(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 680 435 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.07.2020 Bulletin 2020/29

(51) Int Cl.:
E05F 11/06 *(2006.01)* ***E05F 15/619*** *(2015.01)*

(21) Application number: **20151741.4**

(22) Date of filing: **14.01.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **14.01.2019 DE 102019100837**

(71) Applicant: **Kingspan Holdings (IRL) Limited**
Kingscourt,
County Cavan (IE)

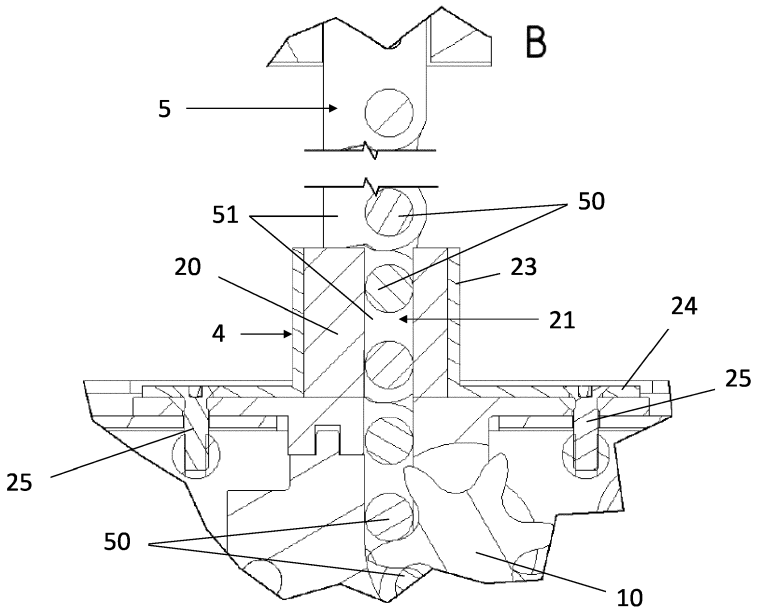
(72) Inventors:
- **Paya-Marin, Miguel A.**
  Hollywell, Flintshire CH8 7GJ (GB)
- **Fries, Wolfgang**
  32657 Lemgo (DE)
- **Czechowitz, Reiner**
  32657 Lemgo (DE)
- **Gladtfeld, Meik**
  32657 Lemgo (DE)
- **Schwedt, Peter**
  32657 Lemgo (DE)

(74) Representative: **Tomkins & Co**
5 Dartmouth Road
Dublin 6 (IE)

(54) **CHAIN DRIVE**

(57) A chain drive (1), in particular for a window, a flap or a dome light, comprising a housing (2) and an electric motor (8) which, by means of a transmission (9), drives a drive pinion (10) which is in engagement with a chain (5) which is formed from chain links and which is received in a retracted position in the housing (2) and can be conveyed, by means of the drive pinion (10), out of the housing (2) and can then be conveyed again into said housing through an opening therein, wherein a stripper which engages around the chain links of the chain (5) is arranged in the region of the opening on the housing (2), the chain links being able to be guided through said stripper. As a result, wet and dirt can be cleaned at least partially from the chain (5) by the stripper (20) when said chain is being retracted.

Fig. 2



EP 3 680 435 A1

Description

[0001] The present invention relates to a chain drive, in particular for a window, a flap or a dome light, comprising a housing and an electric motor which, by means of a transmission, drives a drive pinion which is in engagement with a chain which is formed from chain links and which is received in a retracted position in the housing and can be conveyed, by means of the drive pinion, out of the housing and can then be conveyed again into said housing through an opening therein.

[0002] DE 10 2011 000 881 A1 discloses a pivoting-out device for moving a leaf of a window or a ventilation flap relative to a stationary frame, wherein a movable chain is provided in order to open and close the leaf. Such chain drives have proven to be successful *per se*, but, when the leaf is in an opened position, the chain is subjected to weather conditions and can become both wet and also dirty.

[0003] Therefore, the object of the present invention is to provide a chain drive which has improved protection against wet and dirt.

[0004] This object is achieved by a chain drive comprising the features of claim 1.

[0005] The chain drive in accordance with the invention has, in the region of an opening on the housing for passage of the chain, a stripper which engages around the chain links of the chain and as a result can at least partially clean wet and dirt from the chain links when said chain is being retracted. Since the chain becomes dirty only in the opening position, the stripper can strip off any dirt when said chain is being retracted, and thus prevents this dirt from entering the housing of the chain drive. Moreover, the opening to the inner space of the housing can be small and so only a little amount of moisture or no moisture can enter the housing in the opened position. This prolongs the service life of the chain drive.

[0006] Preferably, the stripper is produced from an elastic material, e.g. from an elastic synthetic material or rubber. Preferably, EPDM is used for the stripper. In a preferred manner, the stripper can be designed as a one-piece moulded part which, during assembly, is fitted onto the chain. This ensures that the chain is enclosed in a particularly effective manner.

