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(54) **Car jack.**

(57) A vehicle jack of the type often known as Y-jacks, which has two support members (1) and (3) pivoted together, with a base foot (4) on one of them and a vehicle engaging portion (5) on the other, in which the vehicle engaging portion has a member which rotates on this second support and shaped to have a positive fit with the vehicle body, by means of an insert or groove with opposing thickened areas for alignment with the direction of the vehicle.

The foot or base (4) has a member which pivots freely on the first support, with rounded support surfaces (26).

The pivoting member (6) comprises a threaded member which pivots near the base through a boss.

There are some studs (24) in the base, which extend through holes to snap into place, thus retaining the base in position and limiting the said rotation.

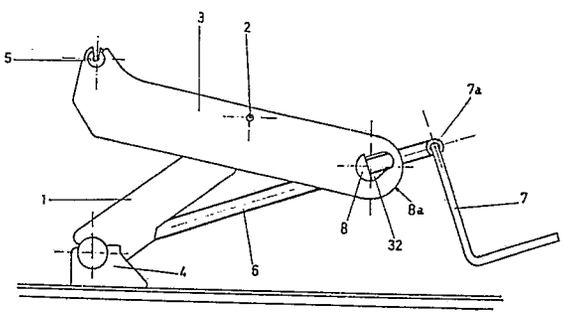

FIG: 1

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Description

This invention concerns vehicle jacks of the type having two support members pivoted together with a foot on one support member and a load engaging socket on the other, and a device to pivot the support members in relation to each other so that the foot and load engaging socket move towards or away from each other whereby a vehicle can be elevated or lowered.

There are several jacks of this kind nowadays which are often referred to as Y jacks because of the relative position of the two members. Examples of this type are shown in British Patent 1450369 and in British Patent application 2176458 among others.

French patent N° 546204-FELIU shows a jack with a second arm connected to a swing support part for the vehicle, a pivot with a second arm and a strut pierced by a worm screw and with a supporting shoe on the ground.

There is a concave head on the second arm on which the vehicle body rests. The first arm receives a runner underneath which forms a joint to which a yoke is attached in which the yoke supports the shaft of the joint of the first arm.

The worm screw is operated by a nut, the end of which has no thread and is connected to some parellel bars which have a hub. These arms start at the yoke joint mentioned above.

This jack is very complex mechanically in the load area on the first arm because of the yoke and joint and made up of a considerable number of supplementary parts when dismantled.

The French patent 2273752 BILSTEIN is also known and corresponds to the British patent 1450369 mentioned above which is the classic Y jack with the first support arm on the ground, a threaded member secured in it and the second support arm together with fixed support section for the vehicle on the second arm which is concave.

The worm screw shaft goes through a nut on the first arm situated in an open slot on the outer part of the first arm. These slots are machined on the free top end of the first arm with an end section which remains unprotected and can often suffer frequent damage while the jack is in use.

The German patent 2621425 PANNE is also known and of the same type as the preceding one with open slots on the end of the first arm. The second arm contains a head with a concave piece to fit onto the vehicle. The first arm is attached to a supporting shoe by means of a joint and two stops are to be found on the shoe end and two bevels on the first arm so that they meet at the two end positions on the jack.

The shoe consists of two pieces; one fixed tightly to the main column and the other to a traction rod. This jack is certainly complex since it needs two support points, a guide slot for the traction rod, the traction or pressure rod itself and the consequent functional and mechanical workings.

The German patent 2936002 STORZ is also jnown and of the Y type which has a horn-shaped piece at the top end of the second arm which turns in the same way as the French patent 546204 FELIU. This piece may be pierced or not by the worm screw shaft and has projecting supports to limit the travel or arc whose main feature is its hellow interior from the edges of the slot onwards.

On this jack and especially when the hern-shaped piece is made of metal a number of metal lugs noticeably stick out of the second arm of the jack where the horn is located, which is an inconvenience when using the jack as well as being costly. In addition the assembly of the jack is complex.

Another jack is known under British Patent 2176458 METALLIFACTURE which has an open slot at the top end of the first arm as well as steps both on the shoe of the first arm and on the free end of the second arm.

The second arm includes a bent track with stops on which the piece that supports the vehicle body rests and turns. The first arm also includes a similar bent track which the shoe runs on.

In both cases, the bent track is the special piece which is necessary.

The aim of the invention is to improve present techniques from the following points.

1. Provide a supporting part for the vehicle on the second arm or supporting member, which has the well-known feature of turning on the second arm and is distinguished by its specific formal concept and working simplicity.

2. Locate a part to support the vehicle body on the second arm which is fixed on the said arm and of a known shape. This support piece is characterized by the thickened edges of the support of the vehicle body which rests on the rim of the second arm and its outer edges which do not protrude over the profile of the arm.
This fixed part is very resistant and its length is curtailed within the width of the second arm.

3. The lower end of the first arm which has a convex prolongation in a rounded shape is connected in the usual way to the support shoe with a belt or pin in which the shoe itself has a rounded concave surface directly receiving the prolongation of the arm without the help of any auxiliary part.

4. The special shape of the barrel which houses the threaded shaft of the jack at the base or foot of the jack also used to connect the said base with the first arm of the jack.

5. Carry out closed slots in the walls of the arms of the jack to avoid loose ones which can get damaged.

6. The special structure of the base, in one version of the jack, channel sections with two snap-fit projections which connect through openings on the under-side of the first arm.

7. The distance between the axel of the base or foot and the vehicle body support to facilitate the inclusion of a conventional crank.

According to one aspect of the present invention,

this is a vehicle jack including two support members pivoted together, a shoe on one support member, a vehicle engaging section on the other support member and means to pivot both support members so that the base and vehicle engaging section move towards or away from each other in which the vehicle engaging section comprisses a member rotatably mounted on the other support member mentioned and shaped to make a positive fit with the vehicle body.

The rotatable member will normally be made of a plastic material and be snap-fit in partially circular recesses on the other support member mentioned. Normally the support members are made of channel sections so that these partly circular recesses are on opposite walls of such a section. The arrangement of the cylindrical member and the support member may be such that the rotation of the cylindrical member is limited either by projections on it or by having a partially circumferential groove, for instance, in which the rim sections of the recesses in the other support member mentioned runs.

The rotatable member mounted on the second arm or second support member has a cylindrical component with a bulge in the middle which lodges between wings of the U-channel on the second arm to control the longitudinal movement of the said member. The ends of the rotatable member on both sides of the central bulge are smaller than the central bulge and in the section between the central section and the ends there are circular grooves as a sort of inlet which take the width of the channel-section wings.

The grooves are partially made so that they constitute a break in the extremes of the groove for the rotatable member. The longitudinal groove well-known in the shape of a U for instance.

According to another aspect of the present inven tion a vehicle jack is provided including two support arms or members pivoted together, a foot on one support member, a vehicle engaging section on the second member and a means of pivoting the support members so that the shoe and the vehicle engaging section move towards or away from each other and in which the vehicle engaging section contains an insert securely fitted onto the end of the other support member mentioned, and having opposite thickened zones which alternatively or simultaneously are separated by a recess in which, for instance, the floor pan sill seam weld of a vehicle can fit.

The thickened zones of the insert conveniently rest on its two ends and the face of the sections made on the second support member so that they fit snuggly with the free ends of the wings of the U channel which constitutes the said second support member. The insert should be made of a plastic material preferably so as not to damage the vehicle on being raised in such a way that it slots into the engaging section on the second support member by pressure.

The insert has some projections on the outside so that once it has been pressed onto the second support member, the projections secure the insert in place and prevent any kind of movement with respect to its axis.

The projections are made on the insert in the same injection molding operation so there are no additional production costs. The projections may be longitudinal or slightly circular and they may even be unitary projections, with one of its special features being that the sides or exterior flaps are placed at equal distance between the interior wing surfaces on the second support member.

Thus, when the insert is ready to be pressed in position on the second support member mentioned, the sides of the projections of the said insert make contact with the internal wing surfaces of the second support member, preventing any movement lengthways.

