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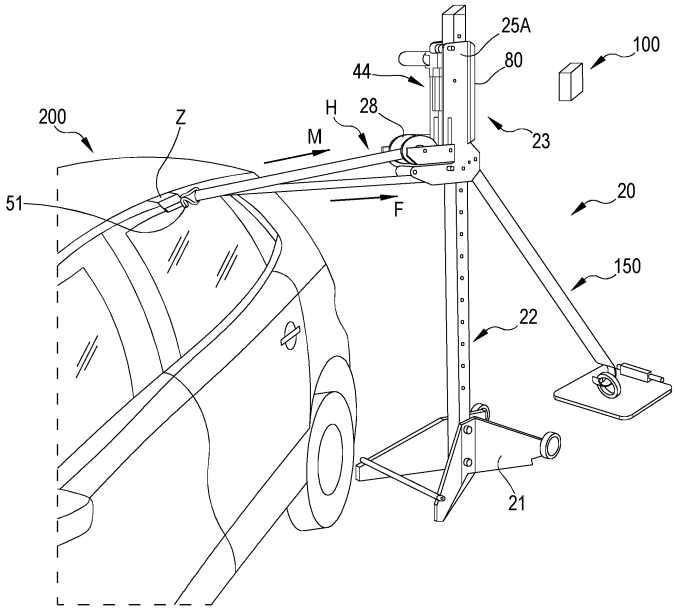
(54) **AN EQUIPMENT FOR PULLING, BY TRACTION, PORTIONS OF A BODYWORK OF A MOTOR VEHICLE**

(57) An equipment for pulling, by traction, portions of a bodywork of a motor vehicle, comprising: an upright (22) borne by a base (21); a slide (23) removably blocked to the upright; stabilising organs (150), hinged to the slide, for stabilising the vertical trim of the upright; a spool (28), an axis of which is rotatably supported by the slide; manual activation means, borne by the slide, for drawing the spool (28) in rotation in an operating direction according to consecutive discrete angular values; stabilising means of the spool, borne by the slide, cooperating with the manual activation means, with the de-activation of the stabilising means enabling the rotation of the spool including in an opposite direction to the operating direction; a flexible component (40), partially enveloped on the spool (28) starting from an end thereof constrained thereto; a head (50) slidably constrained to the flexible component; an actuator (44), borne by the slide, remotely activated by means of a remote control (100), to which a remaining end of the flexible component is constrained; at least a hook (51), borne by the head (50), destined to hook to a portion (Z) of the bodywork of a motor vehicle, in order to pull the bodywork by traction following an initial intervention of an operator on the manual activation means and following the activation of the actuator (44) to define overall the entity of the deformation of the portion (Z) of bodywork caused by the pulling by traction.

FIG.7



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Description

[0001] The present invention concerns the technical sector relating to restoring the trim of a vehicle, in particular a motor vehicle, deformed owing to an accident, for example a road accident.

[0002] In particular, the invention concerns equipment destined to be used, by means of pulling by traction, on parts of a bodywork of the vehicle so as to substantially restore the initial trim; this enables technical experts in the sector to subsequently intervene on those parts, for example with fillers and then with repainting, in order to obtain the desired original aesthetic appearance of the vehicle.

[0003] A known equipment (see figure 1A) comprises a base (1) which bears an upright (2) to which is associated a slide (3) removably blocked to the upright, in a known way, for example according to discrete heights.

[0004] A device (4) is fixed to the upper part of the slide which device comprises two opposite walls (4A, 4B) that rotatably support a spool the axis of which is perpendicular to the axis of the upright.

[0005] A cogwheel (5) is splined on the axis of the spool, external of the walls, which enmeshes with a pinion the shaft of which is supported by one of the walls (4A, 4B); a rod (6) is splined on the shaft, which rod terminates with a grip (7).

[0006] A pawl, hinged to the wall (4B), engages, by the action of a spring acting thereon, with the pinion so as to allow the pinion to rotate, in clicks, in a prefixed operating direction and the blocking thereof when the operator does not activate the rod (6)-grip (7) assembly.

[0007] In order to enable the rotation of the pinion in the opposite direction to the operating direction, it is necessary to intervene on the pawl, overcoming the action of the associated spring in order to disengage it from the pinion.

[0008] The equipment further comprises a flexible component, for example a belt (8), partially wound on the spool starting from an end thereof constrained to the spool; the remaining end of the belt is fixed to the slide (3).

[0009] A head (9) is constrained to the portion (P) of the belt unwound from the spool, i.e. the portion comprised between the spool and the end thereof fixed to the slide, with at least a hook (10), which can slide with respect to the belt.

[0010] In order to move the head (9) away from the device, it is necessary to disengage the pawl from the teeth of the pinion; in order to near the head to the device it is necessary to act on the grip (7), with a consequent rotation of the drum in the operating direction.

[0011] Organs (15) of known type are hinged to the slide (3), for stabilising the vertical trim of the upright (2) during the use of the equipment.

[0012] The known equipment of figure 1A is used in the manner described in the following with reference, for example, to a motor vehicle (16) (figure 1B).

[0013] In the motor vehicle it is necessary to subject an area (S) to traction; the operator moves the head (9) away from the device until engaging the area (S) with the hook (10).

[0014] By acting on the grip (7) the operator causes the tensioning of the portion (P) unwound from the spool with a consequent setting in traction of the area (S) via the hook (10).

[0015] To verify the entity of the deformation caused in the area (S), the operator pauses his or her operation on the grip (7), and approaches the motor vehicle to observe the area (S).

[0016] If the deformation caused is not as desired, the operator returns to the device (4) with the purpose of newly intervening on the grip (7).

[0017] Thereafter the operator newly approaches the motor vehicle to check the entity of the deformation caused by the hook (10) in the area (S).

[0018] This is repeated until reaching the prefixed deformation in the area (S).

[0019] Alternatively to the foregoing, two operators are used, one for operating the grip, the other in proximity of the area (S) so as to control the entity of the deformation.

[0020] The drawbacks that this entails are evident, in particular concerning productivity.

[0021] A further drawback derives from the fact that the pulling is not adjustable continuously but in discrete values as the roller, on which the belt is wound, rotates in click fashion according to angular values equal to the angle between the median radii between two consecutive teeth of the above-mentioned cogwheel.