[0007] The chain links are formed having a substantially H-shaped cross-section perpendicular to the longitudinal direction of the chain. Similarly, a channel on the stripper is likewise formed having an H-shaped cross-section, wherein the chain links are arranged substantially in a form-fitting manner in the channel. The channel can have a length greater than the spaced interval between two bolts of a chain link and so the chain links are guided in an effective manner through the stripper.

[0008] In order to fix the stripper, it can have a protruding flange or it can be fixed on such a flange, wherein the flange is fixed to the housing, e.g. by means of screws, adhesion or other fastening means. In order to ensure stable support of the stripper, it can be fixed in a tubular holder which is produced e.g. from synthetic material or metal. The stripper can then be adhered in the tubular holder.

[0009] In an alternative embodiment, the stripper can also integrally have a holder with a groove, into which an edge of the housing is inserted. This reduces the number of components to a minimum.

[0010] The invention will be explained in greater detail hereinafter with the aid of two exemplified embodiments with reference to the attached drawings, in which:

Figures 1A-1D	show several views of a first exemplified embodiment of a chain drive in accordance with the invention;
Figure 2	shows a partial sectional view of the chain drive of figure 1 in the region of the stripper;
Figure 3	shows a sectional plan view of the stripper of figure 2;
Figure 4	shows a sectional view of a modified exemplified embodiment of a chain drive in accordance with the invention;
Figure 5	shows a partial sectional view of the chain drive of figure 4 in the region of the stripper, and
Figure 6	shows a plan view of the stripper of figure 5.

[0011] A chain drive 1 comprises a housing 2 which can be formed from one or a plurality of housing shells which can be fixed by fastening means 3 to a profile, e. g. a profile for a frame for a window, a flap or a dome light. The chain drive 1 can optionally be mounted on a stationary frame or the movable leaf.

[0012] Provided on the housing 2 is a feed-through 4 for a chain 5 which has, on the end side, a connection part 6 which can be fixed by means of a fastening element to a profile of a stationary or movable leaf.

[0013] Figure 1C shows the chain drive 1 in a sectional view. The chain drive 1 comprises an electric motor 8 which drives a schematically illustrated transmission 9 which rotates a drive pinion 10. The drive pinion 10 is in engagement with a chain 5 which can be conveyed out of the housing 2 or can be retracted into the housing 2 by means of the drive pinion 10. For this purpose, the housing 2 is provided with a receiving space 11 for the chain 5 in the retracted position.

[0014] Furthermore, the chain drive 1 comprises a controller 9 which is supplied with power and serves to control the electric motor 8 in order to move a leaf, a flap or a window to an opened or closed position.

[0015] Figure 2 illustrates in detail the chain drive 1 in the region of the feed-through 4. Located in the region

of an opening on the housing 2 is a stripper 20 which has a channel 21. The chain 5 which is formed from chain links is guided through the channel 21, wherein the channel 21 has a length greater than the spaced interval between two bolts 50 of a chain link.

[0016] The stripper 20 is produced as a one-piece moulded part from an elastic material, in particular EPDM, a rubber-containing material or an elastic synthetic material. The stripper 20 is fixed in a tubular holder 23, e.g. by means of adhesion. The tubular holder 23 comprises laterally protruding flanges 24 which are fixed to the housing 2 by means of screws 25. The tubular holder 23 and the flange 24 can be produced from metal or synthetic material. Alternatively, it is possible to also form the flange 24 in an integral manner with the stripper 20.

[0017] Figure 3 illustrates the region of the channel 21 of the stripper 20 in a plan view. It can be seen that the channel 21 is formed having a substantially H-shaped cross-section, similar to the chain links which are formed by bolts 50 and the plates 51 connecting the bolts 50. The plates 51 can be pulled substantially in a form-fitting or clamping manner through the channel 21 in order to strip off any dirt on the surface of the plates 51 or the bolts 50.

[0018] Figure 4 shows a modified exemplified embodiment of a chain drive in which, in a similar manner to the first exemplified embodiment, the chain drive has an electric motor 8, a transmission 9 for driving the drive pinion 10, wherein the chain 5 can be inserted into a receiving space 11 or a chamber.

[0019] As shown in the detailed views of figures 5 and 6, the stripper 20 is modified such that it is not arranged in a tubular holder but instead is fixed directly on the housing 2. For this purpose, the stripper 20 is provided on the outer side with protrusions 30, on which a groove which is open outwards is formed. An edge 31 on the housing wall of the housing 2 is inserted into the groove in order to fix the stripper 20 on the housing 2. As a result, the stripper 20 can be fixed in a clamping manner to an opening of the housing 2. Furthermore, the stripper 20 then has a channel 21, through which the chain links comprising the bolts 50 and the plates 51 are guided, as described in the case of the preceding exemplified embodiment.

[0020] Other fastening means can also be used in order to fix the stripper 20 to an opening of the housing 2. For example, the stripper 20 can be held in a clamping manner on an outer side of the housing 2 by fastening means.

