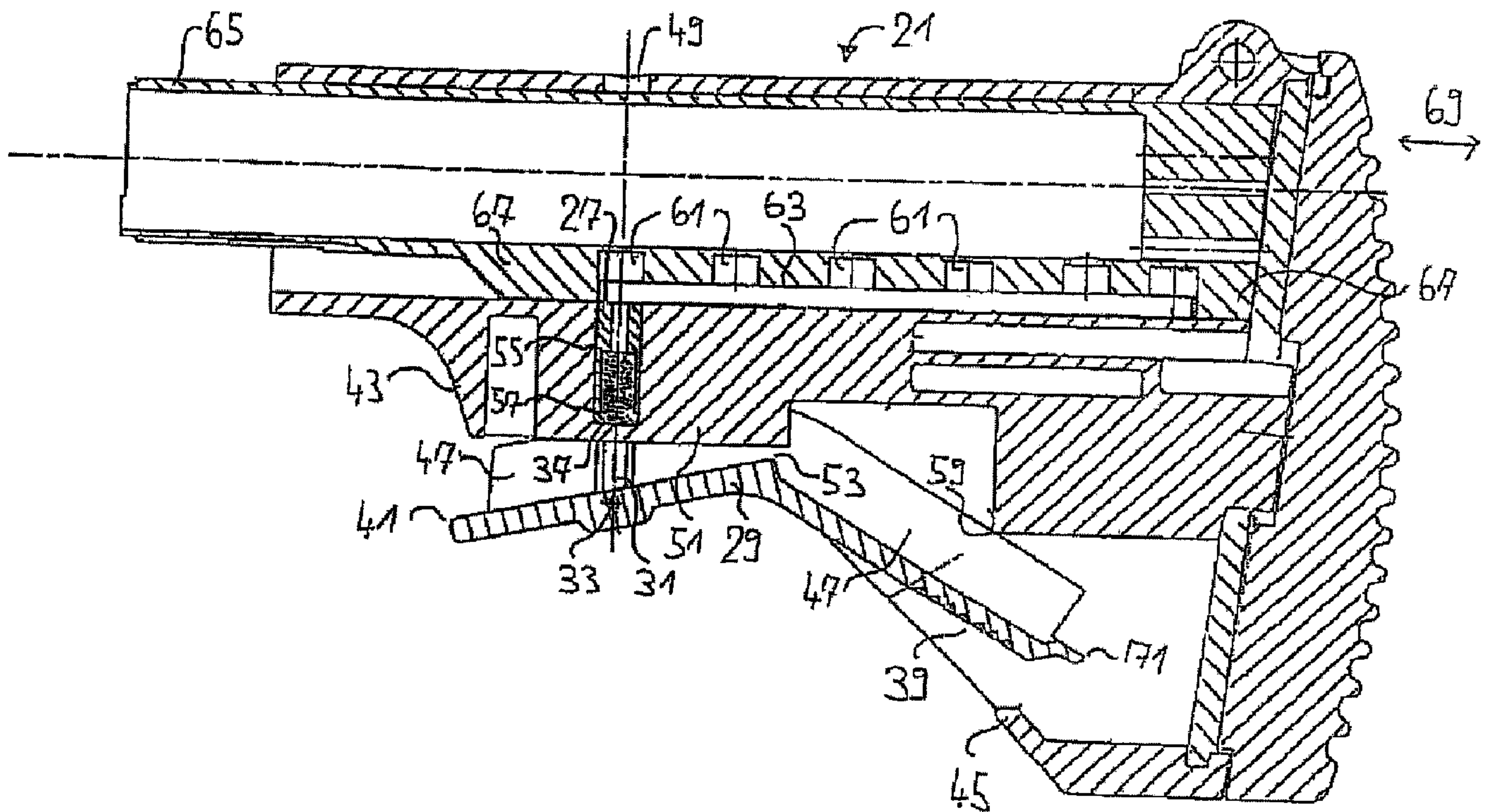




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(54) Title: SHOULDER STOCK FASTENING



(57) Abrégé/Abstract:

The invention relates to a adjustable shoulder support system comprising a shoulder stock (21) that can be slid onto a connecting piece (65) from the rear, said connecting piece projecting from the rear of the object provided with the shoulder support system, and having contiguous receiving recesses (61). The shoulder stock (21) has a downward projecting bolt (27) which carries, on its upper end, an engaging element for engaging in the receiving recesses (61) or which is configured as such. The shoulder support system also comprises a lever (29), arranged in the area of the lower end of the bolt (27) and engaging with the same, for disengaging the engaging body from one of the receiving recesses (61) when the bolt is withdrawn. Said lever (29), on its top, has

(57) **Abrégé(suite)/Abstract(continued):**

a recess which receives the lower end of the bolt (27), said recess being closed to the bottom, and a fastening or cross pin (33) being mounted so as to transversally extend through the bolt (27) or its extension in such a manner that it does not project outward beyond the molded material of the lever (29). The lever (29) is also accommodated inside lateral flanks (35) of the shoulder stock (21).

ABSTRACT

The invention relates to a adjustable shoulder support system comprising a shoulder stock (21) that can be slid onto a connecting piece (65) from the rear, said connecting piece projecting from the rear of the object provided with the shoulder support system, and having contiguous receiving recesses (61). The shoulder stock (21) has a downward projecting bolt (27) which carries, on its upper end, an engaging element for engaging in the receiving recesses (61) or which is configured as such. The shoulder support system also comprises a lever (29), arranged in the area of the lower end of the bolt (27) and engaging with the same, for disengaging the engaging body from one of the receiving recesses (61) when the bolt is withdrawn. Said lever (29), on its top, has a recess which receives the lower end of the bolt (27), said recess being closed to the bottom, and a fastening or cross pin (33) being mounted so as to transversally extend through the bolt (27) or its extension in such a manner that it does not project outward beyond the molded material of the lever (29). The lever (29) is also accommodated inside lateral flanks (35) of the shoulder stock (21).

