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(54) Stabilizing and reinforcing device for vehicle-raising jacks.

(57) A stabilizing and reinforcing device for vehicle-raising jacks, which comprise an arm (3) provided with a stirrup (18) for supporting the vehicle, adopting the form of a transversal channel with a front support portion (20), an arm (1) articulated to the foot (2) of the jack and a nut (7) into which the worm (6) of the jack is threaded. The stirrup (18) is provided with three downwardly directed projections (21,22,23), aligned transversally and situated near the channel, which projections rest against a transversal rod (17) fixed at the end of the stirrup (18), which has attached to it a central plate (24) configured as two parallel plates linked by another intermediate one, forming a central housing by means of which said stirrup (18) is articulated to the rod (17). The stirrup channel has a central flange (25) which projects downwards, to which the lower part of the plate (24) is attached, said lower part of the plate is attached to the end of a central spring (26), also attached to the carrying arm (3) of the stirrup. The foot (2) has a depression (27) in which there is housed the foot-carrying arm (1), which depression is traversed by a rod (28).

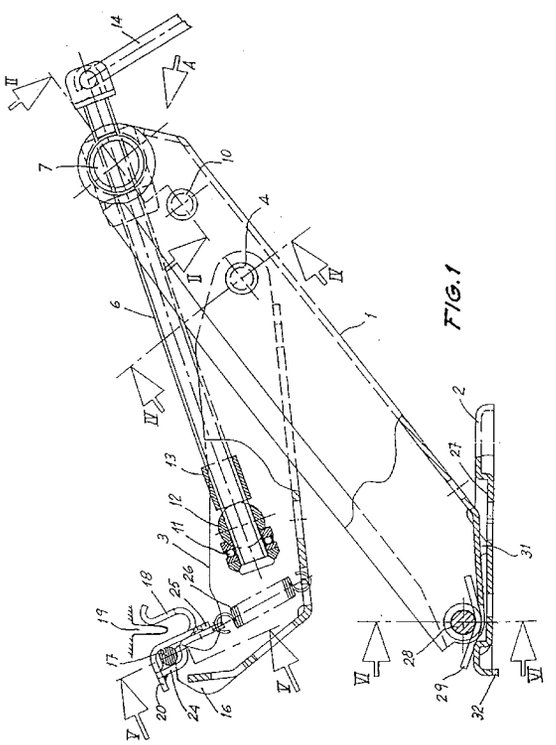

FIG. 1

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Field of the invention

The present Utility Model relates to a stabilizing and reinforcing device for vehicle-raising jacks, which device is applicable to mechanical vehicle-raising jacks of various types, such as "Y"-form jacks, parallelogram jacks, parallelogram jacks with downwardly extending leg, and others.

Background of the invention

Known in the art are mechanical vehicle-raising jacks of various types, the most important being the following:

a) "Y" form jack, which includes a column with a support foot to rest on the ground, to which column is articulated at an intermediate part a raising arm provided with an end stirrup, generally with a channel, for support of the corresponding vehicle, which vehicle has for the purpose flanges fitted near the edges of the lower part of the bodywork. The said column and arms are linked by means of a worm which is threaded to a nut transversally articulated to the upper part of the column, while one end of the worm is attached by articulation and rotatably to an intermediate point of the said raising arm, while the other end of the worm presents a crank or the like which permits the user to operate the mechanical arm to raise the vehicle and thus proceed to replace the corresponding faulty wheel.

b) Parallelogram jack, with four arms articulating with each other and having at their horizontal diagonal a worm, one of whose ends is threaded into a nut provided at one of the vertexes of the parallelogram, while the other end is rotatably attached to the opposite vertex; a section of the worm projects so that it can be operated by a crank as in the type described above. And in this jack the lower vertex of the parallelogram presents, articulated hereto, a plate to rest on the ground functioning as a foot, while the upper vertex of said parallelogram presents another plate functioning as a stirrup, to support the corresponding part of the vehicle.

