(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 076 644**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **82305177.6**

(22) Date of filing: **29.09.82**

(51) Int. Cl.³: **B 25 B 27/02**

(30) Priority: **02.10.81 GB 8129782**

(43) Date of publication of application:
13.04.83 Bulletin 83/15

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

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(54) Method of and means for prising two items apart.

(57) A method of prising two items, such as parts of vehicles, apart using a device (10) comprising first (11) and second (12) rigid members pivotally connected (13) intermediate the ends thereof for relative pivotal movement about an axis transverse to the members, (11,12), the method comprising the steps of inserting one end (14) of both of the members (11,12) closed together, between the items to be prised apart, relatively pivoting the first (11) and second (12) members by moving their other ends (15,16) apart preferably using a fluid operated ram (18) thereby causing their one ends (14) to open to prise the items apart.

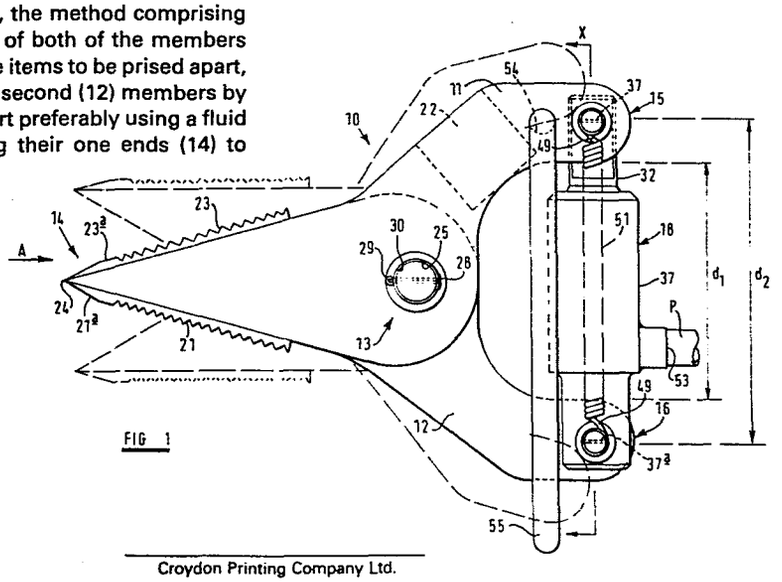

FIG 1

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Title: Method of and means for prising two items apart.

This invention relates to a method of and means for prising two items apart and more particularly but not exclusively to a method useful in the event of a motor accident wherein a door of a vehicle involved in the accident is damaged and thus jammed closed. In this event, it is not possible to open the door by operating the usual door latch mechanism. In this case, one item may comprise the damaged door, and the other item a door post or other part of the vehicle.

Presently, two methods are used to open such a jammed door. The first is to use a prising tool such as a crowbar, the shaped end of which is forced into a space between the door and door post and the bar manipulated as a lever to prise the door open. This method has the disadvantage that great manual effort is required and often it is not possible to exert sufficient effort to open a door in which case the second method is adopted.

The second method involves cutting the door open utilising an oxyacetelene cutting torch. However, the disadvantages of this method include a risk of explosion and fire due to the presence of a volatile fluid and that toxic fumes and heat are produced as a result of the method which are obviously undesirable due to the presence of a trapped occupant of the vehicle.

Accordingly, it is an object of the present invention to provide a new or improved method of and means for prising two items apart.

According to one aspect of the invention we provide a method of prising two items apart using a device comprising first and second rigid members pivotally connected for relative pivotal movement about an axis transverse to the members, said method comprising the steps of inserting one end of both of the members closed together between said items to be prised apart,

relatively pivoting said first and second members thereby causing said one ends to open to prise said items apart.

Preferably, said members are pivoted using a fluid operated ram such as a hydraulic or pneumatic ram or other power means between said other ends.

Thus the invention provides a method using a power tool which is capable of exerting great force to prise the items apart, and said method does not produce heat or toxic fumes.

According to a second aspect of the invention we provide a device for use in the method according to the first aspect of the invention, comprising first and second rigid members, means pivotally connecting said members for pivotal movement about an axis transverse to the members, one end of each of the members being adapted to be inserted closed together between said two items to be prised apart, and the members being adapted to be pivoted by power means to cause said one ends to open to prise said items apart.

