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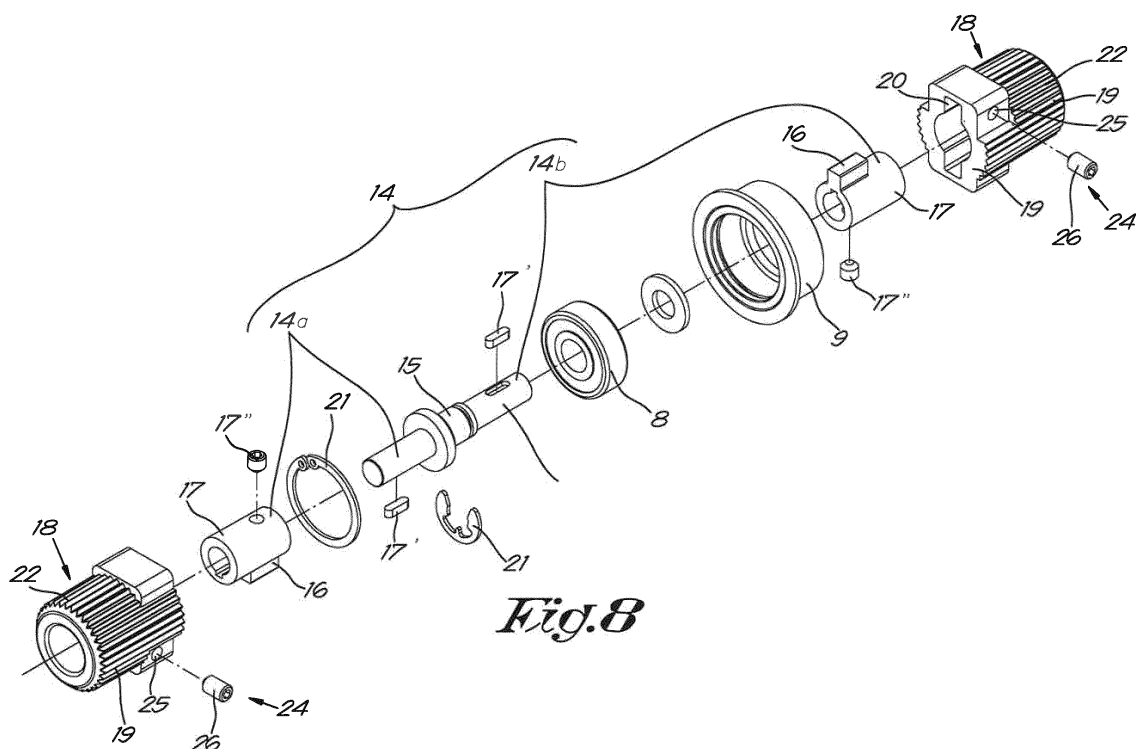
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(54) **SCREEN DEVICE WITH COUPLED RETRACTABLE SCREENS, COUPLING APPLIED THEREBY AND USE THEREOF**

(57) Screen device with two screens (5) which are each mounted on a screen roll (6), containing a torque-transmitting coupling (7) between two coupled rotatable screen rolls (6), such that the drive of one screen roll (6) also drives the other screen roll (6) coupled thereto, wherein the coupling (7) contains an input shaft (14a) and an output shaft (14b) connected to each other and on each shaft (14a,14b) contain a coupling part (18), re-

spectively a first coupling part (18) for coaxial coupling with one screen roll (6) and a second coupling part (18) for coaxial coupling with the other screen roll (6), whereby one coupling part (18) is rotatable over an angle around its shaft (14a, 14b) and whereby the coupling (7) contains an adjustable control (24) with which the angle of rotation of said coupling part (18) relative to its shaft (14a, 14b) can be controlled.



Description

[0001] The present invention relates to a screen device with coupled retractable screens.

[0002] In particular the invention relates to a screen device with at least two retractable screens in the form of a canvas or rolling shutter each retractably and extendably mounted on a screen roll, whereby the awning contains a torque-transmitting coupling between the at least two screen rolls such that the drive of one screen roll will also drive the other screen roll coupled thereto.

[0003] For such screen device both screens can be simultaneously retracted and extended by one single drive, typically in the form of a tube motor in one of both screen rolls.

[0004] Upon mounting the screens it is inevitable that although the lower edges or the bottom bars of both screens are adjusted to the same height relative to each other, the lower edge of one screen ends up slightly higher or lower than the lower edge of the other screen.

[0005] The tube motor allows the upper and lower end positions of the lower edge of both screens to be controlled, but because there is only one drive for both, the difference in height between the lower edge of both screens continues to exist when retracting and extending.

[0006] Screen devices are already known whereby said difference in height can be manually controlled by a rotation of one screen roll relative to the other screen roll by a toothed coupling which engages in one of the screen rolls.

[0007] However, for controlling said difference in height the toothed coupling must be removed from the screen roll and iteratively moved one tooth every time in consecutive steps to, after reassembling, be able to check the alignment of the lower edge of the screens and to restart if necessary.

[0008] It goes without saying that this is time-consuming and consequently not accurate as this control is not continuously variable and is only as accurate as moving the teeth allows.

[0009] The purpose of the present invention is to provide a solution to one or more of the aforementioned and other disadvantages.

[0010] To this end, the invention relates to a screen device with at least two screens which are each retractably and extendably mounted on a screen roll, whereby the screen device contains a torque-transmitting coupling between two rotatably coupled screen rolls, such that the drive of one screen roll also drives the other screen roll coupled thereto, characterised in that the coupling contains an input shaft and an output shaft which are connected to each other in a torque-transmitting way and on each shaft contain a coupling part, respectively a first coupling part for coaxial coupling with one screen roll and a second coupling part for coaxial coupling with the other screen roll, whereby at least one coupling part is rotatable over at least an angle around its shaft and whereby the coupling contains an adjustable control with

which the angle of rotation of said coupling part relative to its shaft can be controlled.

[0011] In this way it is possible to control the alignment of the screens accurately and preferably in a continuously variable way by controlling the rotatable coupling part without having to remove the coupling or the relevant coupling part.

[0012] Consequently, a considerable amount of time can be saved when finetuning the position of one screen relative to the other.

[0013] An advantage of such coupling between two screen rolls is that one single drive suffices to retract and extend both screens, for example in the form of a tube motor which drives one of both screen rolls while the other screen roll is also retracted or extended by said driven screen roll.

[0014] Preferably, each coupling part of the coupling is provided with an adjustable control with which the angle of rotation of the relevant coupling part relative to its shaft can be controlled and adjusted and this independently from each other.

[0015] Moreover, this doubles the control range.

[0016] According to a practical embodiment at least one coupling part contains a sleeve which is mounted rotatably around its relevant shaft and from the inside is provided with an axial groove and the shaft is provided with a radial protrusion which in a mounted condition is integrated with a certain lateral play in the groove of the sleeve, such that the sleeve is rotatable around the shaft over a certain angle, whereby a screw passage is provided in the sleeve for an adjusting screw which ends in said groove of the sleeve opposite the protrusion.

[0017] By screwing or unscrewing the adjusting screw in the screw passage, the lateral play of the protrusion of the shaft in the groove of the sleeve can be controlled.

[0018] In the case of vertical screens, one single adjusting screw is sufficient as the weight of the bottom bar at the bottom means the protrusion of the shaft can always be tightened against the adjusting screw and consequently the position of this single adjusting screw determines the height of the bottom bar.

[0019] It is not excluded that a screw passage is provided for an adjusting screw in the sleeve on either side of the groove, both screw passages ending in the aforementioned groove opposite the protrusion, such that, by suitably screwing and/or unscrewing the adjustment screws in the opposite screw passages, the sleeve on the shaft can be rotated and locked in a certain position thereon between the screws.

[0020] This embodiment is particularly useful in case the weight of the bottom bar is not sufficient to pull the screen downward with sufficient force or in case of a screen device in which the screens move diagonally, such as above a terrace or porch or the like.

[0021] The protrusion of the shaft can, for example, be mounted on a bushing which is coaxially mounted over a thinner shaft and fixedly attached thereto, such that for forming the coupling part it is possible to depart from a

classic or existing smooth shaft without protrusion.

[0022] This allows an existing shaft, for example the input or output shaft of an existing angle transmission between both screen rolls, to be provided with a protrusion for use in a coupling according to the invention.

[0023] Preferably, the adjustable control of at least one coupling part is accessible for control with the screen rolls in coupled and mounted condition.

[0024] Thus, control or adjustment is possible at all times without removing the screen rolls.

[0025] For this purpose, it is useful that the control is accessible at an accessible location between both screen rolls.