[0022] The aim of the invention is to obviate the drawbacks mentioned in the foregoing, with an equipment for pulling, by traction, portions of a bodywork of a motor vehicle, all obtained with a productivity that is superior to what can be attained using the known equipments, and with optimal results concerning the deformations made as these are caused by continuous and adjustable pulling.

[0023] The above-mentioned advantages are obtained according to the contents of the claims.

[0024] Further characteristics of the invention will emerge from the following description, of a preferred but not exclusive embodiment of the equipment of the invention, with particular reference to the appended tables of drawings, in which:

- figure 1A is a perspective view of a known equipment;
- figure 1B illustrates the known equipment of figure 1B during an operation on the bodywork of a motor vehicle;
- figure 2 is a perspective view of the equipment of the invention, with some parts removed better to evidence others;
- figure 2A illustrates detail G of figure 2, with some

parts removed to better evidence others;

- figure 3 is a perspective view substantially in larger scale with respect to figure 2, of detail A of figure 2;

- figure 4 is a perspective view substantially from below looking upwards, of some components of the equipment with some parts removed to better evidence others;

- figure 5 is an exploded view of the components of figure 4;

- figure 6 schematically illustrates the equipment of figure 2, including the vertical stabilising organs of the upright, an integral part of the equipment;

- figure 7 schematically illustrates the contents of figure 6 during an example of use of the equipment.

[0025] With reference to figures 2-7, reference numeral (20) denotes the equipment of the invention.

[0026] The equipment comprises a base (21) which bears an upright (22) to which is associated a slide (23) removably blocked to the upright in a known way, for example by means (24) that insert in holes (22A), for example equidistanced, made in the upright (22); in this way it is possible to vary, in a discrete way, the height of the slide with respect to the base (21).

[0027] The slide comprises two facing walls (25A, 25B) lower parts of which are bent on a same part in order to support a component (27), having a U-shaped section, the wings (27a) of which rotatably support a spool (28), interposed between the wings.

[0028] A cogwheel (29) is splined on the axis of the spool, external of the wings (27A), which enmeshes with a pinion (30) a shaft of which is borne by one of the wings; a rod (31) is splined on the shaft, which rod terminates with a grip (32) (see figure 2, 3).

[0029] A pawl (34), hinged to a wing (27A), engages, due to the action of a spring (35) acting thereon, with the pinion so as to allow the pinion to rotate, in clickfashion, in a prefixed operating direction and the blocking thereof when the operator does not activate the rod (31)-grip (32) assembly.

[0030] In order to enable the rotation of the pinion in the opposite direction to the operating direction, it is necessary to disengage the pawl therefrom by acting on the spring (35).

[0031] A channel (70), of which more will be explained in the following, is identified between the component (27) and the upright (22) (figure 4).

[0032] With reference to the upright (22), on an opposite side with respect to the spool (28), known stabilising organs (150) of the vertical trim of the upright during use of the equipment are hinged to the abutment (80) of the slide.

[0033] Reference numeral (40) denotes a belt, constrained, by an end thereof, to the drum (41) of the spool (28) (figure 5), which partially winds thereon; the remaining end (40A) of the belt is fixed, in a known way, to a first long side (65A) of a rectangular frame (65) the remaining second long side (65B) whereof is constrained, in a known way, to the external end (42A) of a rod (42) sliding internally of a liner (43) of an actuator (44) activated, for example, by means of an electric motor (45) activatable and deactivatable remotely, by means of a remote control (100).

[0034] As known to the expert in the sector, the remote control acts on an electric control unit (not shown in the drawings) installed on the slide and destined to power the engine (45).

[0035] The part (K) of belt (40) which terminates with the end (40A), is positioned, in order, beneath the component (27), in the channel (70), then to connect to the end (42A) of the rod (42).

[0036] The lower part of the component, having the part (K), rotatably supports two cylindrical abutments (61, 62), parallel to one another and perpendicular to the upright (22); the function of the abutments will be more fully evidenced in the following.

[0037] A head is constrained (50) to the portion (H) of the belt (40) unwound from the spool (28), i.e. the portion comprised between the spool and the end (42A) of the rod (40), which head comprises at least a hook (51), which slides with respect to the belt.

[0038] With reference to figure 7, reference numeral (200) denotes a motor vehicle the bodywork of which has a portion (Z) that is to be pulled by traction.

[0039] The operator acts on the pawl (34) to disengage it from the pinion (30) in such a way as to cause, following the action on the rod (31)-grip (32) assembly, the unwinding of the belt (40) from the spool (28) with a consequent moving of the hook (51) away from the upright (22) until enabling the hooking (performed by an operator) of the area (Z) by the hook (51): during this operation the actuator (44) is deactivated.

[0040] At this point the pawl is returned into the engaging position with the pinion; the operator, by acting on the grip (32), draws the spool (28) in rotation in the operating direction, which causes the winding of the belt on the spool, the tensioning of the belt 40 (arrow M) and the start of a pulling by traction in the portion (Z) that increases according to discrete values due to the click-rotation of the pinion, as illustrated above; during this first step the actuator (44) is deactivated.

[0041] The intervention of the operator on the grip (32) is so as to cause the initial part of the deformation that is to be obtained in the portion (Z); the entity of the initial deformation is established by the operator according to both the material of which the bodywork of the motor vehicle is made and the experience of the operator.

[0042] Having finished the first step of the deformation, the operator grips the remote control (100), and positions him/herself in proximity of the portion (Z) so as to directly control, in loco, the final step of the deformation.

[0043] The actuator (44) is activated by means of the remote control which causes the return of the rod (42) into the relative liner (43) with a consequent tensioning of the part (K) of the belt in direction (F): which causes an increase in the deformation caused by the hook (51) on the portion (Z) of the bodywork.

[0044] During the tensioning thereof, the part (K) of the belt (40) is abutted by the above-mentioned cylindrical abutments (61, 62); in this way there are no interferences between the belt and the lower part of the slide (23).

[0045] Using the remote control, the operator activates, deactivates and newly activates the actuator as a function of the entity of the deformation which takes place directly in loco, up until obtaining the prefixed value of the deformation.