Preferably the members are pivoted intermediate their ends and said one ends are moved apart by moving the other ends of the members apart, the power means acting on said other ends.

Alternatively, the members are pivoted at their other ends and the power means acts between the members intermediate their ends.

In the former case, the first and second members may be cranked in the region of the pivot, whereby when said one ends are closed together, the other ends are a first distance apart, said other ends being movable further apart to a second distance wherein said one ends are open. However other configurations of first and second members are possible.

The extent of movement of said one ends, may be governed by the construction of the fluid-operated ram or other power means, although other restraining means may be provided if required.

Said first member may comprise two elements of similar configuration rigidly spaced from one another, and said second member may comprise a single element which is movable between the two elements of the first member. This arrangement has been found to be particularly useful as the resulting device is very strong and rigid.

Said one ends of said first and second members may be provided with a pointed tip to facilitate inserting said ends between the two items to be prised apart. It will be appreciated that if the device is inserted with great force, that the pointed tip may deform the edges of the items to increase the proportion of said one ends of the device which are receivable between said items, to increase leverage.

Preferably, each of the first and second members are provided with toothed jaws attached to or integral with the respective members which jaws may engage the items and facilitate gripping of the items.

The jaws may be made of hardened steel.

Where said first member comprises two spaced apart elements, said elements may be held rigidly apart adjacent said one end by one of said jaws, and also if necessary, adjacent said other end by a spacer such as a metal block.

The device may conveniently be provided with a holding means which means may not only facilitate holding the device during operation, but also provide a rigid grip to facilitate inserting the one ends of the members of the device between said items, with great force.

In a preferred embodiment, the fluid-operated ram comprises a hydraulic ram and the method may include operatively coupling said device to a hydraulic power pack which provides hydraulic fluid under pressure to the ram. The pack is preferably portable and provided with a manual pump or the pump may be operated by an internal combustion engine or electric motor or the like.

However, if desired, the power pack may be provided on an emergency tender vehicle. such as a fire engine.

Typically, such a fluid-operated ram may be capable of moving said other ends of the members of the device apart with great force, for example a force of up to 16 tons, so as to provide a substantial levering force to prise said items apart.

The method is particularly useful for prising doors open and prising apart other parts of motor cars or vehicles which have been crushed or otherwise damaged for example, in an accident, either to facilitate rescue of an occupant of the vehicle, or to facilitate repairs to the vehicle although it can be used to prise any two items apart.

The invention will now be described with reference to the accompanying drawings in which:-

FIGURE 1 is a plan view of a device for use in a method according to the invention;

FIGURE 2 is a section on the lines X-X of Figure 1;

FIGURE 3 is an end view in the direction of arrow A of Figure 1.

FIGURE 4 is a diagrammatic plan view of a modified device; and

FIGURE 5 is a diagrammatic end view in the direction of the arrow B of Figure 4.

Referring to the drawings, there is shown a device 10 for use in a method of prising two items apart, comprising first 11 and second 12 cranked members pivotally connected by a pivot pin 13 intermediate the ends thereof.

One end 14 of each of the members 11, 12 are shown closed together whilst the other ends 15, 16 are a first distance d1 apart. The other ends 15, 16 of each of the members 11, 12 are inter-connected by a hydraulic ram 18.

The first member 11 comprises a pair of elements 19, 20 rigidly spaced apart adjacent said one ends 14 by a toothed jaw 21 comprising a plate interconnecting the

elements 19, 20 at their edges, and adjacent the other end 15 by a block 22 which is welded, or otherwise secured to and between the elements 19, 20.

The second member 12 comprises a single element and is pivoted for movement in a plane between the elements 19, 20 of the first member 11. Thus when the device 10 is in the closed position shown in Figure 1, the one end 14 of the member 12 is received between the one ends 14 of the elements 19, 20 of the member 11.

The member 12 is also provided with a toothed jaw 23, the jaws 21, 23 being made of hardened steel and secured in position by welding or as desired, to the respective members 11, 12.

The one ends 14 of the members 11, 12 and untoothed parts 21a, 23a of the jaws 21, 23 provide a pointed and sharpened tip 24 for use as hereinafter described.