[0026] The invention also relates to a coupling for a torque-transmitting coupling between two screen rolls, whereby the coupling contains two coupling parts on a shaft for coupling with a screen roll, whereby at least one coupling part is rotatable over an angle around its shaft and whereby the coupling contains an adjustable control with which the angle of rotation of said coupling part relative to its shaft can be controlled.

[0027] The invention also relates to the use of such coupling for a torque-transmitting coupling between two screen rolls of a screen device for simultaneously retracting and extending the screens on the screen rolls, characterised in that the coupling is also used for the alignment of the underside of the screens relative to each other by controlling the angle of rotation of at least one coupling part of the coupling.

[0028] With the intention of better showing the characteristics of the invention, a few preferred embodiments of a screen device according to the invention and a coupling applied thereby are described by way of an example without any limiting nature, with reference to the accompanying drawings, wherein:

figure 1 schematically shows a front view of a screen device according to the invention;

figure 2 shows a cross-section according to line II-II in figure 1, but built into the cavity of a wall and with the screens in retracted position;

figure 3 shows the screen device of figure 1 in exploded view;

figure 4 shows the internal components of the section indicated in figure 3 with a frame F4;

figures 5 and 6 show consecutive steps during the mounting of the screen device of figure 1 using a coupling according to the invention;

figure 7 shows the coupling according to the invention as indicated by arrow F7 in figure 5 on a larger scale;

figure 8 shows the coupling of figure 7 in exploded view;

figures 9 to 11 show a cross-section according to line IX-IX in figure 7 and this for different control settings;

figure 12 shows a cross-section as that of the figures 9 to 11, but for an alternative embodiment;

figure 13 shows an alternative embodiment of a device according to the invention;

figure 14 shows the screen device of figure 13 in exploded view;

figure 15 shows the coupling in partially exploded view indicated in figure 14 with F15;

figure 16 shows yet another embodiment of a screen device according to the invention.

[0029] The screen device 1 shown in the figures 1 to 4 contains a screen casing 2 which can be built into the cavity 3 of a cavity wall 4 for example as shown in figure 2.

[0030] In this case two screens 5 are mounted in the screen casing 2, each on a screen roll 6 which is mounted with bearings on both ends in a support of the screen casing 2.

[0031] The screen rolls 6 are connected in a torque-transmitting way by a coupling 7 according to the invention which is bearing-mounted by means of a bearing 8 and a shim 9 in a central support 10 in the middle of the screen casing 2.

[0032] One of both screen rolls 6 is provided with a drive 11, for example in the form of a tube motor which is mounted in the hollow tube of the screen roll 6.

[0033] The coupling 7 between both screen rolls 6 means one single drive 11 is sufficient to be able to simultaneously retract and extend both screens 5.

[0034] The tube motor 11 can be mounted in the left and right screen roll 6 at one's discretion. Figure 4 shows mounting in the left screen roll 6.

[0035] In the case of the example, the coupling ensures both the bearing-mounting of the ends of the screen rolls 6 coupled to each other and the transmission of the torque of the screen roll 6 with the motor drive 11 to the other screen roll 6 without motor drive.

[0036] Figures 5 and 6 illustrate the mounting of the coupling 7 between both screen rolls 6.

[0037] At their lower edge the screens 5 are provided with a bottom bar 12, the weight of which ensures the relevant screen 5 is pulled down tautly.

[0038] The bottom bars 12 as well as the side edges of the screens 5 are, in the example of the figures, guided in vertical guides 13 in the known way.

[0039] During the mounting of the screens 5 on the screen rolls 6 a difference in height H between the bottom bars 12 of both screens 5 is almost inevitable as illustrated in figure 1.

[0040] The end positions of the bottom bars 12 when retracting and extending the screens 5 can be adjusted via the tube motor 11.

[0041] However, said adjustment simultaneously controls the end positions of both screens 5 at the same time as there is only one tube motor 11 for both screens 5 and does not eliminate the existing difference in height H between the bottom bars 12.

[0042] Said difference in height H can, with the screens 5 and screen rolls 6 in mounted condition, be eliminated by means of the coupling 7 according to the invention as

described below and as shown in the figures 7 and 8.

[0043] The coupling 7 contains a shaft 14 which by means of said bearing 8 is mounted with bearings in the central support 10.

[0044] The shaft 14 is composed of a proper straight continuous shaft 15 and two bushings 17, each with a radial protrusion 16, which are coaxially mounted over the proper shaft 15 and attached thereon, for example by means of a wedge 17' and a locking screw 17".

[0045] The thus composed shaft 14 contains a section 14a on the side of the screen roll 6 with the tube motor 11, referred to here as the input shaft 14a with a protrusion 16, and a section 14b on the side of the screen roll 6 without drive, referred to here as the output shaft 14b with a protrusion 16.

[0046] It is not excluded that the protrusions 16 are attached directly on the proper shaft 15 without intervention of a bushing 17.

[0047] Whatever the case, the input and output shafts 14a and 14b are then both provided with a radial protrusion 16.

[0048] The coupling 7 is further provided with two coupling parts 18 for the coupling with each of the screen rolls 6 to be coupled, said coupling parts 18 containing a sleeve 19 which is fittingly slid over the input and output shafts 14a and 14b with protrusion 16 and which along their inside are provided with an axial groove 20 in which the protrusions 16 are integrated with a certain lateral play, such that due to said play the sleeves 19 are freely rotatable over a limited angle around the relevant shafts 14a and 14b.

[0049] The sleeves 19 are axially secured on the shaft 14 by means of circlips 21 or the like.

[0050] On their outer contour the sleeves 19 are provided with an axially extending toothing 22 with which the sleeves 19 can engage in a complementary internal toothing of an end plug 23 as typically provided in an end of the screen rolls 6.

[0051] The couplings are provided with an adjustable control 24 with which the angle of rotation of every coupling part 18 can be controlled relative to the shaft 14 on which the coupling part 18 is mounted.

[0052] The control 24 is in this case formed by the sleeves on either side of the groove 20, being provided with a screw passage 25 for an adjusting screw 26, both said screw passages 25 ending in the aforementioned groove 20 opposite the protrusion 16 in the groove 20.

[0053] The weight of the bottom bar 12 in the groove 20 pulls the protrusion 16 to one side. In the case of the figures 9 to 11 this is to the right.

[0054] In this case one single adjusting screw 26 is sufficient, i.e. in the right screw passage 26 to be able to control the relevant coupling part 18.

[0055] By screwing the adjusting screw 25, the protrusion 16 in the groove 20 is moved to the left. The weight of the bottom bar 12 hereby keeps the protrusion 16 in contact with the end of the adjusting screw 26.

[0056] Figure 9 shows a middle position of the protrusion 16 in the groove 20, whereas in figure 10 the sleeve 19 relative to said middle position is rotated counter-clockwise by screwing in the adjusting screw and in figure 11 the sleeve 19 is rotated clockwise by unscrewing the adjusting screw 26.

[0057] Thus the angle position of the sleeve 19 of the coupling part 18 relative to the shaft 14a or 14b can be determined and consequently also the height of the bottom bar 12 of the screen 5 on the coupled screen roll 6 relative to the bottom bar 12 of the other screen, at least to the extent that the other coupling part 18 is not adjusted or said coupling part 18 is a fixed coupling part without control. By controlling the adjusting screw the height of the bottom bar 12 of the screen can be controlled as shown in figure 1 with arrow P.

[0058] Depending on the direction in which the screen 5 is rolled on the screen roll 6 an adjusting screw 26 will be applied in the left or in the right screw passage 26.

[0059] It is also possible to provide an adjusting screw 26 in each of the two screw passages 25 to, as shown in figure 12, be able to lock the protrusion 16 in a desired position between the two adjustment screws 26 and thus also to block the position of the coupling part 18 on the shaft 14a or 14b.

[0060] Obviously it is also possible that only one screw passage 25 is provided on this or the other side of the groove 20.

[0061] The invention is also applicable in the case of two screens 5 which are coupled at an angle with each other as shown in figure 13, whereby the plane in which one screen 5 is retracted and extended is at right angles with the plane of the other screen 5.

[0062] In this case the two screen rolls 6 are coupled with each other by means of a torque-transmitting perpendicular coupling 7 with a perpendicular transmission with an input shaft 14a and an output shaft 14b which are oriented perpendicularly to each other, whereby one or both shafts 14a or 14b can be provided with a rotatable coupling part 18 for alignment of the bottom bars 12.

[0063] In this case there is no central side guide, but the bottom bars 12, after alignment relative to each other, are mutually connected by a corner piece 27 with legs 28 which are axially attached in the bottom bars 12.

[0064] Figure 16 shows yet another application of a screen device 1 according to the invention with two screens 5 which in this case can be retracted and extended according to a sloping plane in sloping guides 13.