[0046] At this point the tensioning of the belt (40) is gradually zeroed (for example by causing the rod (42) of the actuator to exit from the relative liner (43), and by acting on the pawl (34) to disengage it from the pinion (30) with a consequent decoupling of the hook (51) from the area (Z).

[0047] Definitively, the equipment (20) provided by the invention enables accelerating the deformation of a portion (Z) of the bodywork of a motor vehicle, as the operator, after the first step of the deformation, carried out by acting on the manual activation means via the grip (32), moves so as to directly view, in loco, the portion (Z), by means of the remote control, thus progressively increasing the tensioning of the belt so as to complete the deformation of the portion (Z).

[0048] The tensioning of the portion (Z) in the final step of the deformation is performed gradually and continuously, with all the positive aspects that this entails; this is a direct consequence of the fact of using an actuator that is remotely controlled by a remote control activated by the operator situated in proximity of the portion (Z).

[0049] Alternatively to an electric actuator, another structured actuator can be used so as to be activatable, is deactivatable, remotely, by means of a remote control.

[0050] In place of a belt it would be possible to use another flexible component, for example a chain, a strap, a rope etc.

Claims

1. An equipment for pulling, by traction, portions of a bodywork of a motor vehicle, comprising: an upright (22) borne by a base (21); a slide (23) removably blocked to the upright; stabilising organs (150), hinged to the slide, for stabilising the vertical trim of the upright; a spool (28) an axis of which is rotatably supported by the slide; manual activation means, borne by the slide, for drawing the spool (28) in rotation in an operating direction according to consecutive discrete angular values; stabilising means of the spool, borne by the slide, cooperating with the manual activation means, with the de-activation of the stabilising means enabling the rotation of the spool also in an opposite direction to the operating direction; a flexible component (40), partially enveloped on the spool (28) starting from an end thereof constrained thereto; a head (50) slidably constrained to the flexible component; an actuator (44), borne by the slide, remotely activated by means of a remote control (100), to which a remaining end of the flexible component is constrained; at least a hook (51), borne by the head (50), destined to hook to a portion (Z) of the bodywork of a motor vehicle (200), to pull the bodywork by traction following an initial intervention of an operator on the manual activation means and following the activation of the actuator (44) to define overall the entity of the deformation of the portion (Z) of bodywork caused by the pulling by traction.

2. The equipment of claim 1, with the slide (23) comprising:
two facing walls (25A), (25B), lower parts of which are bent on a same side in order to support a component (27) comprising two opposite wings (27A) which rotatably support the spool (28) interposed between the wings; an abutment (80) situated, with reference to the upright, on an opposite side with respect to the spool, to which the stabilising organs (150) of the vertical trim of the upright are hinged.

3. The equipment of claim 2, with the slide comprising:
two facing walls (25A), (25B) destined to at least partially receive there-between the actuator comprising a motor organ, a liner (43) in which a stem (42) slides axially activated by a motor organ (45), with the lower parts of the walls being folded on a same part in order to support the component (27) which forms two opposite wings (27A) which rotatably support the spool (28) interposed between the wings, the component identifying, with the adjacent upright, a channel (70) for transit of the final part (K) of the flexible component (40), external of the spool, an end (40A) of which is fixed to an end (42A) of the stem which is external of the liner (43).

4. The equipment of claim 3, comprising, in the channel (70), a rectangular frame (65), to a first long side (65A) of which the end (40A) is fixed of the flexible component (40) relative to the final part (K) of the flexible component (40) and to which second long side (65B) is constrained the end (42A) of the stem (42) external of the liner.

5. The equipment of claim 3, with the component (27) comprising, in the lower part thereof, at least an abutment (61, 62) destined to abut the final part (K) of the flexible component (40) in consequence of the tensioning thereof.

6. The equipment of claim 5, wherein the abutment

(61), (62) has a cylindrical shape.

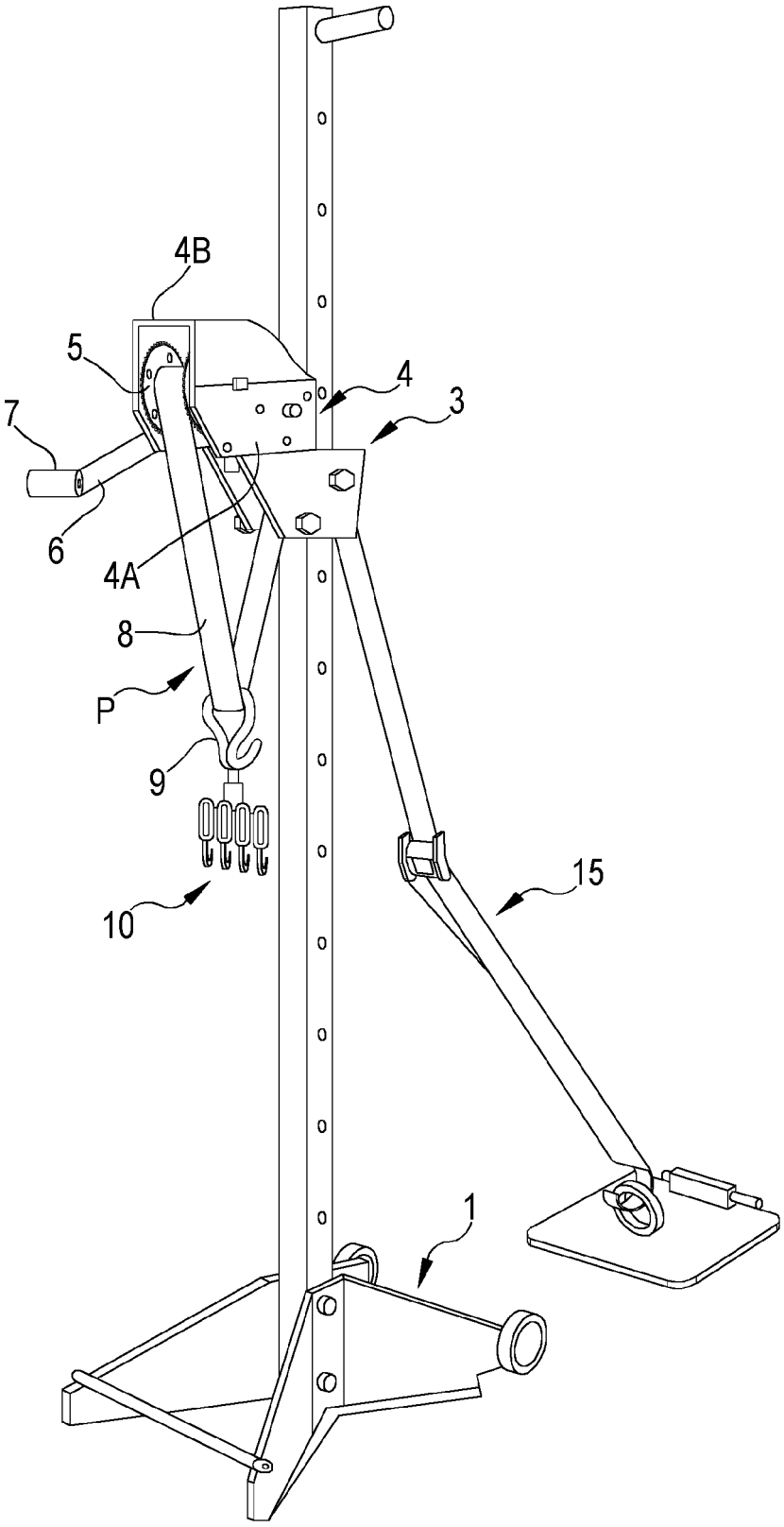
7. The equipment of claim 6, wherein the abutment (61), (62) is rotatably supported by the component (27).