In both the above aspects, when the longitudinal recess or groove is provided, the jack can be properly aligned relative to the vehicle on the basis of the direction of the floor pan sill seam weld. In both cases, the insert can be a plastic material to prevent damage to the vehicle being raised. This also means it can be injection molded and if desired, coloured as an aid in use. With most jacks of the type of the present invention, there is a change in direction during the lifting operation between the end of the member carrying the vehicle engaging section and the vehicle itself, but in both cases this is conveniently adjusted. In the first case the rotation of the cylindrical member is easily achieved with the load being transferred from the cylindrical member to the support member over a relatively large supporting surface between the rotatable member and the support member. In the second, this is acheived in operation by loas that is initially supported by one of the enlarged ends being subsequently transferred to the other.

According to another aspect of the present invention a vehicle jack is provided including two support members pivoted together, a foot on one support member, a vehicle engaging section on the other support member and a means of pivoting the support members so that the foot or base and the vehicle engaging section move towards or away from each other in which the base comprises a freely pivoted base member on the lower part of the first support member and this support member having rounded support surfaces to about the lower ends with the shape of the support member mentioned and having a snap-fit engagement with the lower end of the support member.

Normally the support member is of the channel shape type and the foot member has a lower supporting surface and straight sides extending from the same. Partially circular support surfaces are to be found on these sides to engage with a correspondingly shaped lower end on the support member. The sides also preferably include dowels, which pass through corresponding holes on the lower end of the support member and snap fasten to retain the base in place.

It is desireable that the base member and support member are so shaped as to reduce possible rotation between them and to make initial positioning of the jack easier and more accurate. The base member can be made of a plastic material, for

instance, by injection molding, which is both simple and cheap, sturdy and looks good. The dowels increase the security of fixing the base member and allows for a simple construction and the snap-fit facility makes assembly particularly easy. The lead can be borne by the curved surface between the base member and support. This aspect of the invention is useful on its own or combined with either of the two previously discussed aspects, as shall be seen later.

According to another aspect of the present inven tion, a vehicle jack is provided, including two support members pivoted together, a base pivoted on a support member and a vehicle engaging section on the other support member so that the base and vehicle engaging section move towards or away from each other wherein the pivoting device comprises a threaded member secured pivotally to a previously mentioned member adjacent to the base and passing through a threaded barrel engaging the other support member at a point far from the vehicle engaging section, the connection between the support members, the vehicle engaging section and the barrel being pivotable.

With this arrangement, when the threaded member is turned in one direction the end of the second support is deawn downwards and towards the base member which in turn raises the vehicle engaging section. This arrangement ensures a safe and stable jack with the screw generally stable when turned. In addition, the screw threads are generally protected by the support member which tends to be above it so that any contact with clothing and the like is less likely to happen.

This aspect of the invention can be used with either of the first two aspects discussed above and/or the third aspect mentioned above, namely the freely pivoted base. However, and preferably in this aspect of the invention the end of the screw adjacent to the base is received in a support member which simultaneously operated as a pivot to join the base and the corresponding support member.

This support can be made of a plastic material with a pair of grooves adjacent to each other to admit respectively, the edges of the recesses on the base and the corresponding support member. In the centre. between these pairs of recesses lies a barrel section with a transverse bore in which the end of the threaded part is set. The support may be shaped specially to facilitate the initial assembly of the parts followed by the rotation of the support member to prevent subsequent inadvertant disassembly. This is a very simple and convenient way of providing independant movement for the base, the support member and the worm screw with a single item on the apparatus. This can provide reliable contact with the ground and eliminate any undesireable rocking movement.

According to another aspect of the present inventopn, a vehicle jack is provided, including two support members pivoted together, a base pivoted on a support member and a vehicle engaging section on the other support member so that the base and vehicle engaging section move towards or away from each other a threaded member which is attached rotatably at one end to one of the support members and which passes through a threaded support on the other support member. The threaded support is in a barrel or boss extending across the U channel section which comprises the other member mentioned and through slots on the walls thereof, the said slots being shaped to allow initial insertion of the barrel and to prevent any movement thereof once the barrel has been engaged with the threaded member when the jack is assembled.

This aspect of the invention can be used with one or more of the preceding aspects. This allows the simple insertion of the barrel followed by its movement to the position of operation in which the barrel cannot be removed while it can rotate sufficiently to allow the jack to be raised and lowered.

The slots in which the barrel is situated are located on the channel section wings of the arm or arms, as the case may be, and are closed off with no outlet towards the edges of the said wings. This is specially advantagous since it completely eliminates any undesireable projection or but as can be appreciated later.

One last aspect of the invention relates to the positioning of the jack when the worm screw is connected to the barrel in the second support member and to the other barrel or boss in the base or support shoe on the first support member.

On other known jacks, when the jack is folded away, the vertical of the turning point of the shoe coincides with the vehicle engaging section on the second support member or arm since the length of this second member is practically equal to the distance between the turning point of the shoe and the point where the crank operates on the worm screw. For this reason, and because the point where the crank operates is very close to the ground, a special crank is necessary, a hinged crank for instance. This would add some additional cost but would mean the users hand would not touch the ground.

According to the invention, it is of note the fact that the second member which includes the vehicle engaging support is shorter than the distance between the axle and the point where it engages so that the vertical of the axle and the support are separated a certain distance.

With this arrangement, the base axle and the support must be aligned under the same vertical at first and must be carried out by hand. Once this has been achieved, it turns out that the point at which the crank operates has been raised and so it is then possible to use a simple and economical crank.

The following illustrated description is included only as an example, so that the invention may be understood more easily. The following descriptions are given:

FIG. 1. is a side view of one elevation of the jack in accordance with the invention.

FIG. 2. is a perspective of the top part of the jack in FIG. 1. showing the rotatable vehicle engaging section.

FIG. 3A, 3B and 3C are sectional drawings of

part of the jack in the region of the base.

FIG. 4. is an elevation of the second embodiment of the jack in accordance with the invention.

FIG. 5 is a perspective of the vehicle engaging section from above of FIG. 4.

FIG. 6. is a sectional drawing showing the pivoted base of the jack in FIG. 4.

FIG. 7 is a view of the jack in FIG. 4 when folded.

FIG. 8. is a view of the jack in FIG. 1 when folded.

FIG. 9. is a partial perspective showing the barrel used in the invention in the slots of the support members.

FIG. 10, 11 and 12 shows the back top section of the vehicle engaging section from FIG. 5.

FIG. 13 is section II of FIG. 5.

In the first operation according to FIG. 1. to 3C, the jack has a first arm or support member (1) pivoted at (2) to a second arm or support member (3). Mounted pivotally and freely at the lower end of (1) is a base member (4). There is a load engaging member (5) mounted rotatably on the upper end of the arm at (3). Extending between the end of the arm (1), near the base, and the end of the arm (3) away from the load engaging member (5) is a screw threaded member (6) with a crank (7) at the end of the appliance (7a).

The screw threaded member (6) passes through a barrel or boss (8) set in the end of the arm (3) through closed slots (32) and is rotatably attached to the arm (1) near the base (4). When the screw turns (6) in one direction, the end of the arm in the barrel (8) is drawn towards the base (4) so that the load engaging member (5) is raised lifting the vehicle below which the jack is placed. Reverse rotation lowers the load engaging member (5).

Arm (3) and (1) are channel shaped in cross-section. The base (4) is usually a channel shaped member as shown in FIG. 3A, 3B and 3C and will normally be made of metal as will arms (1) and (3).

The rotatable member (5) is shown in FIG. 2 to be received in the partially circular recesses at the end of arm (3). The rotatable member (5) is normally cylindrical and the central part is larger than the ends (5a). The rotatable member is fixed into the walls of the profile of the arm (3) through sides of central part and is controlled lengthways in this way. The member (5) has partially circular grooves in the sides of the central part in which the thickness of the wings of arm (3) are fitted.