c) Jack which comprises a mechanism based on four arms articulated together and arranged in the form of a parallelogram, provided with a worm situated on one diagonal member, as in type b), which is approximately horizontal in the operating position of the jack, which worm is operated by a corresponding crank or the like. The front end of the worm is threaded into a nut articulated on the front vertex of the parallelogram, while the opposite end of the worm passes through a cross-member which is articulated on the rear opposing vertex of the said parallelogram. The rear end of the worm ends in a rear expansion section, which rotatably bears against the said cross-member, with advantageous insertion of a bearing to facilitate the rotary support, although the relative positions of said rotary support and the above-mentioned nut could clearly be inverted. This jack presents a stirrup near the upper vertex of the parallelogram and on a prolongation of the upper rear arm; while, characteristically, the lower rear arm of the parallelogram, which emerges from its rear vertex, has a longer lower section forming a jack support leg, normally articulated in turn to a foot which rests on the ground.

The different types of known jacks provide various advantages which make them especially useful for specific differentiated applications of the jacks, in accordance with the technical requirements of the manufacturers of the corresponding vehicles. Nevertheless, the problem raised in general by vehicle-raising jacks in respect of utilization thereof by a normal user, without specific knowledge in this field and sometimes not even conversant with correct utilization of a jack to change a damaged wheel on his/her vehicle, consists in ensuring the stability of the whole formed by the jack and the vehicle during the functional operation of the former and also in resisting the mechanical stress required by the vehicle manufacturer and contemplated, amongst other technical specifications, in their corresponding conditions.

Also known is the fact that mechanical jacks for raising vehicles present a support for holding the corresponding lower part of the vehicle to be raised, which support is also denominated stirrup and is in some cases fixed, that is, it is firmly attached to the end of the carrying arm, while in other cases it can rotate with respect to a transversal horizontal axis of the end of said carrying arm, so that it constitutes an axis of rotation for the stirrup, so that the latter can fit better against the bodywork of the vehicle during raising and lowering with the corresponding mechanical jack.

In cases where the stirrup rotates with respect to its carrying arm by means of a rotation shaft, which is parallel to the axis of tilting of said arm, there is a known embodiment in which said rotation shaft is set at a certain distance with respect to the support plane of the vehicle bodywork, while in a further known embodiment that rotation shaft rests directly next to the lower side of a flat stirrup support part, so that the distance between the rotation shaft and the lower side of the vehicle bodywork, at the part where the latter rests on the stirrup, is determined solely by the actual thickness of said part of the stirrup.

Normally, and in addition to the aforesaid flat part, the known stirrups present a U- or V-shaped recess or channel, in which channel can be freely housed a lower flange on the corresponding lower part of the vehicle bodywork, reinforced in that zone

in order to withstand the mechanical stresses of the jack stirrup support for raising the vehicle. The said flange serves to guide the jack stirrup and prevent any accidental slippage, without the flange resting in the bottom of the stirrup channel.

Utility Model no. 247.051 discloses a vehicle-raising jack of the "Y" type, like type a) described above, and characterized essentially in that the rotation shaft of the support plate or stirrup rests directly on the lower side of same and is set approximately in a horizontal plane with the formation projecting from the underside of the vehicle, that is, from the lower part of the vehicle bodywork in which said jack support plate or stirrup is placed and fitted.

A jack provided with a stirrup articulated to the end of its carrying arm, through a rotation shaft parallel to the tilting axis, can adapt better to the relative movement between the vehicle bodywork and said jack than is the case of a jack with a stirrup which is fixed with respect to its carrying arm. Nevertheless, there exist today vehicles whose specific suspension layout, and even different response of the suspension units of the front and rear wheels, render inadequate mere rotation of the jack stirrup with respect to its carrying arm, requiring instead that the stirrup also has additional degrees of free movement, that is, other movements allowing it to adapt suitably to the complex movement of such vehicles when they are raised or lowered with a mechanical jack, by yielding of the suspension in directions different to those imposed by mere rotation of a transversal axis with respect to the stirrup carrying arm. Automobile manufacturers further require jacks to have higher mechanical strength, partly due to the greater weight of such vehicles deriving from an increase in their passive safety elements (bodywork reinforcement elements, internal fitments, etc.), which presupposes a corresponding reinforcement to the involved part of the jack, qualities not always achieved in known jacks.