Shoulder Stock Fastening

The invention relates to an adjustable shoulder support system comprising

- a shoulder stock that can be slid onto a connecting piece from the rear, said connecting piece projecting from the rear of the object provided with the shoulder support system, and having contiguous receiving recesses wherein the shoulder stock exhibits a downward projecting bolt (27) which carries, on its upper end, an engaging element for engaging in the receiving recesses or which is configured as such, and
- a lever arranged in the area of the lower end of the bolt and engaging with the same, for disengaging the engaging body from one of the receiving recesses when the bolt is withdrawn

(Generic part of Claim 1).

When in the following positional terms such as “below”, “to the front”, “above” or the like are assumed, then the shoulder stock with the weapon to which the shoulder stock is fastened is always considered in the position of a normal firing position with horizontal barrel and uncanted pointing to the front. The shoulder stock can of course also be removed or be fastened to another device such as for example an aiming device for training purposes.

The automatic pistol which is currently used predominantly in the USA (the M 16 or M 4) is equipped with a shoulder stock which can be adjusted in length in stages and which is altogether removable. This shoulder stock is shown in DE-OS 1 553 855 (Figures 1 and 2, reference symbol 1). At the rear side it exhibits a

base plate 3 and can be slid onto a connecting piece of the weapon from the rear, said connecting piece extending along the axis of the bore (direction of fire). This connecting piece exhibits on the underside several tandem boreholes that are open to the bottom. A vertical bolt 7 is mounted under the boreholes and is pressed by a spring (not shown) to the top in such a way that, in its resting position, it falls into one of the boreholes. The guide of the bolt 7 is a borehole in the shoulder stock.

From below a lever 9 similar to a trigger, which is formed out of sheet metal or plastic, is pushed above the bolt 7 by means of a borehole placed in it and fastened by means of a cross pin 13, said cross pin running below it through a borehole of the bolt 7 and protruding on both sides. This cross pin 13 can be somewhat pounded, bent on both sides or can be constructed as a spring bolt.

A cross bar 15 (not shown in Figure 2) of the shoulder stock 1 extends in longitudinal direction of the rifle from the front to the rear as well as downward and abuts on both sides with slight distance on the lever 9, so that the lever 9 cannot twist, but rather always occupies the same location as the actual trigger of the rifle.

In the shoulder stock 1 the lever 9 lies on an edge (not shown) lying above, to be precise at a place shortly behind the Bolt 7. If the finger presses against the lever 9 in the direction of the arrow (Figure 1), then it swivels around the named edge, wherein it presses downward against the pin 13. As a result of this the bolt 7 is pulled downward against the force of the named spring, and the bolt 7 passes out of its borehole, in which it was located, downward. Now it is possible, in the case of drawn lever 9, to set the length of the shoulder support system 1.

Since the lever 9 can shift on the named edge, upon which it is lying, and sometimes also due to the clearance in the guide of the bolt 7, viewed in longitudinal direction of the shoulder stock or of the rifle, the operations function without disturbance in the case of operation.

In the named connecting piece, which is fitted on the rifle, a downward protruding stop is arranged behind the named boreholes, which serve the purpose of setting the length of the shoulder support system, against which said stock the bolt strikes when in the case of pulled lever the shoulder stock is pulled all the way to the rear. The shoulder stock hence cannot be removed from the connecting piece and consequently also cannot be removed from the rifle. However if the lever 9 is grasped on its rear end 17 and is pulled forcefully downward against the force of the named spring, then the bolt 7 is pulled down with the cross pin 13 so far that with its upper end it lies below the stop. Now the shoulder stock 1 can be removed from the connecting piece and with it from the rifle.

In the case of this arrangement some shortcomings have resulted, for example the fact that the marksman gets his sleeve entangled on the rear end 17 of the lever 9 and in the case of a rapid hand movement pulls said lever downward without wishing to release the shoulder stock. Thus said marksman can, without wanting to, shift the shoulder stock 1 or even remove it.

A further disadvantage lies in the fact that the rear end 17 of the lever 9 protrudes downward whenever it is not being operated. The rifle can get caught on a branch or the like under this end 17 when it is moved downward and to the rear. The marksman can even reach behind the end of the lever 9 with his finger and injure himself on the sharp end 17 of the lever 9.

When a marksman reaches behind the lever 9 and fires, he injures himself through the recoil of the weapon.

While it is true that it would be possible to round off or bevel this end 17 of the lever 9, then the lever 9 would have to be extended to the rear by the length of the rounding off or bevel in order to offer the marksman a secure point of support which lies far enough behind the named end in order to be able to effortlessly set the length of the shoulder support system 1 so that at least one of the setting options would have to be omitted because the shoulder stock as such would be longer.

It is the object of the invention to improve the handling of the shoulder stock without having to sacrifice any of the advantages of the present shoulder stock (low length, adjustability, low production costs).

This object is solved by the fact that the lever exhibits a recess in its top side which holds the underside of the bolt wherein the recess is closed to the bottom and a fastening pin or cross pin is mounted so as to transversally extend through the bolt in such a way that it does not protrude outward beyond the molded material of the lever. Further the lever is held within lateral flanks of the shoulder stock.

The material of the lever consists preferably of molded material. By molded material a material is understood which e.g. can be placed in a mold through die casting or plastic and for completion of the molded part preferably requires in addition at the most the simplest finishing work, such as for example the snapping off of the sprues. A lever made of molded material is not new, but rather was probably

first used in 1936 in the case of the US rifle M1 Garand, where the lever was cast of zinc, but still required expensive burnishing work. In the case of the invention a hard plastic is to be recommended, so that the lever comes out of the die casting mold practically ready to be installed.

The cross pin is placed into this lever made of (molded)-material in such a way that it is completely immersed. An interference fit in the bolt prevents it from falling out. This solution is possible in particular in the case of a workpiece made of molded material, because this workpiece can hold the bolt with greater precision than is the case with a bent part. In addition the borehole, which holds the bolt or a corresponding part, can be constructed as a blind hole, so that moisture and soil dirt cannot get to the shoulder stock through the underside of the borehole.

It is completely impossible to catch a part of one's clothing on an end of the cross bolt, because the cross bolt does not protrude. Instead of this a projection that can be grasped well, but is in no way obstructs can be constructed on the lever with which the lever can be pulled downward in the case of the removal of the shoulder stock. In addition the lever is protected from exterior influences, such as lateral impacts on the weapon by the lateral flanks.