The grooves (9) do not extend fully around its section, but are limited at (9a) to prevent the member rocking. There is a slot (9) of a well known shape which goes lengthways and admits the sill seam weld of the car for aligning purposes. This member (5) will preferably be made of a hard plastic material.

In FIGs. 3A, 3B and 3C sectional views are shown respectively of the lines CC. BB and AA on the jack in the area of the base (4) attached to the foot (1). As is shown in FIG. 3C, the screw (6) extends towards the inside of the barrel (11) in which it turns freely and in which it is retained against longitudinal movement at least to the right by virtue of the cover (12). Outside the barrel (11) and on both sides there are two grooves inside which the edges of the recesses of the shoe side walls fit (4). Thus the barrel (11) functions pivotally to connect the end of the screw (6) to the lower end of the shoe (1) and the base (4). Each one can move freely in relation to one another. Consequently, with a single item important aspects of the assemly of the jack can be achieved.

As is shown, specially in FIGs. 3A and 3B it can be assembled quite simply by taking advantage of the notches towards the lower end of the grooves in the barrel. These notches are shown at (13) and (14). In particular angular positions of the barrel, the barrel itself can be inserted so that the grooves receive the edges of the recesses made in the side walls of the shoe (1) and the base (4) respectively. After appropriate rotation of the barrel, the notches move away from the edges of the recesses so that the barrel cannot be removed from the recesses since both are slightly more than semicircular in size.

It can be appreciated that when the kack is not in use, it can be completely wound down with the shoe (1) fitting into the channel section of arm (3). Preferably, the cranked handle can then be pivoted to lie alongside arms (1) and (3).

FIGs 4, 5, 6 and 7 show a second drawing of the jack in accordance with the invention. Certain of its features may be incorporated into the first embodiment already described and vice versa.

As shown in FIG. 4 the jack of this embodiment includes a first arm (15) and a second arm (16) both pivoted at point (17) connecting the arms (15) and (16) there is a threaded member (18) with a crank (19) on its free end. The other end of this screw threaded member is held in a bushing or barrel (20) retained in grooves (32) in arm (16). In between the ends, the screw threaded member is threaded through a bushing (21) set in a slot (32)at the top end of arm (15).

There is a freely pivoting base (22) at the lower end of member (15) and at the end of arm (16) there is an insertion which makes contact with the underside of the vehicle when raised.

As in the previous embodiment both arms (15) and (16) are of the channel shaped cross-section. The jack can be lowered from the position in FIG. 4 to a closed position as in FIG. 7 where the arm (16) fits entirely into arm (15). As shown in FIG. 6 the base at the end of arm (15) is constructed to accomodate the free end of the first arm (15) directly.

FIG. 5 shows an enlarged drawing of the insertion placed at the top end of arm (16). This is a plastic molded insert which is partially rounded with thickened edges. These thickened edges are separated by a groove (28) into which the sill seam weld of a car can be fitted for alignment.

As jacking up takes place, (see FIG. 4) it will be appreciated that contact with the vehicle which will be at the thickened edge (23) shown on the left of the insert will eventually transfer to the outer edge (23). This provides a smooth and stable means of ensuring continuous contact with the vehicle.

As shown in FIG. 5 the insert rests on the thickness of the cross-section of arm (16) and rims (23a) of the thickened areas flush with the outer edges (16a) of arm (16).

The insert (23) is controlled lengthways as can be appreciated in FIGs. 10, 11, 12 and 13. Projections 34, 35 or 36 which create the ends (30) are made on the underside of the insert and make contact with the inside walls of the wings on the channel section which constitutes arm (16). Lengthways movement of the insert is controlled in this way. FIG. 13 shows a view specially from section II of FIG. 5 when an insert is fitted as shown in FIG. 10.

The thickened areas (23) take the load of the car body and offers sufficient resistance in all cases because it is perfectly embedded.

Since the insert (23) is made of a plastic material preferably, it can be applied by pressure onto the upper end of the second member (16).

FIG. 6 is a partially sectional view of the bottom of arm (15) showing the base (22) which is preferably made of a plastic material and normally channel shaped. The base (22) has two sides extending up inside the bottom of are (15). Projecting from those sides of the base (22) are snap-fit projections (24) which extend through corresponding apertures on arm (15). This means the base (22) can be assembled easily and can nevertheless rotate freely.

Referring again to FIG. 6 and FIG. 4, it can be appreciated that the bottom of the arm (15) has a rounded end (25) and that the shoe (22) also has a rounded part. The jacking load is transferred to the ground through the base (22) through the abutment between (25) and (26) instead of through the projections (24). Thus, this ensures that the load is spread over a considerable area and local stresses do not become excessive to damage the projections (24) at any time. The curved surface (26) meets shoulders (27) on each side, both of the base (22) and the shoe (15) and designed to limit relative rotation between base (22) and arm (15).

FIG. 7 shows the jack in FIG. 4 completely wound down where the cranked handle (19) can be turned to tighten the screw member (18) in the assembly to prevent rattling.

Another aspect of the invention applicable to all embodiments is shown in FIG. 9. In this particular case the end (15a) of arm (15) is shown as in FIG. 4 even though it can be equally applied to FIGs. 1, 7 and 8 as will be described later. A barrel is shown (21) which could well be barrel (8) in FIG. 1 and the same barrel (20) in FIG. 1. which is set in closed slots (31)-(32) made on opposite sides of the jack arms.

In this case, barrel (21) is placed within the channel section (15) while it is being set in position and it can be seen that each side of the channel (15) has a slot with a recesss (31) which has a substantially circular segment attached to an elongated segment (32). The barrel (21) has a cylindrical part transverse to the arm (15) to receive and secure the screw rotatably. At each end of the cylindrical part (33) it has the enlarged section (21).

In the position shown, the barrel can be inserted first into one recess (31) and then into the other. When the barrel turns, it remains in the position shown, for example, in FIG 4 and in this position it cannot move much towards the free end of the arm (15) nor can it be released from the recesses.

The slots (31)-(32) avoid making the wings open to the outside because they are closed and contributes to the reinforcement of the arms, specially at the ends (15a) in FIGs. 1, 4, 7, 8 and 9. Thus this design achieves a sturdy, secure and simple assembly.

In regard to FIGs. 1 and 8 as shown in one of the drawings in the letter it is a folded position from which the jack can be operated. This is particularly outstanding as a feature.

As can be appreciated in FIG. 8 the second arm (3) is shorter than the distance from the vertical at (11) and the end at (7a) of the screw (7), so that the verticals of the support (11) and the vehicle engaging member (5) do not coincide. This means that the arm (3) must be raised to bring the verticals closer.

In this invention, a complex crank is not necessary to raise the jack from a position on the ground. A simple crank handle is used to gain simplicity.

Claims

1. A vehicle jack including two support members pivoted together, a show on one support member, a vehicle engaging portion on the other support member so that the base and the vehicle engaging section move towards or away from each other on which the vehicle engaging section comprises a rotatably mounted member on the second support member in the usual way. Its movement is controlled and it has a longitudinal slot which is its main feature because the said member includes a cylindrical body in the centre section (5) and sides (5a) that are smaller than the centre sections, into which the member is fitted between the internal walls of the second support member (3) through the sides of the centre section.

2. A vehicle jack in accordance with claim 1 featuring slots (9) in the sides of the centre section (5), partially circular which admit the thickness of the second support member (3).

3. A vehicle jack in accordance with claims 1 and 2 featuring stoppers (9a) at the ends of the slots which limit the rotation of the rotatable member on the second support member (3).

4. A vehicle jack including two support members pivoted together, a foot on one support member, a vehicle engaging section on the other support member and a means to pivot the said support members so that the base and vehicle engaging section move towards or away from each other, in which the vehicle engaging section contains an insert fitted onto the end of the second support member. It is an outstanding feature that the insert is fitted under pressure onto the second support member (16) and has thickened longitudinal edges (23) on which the said insert is supported by the ends

on the thickness (16a) of the second support member (16). It sits flush with the ends and edges (23a) of the enlargements with the cross-section of the support member (16).