Summary of the invention

In order to remedy the inherent disadvantages and defects of the hitherto known mechanical jacks, the invention embodies a solution to the problems described above, for the purposes of which the object of this Utility Model is a stabilizing and reinforcing device for vehicle-raising jacks, which comprises an arm provided at one end with a stirrup as resting point and support for the vehicle and which has the form of a transversal channel with at least one flat front support portion, an arm or column to which the foot of the jack is articulated and a nut into which the jack worm is threaded; characterized in that the stirrup is provided, at the front support portion thereof, with three downwardly directed projections, one of them central and the other two equidistant therefrom, aligned transversally and situated near the channel and at a distance from the respective side edges of said front portion of the stirrup, which projections rest against a transversal rod slightly longer than the gap between the two equidistant projections and fixed at the end of the stirrup carrying arm, which has attached to it a central plate of narrower width than the gap between the two vertical wings of the end of said carrying arm and is configured as two parallel, opposing plates linked by another intermediate one, forming a lower, central tubular part, situated in front of the front wall of the stirrup channel and beneath its front support portion, forming a central housing by means of which said stirrup is articulated freely to the rod, with substantial play; in that the stirrup channel has a cut-back front central flange which projects downwards, to which the lower part of the plate is attached, likewise projecting downwards and set below the housing; in that to said lower part of the plate is attached the end of a central spring, whose opposite end is attached to the carrying arm of the stirrup, keeping the latter centred against the rod and in a predetermined position; and in that the foot has a centred depression in which there is housed the corresponding lower part of the foot-carrying arm or column, which depression is traversed - just above- by a transversal rod fixed to the front part of the foot and with said arm articulated to it, with a spring being arranged between the foot and arm.

The said stabilizing and reinforcing device can be applied to any of the known types of jacks or to any other future type having the parts or means defined above before the work "characterized".

The stabilizing and reinforcing device for vehicle-raising jacks, according to the present invention, presents, amongst others, the following advantages: increased jack stability, reinforcement of mechanically critical parts of the jack and increased user ease of initial jack placement position underneath the bodywork of the vehicle to which it is applied.

The device according to the present Utility Model offers the advantages described above, in addition to others which can be deduced easily from the example of embodiment of said device, which is described in greater detail below in order to facilitate an understanding of the characteristics outlined above, at the same time providing information about various details, the specification being accompanied by drawings which, only by way of example and without limitation of the scope of the present invention, show a practical embodiment of the said stabilizing and reinforcing device for vehicle-raising jacks.

Brief description of the drawings

In the drawings, figure 1 shows a side elevation view of the jack, starting to rise underneath the vehicle bodywork (of which a part is shown schematical-

ly); figure 2 is a cross section view along the line II-II of figure 1, and shows a detail of assembly of the nut; figure 3 is a view in accordance with arrow A of figure 1; figure 4 is a cross section view along the line IV-IV of figure 1, showing the articulation between the stirrup carrying arm and the column; figure 5 is a cross section view along the line V-V of figure 1, and shows the stirrup; and figure 6 is a cross section view along the line VI-VI of figure 1, showing the lower part of the jack at the ground support zone thereof.

Description of an embodiment according to the invention

In accordance with the aforesaid figures of the drawings, a jack of the "Y" type is shown, comprising a column 1 (which in the case of the parallelogram-type jack would be an arm) to which is articulated a foot 2 for support of the jack on the ground, to which column is in turn articulated at an intermediate point thereof a raising arm 3 (carrying a stirrup), which articulation is implemented through the corresponding shaft 4 in such a way that the raising arm presents at this articulation two cylindrical recesses 5 (figure 4), which reinforce this part of the arm and provide a large support surface for it at its articulation with the column 1. The column 1 and the raising arm 3 are linked by a worm 6 which traverses and is threaded in a nut 7 (figures 1 and 2), which is this case is made of plastic material, which is provided with two transversal and opposite trunnions 8 which are inserted in the two cylindrical recesses 9 on the column 1 for tilting of the nut and, in consequence, of the worm 6, which cylindrical recesses form a reinforcement for this part of the column and a larger support surface for the nut.