[0065] The invention is also applicable to awnings with coupled screen rolls with a retractable and extendable canvas which is attached at the bottom on a bottom bar that is attached to articulated arms which push the bottom bar in a diagonally downward direction away from the screen rolls upon extending.

[0066] It is understood that control of the angle of rotation of the rotatable sleeve 19 on the shaft 14a or 14b can also be realised in other ways, for example by replacing the adjustment screws 26 with a shaft with a worm which engages on a worm wheel which is attached to the

shaft 14a or 14b, whereby, by rotating the shaft with the worm, the worm wheel can be rotated, and consequently also the sleeve 19 on the shaft 14a or 14b when it is held.

[0067] The present invention is by no means limited to the embodiments described as an example and shown in the drawings, but a screen device according to the invention and a coupling thereby applied and use can be realised in all kinds of forms and dimensions, without departing from the scope of the invention.

Claims

1. Screen device with at least two screens (5) which are each retractably and extendably mounted on a screen roll (6), whereby the screen device contains a torque-transmitting coupling (7) between two coupled rotatable screen rolls (6), such that the drive of one screen roll (6) also drives the other screen roll (6) coupled thereto, **characterised in that** the coupling (7) contains an input shaft (14a) and an output shaft (14b) which are connected to each other in a torque-transmitting way and on each shaft (14a, 14b) contain a coupling part (18), respectively a first coupling part (18) for coaxial coupling with one screen roll (6) and a second coupling part (18) for coaxial coupling with the other screen roll (6), whereby at least one coupling part (18) is rotatable over at least an angle around its shaft (14a, 14b) and whereby the coupling (7) contains an adjustable control (24) with which the angle of rotation of said coupling part (18) relative to its shaft (14a, 14b) can be controlled.
2. Screen device according to claim 1, **characterised in that** each coupling part (18) contains an adjustable control (24) with which the angle of rotation of the relevant coupling part (18) relative to its shaft (14a, 14b) can be controlled and set and this independently from each other.
3. Screen device according to claim 1 or 2, **characterised in that** in a mounted condition of the screen device (1) the input and output shaft (14a, 14b) of the coupling (7) contains a straight continuous shaft (15) which is mounted with bearings in a support (10) which is located between both coupling parts (18).
4. Screen device according to claim 1 or 2, **characterised in that** in a mounted condition of the screen device (1) the input and output shaft (14a, 14b) of the coupling (7) are part of a perpendicular coupling (7) to perpendicularly couple two screen rolls (6) to each other, whereby the perpendicular coupling (7) serves as intermediary support for the coupled screen rolls (6).
5. Screen device according to any one of the previous claims, **characterised in that** at least one coupling

part (18) contains a sleeve (19) which is rotatably mounted around its relevant shaft (14a, 14b) and which along the inside is provided with an axial groove (20), whereby the shaft (14a, 14b) is provided with a radial protrusion (16) which in a mounted condition is integrated with a certain lateral play in the groove (20) of the sleeve (19), such that the sleeve (19) is rotatable over a certain angle around the shaft (14a, 14b).

6. Screen device according to claim 5, **characterised in that** the control (24) is formed by a screw passage (25) provided in the sleeve (19) for an adjusting screw (26), said screw passage (25) ending in said groove (20) of the sleeve (19) opposite the protrusion (16) in the groove (20), such that, by screwing or unscrewing the adjusting screw (26) in the screw passage (25), the lateral play of the protrusion (16) of the shaft (14a, 14b) in the groove (20) of the sleeve (19) can be controlled.
7. Screen device according to claim 5 or 6, **characterised in that** in the sleeve (19) on either side of the groove (20) a screw passage (25) is provided for an adjusting screw (26), both said screw passages (25) ending in said groove (20) opposite the protrusion (16), such that, by suitably screwing and/or unscrewing the adjustment screws (26) in the opposite screw passages (25), the sleeve (19) on the shaft (14a, 14b) can be rotated and locked thereon in a certain position between the adjustment screws (26).
8. Screen device according to any one of the claims 5 to 7, **characterised in that** the shaft (14a, 14b) of the coupling part (18) is composed of a proper shaft (15) and a bushing (17) mounted on said proper shaft (15) which is provided with the aforementioned radial protrusion (16), said bushing (17) being coaxially mounted over the proper shaft (15) and or fixedly attached thereon.
9. Screen device according to any one of the claims 5 to 8, **characterised in that** the sleeve (19) of the coupling part (18) is axially secured relative to the shaft (14a, 14b) of the coupling part (18).
10. Screen device according to any one of the claims 4 to 8, **characterised in that** both the input shaft (14a) and the output shaft (14b) are provided with a rotatable coupling part (18) with a sleeve (19) with control (24) for the rotation of the coupling part on its shaft (14a, 14b).
11. Screen device according to any one of the claims 4 to 10, **characterised in that** at least one of the coupled screen rolls (6) contains an end plug (23) which is attached in or on the screen roll (6) for coupling with the coupling (7) and which is provided with an

internal axial toothing and that the coupling (7) is provided with at least one coupling part (18) with a sleeve (19) with a complementary external toothing (22) with which the coupling part (18) can be slid in the end plug (23).

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12. Screen device according to any one of the previous claims, **characterised in that** in the coupled and the mounted condition of the screen rolls (6), the adjustable control (24) of at least one coupling part (18) is accessible for control of the angle of rotation of one screen roll (6) relative to the other coupled screen roll (6) without having to remove the relevant screen rolls (6).
13. Screen device according to claim 12, **characterised in that** the control (24) is accessible at a location between both coupled screen rolls (6).
14. Screen device according to any one of the previous claims, **characterised in that** it is provided with one single drive (11).
15. Screen device according to claim 13, **characterised in that** the single drive (11) is formed by a tube motor in the screen roll (6) which is coupled with the input shaft of the coupling (7).
16. Coupling for torque-transmitting coupling between two screen rolls (6) for retracting and extending the screens (5) of a screen device (1), whereby the coupling (7) contains an input shaft (14a) and an output shaft (14b) which are connected to each other in a torque-transmitting way and on each shaft (14a, 14b) contain a coupling part (18), respectively a first coupling part (18) for coaxial coupling with one screen roll (6) and a second coupling part (18) for coaxial coupling with the other screen roll (6), whereby at least one coupling part (18) is rotatable over at least an angle around its shaft (14a, 14b) and whereby the coupling contains an adjustable control (24) with which the angle of rotation of said coupling part (18) relative to its shaft (14a, 14b) can be controlled.
17. Use of a coupling according to claim 16 for a torque-transmitting coupling (7) between two screen rolls (6) of a screen device (1) for simultaneously retracting and extending screens (5) on the screen rolls (6), **characterised in that** the coupling (7) is also used for the alignment of the underside of the screens (6) relative to each other by controlling the angle of rotation of at least one coupling part (18) of the coupling.

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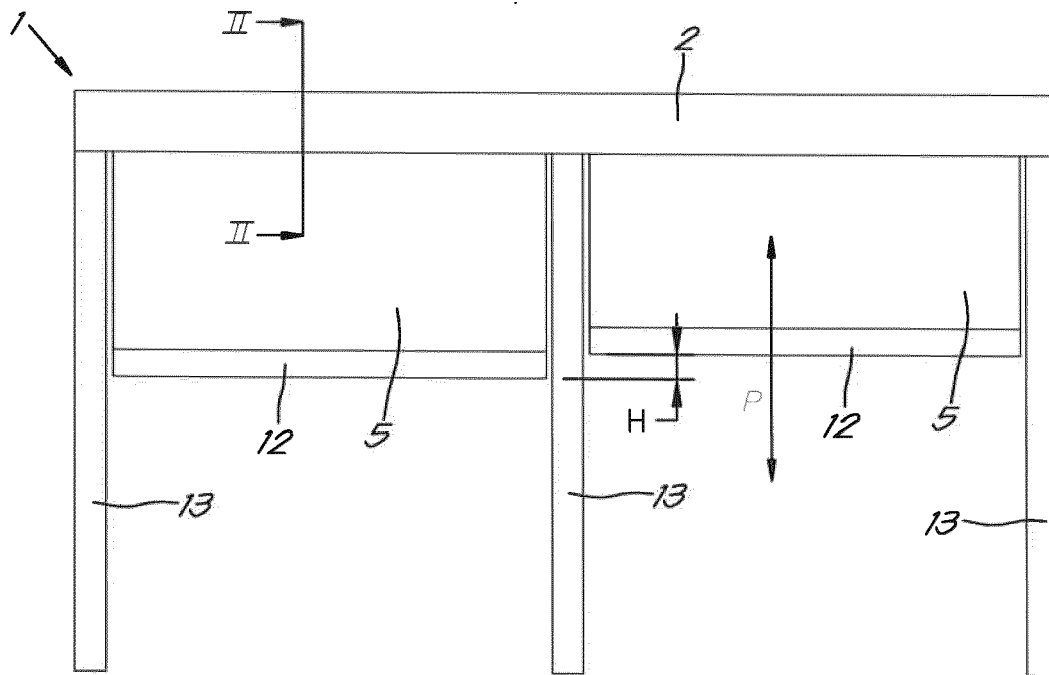