Thus an arrangement is created which works better than the known arrangement, but is likewise cost-effective, in the case of greater production capacities is even more cost-effective.

A further development of the invention consists in the arrangement of a tension member between the fastening pin or cross pin and the top side of the hollow constructed bolt (Claim 2). As a result of this the bolt can make a vertical movement while the position of the lever at which the

tension member is fastened can additionally carry out a slight horizontal movement. The abutment point on the edge consequently forms a kind of hinge.

A further embodiment of the invention consists in the fact that the underside of the bolt is held in a downward tapered borehole of the shoulder stock and provided with a recess, and that between the recess and the contraction of the borehole a spiral-shaped spring is arranged in a lower section of the bolt (Claim 3). Thus for example the borehole with the spring can be filled with grease. In this way the rusting of the spring is at least delayed, so that it doesn't lose any spring resistance within its time of use.

One embodiment of the invention consists in the fact that the lever in its front part is seated on a plane section of the shoulder stock plane from below, whose rear area cooperates with a swivel edge of the lever in order to form the hinge around which the lever can be tipped in such a way that the length of the shoulder support system is adjustable (Claim 4). Through the plane support the penetration of moisture into especially sensitive parts of the shoulder stock is prevented.

An especially preferred further development of the invention consists in the fact that at a distance behind the point around which the lever can be tipped for disengagement from the connecting piece of the rifle, a rear edge of the shoulder stock is arranged, upon which the lever is seated, when it is sufficiently pulled for the adjustment of the length of the shoulder support system (Claim 5). It is thus not possible to pull the lever too far, so that not only is the expenditure of force economized, but rather in the worst cases also the accidentally removal of the shoulder stock is prevented. The

rear edge is preferably arranged vis-à-vis the point at which the finger grasps the lever so that flexural stresses are reduced to a minimum. The placement of grip grooves at the underside or front side of the lever ensures that ordinarily the lever finger is pressed in the grip grooves and hence opposite the rear edge.

The lever could be grasped as a whole and pulled downward if one wants to remove the shoulder stock. However it is preferred that the pulled lever can be grasped on its front part and can be swiveled around the rear edge in order to release the shoulder stock (Claim 6). The front part of the lever, where one exercises the optimum leverage, does not need to protrude or only needs to protrude a bit to the front. Only when the lever is pulled can this front part be grasped with the finger and pressed downward, wherein the lever swivels around the edge in the rear and pulls the bolt downward so far that the shoulder stock can be removed. For this purpose two hands are required, the one for removing and the other for grasping of the front side so that an unintentional disassembly of the shoulder stock is practically impossible.

A further embodiment of the invention consists in the fact that the front side of the lever in its resting position is seated on a block of the shoulder stock and protrudes above said block to the front only so far that it does not form a handle for the release of the shoulder stock (Claim 7). This slight protrusion ultimately only serves the purpose of facilitating the grasping of the front side of the lever when it is already completely pulled. Moreover a reliable support on the block is created, even when great production inaccuracies are to be expected.

One significant further development of the invention consists in the fact that the rear end of the lever exhibits a projection with which it engages a transverse wall of the shoulder stock in such a way that it cannot be gripped underneath from behind (Claim 8). Together with the lateral flanks which the inventive shoulder stock also exhibits, just as the known shoulder stock does, and with the wall of the shoulder stock on the front side of the lever, the lever in its resting position is completely surrounded by parts of the shoulder stock which only permit the removal. In the process the lever preferably has an angled, lower surface which on both sides is surrounded by lateral flanks of the shoulder stock and on the rear side by the transverse wall, so that the lever can only be operated when one pushes it in between the lateral flanks. For example a branch which gets caught above the lateral flanks presses only against the shoulder stock, but not against the lever. Unintentional operation is thus practically impossible.

In the case of use in the damp terrain, when the shoulder stock is already adapted to the marksman, moreover a little grease suffices in order to completely seal the contours of the lever and to ensure that practically no moisture reaches the insides of the mechanism of the shoulder stock. In addition the lever does not exhibit any protruding edges whatsoever, not even the rear edge, said edges at which the lever could get caught with an obstacle or with which it could injure the hand of the marksman. Thus a lever formation is created which lies flat on the shoulder stock and as a result prevents all of the initially named disadvantages of the known arrangement, but which in addition also exhibits additional advantages, for example the good sealing against the penetration of moisture, without which with an increase of the production costs would be expected.

A further embodiment of the invention consists in the fact that the shoulder stock and the lever consist of plastic

(Claim 9). Consequently a light shoulder stock which is also resistant to sea water is created which exhibits considerably lower production costs compared to the known design made of aluminum alloy. The shoulder stock of the invention is moreover lighter and, as already explained, is significantly safer to handle than the known shoulder stock.

The subject matter of the invention will now be described more closely with the help of an exemplary embodiment shown in the drawing, which however in no way is intended to restrict the invention. The figures show the following:

- Figure 1 shows a lateral view of a known shoulder stock,
- Figure 2 shows a view from direction II in Figure 1,
- Figure 3 shows a lateral view of the inventive shoulder stock,
- Figure 4 shows a section through the representation of Figure 3,
- Figure 5 shows a longitudinal section through the shoulder stock together with the connecting piece of a rifle with pressed lever for the setting of the length of the shoulder support system, and
- Figure 6 shows a representation as in Figure 5, however with pulled out lever for the removal of the shoulder stock.

Figures 1 and 2 have already been dealt with initially in the discussion of the state of the art. The reference symbols used there are, wherever practical, also used in the description of the invention; however they are increased by 20.

In other respects the reference symbols of individual elements are only used in the figures in which the corresponding element has special significance. Naturally the same reference symbols apply for Figures 1 and 2 or 3 through 6.

In Figure 3 the inventive shoulder stock 21 is shown in lateral view. This shoulder stock 21 has a lever 29, which barely protrudes outward. A cross pin 33 is discernible, but does not protrude over the material of the lever 29 and hence cannot catch anywhere. At the angled rear side the lever 29 has a point of application 39 which is made recognizable by a ribbing. On the front side of the lever 29 an actuating section 41 is located which protrudes a bit over the shoulder stock 21 to the front. A transverse flank 35 extends on either side of the lever 29 in such a way that said lever is protected from unintentional operation for example by a transverse branch.