On the column 1 and in a position close to the nut 7 is a pin 10 which secures and retains the two vertical wings of the U-profile of the column, which avoids any separation of said wings in the zone of the nut, and therefore avoids any escape of the trunnions 8 of said nut.

The worm 6 is borne at its front end by a support which can consist of a bearing 11, as shown in figure 1, or of other suitable means for retaining the front end of the worm in position, while at the same time facilitating its rotation with respect to its transversal support, which in this example consists of a sort of transversal shaft 12 articulated to the two vertical and parallel wings of the raising arm 3 and against which the bearing 11 rests, while on the opposite part there is a sleeve 13 fixed on the worm 6, which retains the arm 3 with respect to the front end of the worm, while at the same time forming a stop for maximum raising of the arm 3 with respect to the column 1. The relative location of the bearing or the like and of the nut could be inverted, that is, the latter would then be set at the corresponding part of the shaft 12 and the bearing would be set resting on articulated transversal shaft-like stop, situated at the place occupied by the nut 7 and between that shaft and the projecting rear part of the worm.

At the rear end of the worm 6 is linked in articulation a crank 14, as a means for the user to make the nut rotate in order to have it withdraw or advance, that is, to raise or lower the arm 3 with its stirrup and, in consequence, the bodywork of the vehicle to which it is applied. In this example, the crank 14 is articulated inseparably to the rear end of the worm 6, with stops fitted to establish its operating position, although the rotating action of the worm could be implemented by other means, which could even consist in a separatable or disassemblable connexion between the crank or the like and the rear end of the worm.

The column 1 is generally "U"-shaped with its free ends bent, in turn, in the form of an inverted-position "U", counterpoising each other, as shown in figure 4. The base of this "U" profile is interrupted at the upper end of the column, being partially prolonged and following the oblique cut of that end, in the form of two wings 15 (figure 3) which prevent the two vertical-profile wings on this part of the column coming together, thus preventing them pressing against the nut 7, avoiding the greater effort which this would involve as a result of a certain braking effect on said nut, and also avoiding eventual deterioration thereof due to that action. The lower end of the column also presents a similar layout, such that the base of its profile is lengthened, bending according to the oblique cut of said lower end and interposing itself between the two wings of the column, thus preventing them coming together, that is, keeping them in their correct positions. The specific profile of the column could clearly be any other with the necessary mechanical strength for its function, including two parallel profiles joined together by cross-members.

The raising arm 3 is constituted, in this example, by a "U" profile, although it could be any other of suitable mechanical strength, whose free end is cut off obliquely, so that the base of the profile is lengthened, bending and interposing itself between the two vertical wings of the profile, to which it is welded at its end, the wings forming two upward prolongations 16, to the upper part of which is welded a transversal rod 17 (figures 1 and 5). The stirrup 18 serves to hold and support the vehicle to which the mechanical jack is applied and adopts the overall configuration of a transversal channel, of "U" shape in this example (although it could have a "V" shape or any other suitable shape), in which channel may be fitted freely the lower flange 19 provided for this purpose on the corresponding lower part of the automobile bodywork; and said stirrup is further provided with at least one front portion 20 at which is implemented properly speaking the support of the vehicle bodywork, that part being substantially flat for this purpose.

On said front support portion 20, the stirrup has three downward projections 21, 22 and 23, projection 21 being central and the other two projections 22 and 23 equidistant there from and situated on either side of it, these three projections being aligned transversally and situated close to the channel of the stirrup and at a certain distance from the respective side edges of the above-mentioned front support portion 20, as can be seen in figure 5; and these projections 21, 22 and 23 rest against the rod 17, which is slightly longer than the gap between the two side projections 22 and 23.

The stirrup 18 has linked to it, by welding in this example, a plate 24 of narrower width than the internal gap between the two vertical wings of the end of the arm 3 carrying the stirrup 18, so that there exists transversal play which permits the stirrup to move in that direction in relation to its carrying arm 3. The projections 21, 22 and 23 can be constituted by recesses (as shown in figure 5) or by pieces or supplements fixed below the stirrup and set between the lower side of its front support portion 20 and the transversal rod, to form its swivelling support on the latter; and, in any case, such lower projections form a stirrup reinforcement at this point of same.