Fig. 1

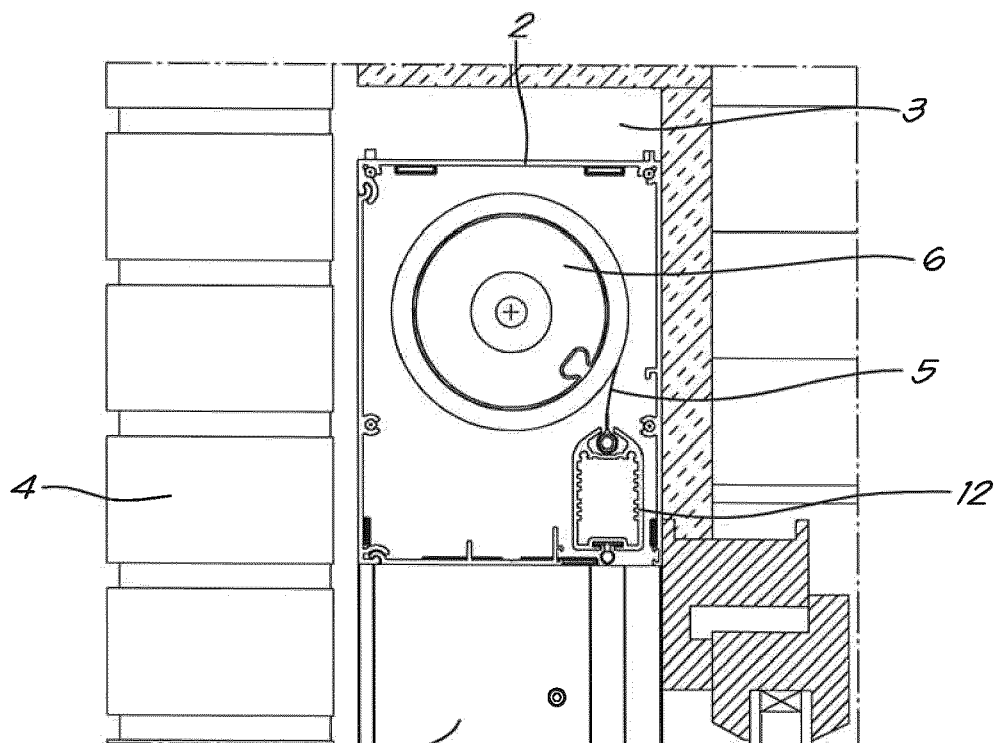


Fig. 2

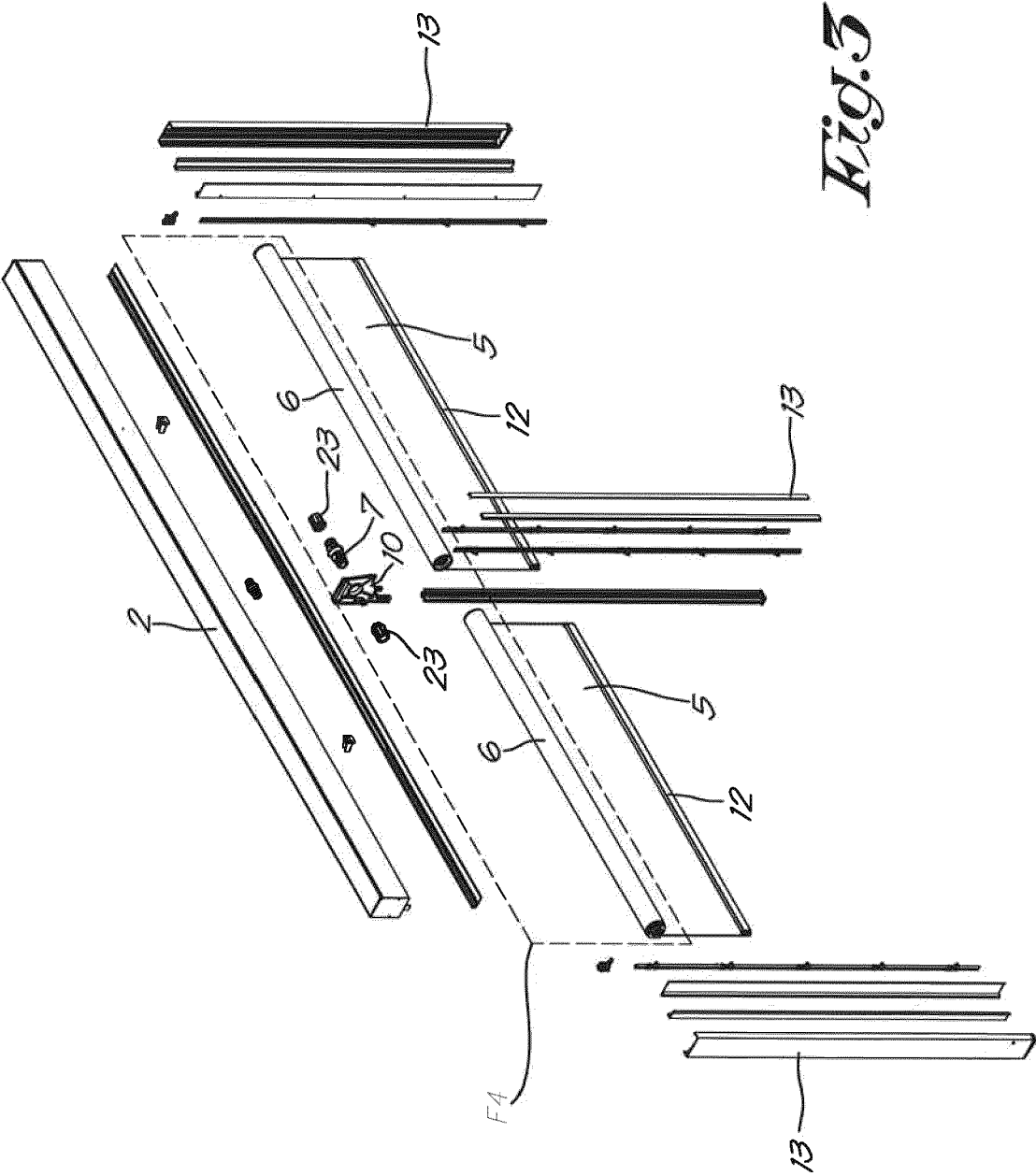


Fig. 3