From Figure 4 it can be recognized that the lever 29 exhibits a lateral wall 47 on both sides, said lateral wall sealing inward on each side from the adjacent lateral flank 35. The lateral flanks 35 hold the lever 29 in any lever position, thus shielding it from exterior influences.

The plane upper surface of the lever 29 abuts on its front side to a front wall 43 of the shoulder stock 21 and a little behind on the plane lower surface of a Block Klotz 51 of the shoulder stock 21. On the rear side of this block 51 the plane upper surface of the lever 29 ends in a hinge edge 53.

A vertical borehole 55 that is tapered downward is placed in the block 51, said borehole in which a hollow constructed, offset

bolt 27 is seated. Around its tapered end a spring 57 (not shown in Figure 4, but can be seen in Figure 5) is arranged, which supports itself between the Recess 37 of the borehole 55 and the Recess of the bolt 27. Between the cross pin 33 and the top side of the bolt 27 a tension member 31 is arranged.

The bolt 27 is fastened with the cross pin 33 in a blind hole in the lever 29 which is only open to the top. Above the bolt 27 in the upper wall of the shoulder stock 21 a borehole 49 is placed through which the bolt 27 can, in the case of assembly, be pressed downward against the force of the spring. This borehole 49 can later be sealed.

The process in the operation of the lever 29 is shown in Figure 5: when the finger is pressed against the point of application 39 and the ribbing that is present there, without touching the lateral flanks 35, then the lever 29 swivels around the hinge edge 53 and in the process pulls the bolt 27 downward by means of the cross pin against the force of the spring 57 until the lateral walls 47 of the lever 29 strike a front edge 59 which is formed in the shoulder stock 21, opposite the point of application 39.

The connecting piece which belongs to the rifle has a series of boreholes 61 on the underside, said boreholes whose lower ends are connected by a lower surface 63. The lower surface 63 is sealed to the front and rear by a block 67 protruding downward. In the case of a completely pulled lever 29 the upper end of the bolt 27 is located directly beneath the lower surface 63, so that the shoulder stock 21 can be pulled back and forth in the direction of the arrow 69 relative to the connecting piece and hence to the rifle. If one releases the lever 29 and the shoulder support 21 moves further in the direction of the arrow 69,

the bolt 27 falls into the next borehole 61 and holds the shoulder stock 21 firmly in this position. The front and rear block 67 prevents the shoulder stock 21 from accidentally disengaging from the connecting piece. The lever 29 cannot be further moved by the pressure on the point of application 39 since the point of application 39 of the front edge 59 lies directly opposite, said point of application against which the lateral walls 47 of the lever 29 abut with their rear edge.

In the case of a pulled lever 29 the actuating section 41 can now be grasped on its front side by the finger and further pressed diagonally downward. Now the lever 29, through its contact with its lateral walls 47 on the front edge 59 of the shoulder stock 21, begins swiveling around said shoulder stock, wherein it pulls the bolt 27 downward against the greater and greater force of the spring 57 until the horizontal surface of the rear block 67 of the connecting piece 65 glides over the bolt 27 when one pulls the shoulder stock 21 to the rear in the direction of the arrow 69. Now the shoulder stock 21 comes loose and can be removed from the connecting piece 65 and hence from the rifle (Figure 6).

The placement of the shoulder stock 21 on the connecting piece 65 and hence on the rifle takes place in the following sequence:

1. Pulling of the lever 29 through pressure on the point of application 39 up to the stop on the front edge 59,
2. Grasping of the actuating section 41 and further pulling downward of the lever 29,
3. Slipping of the shoulder stock 21 onto the connecting piece 65, and

4. release of the lever 29 shortly before the intended location and further movement of the shoulder stock 21 up to said location.

Now the bolt 27 falls into the intended borehole 61 of the connecting piece 65 and the lever 29 returns to its starting position, wherein it engages with its rear end 71 the rear transverse wall 45 of the shoulder stock 21 and with its upper surface rests upon the lower surface of the front wall 43 and of the block 51. In the process a certain resilience of the lever 29, which is made of plastic, provides for the sealed contact of both the rear end 71 on the rear side of the rear transverse wall 45 as well as of the actuating section 41 on the front wall 43. The lateral walls 47 in the process rest tightly on the inner surfaces of the lateral flanks 35, so that a moisture-inhibiting sealing of the inside parts of the shoulder stock 21 is achieved, from which the bolt 27 and the spring 57 could be exposed to rusting.

AMENDED CLAIMS**Received by the International Bureau on 14 November 2007 (11/14/2007)****Claims**

1. An adjustable shoulder support system comprising
 - a shoulder stock (21) that can be slid onto a connecting piece (65) from the rear, said connecting piece projecting from the rear of the object provided with the shoulder support system, and having contiguous receiving recesses (61) wherein the shoulder stock (21) exhibits a downward projecting bolt (27) which carries, on its upper end, an engaging element for engaging in the receiving recesses (61) or which is configured as such, and
 - a lever (29) arranged in the area of the lower end of the bolt (27) and engaging with the same, for disengaging the engaging body from one of the receiving recesses (61) when the bolt is withdrawn, wherein
 - the lever (29) exhibits a recess in its top side which holds the underside of the bolt (27)
 - the recess is closed to the bottom,
 - a fastening pin or cross pin (33) is mounted so as to transversally extend through the bolt (27) in such a way that it does not protrude outward beyond the molded material of the lever (29),
 - the lever (29) is held within lateral flanks (35) of the shoulder stock, and
 - the rear end of the lever (29) exhibits a projection (71) with which it engages a transverse wall (45) of the shoulder stock

AMENDED SHEET (ARTICLE 19)

(21) in such a way that it cannot be gripped underneath from behind.