The lower part of the plate 24 is fixed, in this case by welding, to a front, central flange 25 cut out of the stirrup channel and projecting downwards, extending still further below the plate 24 and having an orifice into which is fixed the end of a central spring 26, whose opposite end is attached to the base of the stirrup-carrying arm 3 profile, so that in the inactive position of the stirrup 18, it keeps the latter centred against the rod and in a predetermined position owing to the location of the lower anchorage point of the spring to said arm. The plate 24 is configured as two parallel, opposite parts linked by another intermediate one, forming the configuration of figure 1, similar to the cipher four and forming a lower, central, tubular part situated in front of the front wall of the stirrup 18 channel and underneath its front support portion 20, which tubular part forms a central housing by which said stirrup is articulated freely to the rod 17 with substantial play in several directions, in addition to the transversal travel with respect to the rod 17 described above. The spring 26 has the function of centring the stirrup 18, also situating it initially to facilitate automatic positioning by the user when s/he moves in the mechanical jack and places it under the vehicle bodywork, in addition to the function of eliminating the noise which the stirrup would produce when stowed in the corresponding part of the vehicle.

The foot 2 of the mechanical jack is provided with depression (figures 1 and 6) centred transversally, which mechanically reinforces the foot, while at the same time permitting the articulation shaft 28 between the lower end of the column 1 and the foot 2 to be as low as possible, thus increasing the stability of the jack. This shaft 28 is fixed, in this example by welding, on the foot 2, just on top thereof and has a spring 29 coiled around the central part thereof, the ends of which rest resiliently against said lower part of the column 1 and against the foot 2, urging the latter against the lower part of the column when the jack is inactive and raising of the column with respect the support foot on the ground has not commenced, which also predetermines automatically an initial placement position for the user, while at the same time avoiding any noise which the jack might make when stowed in the vehicle.

The column has two cylindrical recesses 30 which reinforce its two vertical wings at this part of articulation with the foot, forming a larger surface area of support of the column on the shaft 28. The lower part of the column 1, which in the initial position of the jack is located within the hollow 27, may have stops 31 for positioning thereof with respect to the bottom of the hollow 27 of the foot 22, while the latter may have pawls 32 for gripping the ground or, in any case, improving the grip of the foot on the ground on which it rests.

It should be pointed out that, in the embodiment of the stabilizing and reinforcing device for vehicle-raising jacks object of the present Utility Model, all variations of detail dictated by experience and practice may be applied in respect of shapes and dimensions, both absolute and relative, and in respect of the materials used and other factors of an accessory nature, as may any modifications of constructional detail as are compatible with the essential nature of the claims, for all these lie within the spirit of the following claims.

Claims

1.- A stabilizing and reinforcing device for vehicle-raising jacks, which comprise an arm provided with a stirrup at one end for holding and supporting the vehicle, adopting the form of a transversal channel with at least a flat front support portion, an arm or column to which is articulated the foot of the jack and a nut into which the worm of the jack is threaded; characterized in that the stirrup is provided, at the front support portion thereof, with three downwardly directed projections, one of them central and the other two equidistant from it, aligned transversally and situated near the channel and at a distance from the respective side edges of said front portion of the stirrup, which projections rest against a transversal rod slightly longer than the gap between the two equidistant projections and fixed at the end of the stirrup carrying arm, which has attached to it a central plate of narrower width than the gap between the two vertical wings of the end of said carrying arm and is configured as two parallel, opposing plates linked by an-

other intermediate one, forming a lower, central tubular part, situated in front of the front wall of the stirrup channel and beneath its front support portion, forming a central housing by means of which said stirrup is articulated freely to the rod, with substantial play; in that the stirrup channel has a cut-back front central flange which projects downwards, to which the lower part of the plate is attached, likewise projecting downwards and set below the housing; in that to said lower part of the plate is attached the end of a central spring, whose opposite end is attached to the carrying arm of the stirrup, keeping the latter centred against the rod and in a predetermined position; and in that the foot has a centred depression in which there is housed the corresponding lower part of the foot-carrying arm or column, which depression is traversed - just above- by a transversal rod fixed to the front part of the foot and with said arm articulated to it, with a spring being arranged between the foot and arm.

