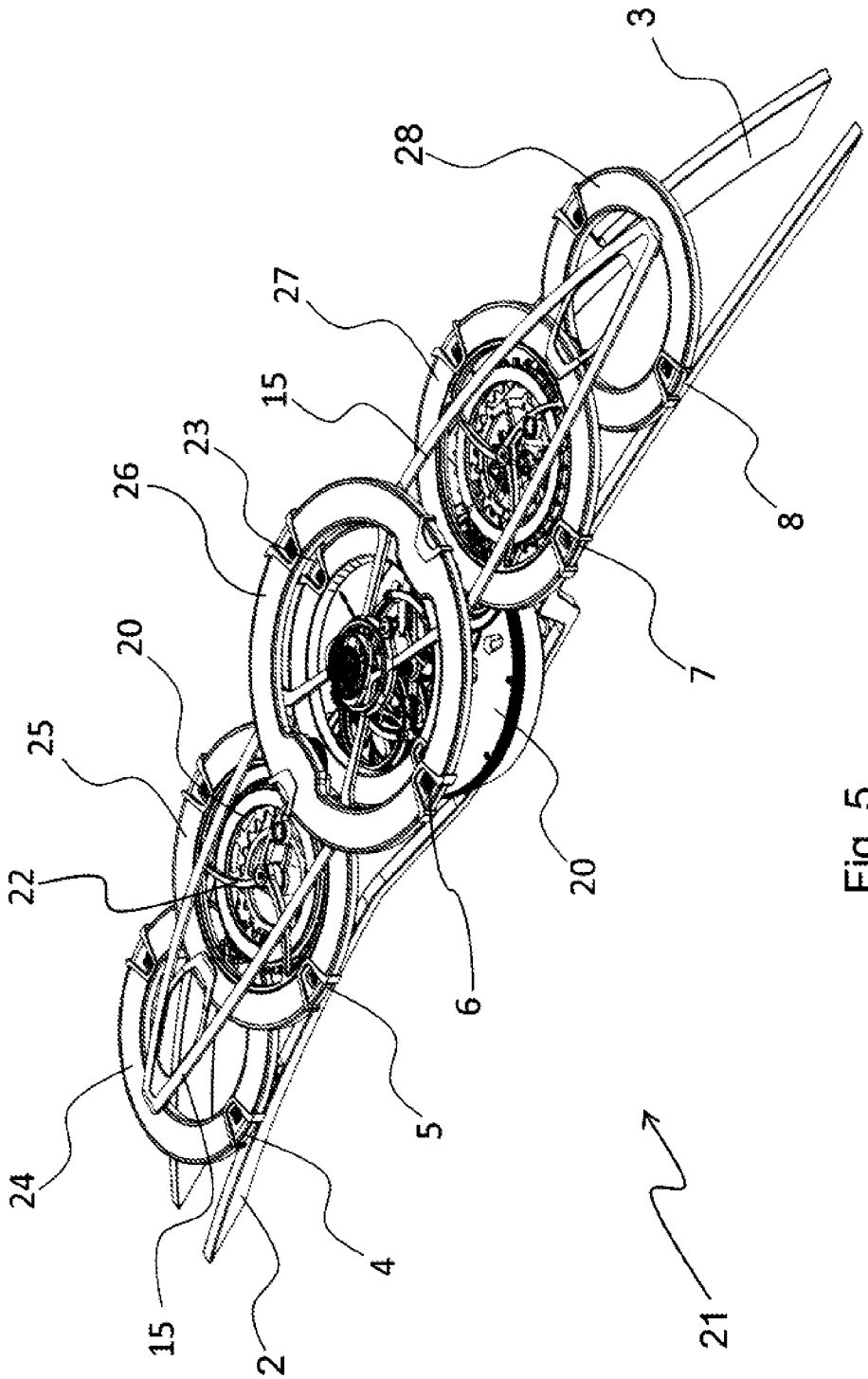


Fig. 5

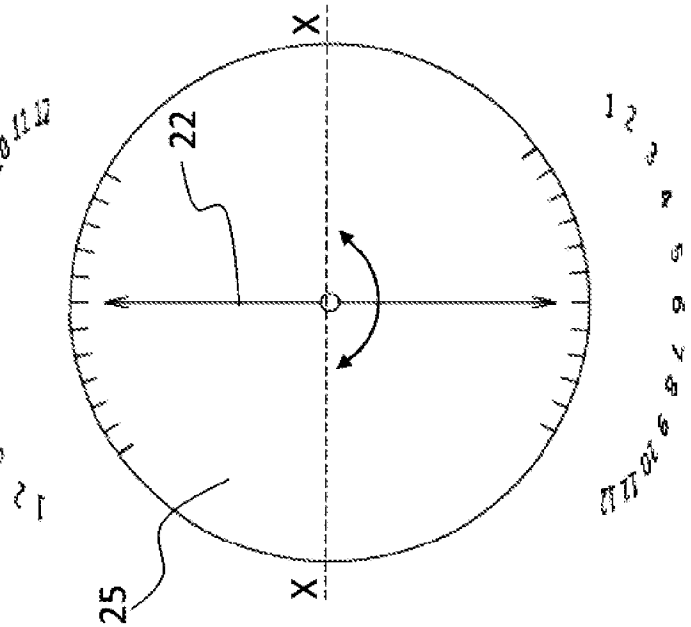


Fig. 7

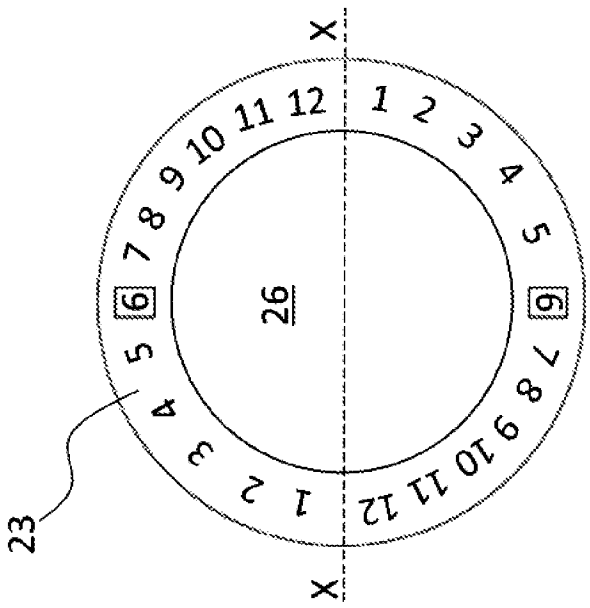


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2020/052750

A. CLASSIFICATION OF SUBJECT MATTER
INV. G04B37/14 G04B45/00 G04B33/08 G04B37/08
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008/044220 A2 (PENULA JOSEPH [US]) 17 April 2008 (2008-04-17) page 2, paragraphs 1,3 figures 1-3,8,10 page 5, paragraph 2	1-8
X	US 8 873 342 B1 (BOUDREAUX URSULA BLACKSHERE [US] ET AL) 28 October 2014 (2014-10-28) figure 9	1
X	FR 454 987 A (FABRIQUE MOVADO L A I DITESHEIM & FRERE [CH]) 19 July 1913 (1913-07-19) figure 4	1

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 July 2020	15/07/2020

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2020/052750

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 297 17 856 U1 (KUNDO STAIGER GMBH [DE]) 18 February 1999 (1999-02-18) figures 1,2 claims	1

X	US 2 166 687 A (KEHL HOWARD A) 18 July 1939 (1939-07-18) figure 2	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2020/052750

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008044220 A2	17-04-2008	CN 101632049 A	20-01-2010
		EP 2074484 A2	01-07-2009
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