2. The shoulder support system according to Claim 1, in which an extending tension member (31) is arranged between the fastening pin or cross pin (33) and the bolt (27).
3. The shoulder support system according to any one of Claims 1 through 2, in which the underside of the bolt (27) is held in a downward tapered borehole (55) of the shoulder stock (21) and provided with a recess, and that between the recess and the contraction (37) of the borehole (55) a spiral-shaped spring (57) is supported within the bolt (27).
4. The shoulder support system according to any one of Claims 1 through 3, in which the lever (29) in its front part is seated on a plane section (51) of the shoulder stock (21) plane from below, whose rear area cooperates with a swivel edge (53) of the lever (29) in order to form the hinge around which the lever (29) can be tipped in such a way that the length of the shoulder support system is adjustable.
5. The shoulder support system according to any one Claims 1 through 4, in which at a distance behind the point around which the lever (29) can be tipped for the setting of the length of the shoulder support system, a rear edge (59) of the shoulder stock (21) is arranged, upon which the lever (29) is seated, when it is sufficiently pulled for the adjustment of the length of the shoulder support system.
6. The shoulder support system according Claim 5, in which the pulled lever (29) can be grasped on its front part (41) and

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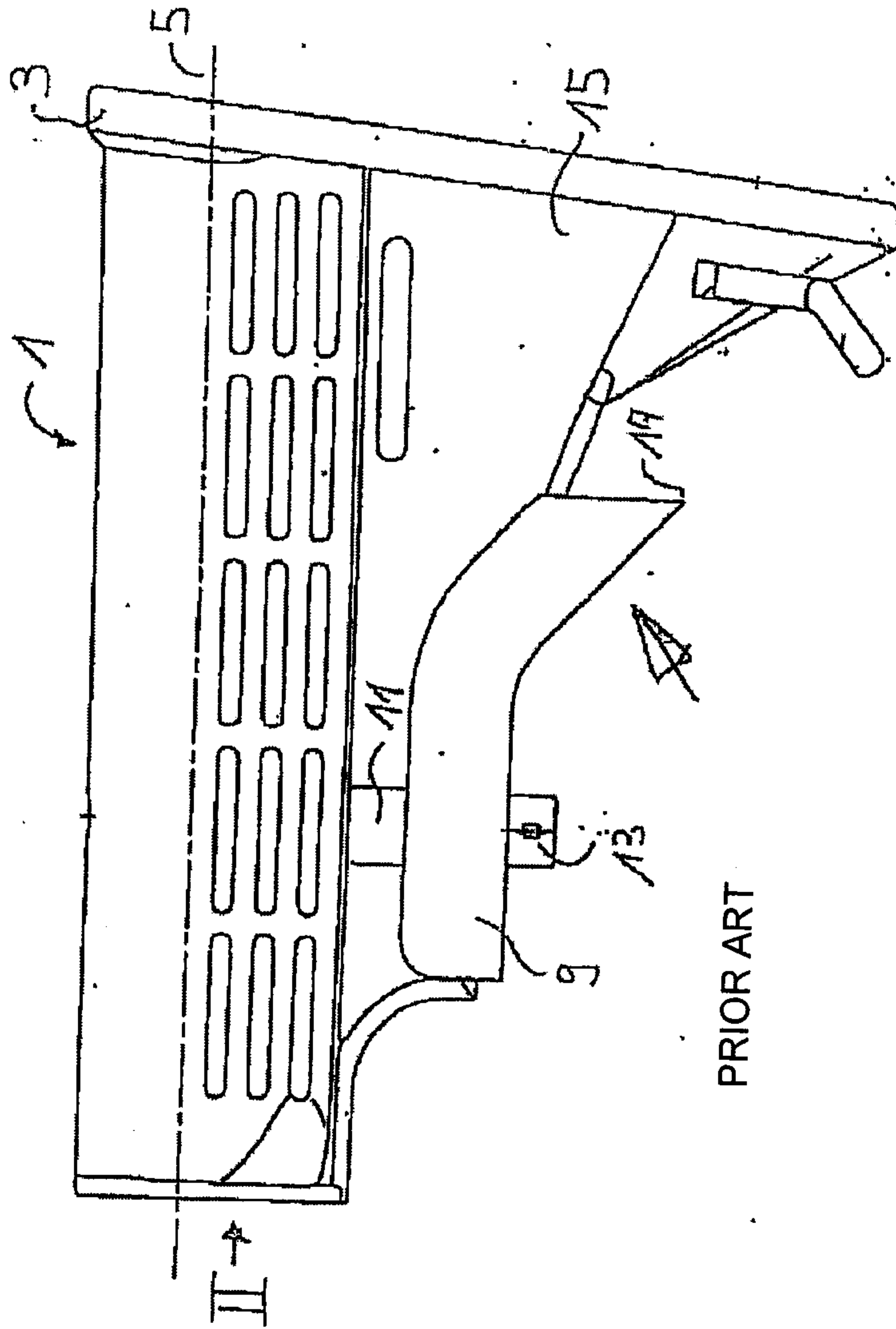
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can be swiveled around the rear edge (59) in order to release the shoulder stock (21).

7. The shoulder support system according to Claim 6, in which the front part (41) of the lever (29) in its resting position is seated on a wall (43) of the shoulder stock (21) and protrudes above said wall to the front only so far that it does not form a handle for the release of the shoulder stock (21).
8. The shoulder support system according to any one of Claims 1 through 4, in which the shoulder stock (21) and the lever (29) consist of plastic.