The pivot pin 13 comprises a hollow shank 25 having a flanged head at one end. The shank 25 extends through and from the members 11, 12, a washer 28 being received on the extending end of the shank 25 and retained thereon by means of a transversely extending split pin 29 which is received in a transversely extending passage 30 in the extending end of the shank 25.

The said other ends 15, 16 of the members 11, 12 of the device are provided with apertures, the first member 11 having aligned apertures 31 in the elements 19, 20. The ram 18 has a piston 32 the outward end of the piston 32 being flattened and received between the two elements 19, 20 and also having an aperture 33 aligned with apertures 31 of the elements 19, 20 through which a pivot pin 34 passes. The pin 34 extends from either side of the member 11 and is located in the position shown by means of washers 35 and split pins 36 which extend through transverse apertures 37 of the pin 34.

The ram 18 also comprises a cylinder 37 in which the piston 32 is slidable, the cylinder 37 having a bifurcated end 40 between the limbs 41, 42 of which the

other end 16 of the second member 12 is received. The limbs 41, 42 of the end 40 are provided with aligned apertures 43, and the end 16 of the second member with an aperture 44 also aligned with apertures 43, through which apertures 43, 44 a further pivot pin 45 extends. The pin 45 is also located in position by further washers 35a, split pins 36a which pins extend through transverse apertures 37a in the pin 45.

Adjacent each projecting end of each pin 34, 45, grooves 48 are provided in which the end coils 49 of springs 50, 51 are received to urge the other ends 15, 16 of the members 11, 12 together.

The ram 18 has a chamber 52 in the cylinder 37, with which a nozzle 53 communicates, from which nozzle hydraulic fluid under pressure may be fed from a hydraulic power pack (not shown) to which it is connected by a flexible pipe P1 into the chamber 52 to urge the piston 32 from the cylinder 37 against the force of springs 50, 51 to move the other ends 15, 16 of the members 11, 12 apart to a second distance indicated by arrow d2.

It will be appreciated that as the ends 15, 16 are moved apart, that the ends 14 of the members 11, 12 will open, to the position shown in dotted lines.

The first member 11 has welded thereto at 54 a handle 55. The handle 55 comprises a substantially rectangular loop and provides a rigid holding means for the use of the device 10.

When it is desired to prise two items apart, for example to prise open a car door which is jammed closed as a result of an accident, the pointed tip 24 is inserted with the one ends 14 of the device 10 closed together as shown in full lines , in a space between the jammed door and a door post or other part of the vehicle, until the jaws 21, 23 grip the edges of the door and post. This may be done with some force as the handle 55 provides a rigid support.

The hydraulic ram 18 is then actuated to move the ends 15, 16 of the members 11, 12 apart, and thus the members 11, 12 will pivot about pivot pin 13 in parallel planes and the ends 14 will open. The toothed jaws 41, 43 will grip the edges of the door and post and the door will be prised open.

When the hydraulic ram 18 is de-actuated, the springs 50, 51 will close the one ends 14 of the members 11, 12 by moving the ends 15, 16 together again.

Referring now to Figures 4 and 5 there is illustrated a modification in which the device is as described with reference to the preceding Figures except as hereinafter to be described. In this modification, instead of the handles 55 described hereinbefore there are provided handles 55a welded to the first member 11a at 54a and 54b. In addition, instead of the springs 50, 51 there are provided springs 50a, 51a hooked onto the horizontally extending parts 55b of the handles 55a at their upper ends and to pins 60a welded to the second member 12a at their lower ends.

It will be appreciated that many modifications may be made without departing from the scope of the invention. For example, the members 11, 12 need not be of the configuration shown but many other configurations are possible. The ram 18 need not comprise a hydraulic ram, but a pneumatic ram or other power means to move the ends 15, 16 apart may be provided.

Although in the arrangement described, the members 11, 12 are pivoted intermediate their ends by a power means 18 which acts between the ends 15, 16, if desired, by suitable modification of the configuration of the members 11, 12, the members 11, 12 may be pivoted at their ends 15, 16 and the power means 18 may act intermediate the ends of the members, for example, between the members.

Although the method described has been for prising open a jammed door of a motor car, the method and device have many other uses.