5. A vehicle jack in accordance with claim 4 in which the underside of the fixed member insert has patially circular projections made at some distance from the edges so that the exterior walls (30) make contact with the opposite inside faces of the cross-section of the second support member (16).

6. A vehicle jack including two support members pivoted together, a shoe on one support member, a vehicle engaging portion on the other support member so that the base and the vehicle engaging section move towards or away from each other with a base with pivots in the usual way. The base (22) pivots directly on the end of the first support members (15) both of which, namely the said base and end of the first support member have rounded support surfaces (26) which directly abut. The base (22) snap-fits onto the bottom end (25) of the first support member.

7. A vehicle jack in accordance with claim 6 including partially circular support surfaces on the lower end (25) of member (15) and on the base (22). Both surfaces abut to transfer the load from member (15) to the base (22).

8. A vehicle jack in accordance with claim 6 or 7 including dowels or studs (24) in the base (22) which extend through corresponding apertures on the lower end (25) of member (15) and which snap-fit to retain the base in place.

9. A vehicle jack in accordance with claims 6, 7 or 8 in which both the base (22) and member (15) include a means (27) to limit the rotation of the base and the said member.

10. A vehicle jack including two support members pivoted together, a shoe on one support member, a vehicle engaging portion on the other support member so that the base and the vehicle engaging section move towards or away from each other with a threaded member which passes through a threaded barrel seated in the second support member. And its rotation is ensured to the first support member because the threaded member (6) is attached pivotally through a threaded end (6a) to a threaded member (11) adjacent to the base (4). Also because the second support member is shortar than the distance between the vertical axis of member (11) and the joint (7a) of the crank (7) when the jack is wound down.

11. A vehicle jack in accordance with claim (10) where the threaded end (6a) of the screw (6) adjacent to the base is received in support member (11) which simultaneously works pivotally to attach the base (4) to the support member (1).

12. A vehicle jack including two support members pivoted together, a shoe on one support member, a vehicle engaging portion on the other support member so that the base and the vehicle engaging section move towards or away from each other with a threaded member which is attached rotatably at least to the barrel at the top ends of the support members. The threaded barrels (8), (21) and (20) extend through the closed slots (32) made on opposite walls of the members (3), (15) and (16). The slots are shaped to allow initial insertion of the barrels but prevent their moving once the said barrels have been attached to the threaded member (6) and (18) and the jack has been assembled.