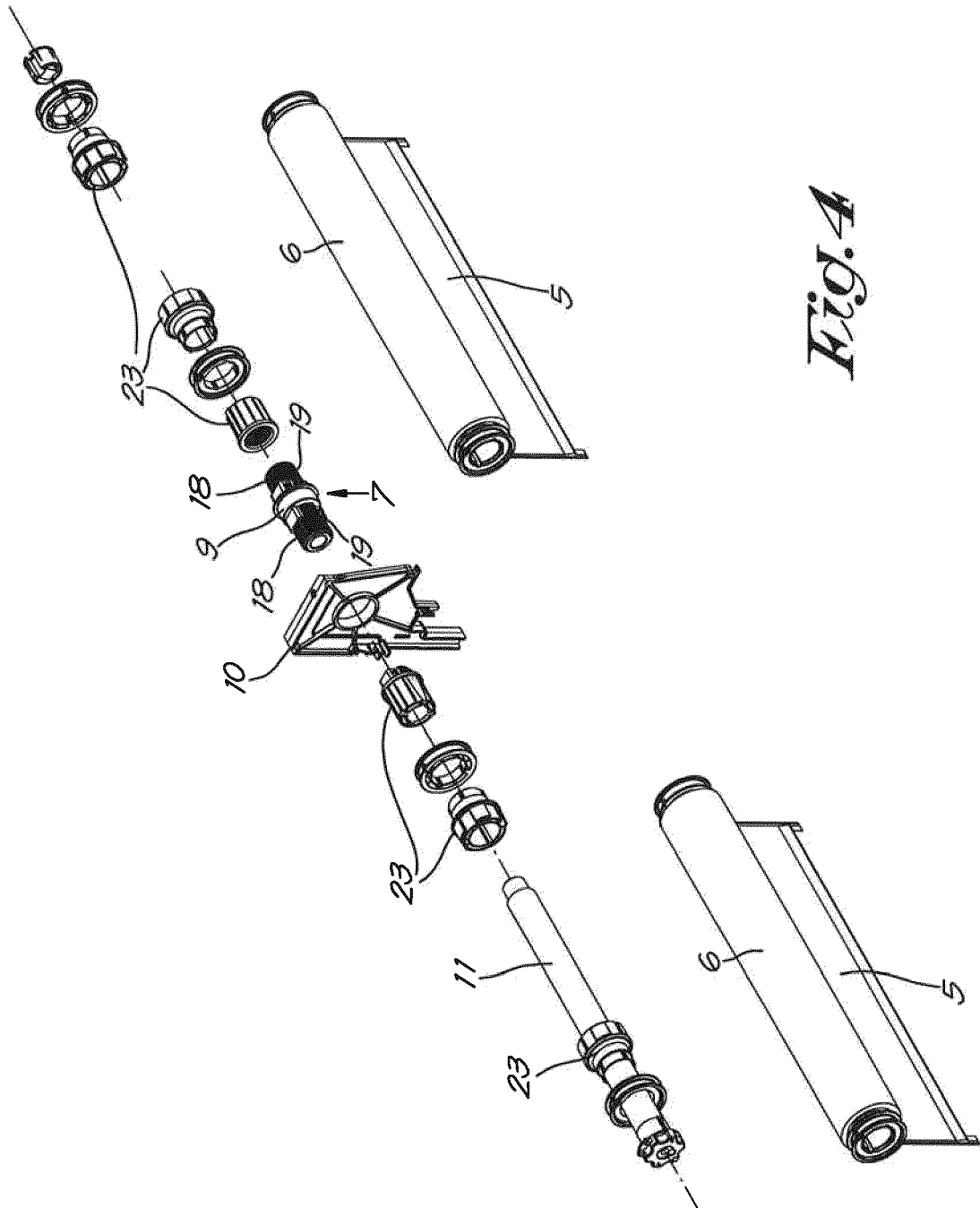


Fig. 4

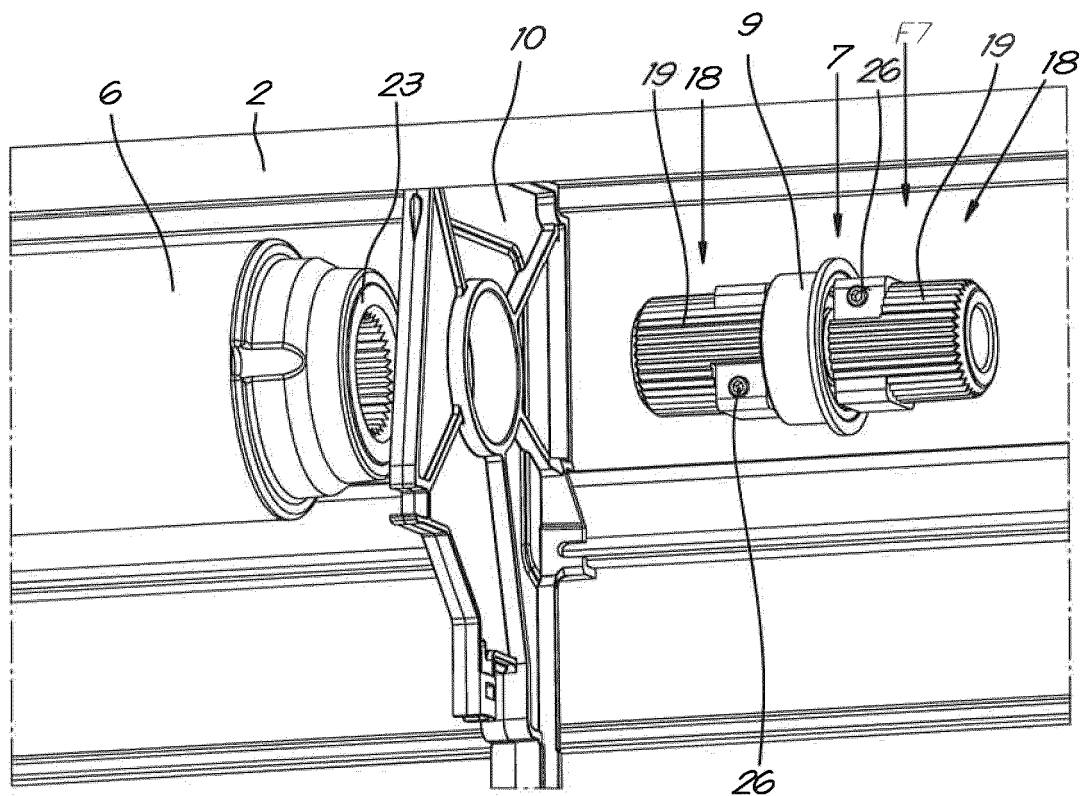


Fig. 5