Further, although the method has been described as including the step of inserting the pointed tip 24 between two items, if desired, the device may be used to puncture a panel or other item due to the pointed tip 24. In this case, the two items will comprise the edges of the puncture and the panel may be torn open by the method and device hereinbefore described.

CLAIMS:

1. A method of prising two items apart using a device (10) comprising first and second rigid members (11,12) pivotally connected for relative pivotal movement about an axis transverse to the members (11,12), said method comprising the steps of inserting one end (14) of both of the members (11,12) closed together between said items to be prised apart, relatively pivoting said first and second members (11,12) thereby causing said one ends (14) to open to prise said items apart.

2. A method according to Claim 1 wherein said members (11,12) are pivoted using a power means (18) between said members.

3. A device for use in the method according to Claim 1 or Claim 2 comprising first and second rigid members (11,12), means (13) pivotally connecting said members (11,12) for pivotal movement about an axis transverse to the members (11,12), one end (14) of each of the members (11,12) being adapted to be inserted closed together between said two items to be prised apart, and the members (11,12) being adapted to be pivoted by power means (18) to cause said one ends (14) to open to prise said items apart.

4. A device according to Claim 3 wherein said members (11,12) are pivoted intermediate their ends and said one ends (14) are moved apart by moving the other ends (15,16) of the members (11,12) apart, the power means (18) acting on said other ends.

5. A device according to Claim 4 wherein the first and second members (11,12) are cranked in the region of the pivot (13), whereby when said one ends (14) are closed together, the other ends (15,16) are a first distance

apart, said other ends (15,16) being movable further apart to a second distance wherein said one ends (14) are open.

6. A device according to any one of Claims 3 to 5 wherein said first member (11) comprises two elements (19) of similar configuration rigidly spaced from one another, and said second member (12) comprises a single element which is movable between the two elements (19) of the first member (11).

7. A device according to any one of Claims 3 to 6 wherein said one ends (14) of said first and second members (11,12) are provided with a pointed tip (24) to facilitate inserting said ends (14) between the two items to be prised apart.

8. A device according to any one of Claims 3 to 7 wherein each of the first (11) and second (12) members are provided with toothed jaws (21,23) attached to or integral with the respective members (11,12) which jaws (21,23) are adapted to engage the items and facilitate gripping of the items.

9. A device according to any one of Claims 3 to 8 wherein the device (10) is provided with a holding means (55) which facilitates holding the device during operation, and also provides a rigid grip to facilitate inserting the one ends (14) of the members (11,12) of the device (10) between said items, with great force.

10. A device according to any one of Claims 3 to 9 wherein the power means (18) comprises a hydraulic ram coupled to a hydraulic power pack which provides hydraulic fluid under pressure to the ram.

11. A method according to Claim 1 or Claim 2 utilising a device (10) according to any one of Claims 3 to 10 wherein said two items comprise parts of a motor car or other vehicle which has been damaged in an accident, either to facilitate rescue of an occupant of the vehicle, or to facilitate repairs to the vehicle.