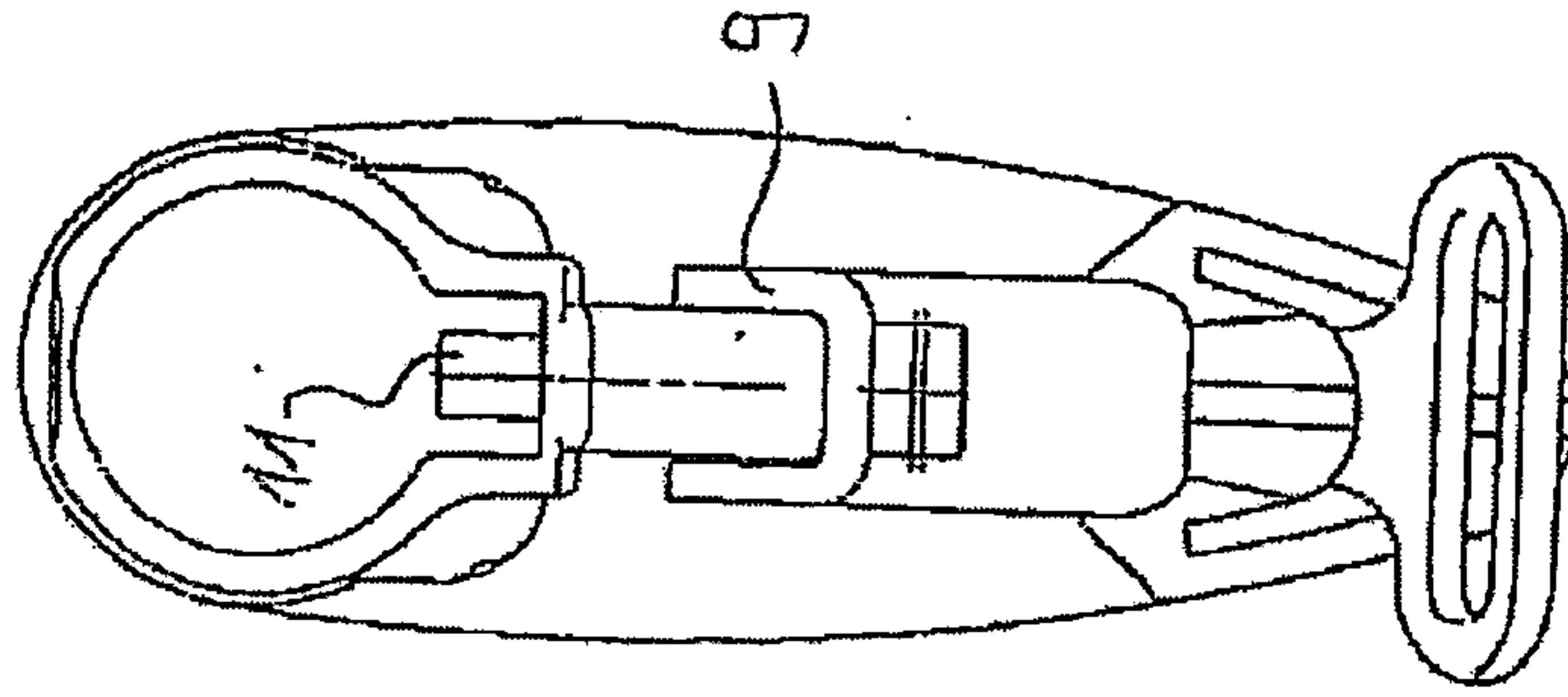
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Fig. 1



PRIOR ART

Fig. 2



PRIOR ART

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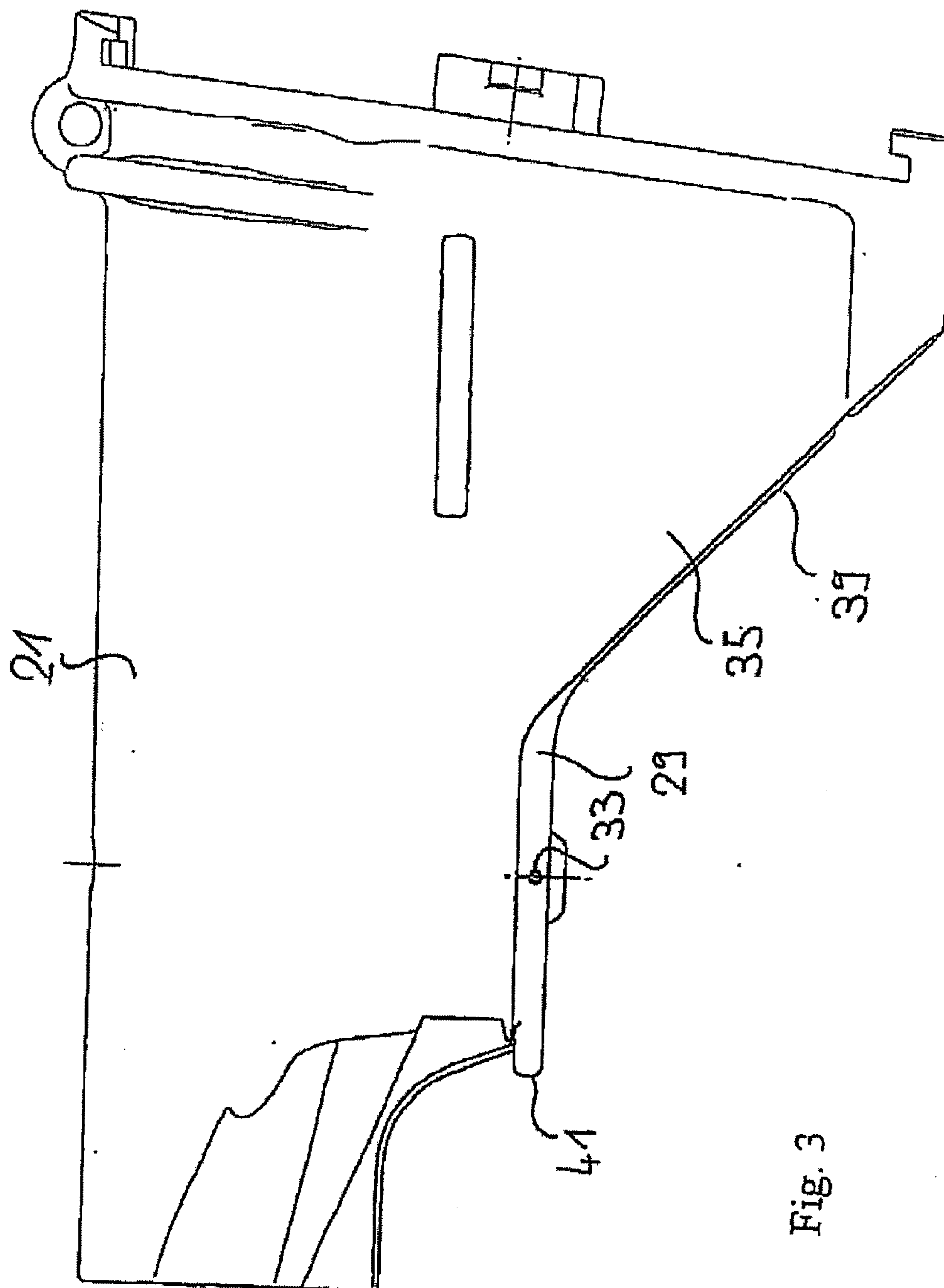