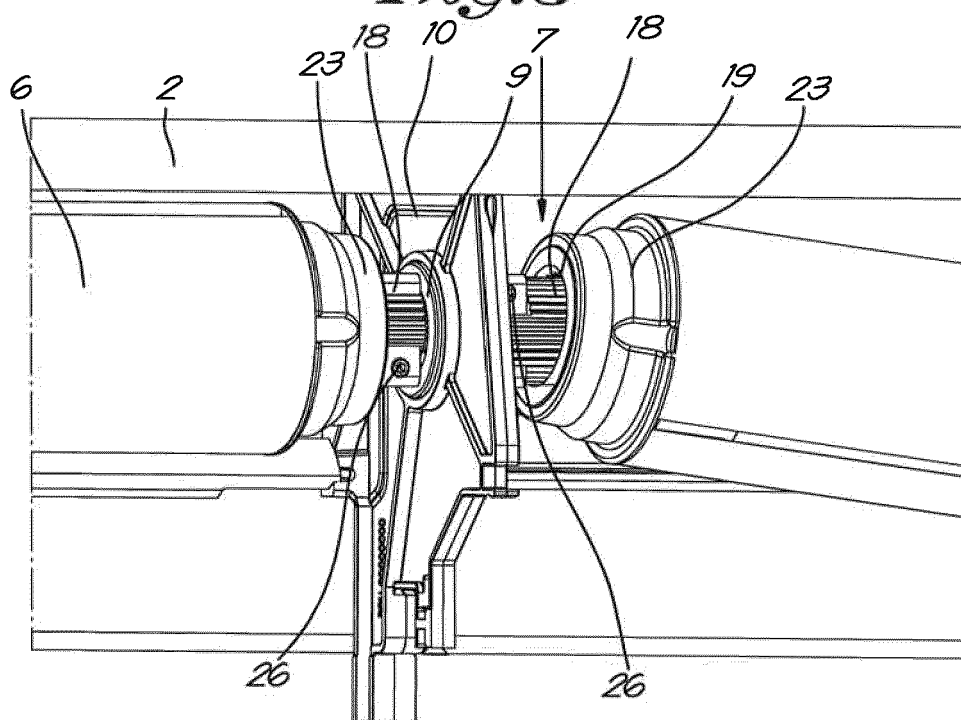


Fig. 6

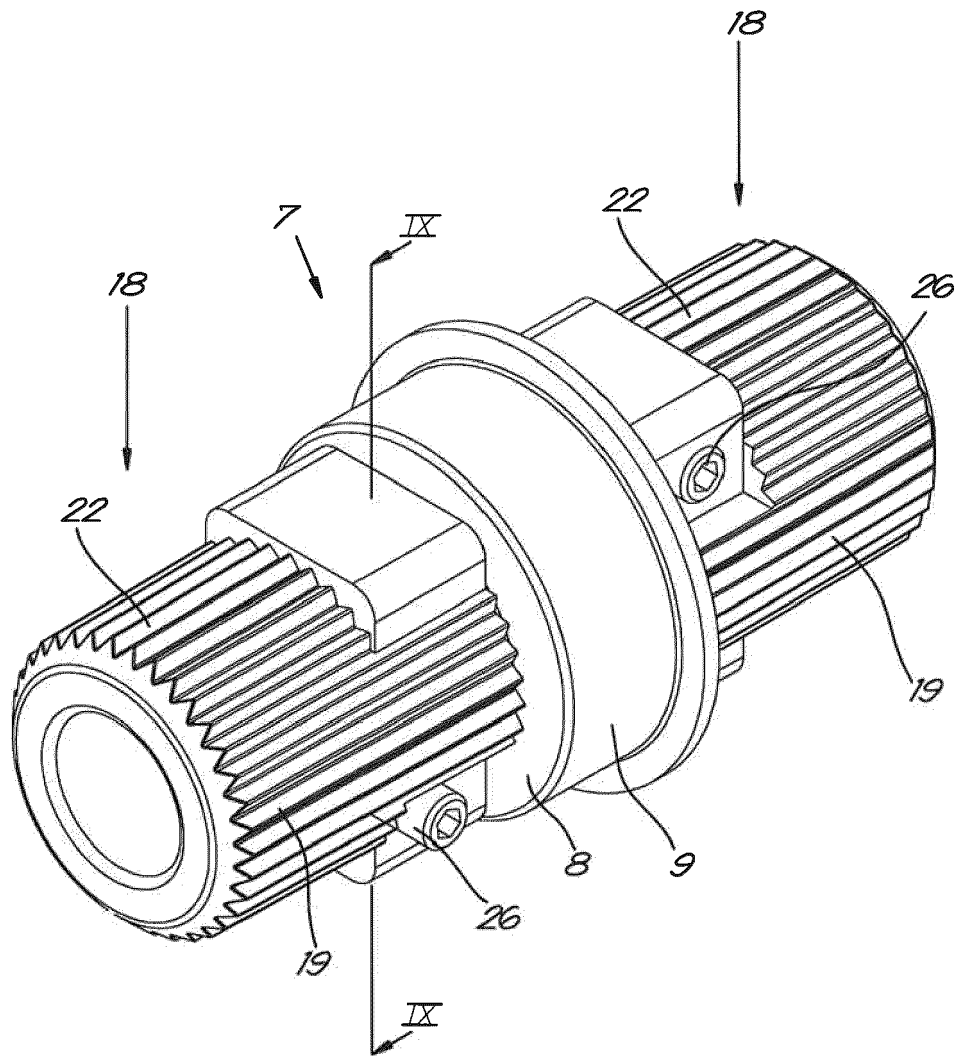
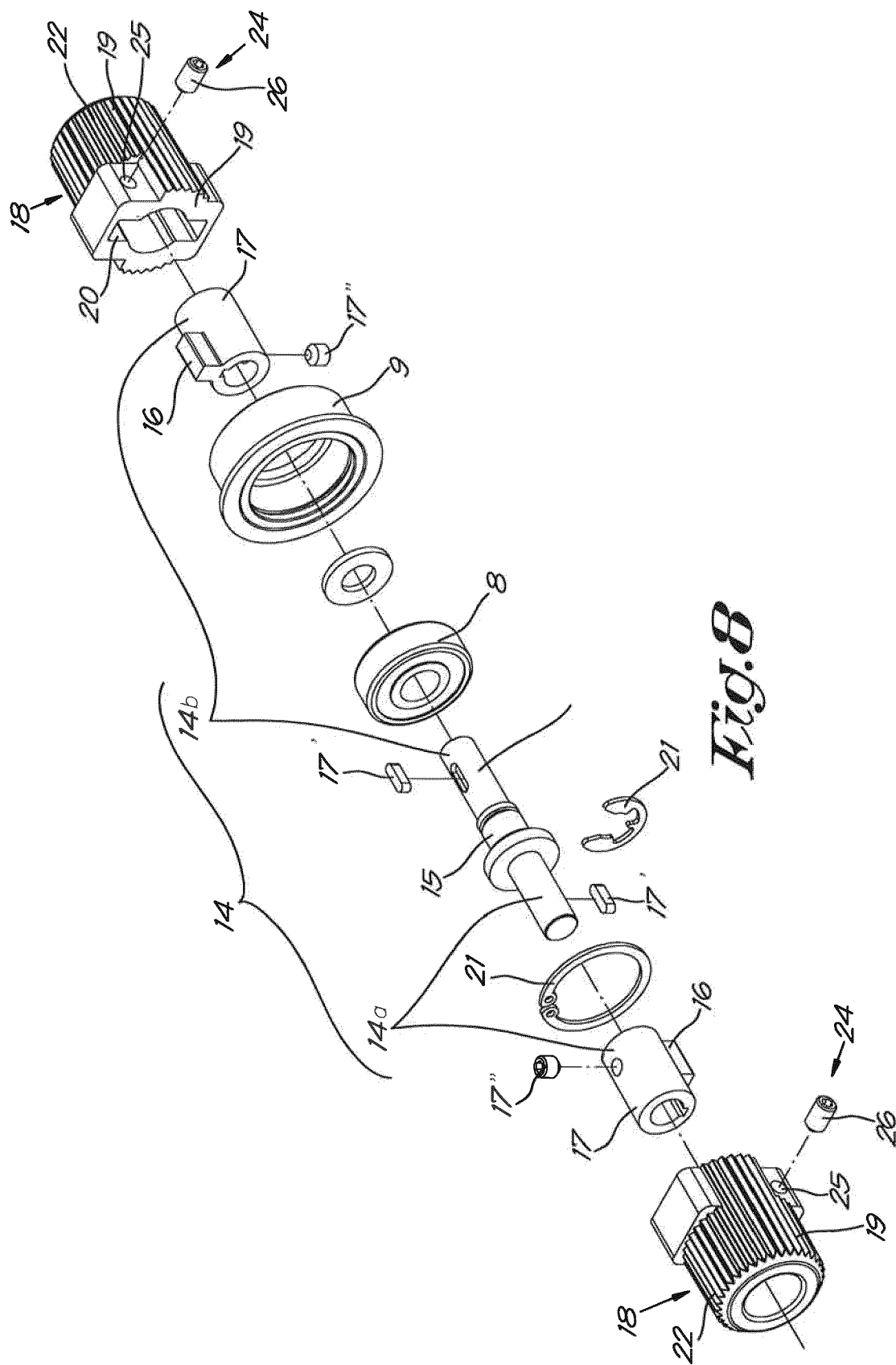