[0021] The words "comprises/comprising" and the words "having/including" when used herein with reference to the present invention are used to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof. It is appreciated that certain features of the invention, which are for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity described in the context of a single embodiment, may also be provided separately or in any suitable combination.

List of reference signs

[0022]

1	chain drive
10	drive pinion
11	receiving space or chamber
2	housing
20	stripper
21	channel
23	holder
24	flange
25	screws
3	fastening means
30	protrusions
31	edge
4	feed-through
5	chain
50	bolts
51	plates
6	connection part
7	controller
8	electric motor
9	transmission

Claims

1. Chain drive (1), in particular for a window, a flap or a dome light, comprising
a housing (2) and an electric motor (8) which, by means of a transmission (9), drives a drive pinion (10) which is in engagement with a chain (5) which is formed from chain links and which is received in a retracted position in the housing (2) and is conveyed, by means of the drive pinion (10), out of the housing (2) and conveyed again into said housing through an opening therein, and wherein a stripper which engages around the chain links of the chain (5) is arranged in the region of the opening on the housing (2), the chain links being guidable through said stripper.

2. Chain drive as claimed in claim 1 wherein the stripper (20) is produced from an elastic material.

3. Chain drive as claimed in claim 1 or 2, wherein the stripper (20) is formed as a one-piece moulded part.

4. Chain drive as claimed in any one of the preceding claims, wherein the chain links are formed having a substantially H-shaped cross-section and a channel (21) on the strippers (20) is likewise formed having an H-shaped cross-section.

5. Chain drive as claimed in any one of the preceding claims, wherein a channel on the stripper has a length greater than the spaced interval between two bolts (50) of a chain link.

6. Chain drive as claimed in any one of the preceding claims, wherein the stripper (20) has a protruding flange (24) or is connected to said flange which is fixed on the housing (2).

7. Chain drive as claimed in any one of the preceding claims, wherein the stripper (20) is fixed in a clamping manner on the housing.

8. Chain drive as claimed in any one of the preceding claims, wherein the stripper (20) has a fastening portion (30) with a groove, into which an edge (31) of the housing (2) is inserted.

9. Chain drive as claimed in any one of the preceding claims, wherein the stripper (20) is fixed in a tubular holder (23).