8. The equipment of claim 6 or 7, wherein the axis of the abutment is perpendicular to the axis of the upright (22).

9. The equipment of claim 1, with the slide (23) supporting a component (27) comprising two opposite wings (27A) which rotatably support the spool (28), interposed between the wings, and with the manual activation means comprising: a cogwheel (29), splined on the axis of the spool, external of the wings (27A); a pinion (30), coupled to the cogwheel (29), a shaft of which is borne by one of the wings; a rod (31), splined on the shaft, which bears a grip (32), and with the stabilising means of the spool (28) which comprise: a pawl (34), hinged to one of the wings (27A), which engages, due to the action of a spring (35) acting thereon, with the pinion (30) so as to allow the pinion to rotate, in clicks, in a prefixed operating direction which causes the wrapping of the flexible component on the spool.

10. The equipment of claim 1 or 3, with the actuator being of a pneumatic type.

FIG.1A



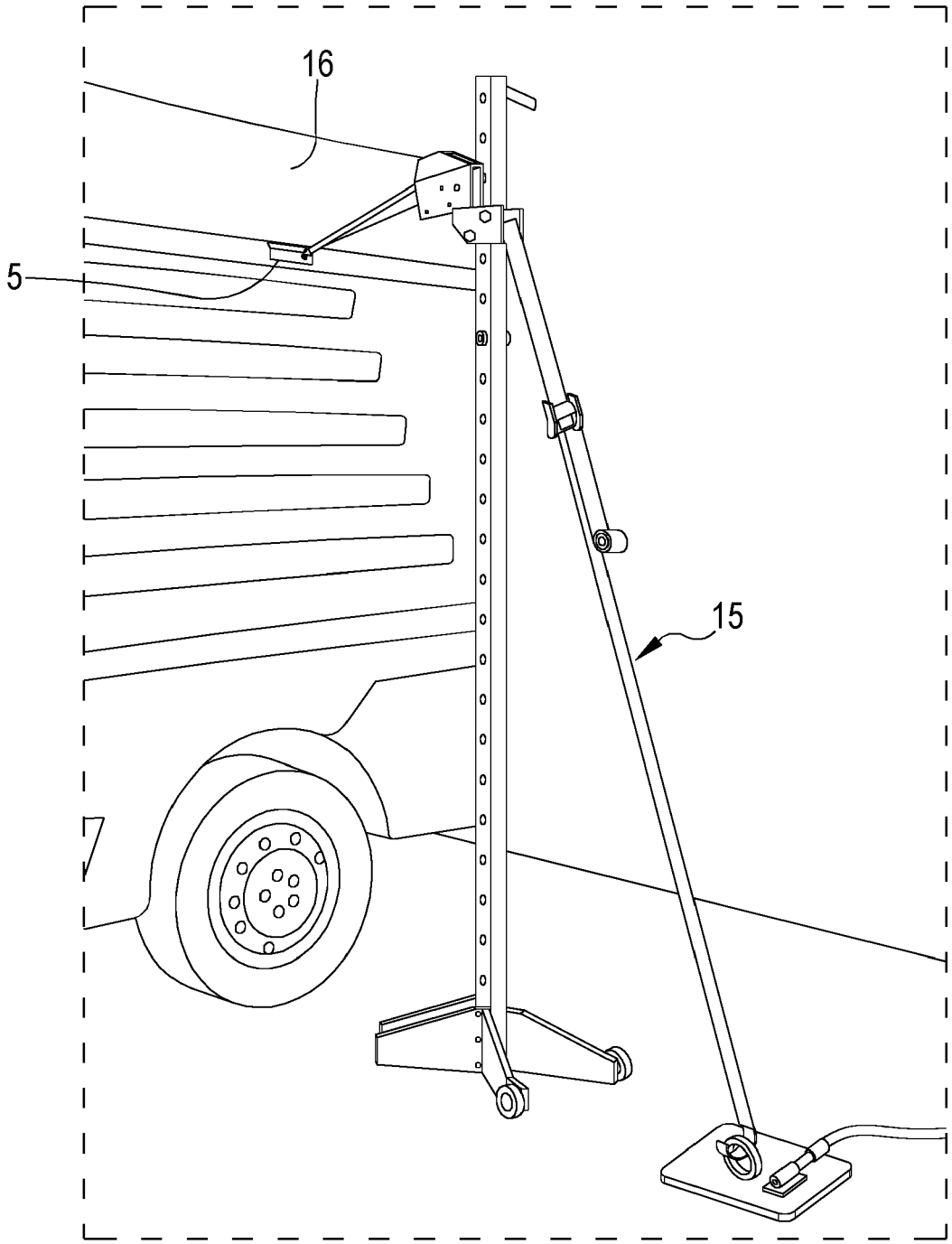


FIG.1B

FIG.2

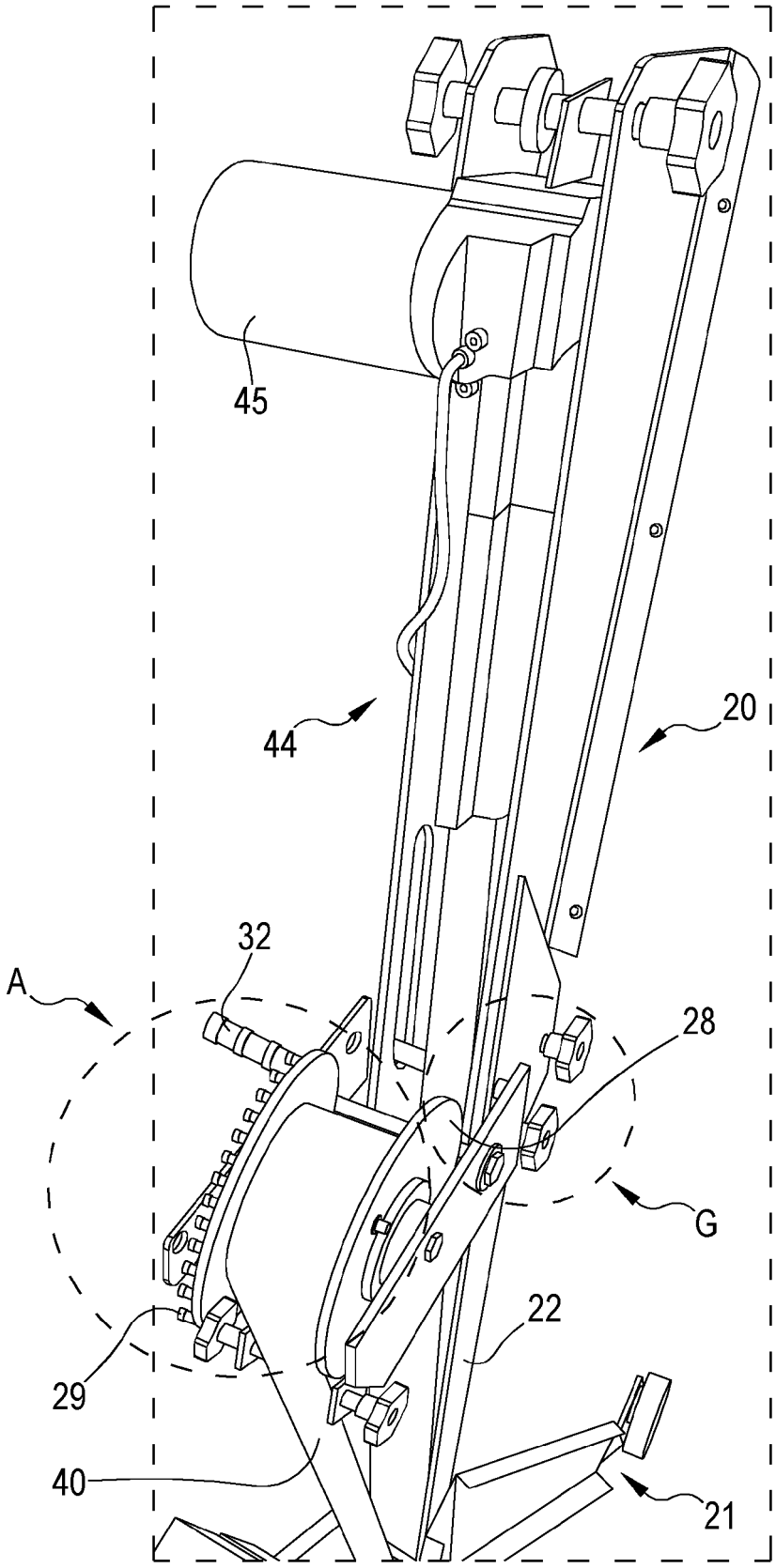


FIG.2A

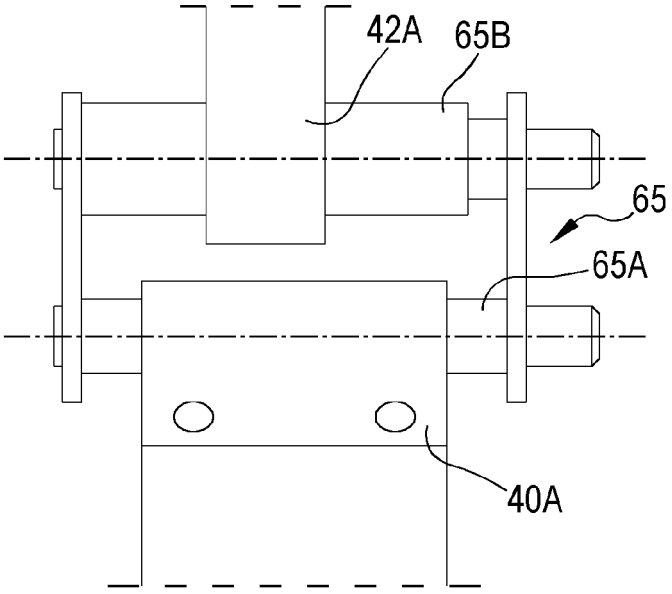
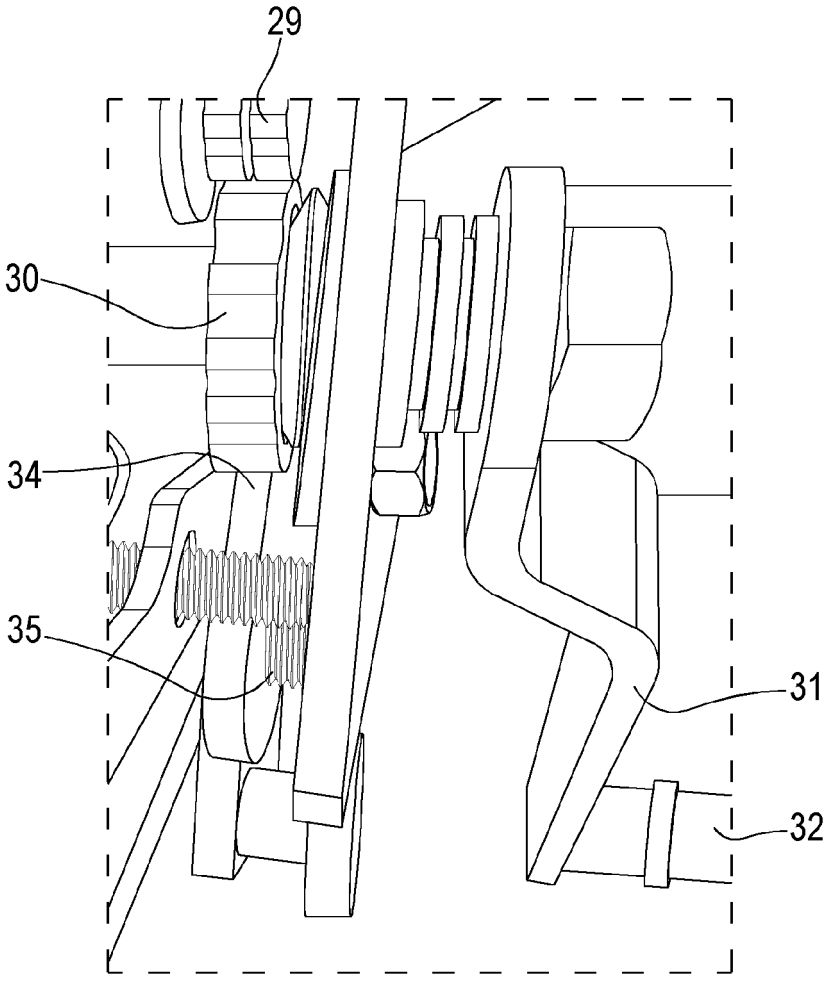