Fig. 7



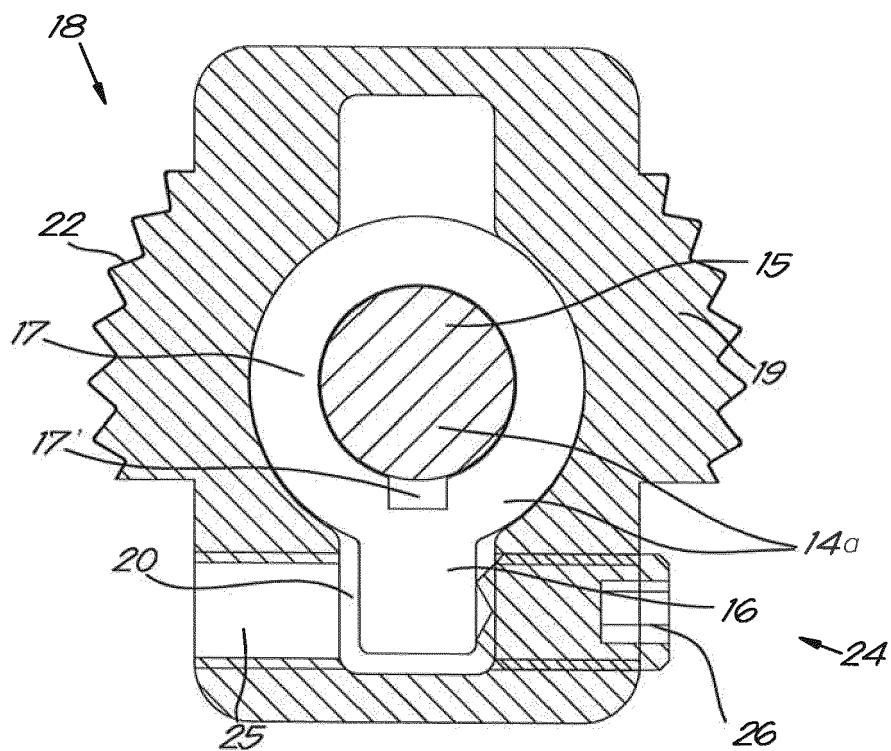


Fig. 9

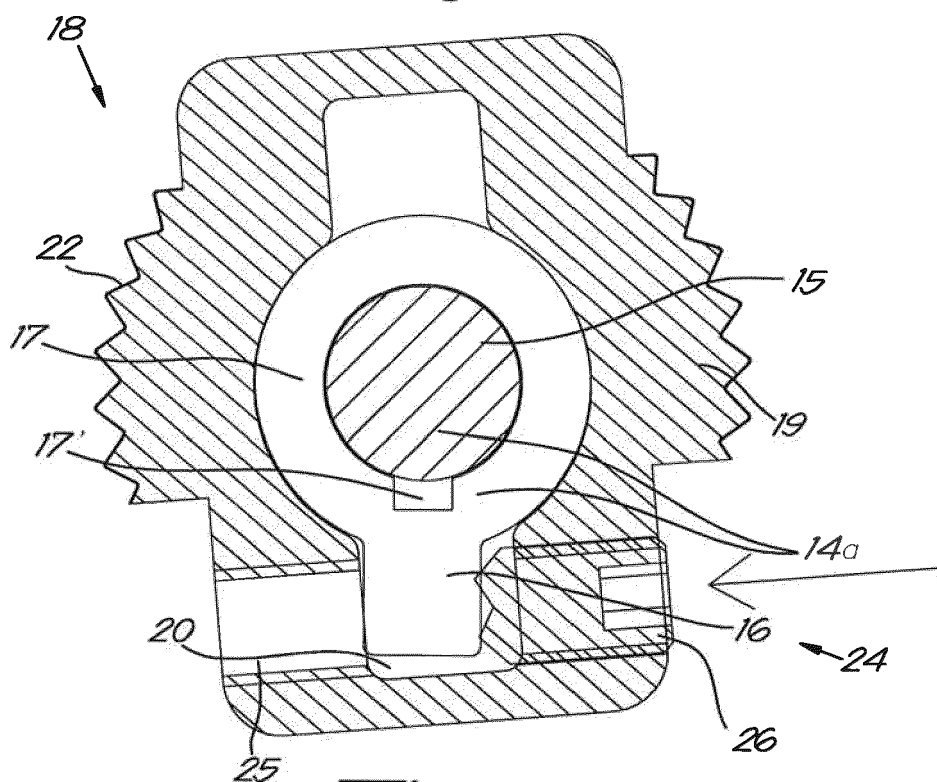


Fig. 10

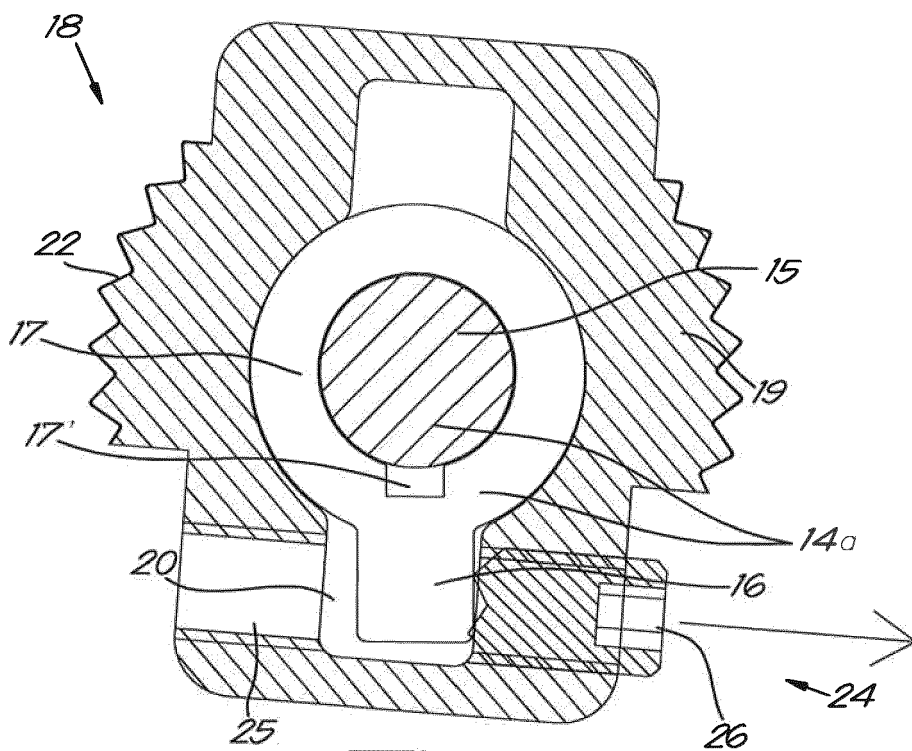


Fig. 11

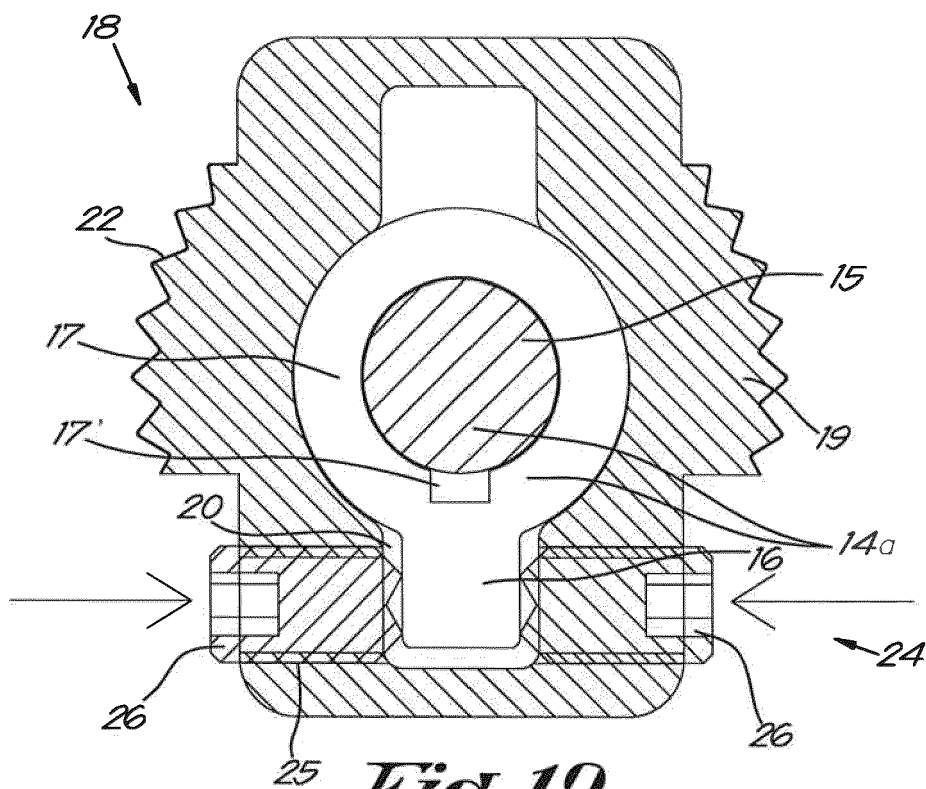


Fig. 12

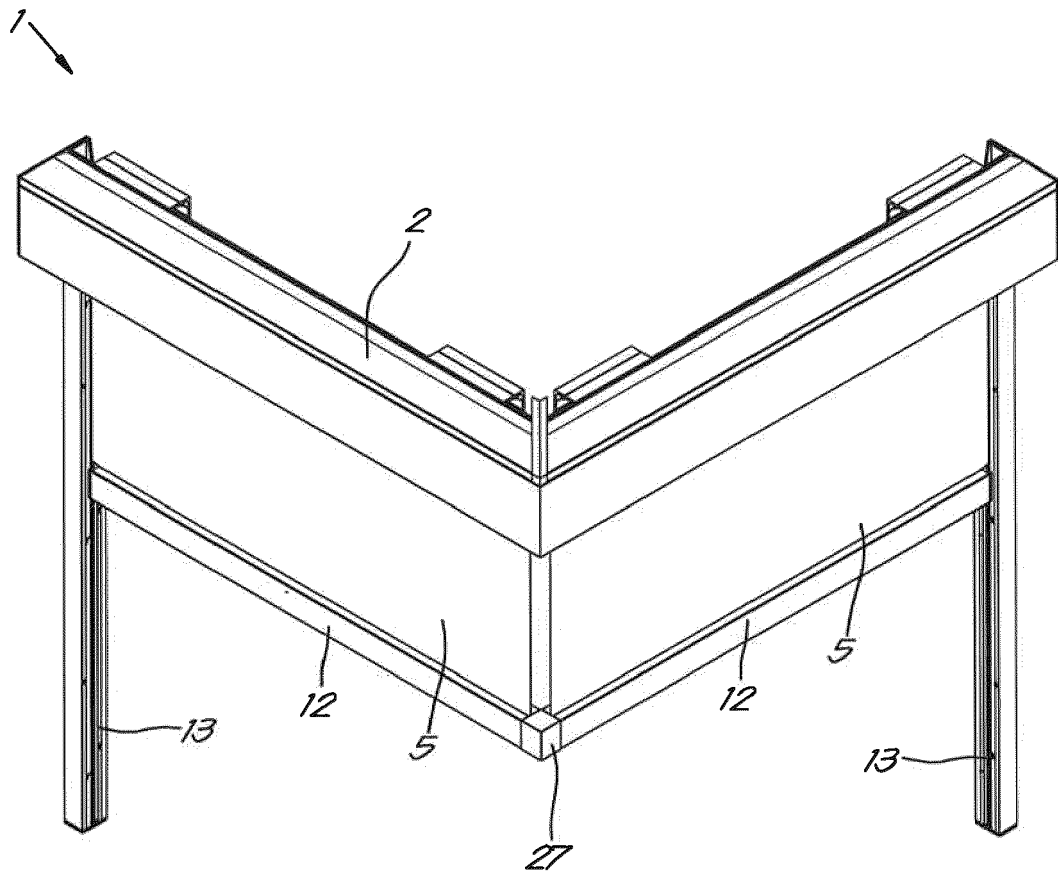
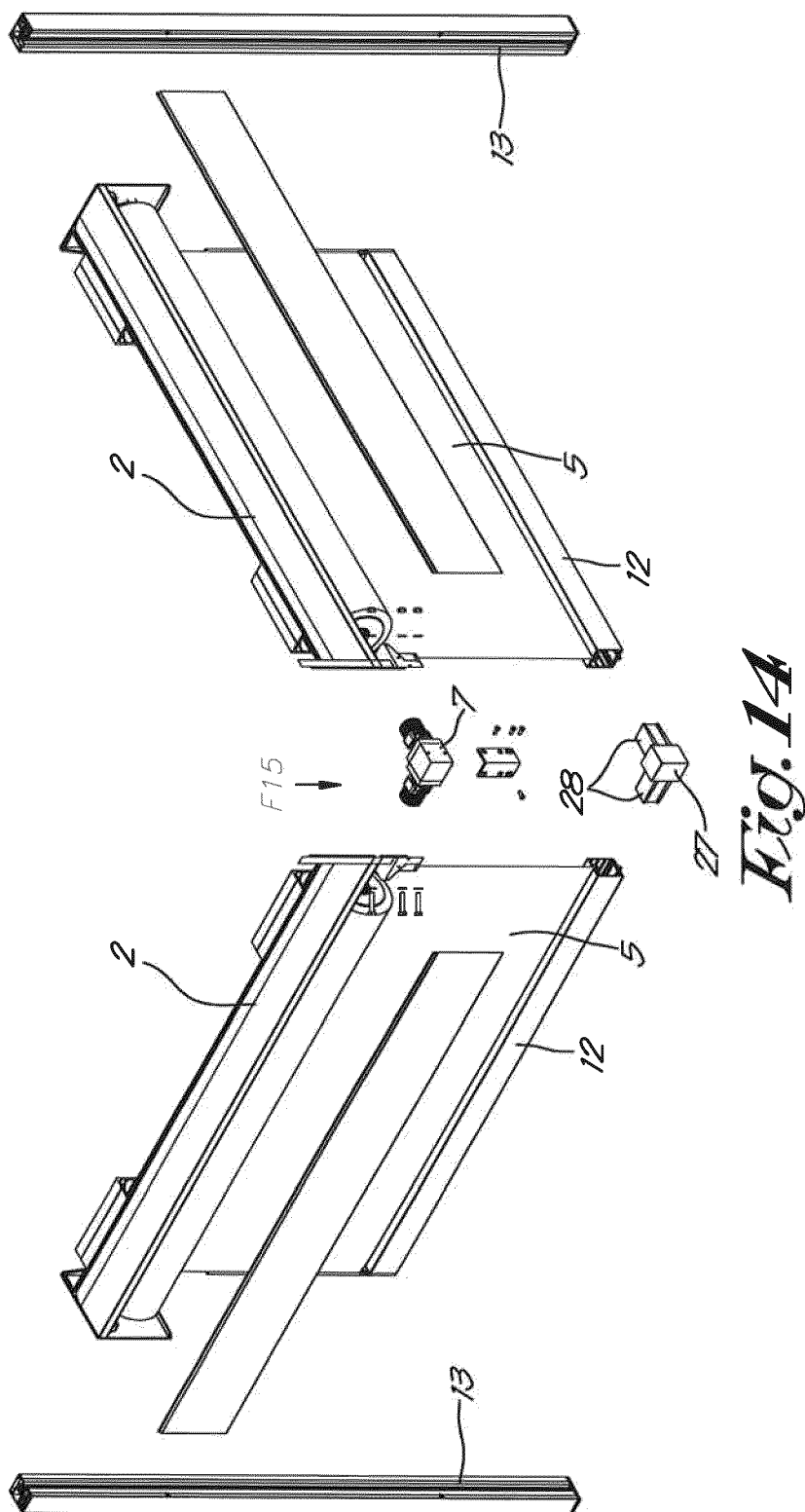


Fig. 13