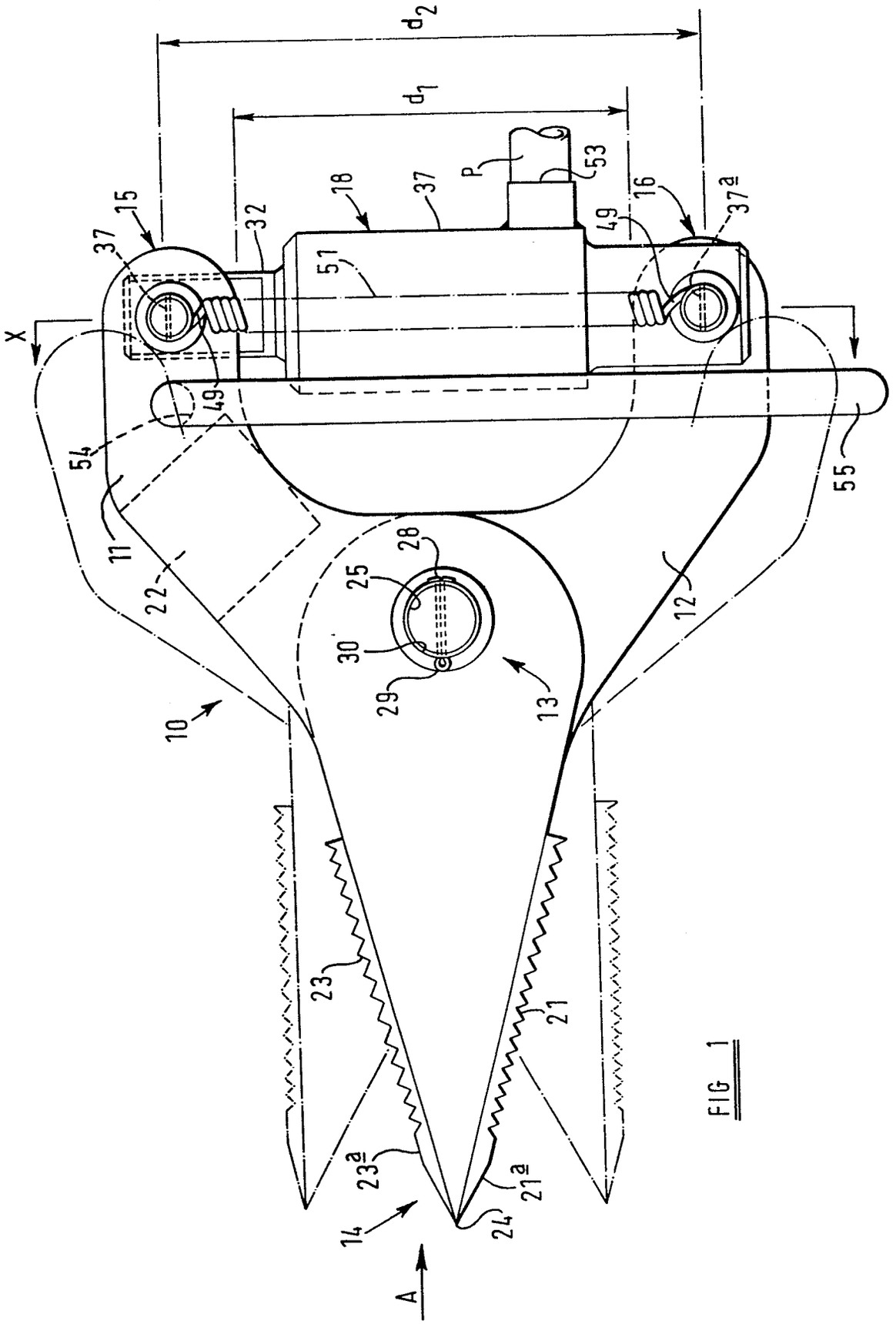
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FIG 1