10. A window, a flap or a dome light comprising the chain drive according to any of claims 1 to 9.

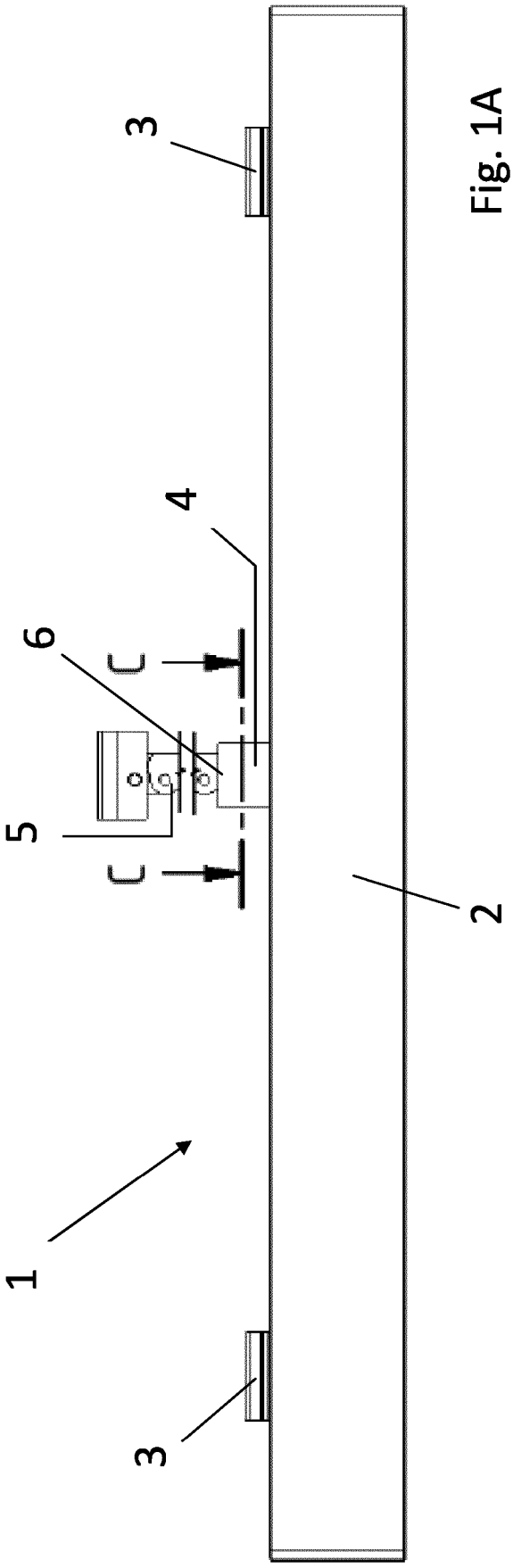


Fig. 1A

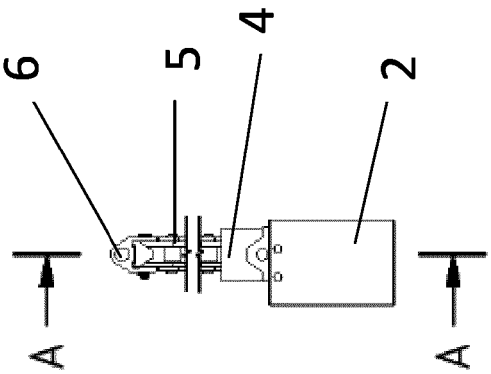


Fig. 1B

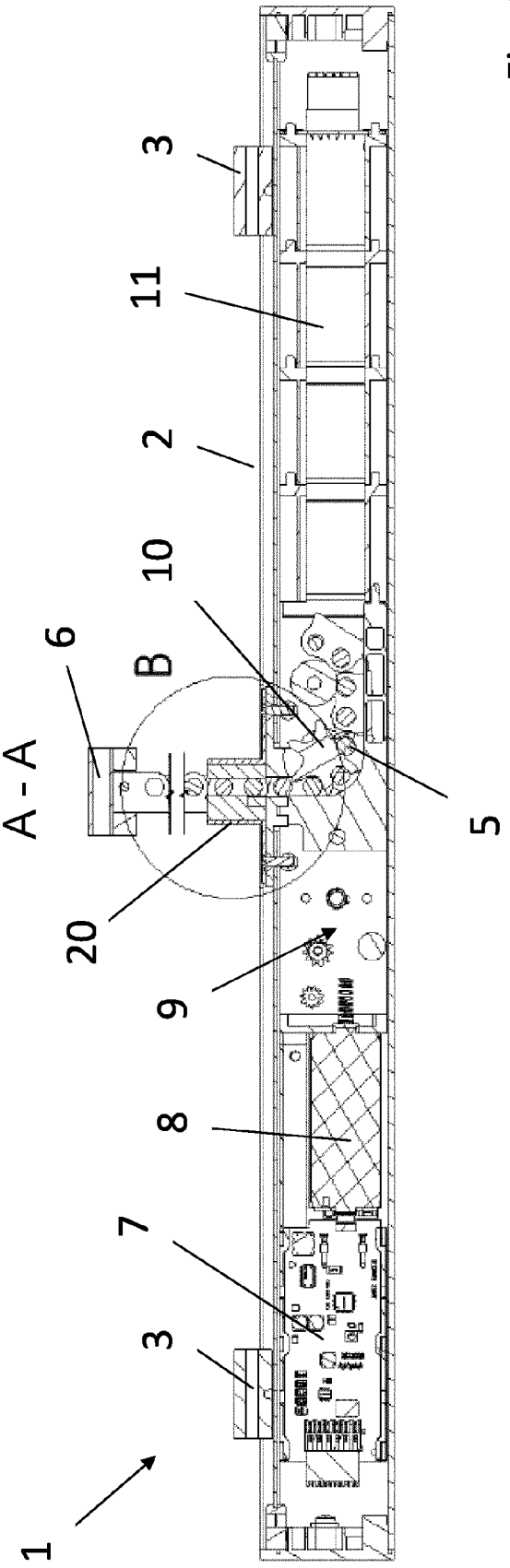


Fig. 1C

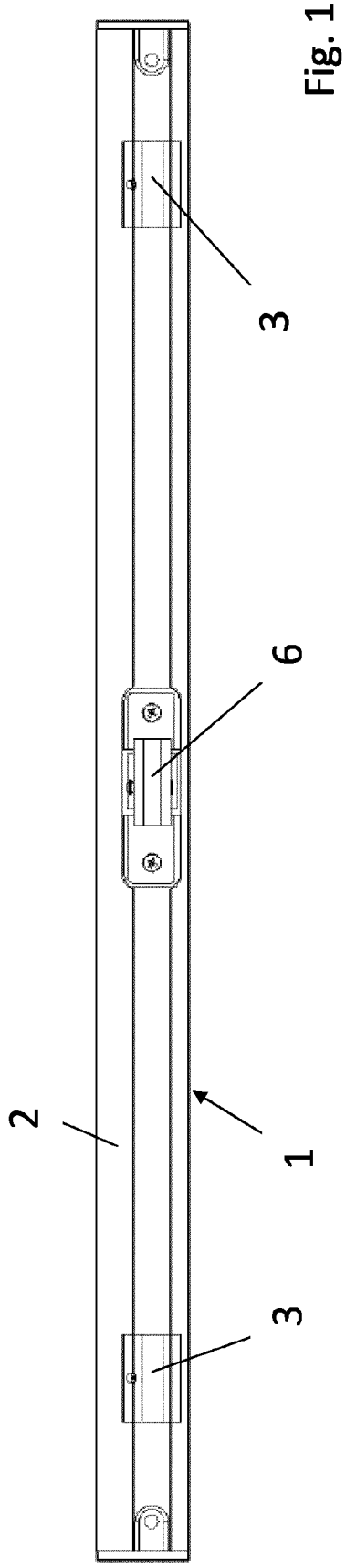


Fig. 1D

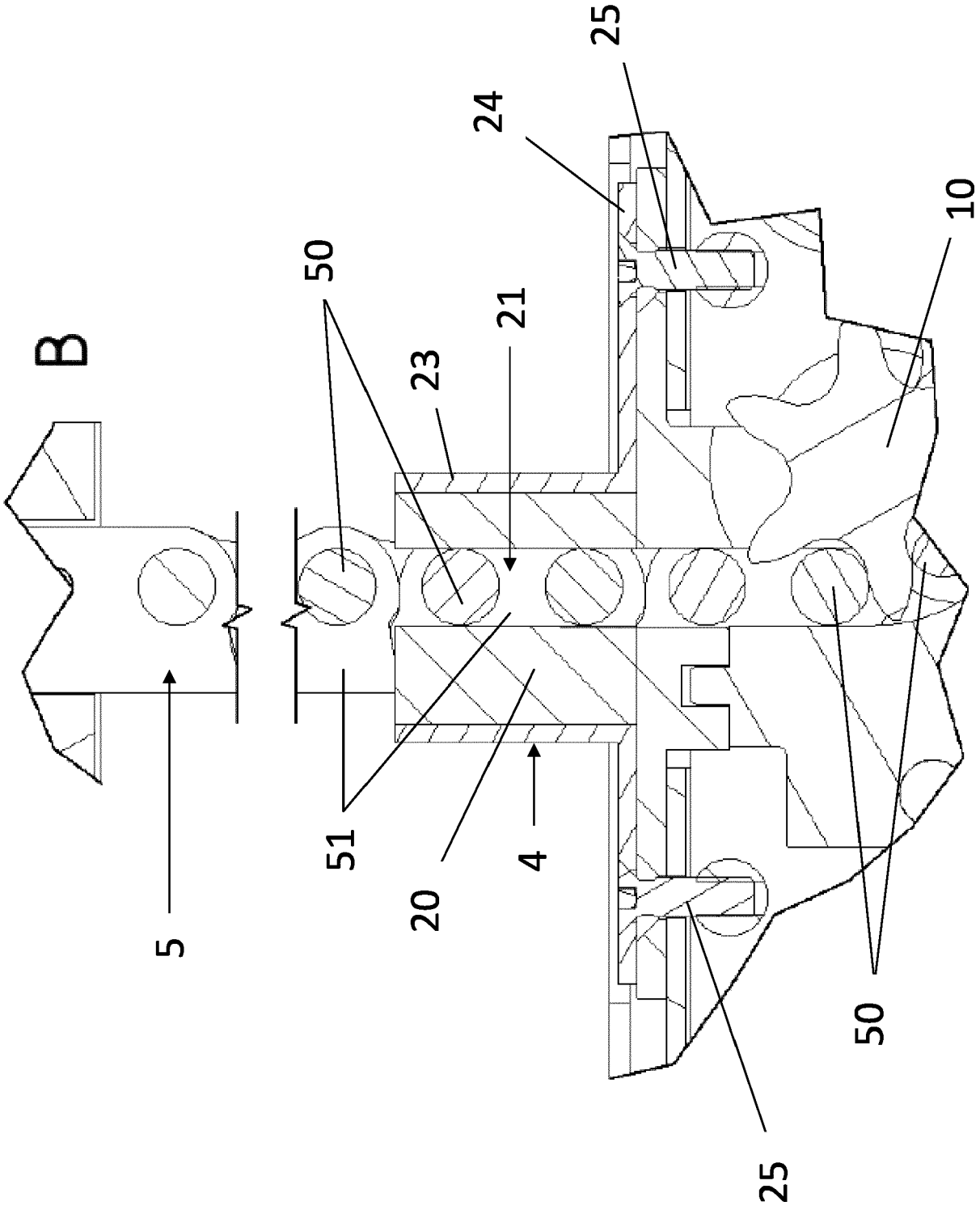


Fig. 2

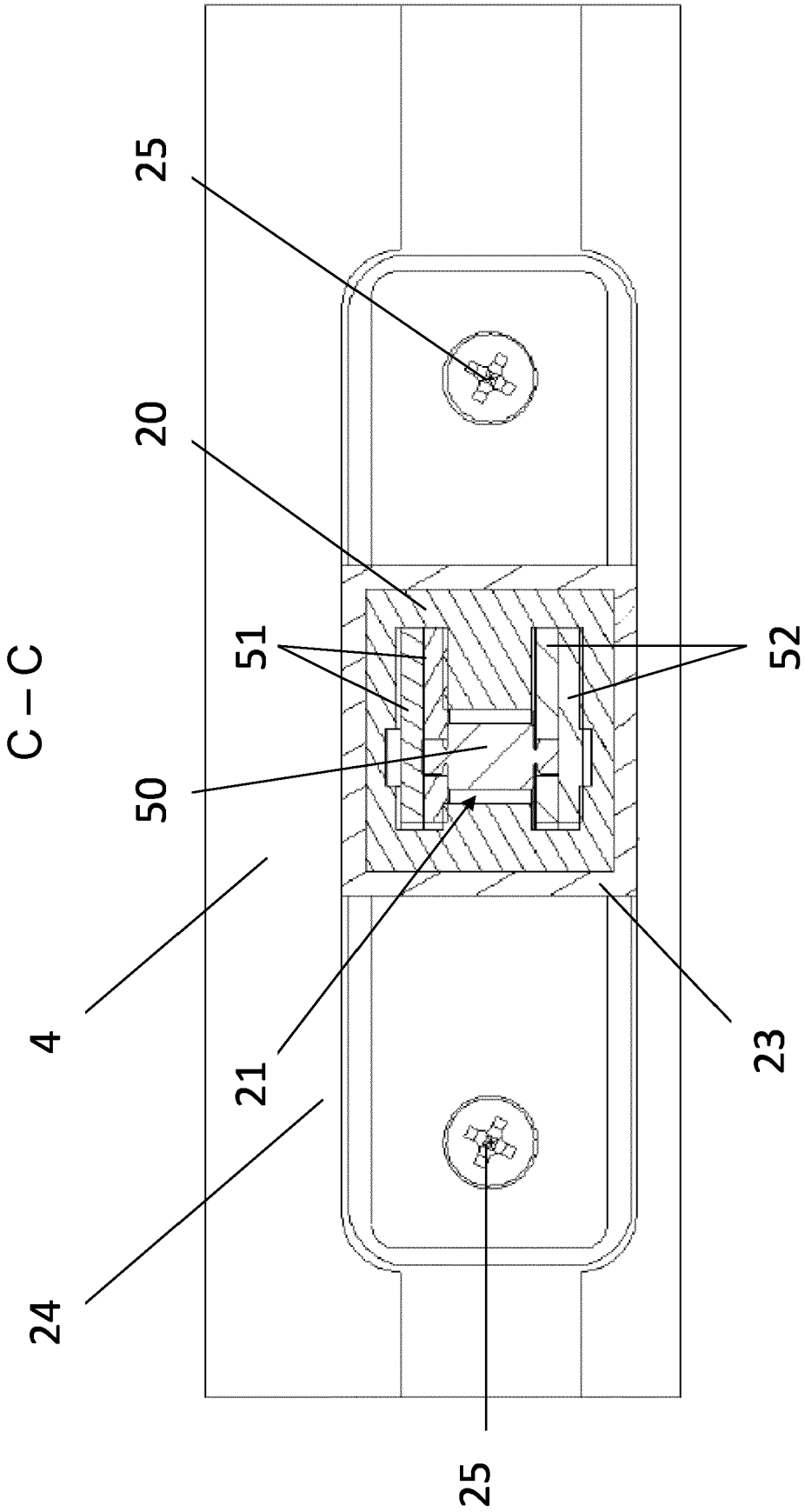