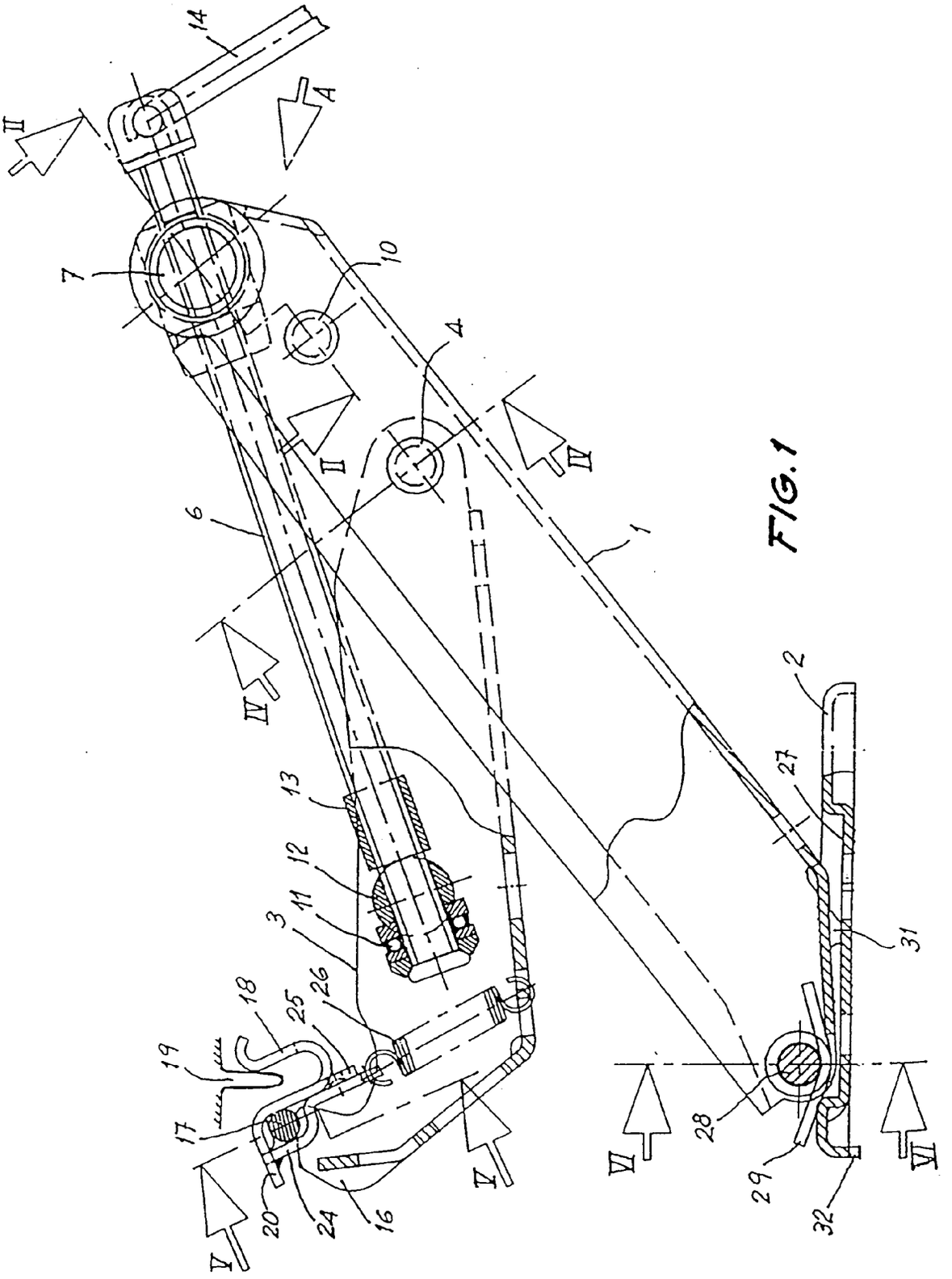
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FIG. 1