Fig. 3

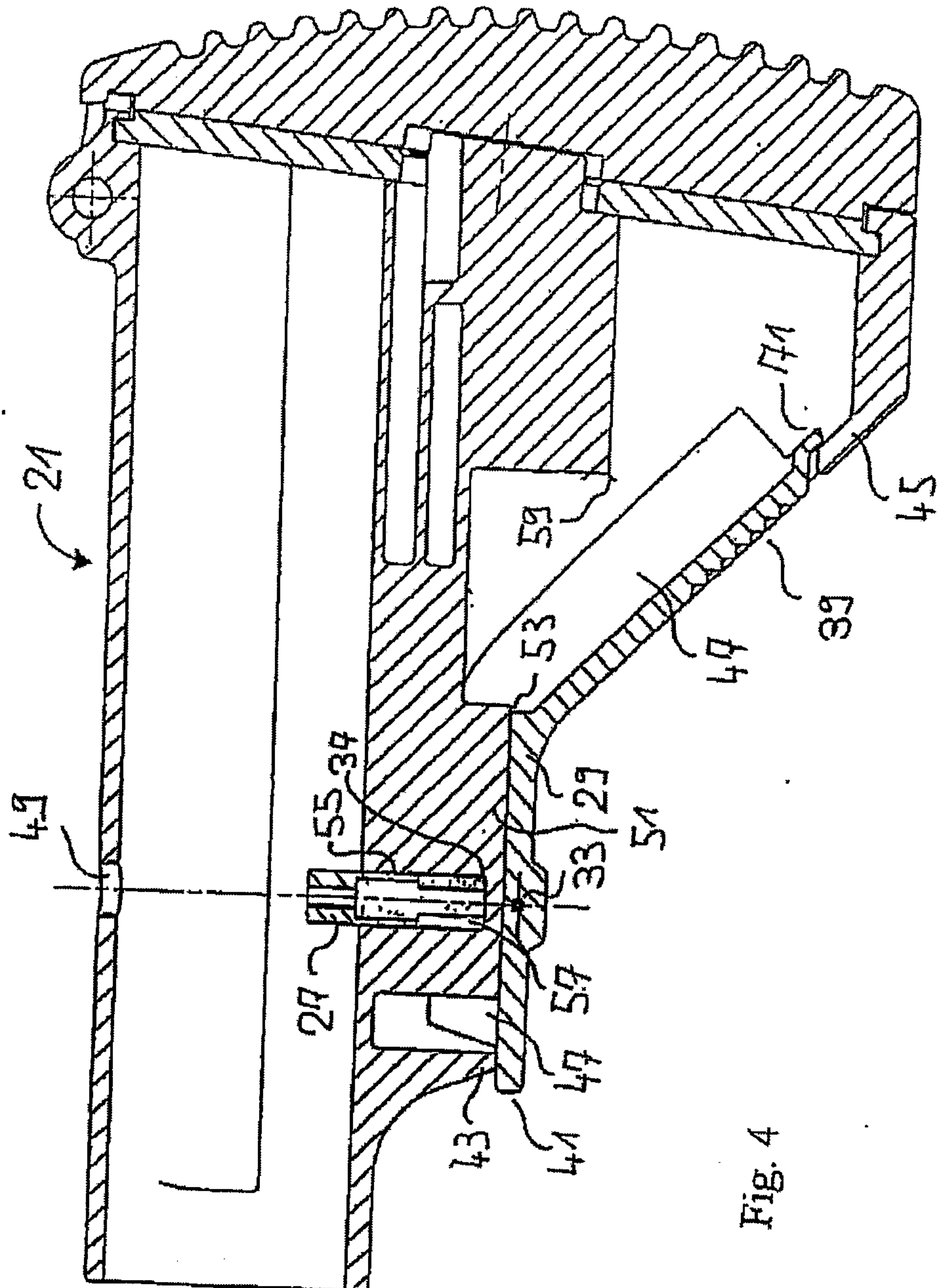
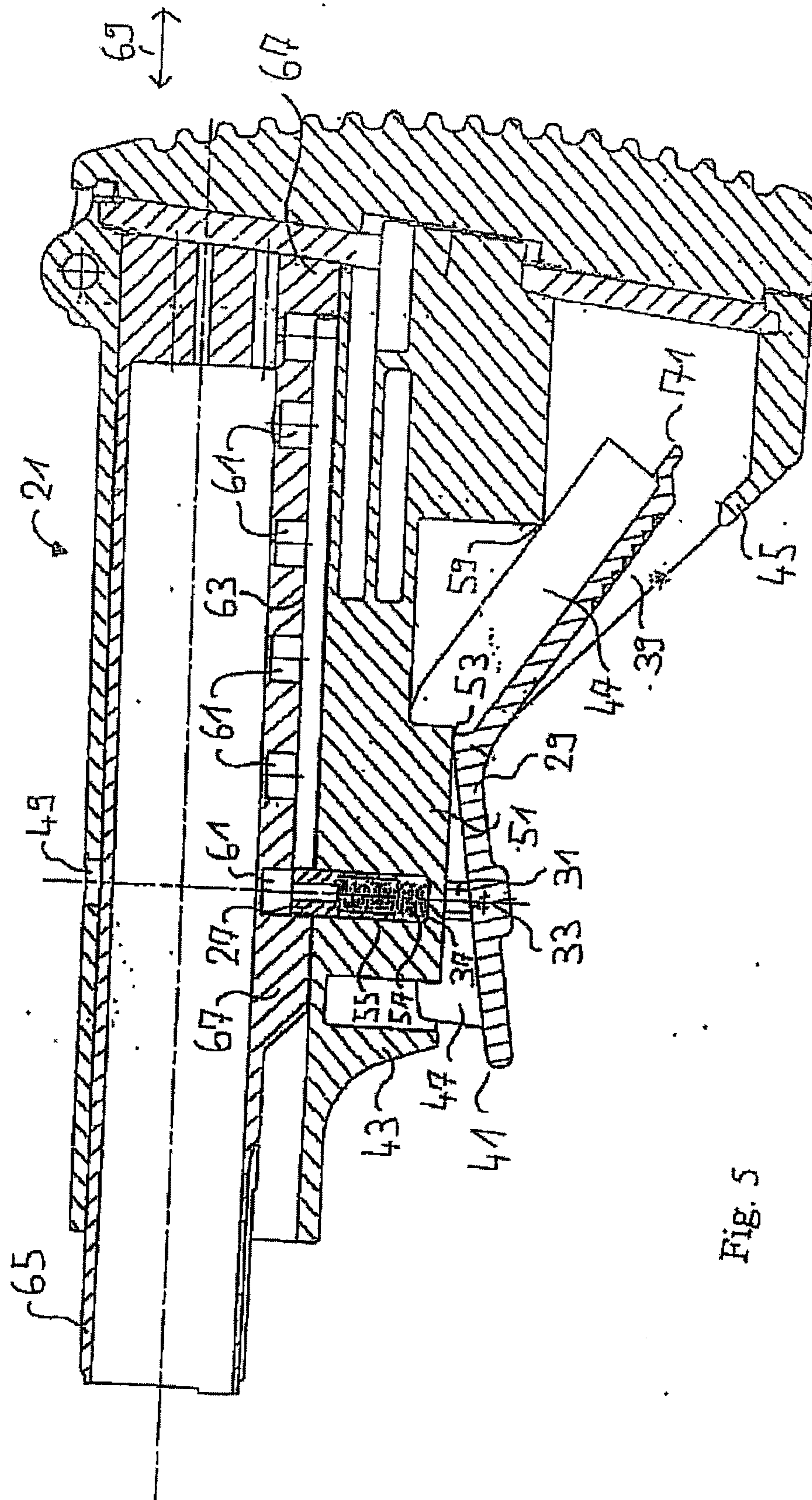