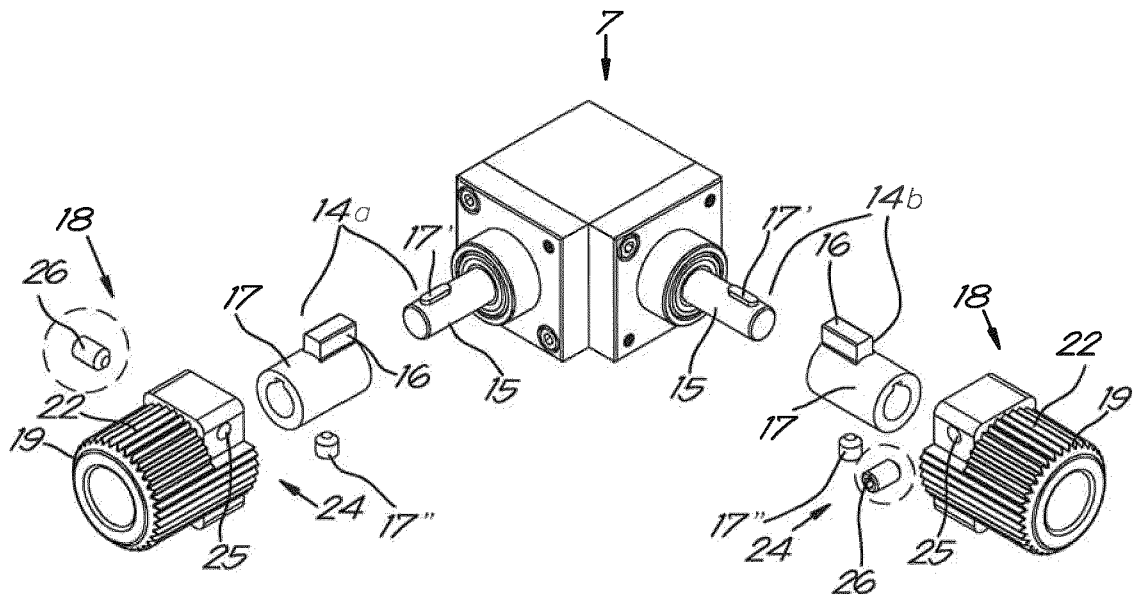


Fig. 15

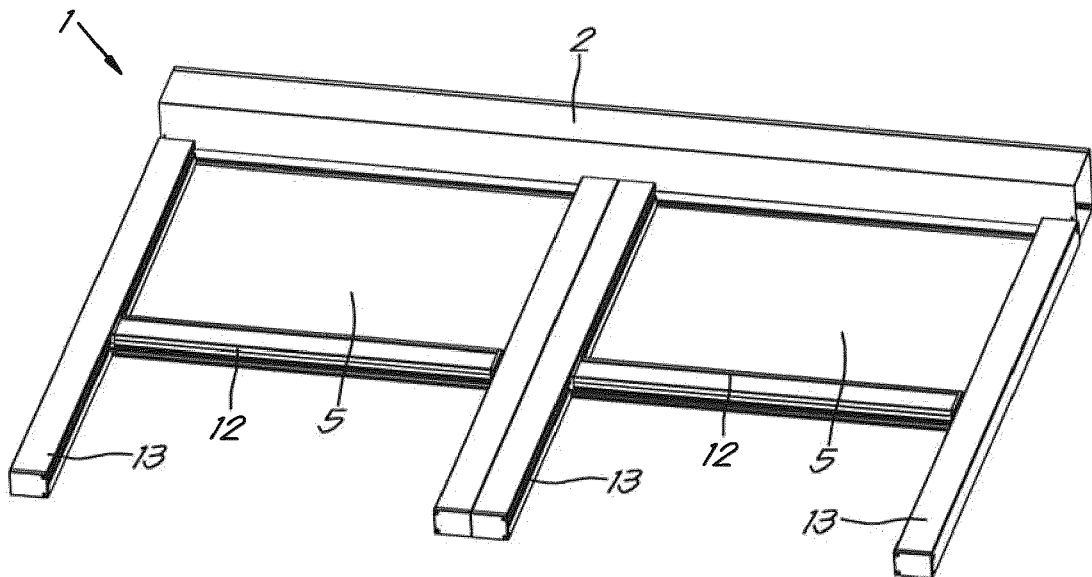


Fig. 16



EUROPEAN SEARCH REPORT

Application Number

EP 21 20 3491

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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A			
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