FIG.3



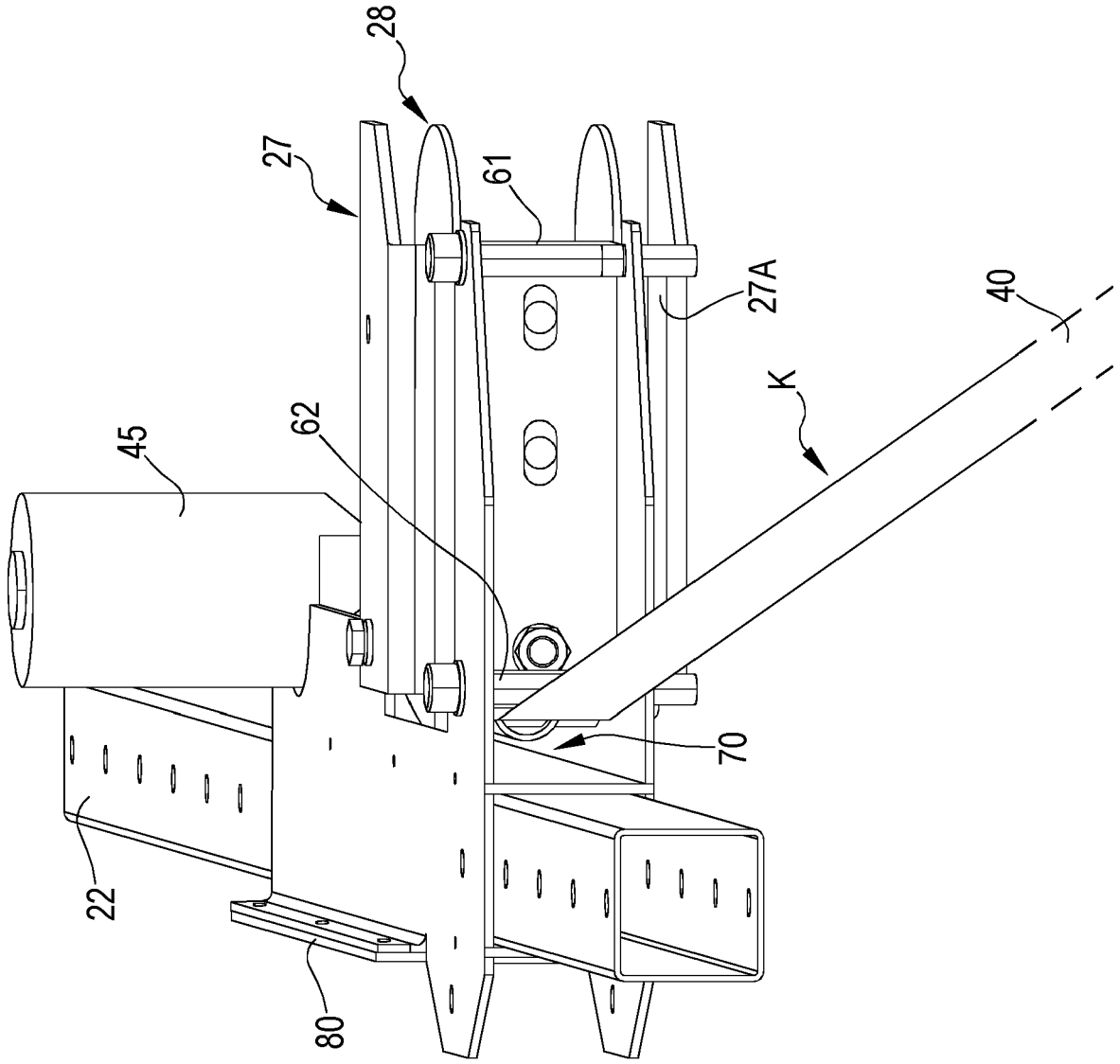


FIG.4

FIG.5