Fig. 3

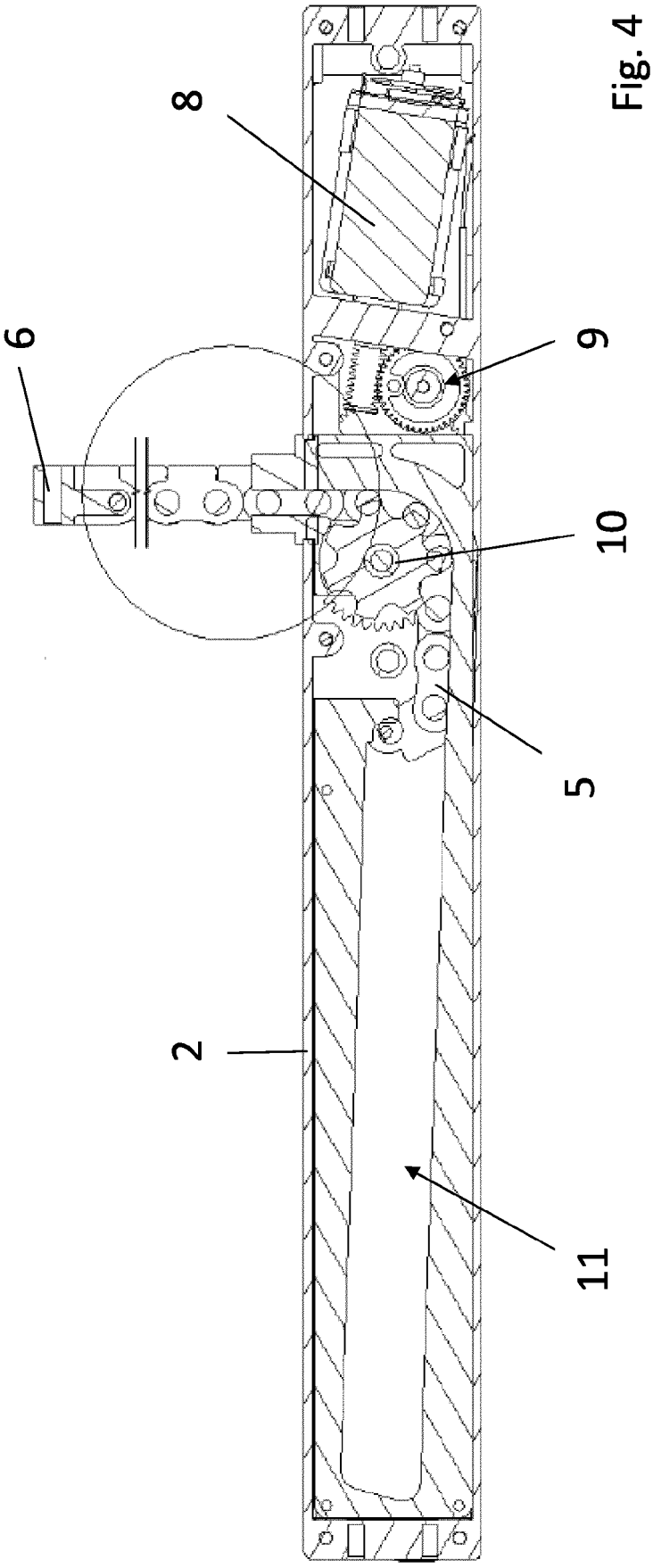


Fig. 4

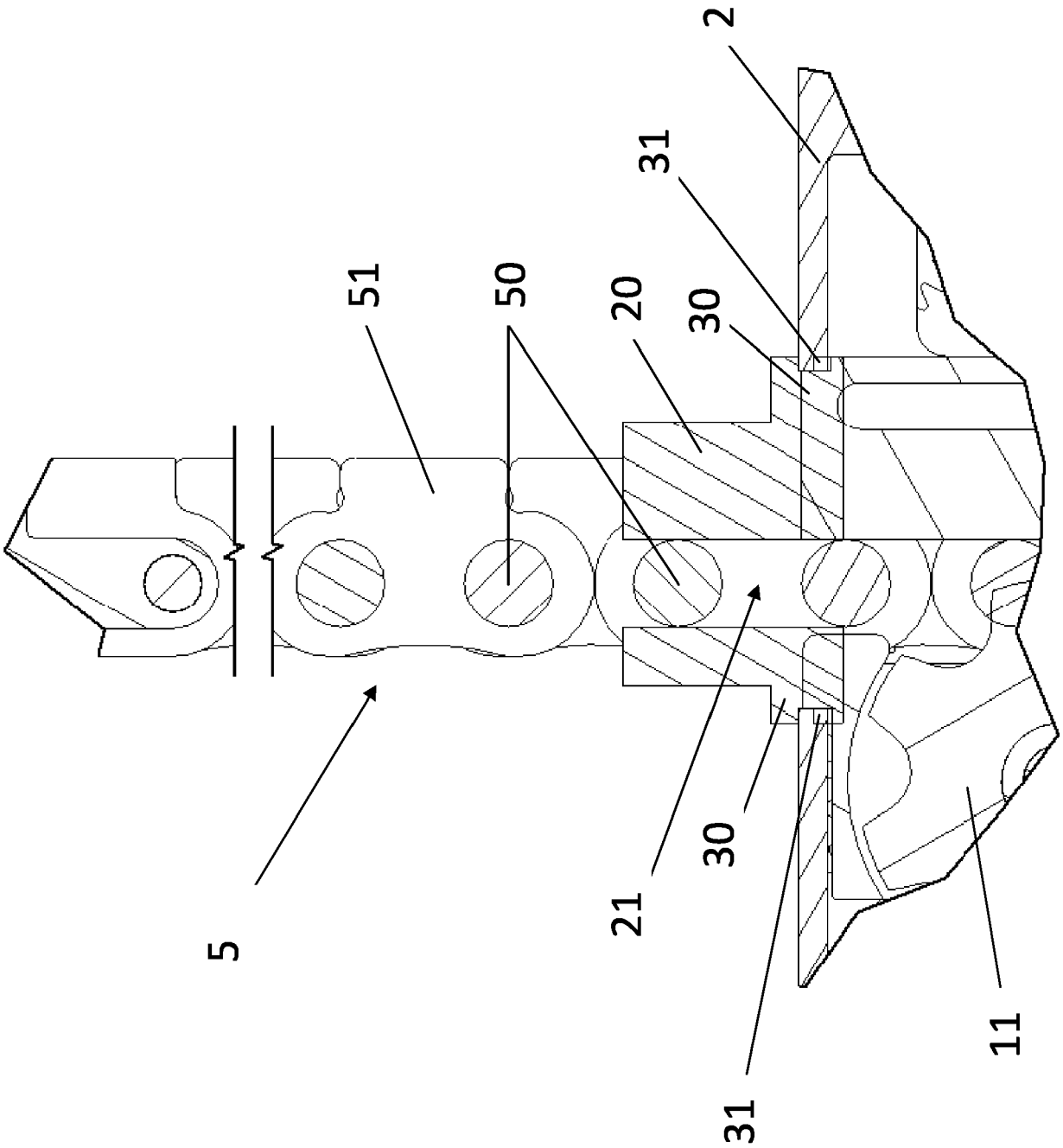


Fig. 5

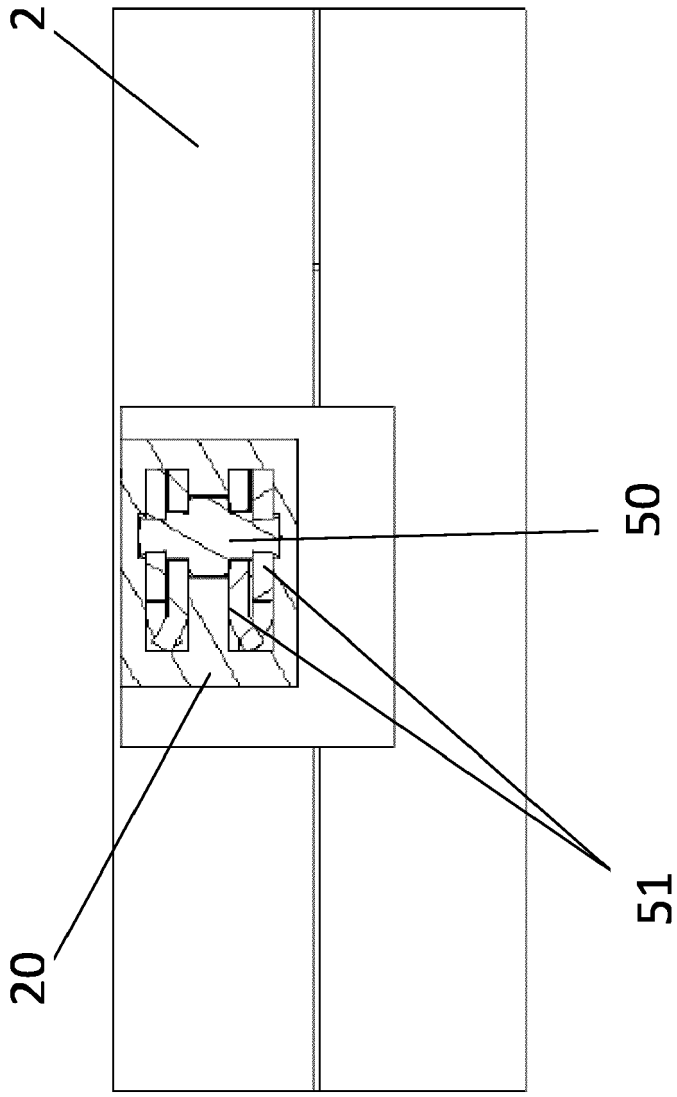


Fig. 6

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 15 1741

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 20 2015 100105 U1 (AUMÜLLER AUMATIC GMBH [DE]) 11 April 2016 (2016-04-11) * paragraphs [0040] - [0043]; figures 2-5 *	1,2,5,6, 10	INV. E05F11/06 E05F15/619