FIG 2

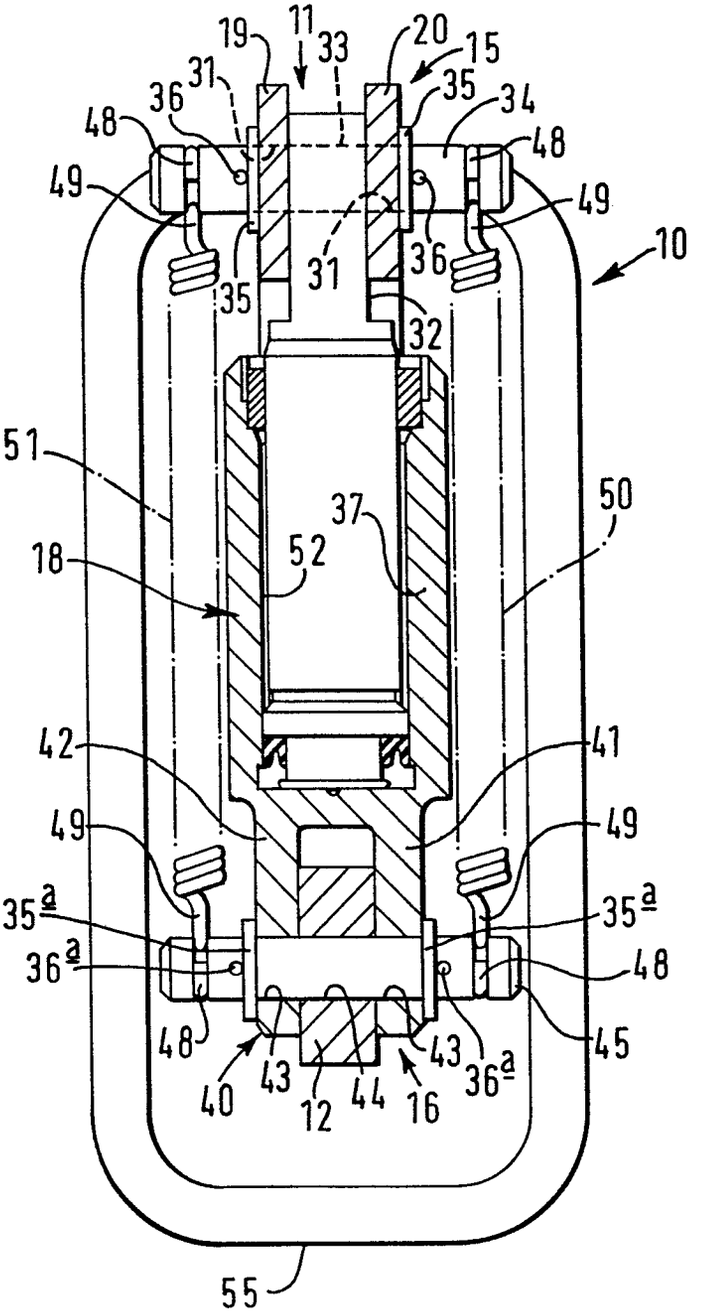
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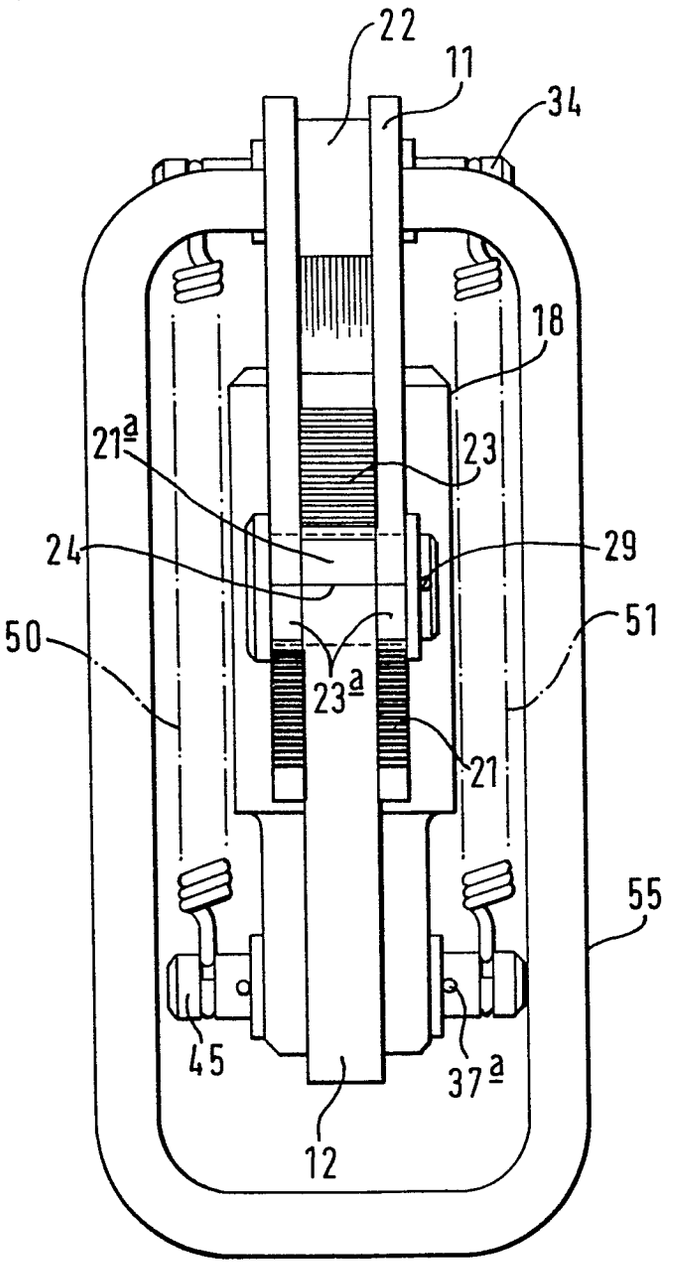
FIG 3