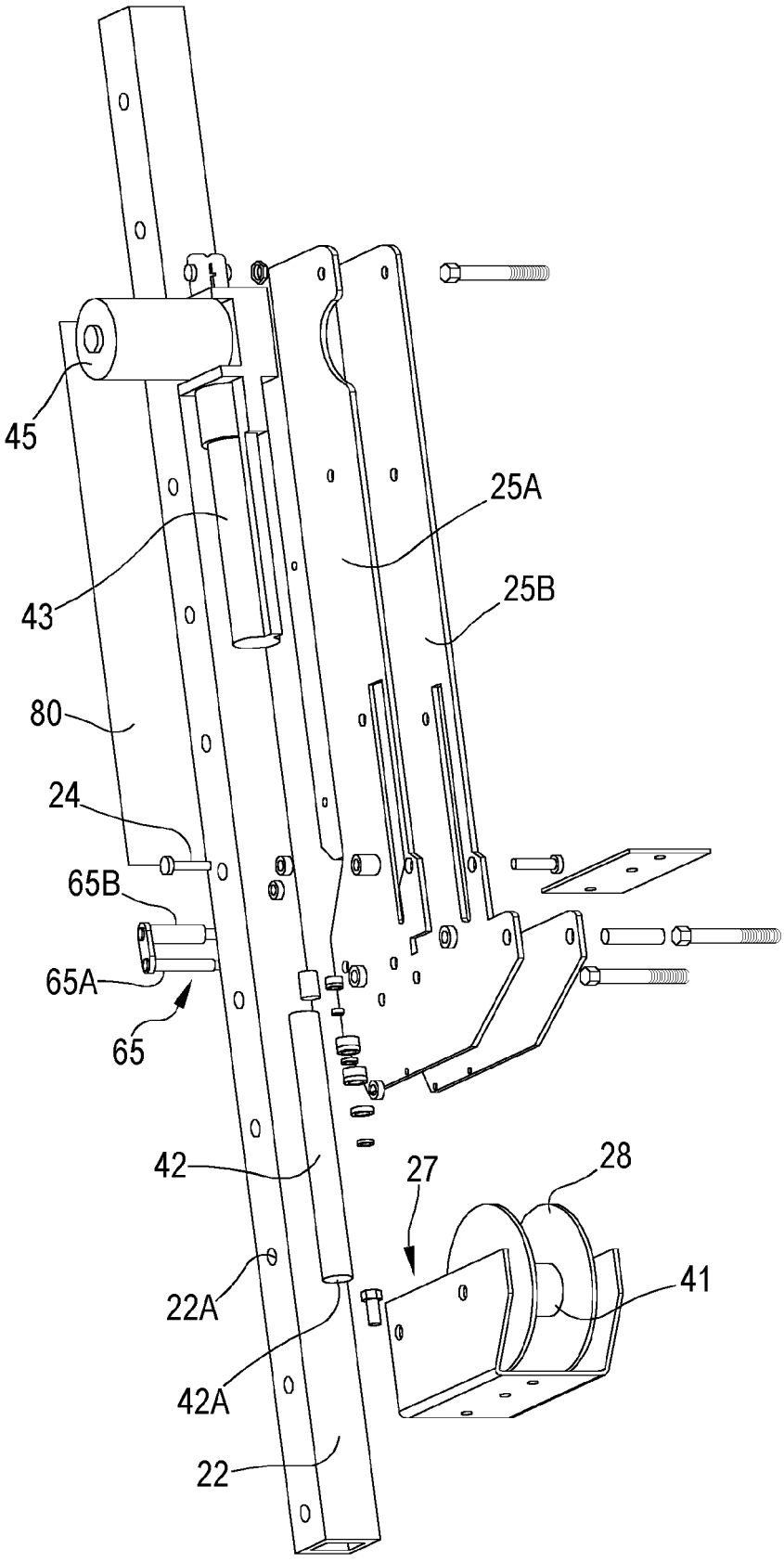
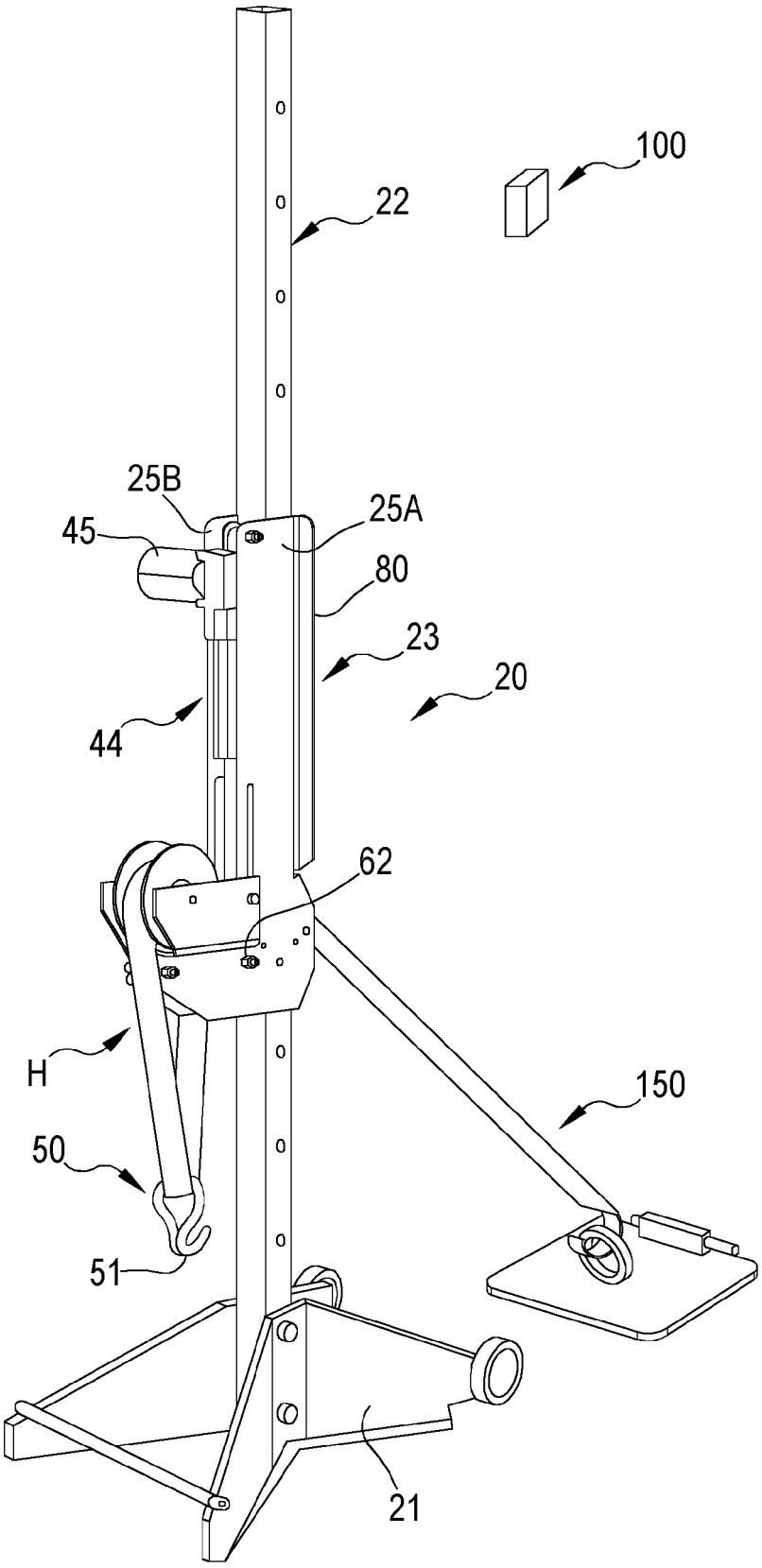