X	EP 0 864 720 A2 (TOPP S R L [IT]) 16 September 1998 (1998-09-16) * column 2, lines 31-46; figures 3,11,12 *	1-5,9,10	
X	IT BO20 120 439 A1 (WINDOW AUTOMATION INDUSTRY S R L A SOCIO UNICO) 8 February 2014 (2014-02-08) * figures 4-6 *	1,6,7,10	
X	EP 0 610 948 A1 (SCHLACHTER KLEMENS [DE]) 17 August 1994 (1994-08-17) * column 12, line 54 - column 14, line 58; figures 16-18 *	1-3,6, 8-10	

TECHNICAL FIELDS SEARCHED (IPC)

E05F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 May 2020	Witasse-Moreau, C

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 15 1741

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-05-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202015100105 U1	11-04-2016	CN 107208447 A	26-09-2017
		DE 202015100105 U1	11-04-2016
		EP 3245373 A1	22-11-2017
		WO 2016113286 A1	21-07-2016
EP 0864720 A2	16-09-1998	AT 253682 T	15-11-2003
		DE 69819386 T2	26-08-2004
		EP 0864720 A2	16-09-1998
		IT PD970051 A1	14-09-1998
IT BO20120439 A1	08-02-2014	---	---
EP 0610948 A1	17-08-1994	DE 4304108 A1	10-11-1994
		EP 0610948 A1	17-08-1994

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 102011000881 A1 **[0002]**