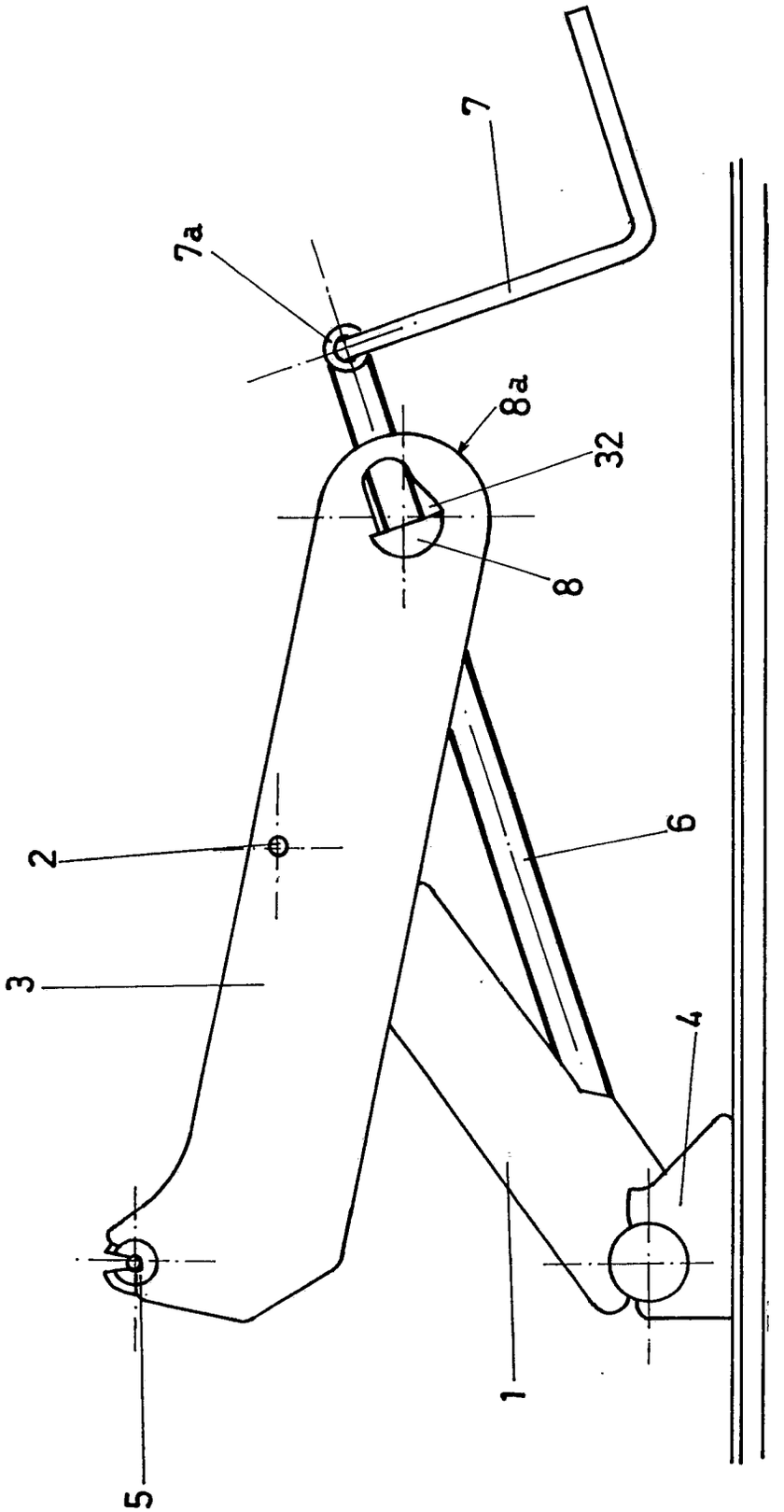

FIG: 1

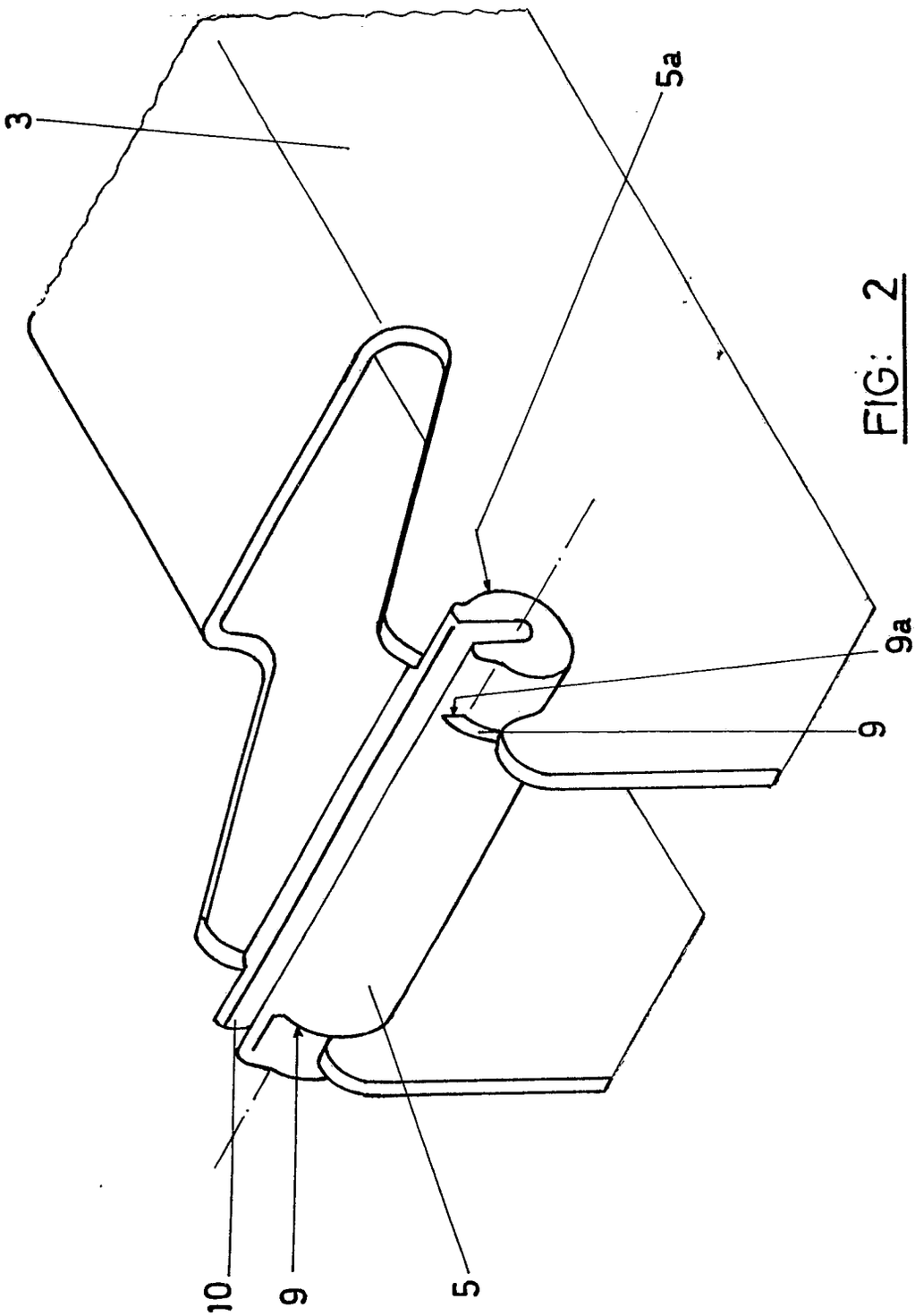

FIG: 2

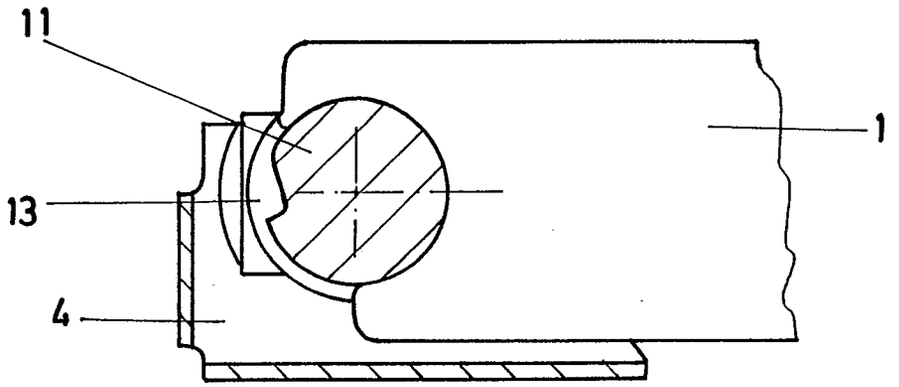

FIG 3A

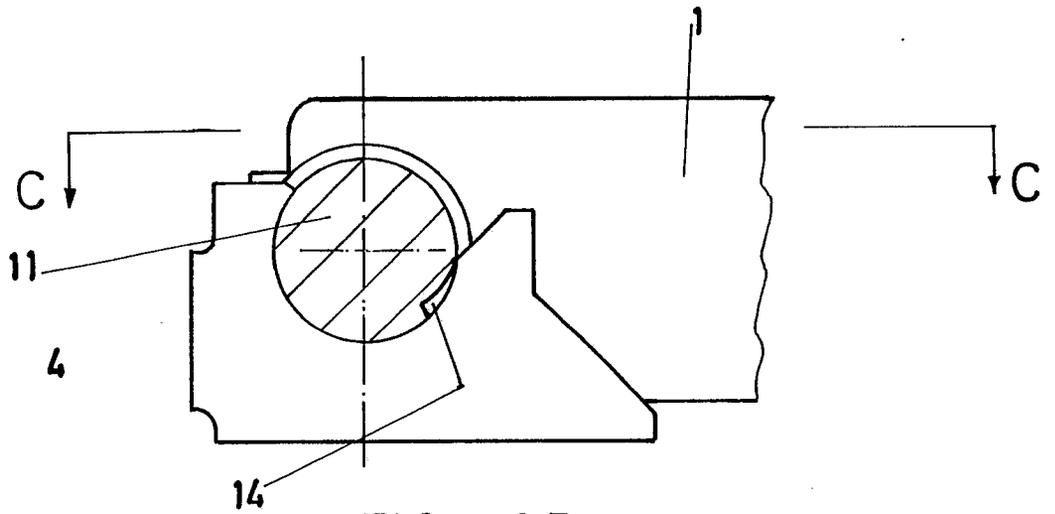

FIG: 3B

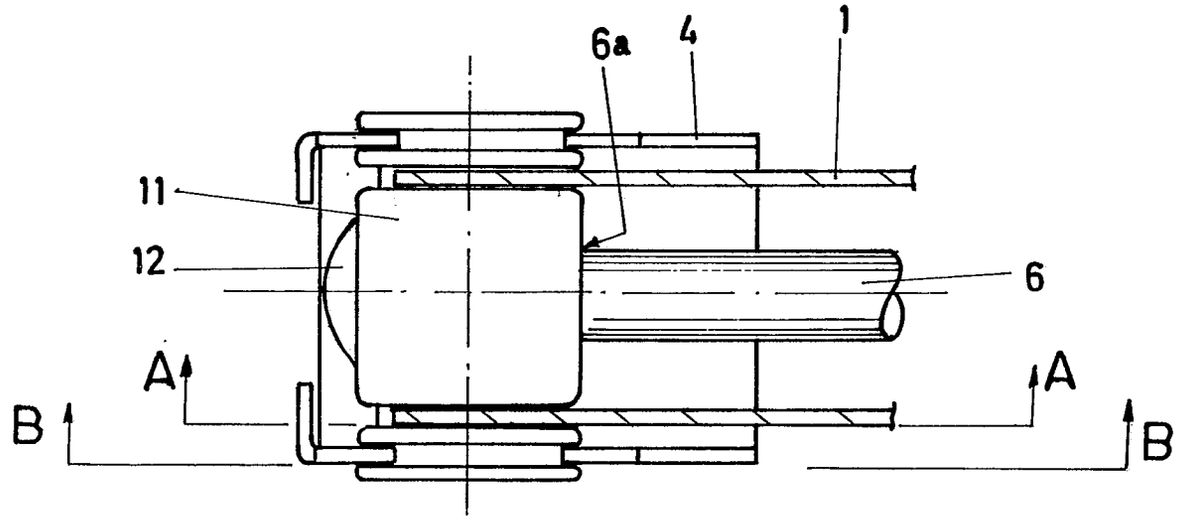

FIG 3C

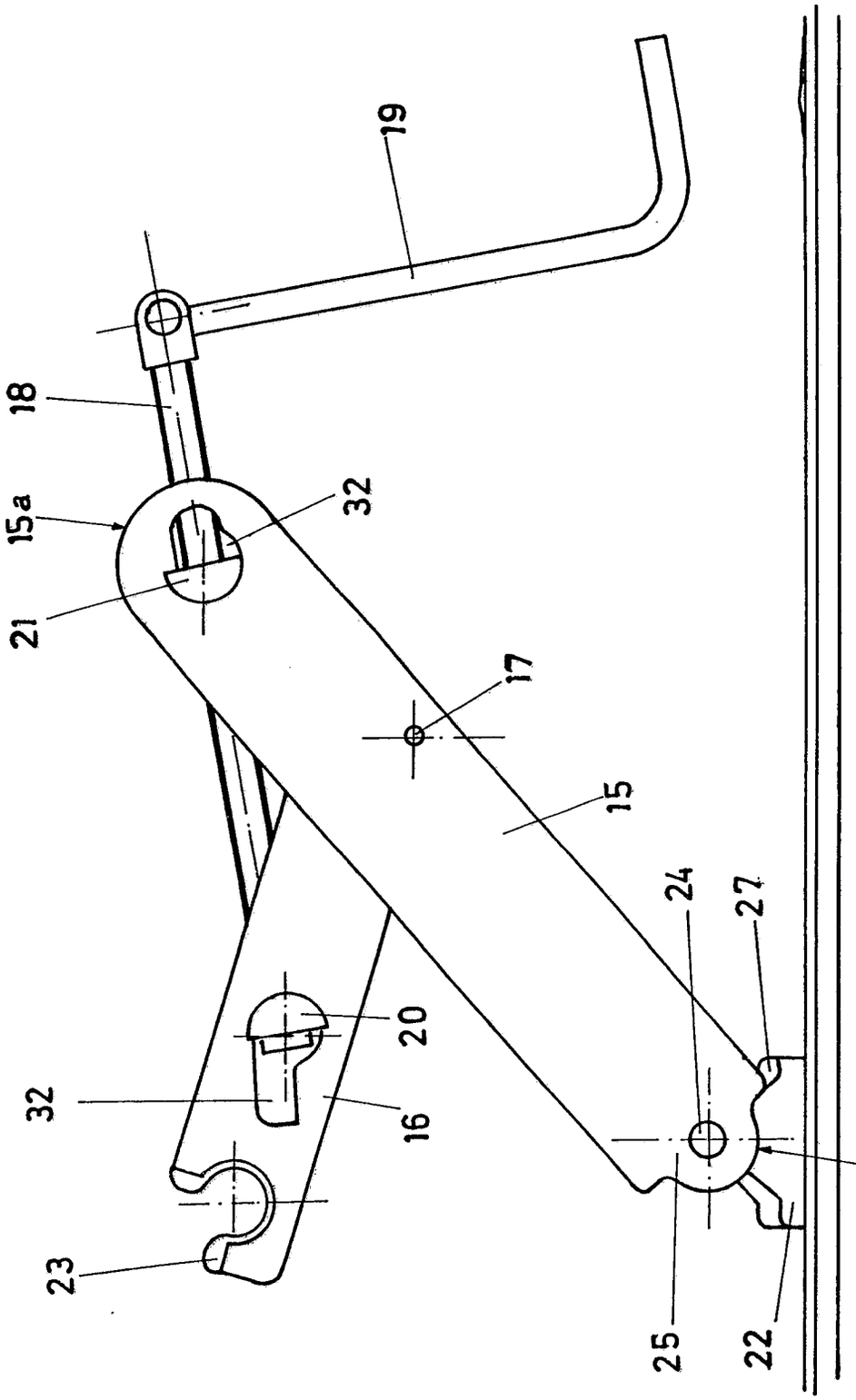

FIG: 4

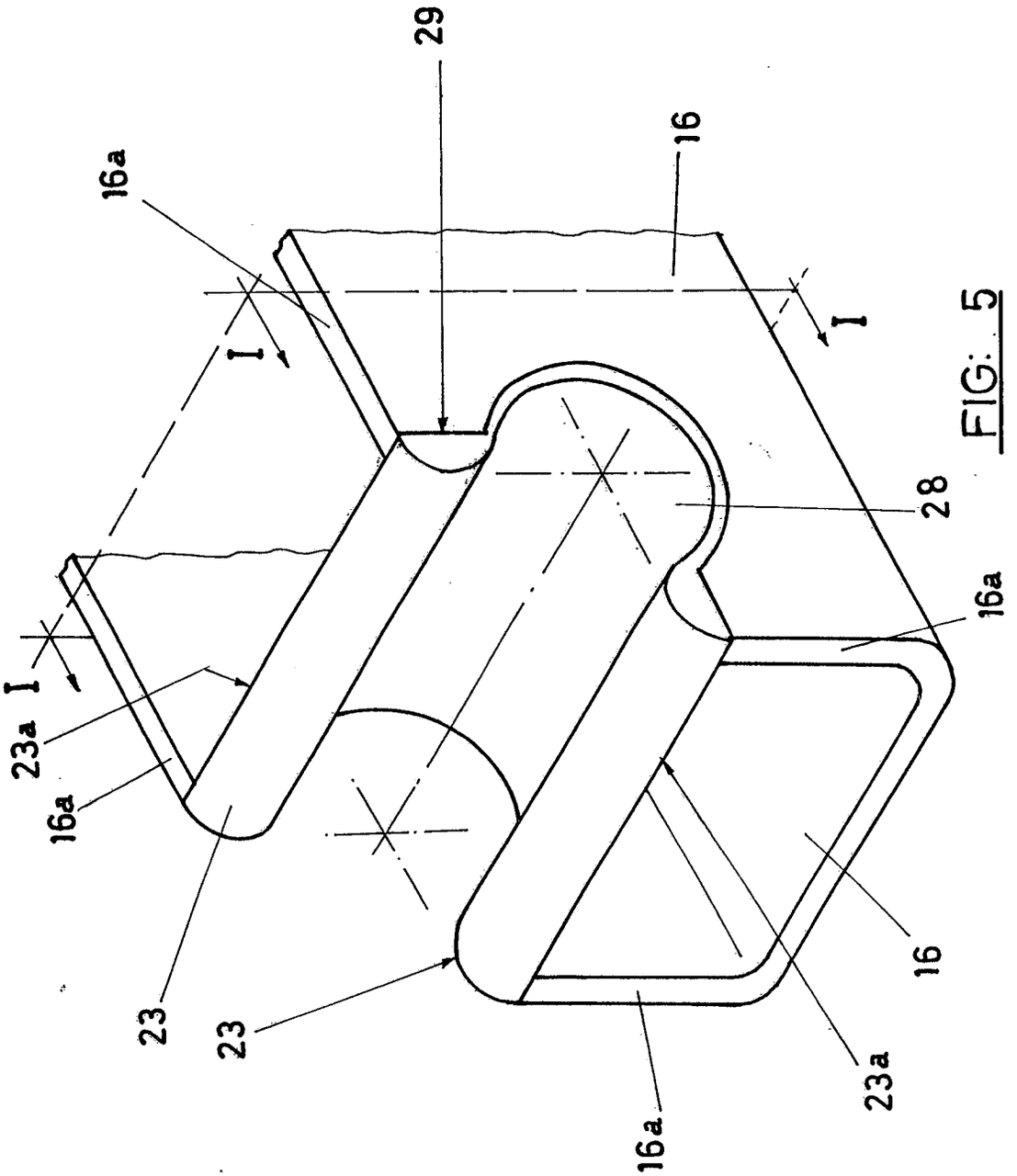

FIG: 5

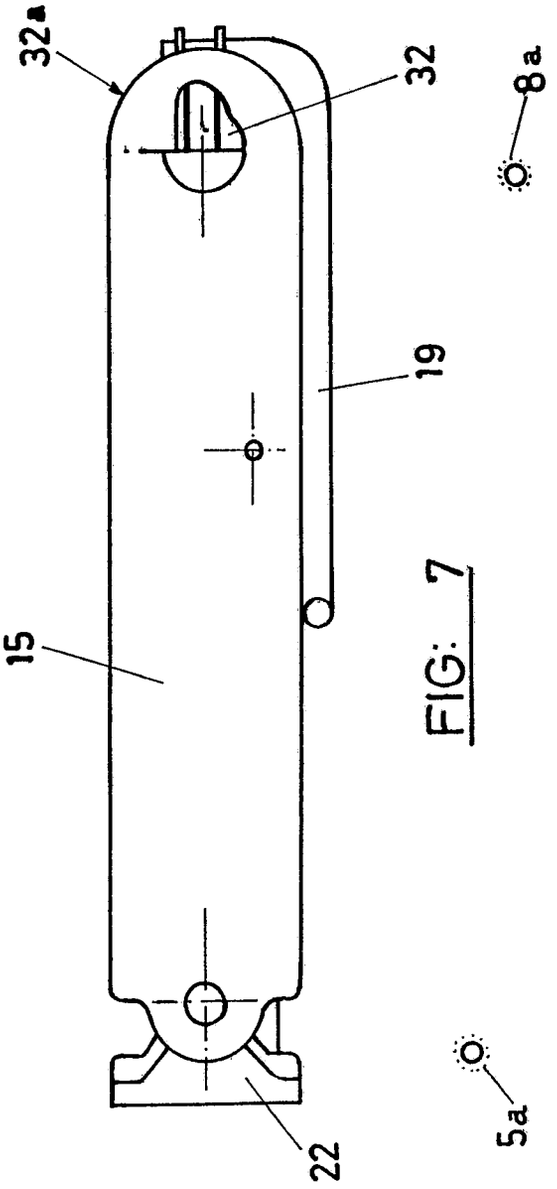