FIG.6



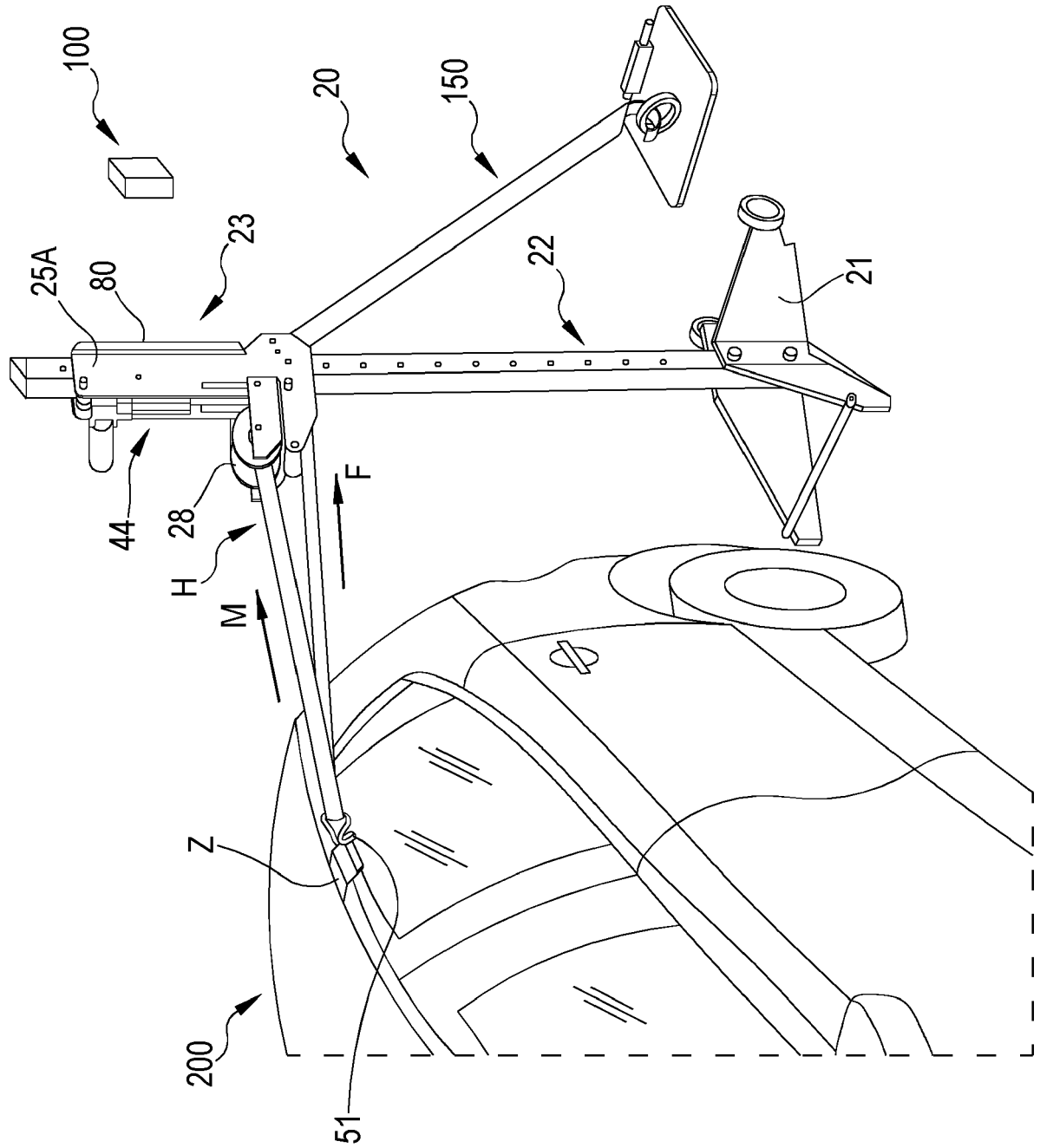


FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 23 20 9846

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 748 842 A (DINGMAN BOYD W [US]) 7 June 1988 (1988-06-07) * figures 1-3 *	1-10	INV. B21D1/12 B21D1/14 B60S5/00
A	US 4 712 417 A (JARMAN DAVIS R [US] ET AL) 15 December 1987 (1987-12-15) * figures 1, 3 *	1-10	
A	US 3 492 855 A (WYLIE CLEYBURN M) 3 February 1970 (1970-02-03) * figures 1-5 *	1-10	
A	US 3 955 397 A (MEIS WILLIAM J) 11 May 1976 (1976-05-11) * figures 1, 2 *	1-10	
A	US 4 475 716 A (JARMIN DAVIS R [US] ET AL) 9 October 1984 (1984-10-09) * figures 1, 2 *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			B21D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 April 2024	Vassoille, Philippe

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12-04-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4748842 A	07-06-1988	NONE	
US 4712417 A	15-12-1987	CA 1271185 A	03-07-1990
		US 4712417 A	15-12-1987
US 3492855 A	03-02-1970	NONE	
US 3955397 A	11-05-1976	NONE	
US 4475716 A	09-10-1984	NONE	

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