FIG.2

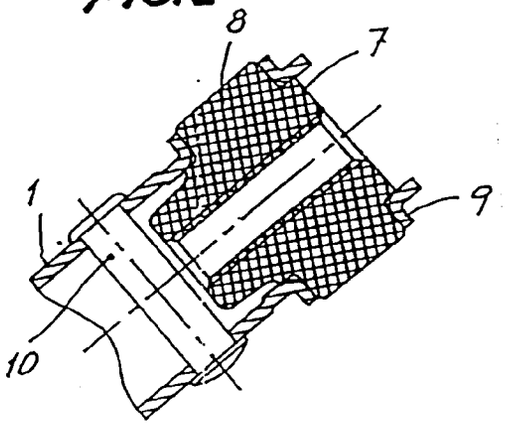
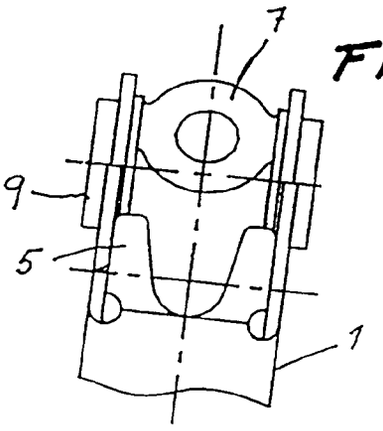


FIG.3



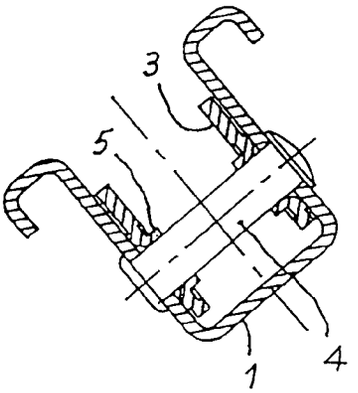


FIG. 4

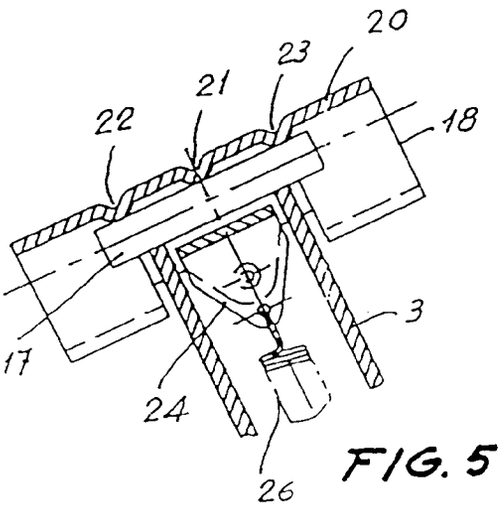
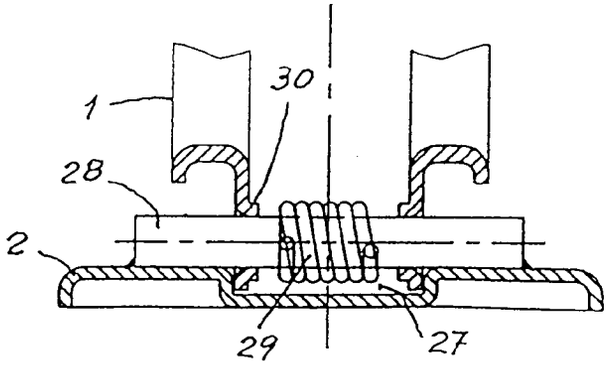


FIG. 5

FIG.6



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EUROPEAN SEARCH REPORT

Application Number
EP 94 50 0019

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.5)
A	EP-A-0 469 234 (SALVADOR ROVIRA) * figures *	1	B66F3/12
A	EP-A-0 451 643 (SALVADOR ROVIRA) * figures *	1	
A	DE-U-74 14 229 (ALLENDORFER FABRIK FÜR STAHLVERARBEITUNG ING. H. PANNE K.G.) * figures 4,5,7,7A,10 *	1	
A	DE-U-87 06 754 (A. BILSTEIN G.M.B.H. & CO. K.G.)		

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

B66F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 April 1994	Guthmuller, J

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