FIG: 7

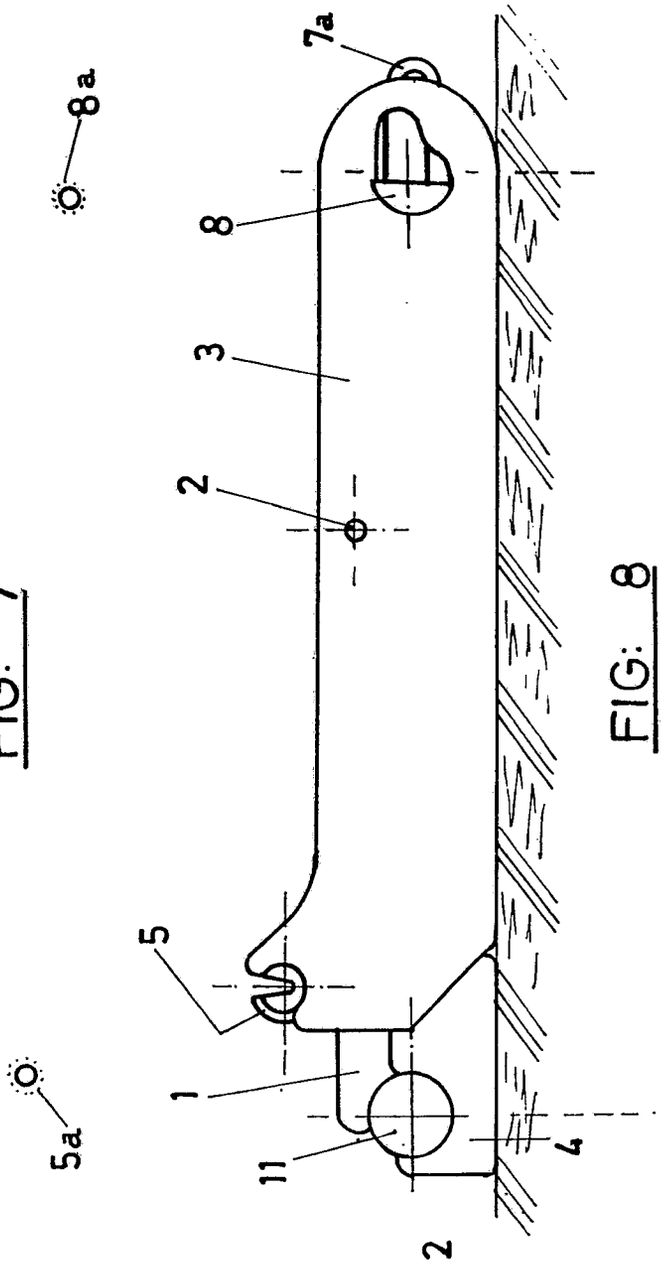

FIG: 8

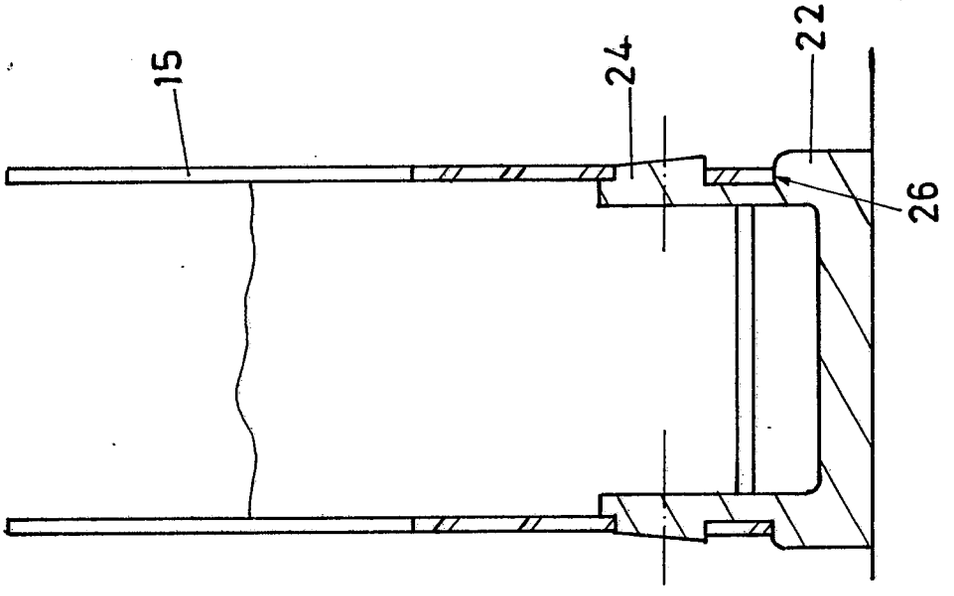

FIG: 6

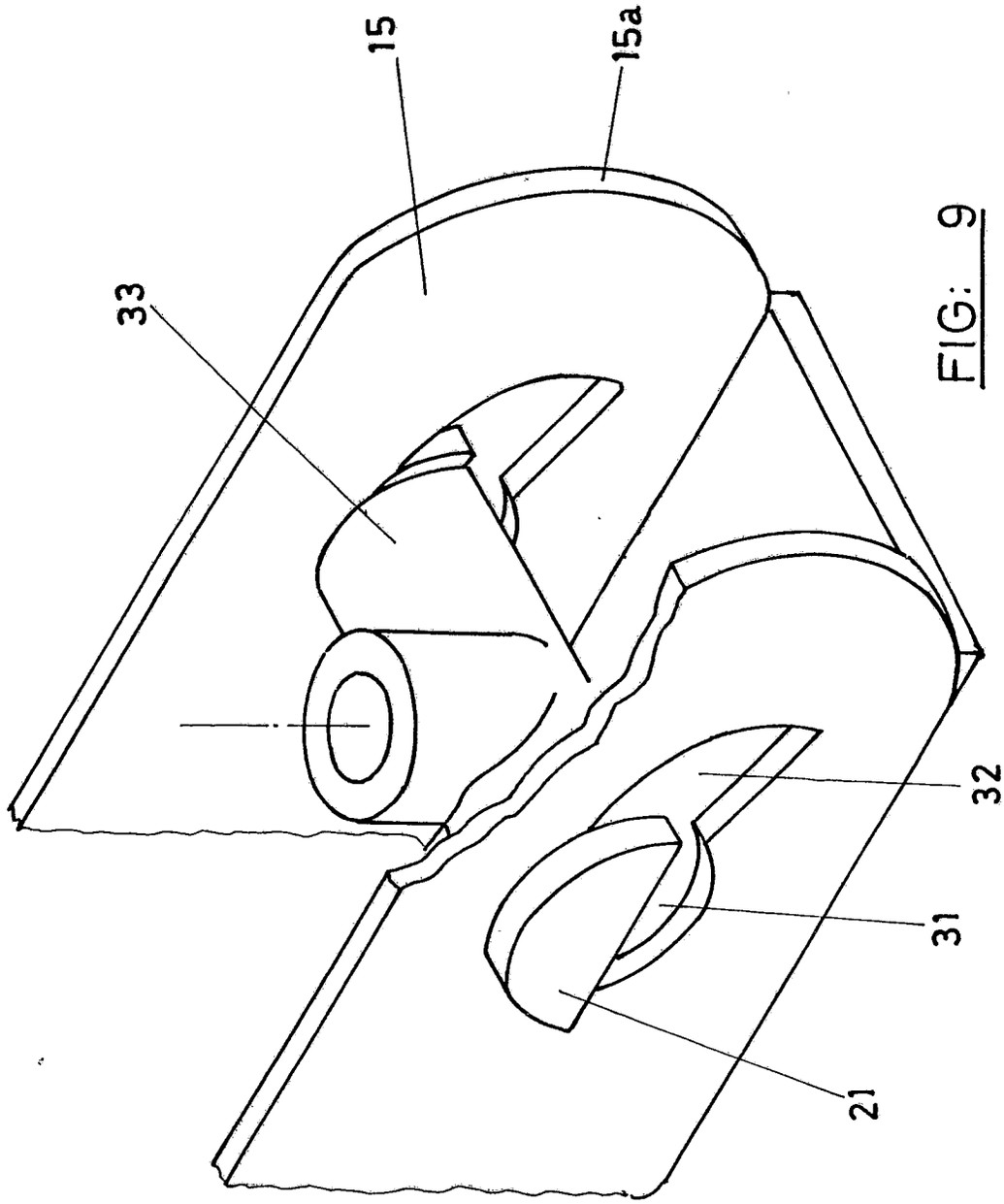

FIG: 9

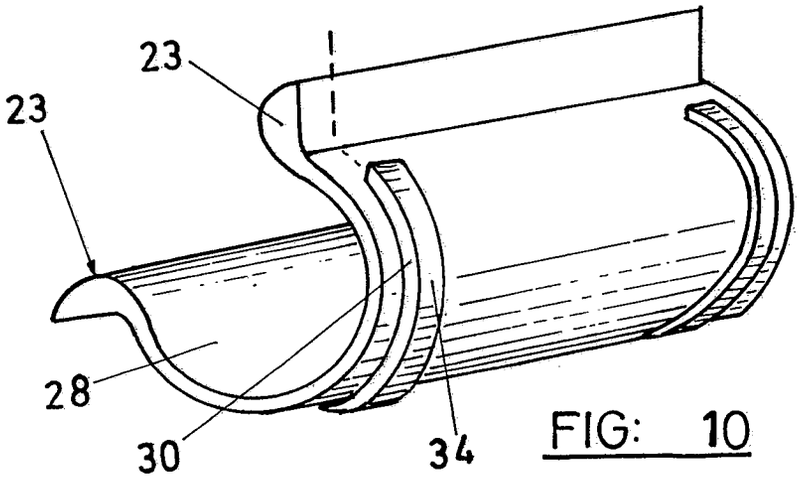

FIG: 10

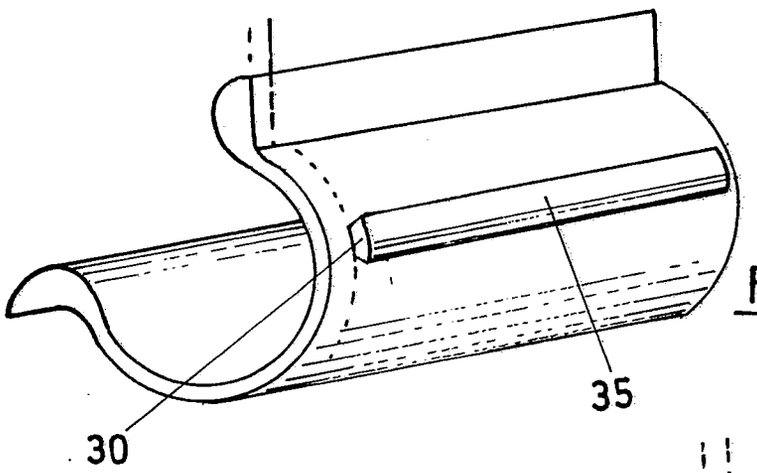

FIG: 11

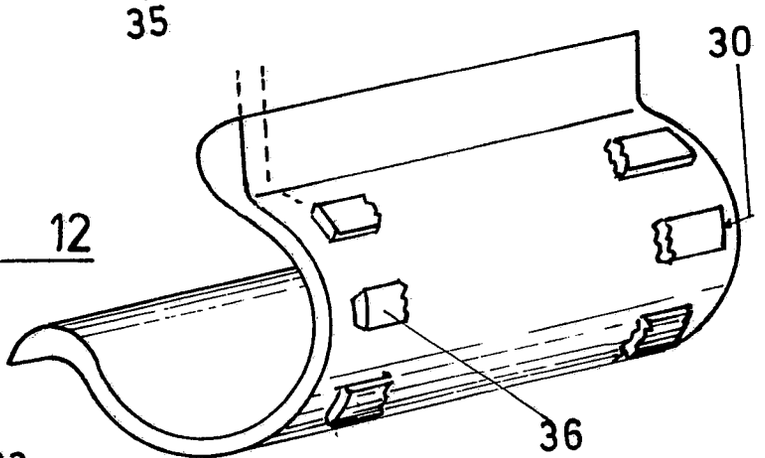

FIG: 12

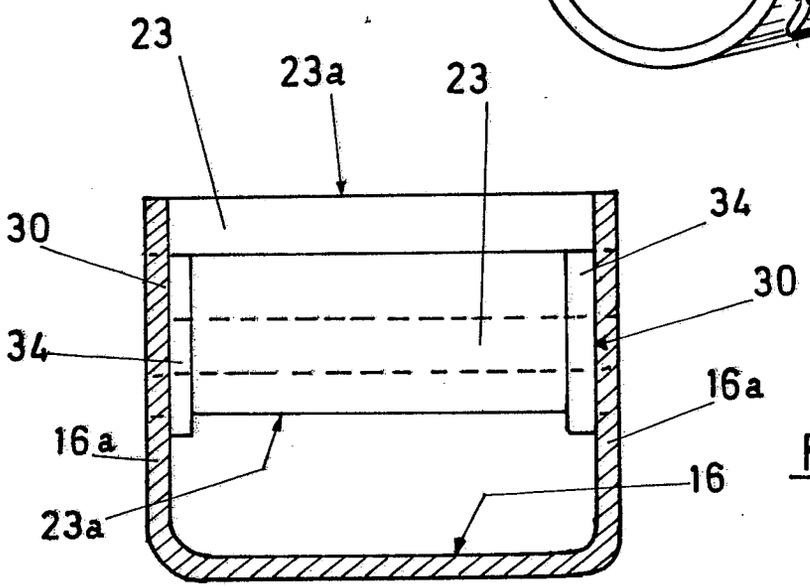

FIG: 13

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 50 0006

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
D,X	DE-A-2 936 002 (E.A. STORZ GmbH & CO. KG) * Page 11; page 12, paragraphs 1,2,3,4 *	1	B 66 F 3/12
D,A		4,6,10, 12	
D,X	GB-A-2 176 458 (MEGALLIFACTURE LTD) * Whole document *	6,7,9	
D,A		1,4,10, 12	
D,X	FR-A- 546 204 (M.A. FELIU) * Whole document *	6,7,9, 10	
D,A		1,4,11, 12	
D,A	DE-A-2 621 425 (ALLENDORFER FABRIK FÜR STAHLVERARBEITUNG ING. HERBERT PANNE KG)		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
D,A	FR-A-2 273 752 (FIRME AUGUST BILSTEIN) & GB-A-14 50 369		B 66 F B 60 S

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15-03-1989	VAN DEN BERGHE E.J.J.

CATEGORY OF CITED DOCUMENTS

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