Fig. 4



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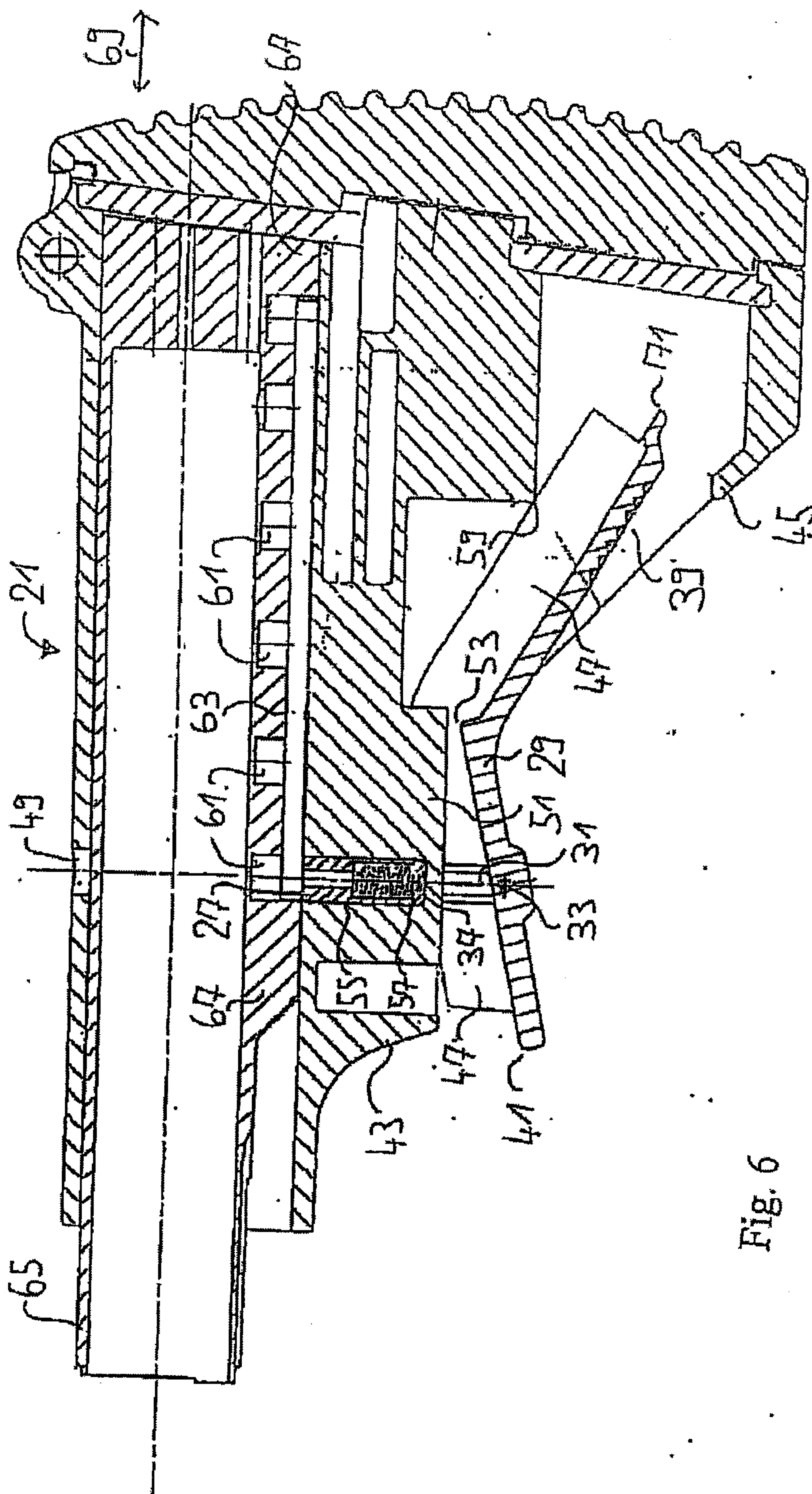


Fig. 6