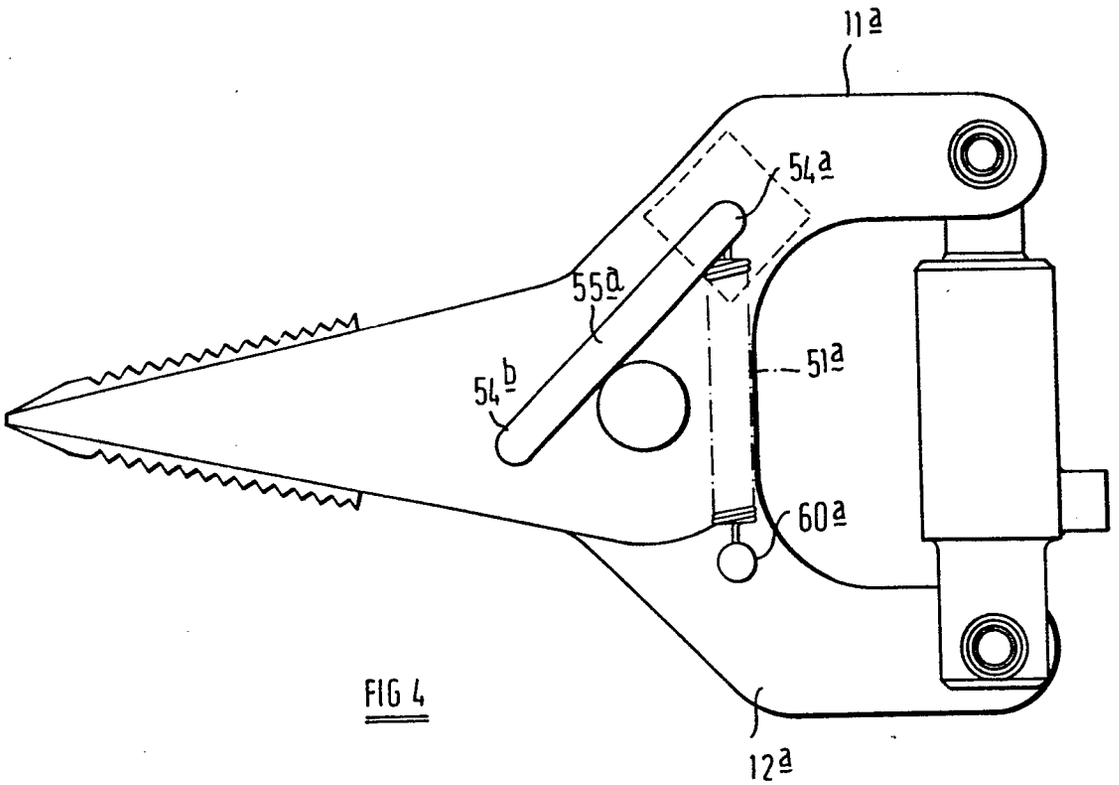


FIG 4

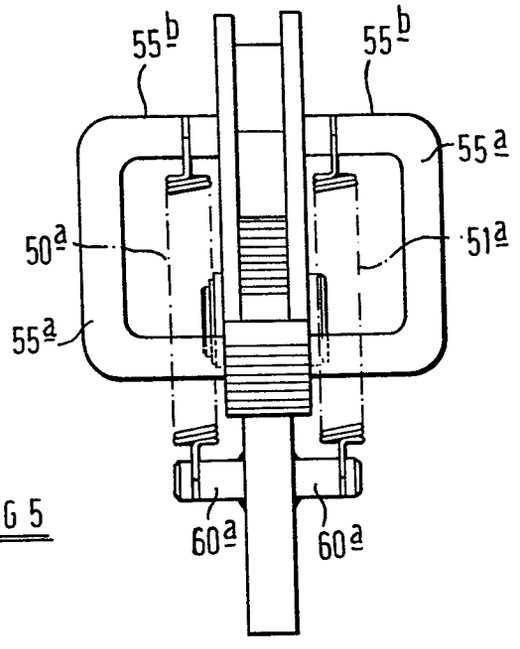


FIG 5