



(43) International Publication Date
22 May 2009 (22.05.2009)

(10) International Publication Number
WO 2009/064238 A1

(51) International Patent Classification:

B25G 3/18 (2006.01) **A47L 13/42 (2006.01)**
A47L 13/20 (2006.01) **B25G 3/26 (2006.01)**

(21) International Application Number:

PCT/SE2008/000643

(22) International Filing Date:

16 November 2008 (16.11.2008)

(25) Filing Language:

Swedish

(26) Publication Language:

English

(30) Priority Data:

0702531-5 17 November 2007 (17.11.2007) SE

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(81) **Designated States** (*unless otherwise indicated, for every*

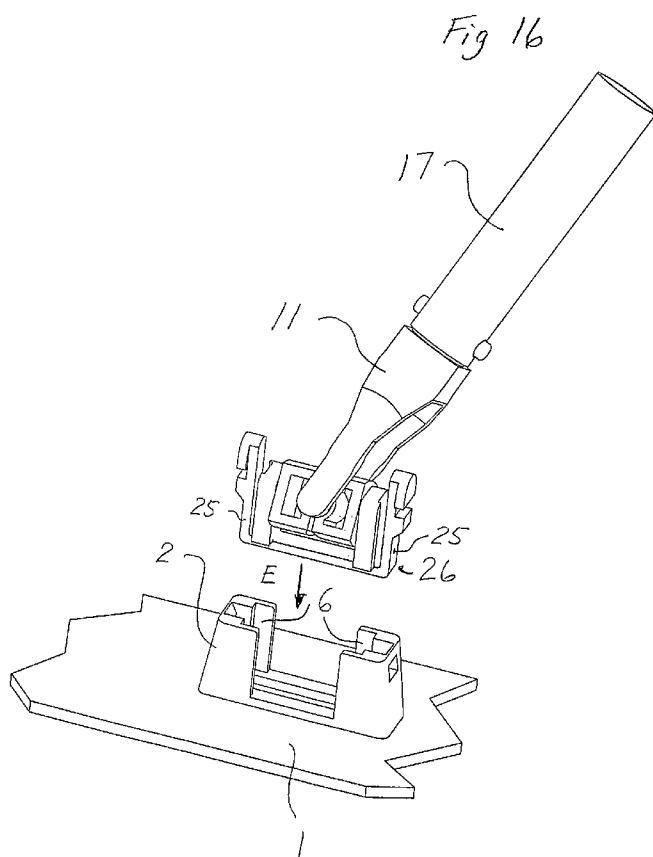
kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

(84) **Designated States** (*unless otherwise indicated, for every*

kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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(54) Title: CONNECTION WITH JOINT MEMBER



(57) Abstract: A connection for the releasable interconnection of a tool (1) and a tool shaft (17), said connection including an upper joint member (11), a middle element (14) and a lower joint member (20), said upper joint member (11) including an upper fastener (16) for fastening to the tool shaft (17) and said lower joint member (20) including a lower fastener (26) for fastening to the tool (1), each of these joint members (11 and 20) including a pivot joint for articulated interconnection with the middle element (14), the axial alignments of said pivot joints being different, it being possible, by the exertion of an essentially rectilinear force on an operating member (31), to disconnect the tool (1) from the upper joint member (11).



Declaration under Rule 4.17:

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report*

CONNECTION WITH JOINT MEMBER

Technical area

The invention is based on a connection for the releasable interconnection of a tool
5 and a tool shaft, said connection including an upper joint member, a middle element
and a lower joint member, said upper joint member including an upper fastener for
fastening to the tool shaft and said lower joint member including a lower fastener for
fastening to the tool, each of these joint members including a pivot joint for
10 articulated interconnection with the middle element, the axial alignments of said pivot
joints being different.

Technical background

Tool connections of the above type are well known from cleaning tools for dry and
wet mopping of floors with flat-shaped mop carriers (so-called mop frames)
15 interconnected with a cleaning shaft.

Such cleaning tools can also be used to clean other flat surfaces that require
cleaning (e.g. walls and ceilings). In these cases, the shaft is used at different angles
and an interconnection that has a joint system of the above type (i.e. articulated
20 around two joints with axes that differ from each other) is necessary between the
cleaning shaft and the mop frame. This is so that contact is maintained between the
textile of the mop and the flat surface that is to be cleaned. Such cleaning tools are
used in the so-called flat-mop method, which is becoming ever more widely used in
professional cleaning. The ability to easily change the tool on the cleaning shaft is a
25 major requirement here.

Changing from one length of mop frame to another is common. Sometimes, users
also want to change from one mop type to another. For example, on one occasion, a
mop frame with a mount for a textile mop may be required. On another, the
30 requirement may be for a mop frame with fastening arrangements for disposable (so-
called non-woven) cloths. Sometimes, users also want to fit the cleaning shaft with
entirely different types of tools suitable for cleaning, for example, interior fittings, air
vents or windows. This leads to a need for a number of different tools that can be
easily interchanged.

For a long time (throughout the development of the flat-mop method from the start of the 1980's to the beginning of the 21st century), connections between cleaning shafts and mop frames were so awkward that cleaners seldom, if ever, changed tools.

5 Instead, they carried around a number of complete shafts for their various cleaning assignments. To overcome this, a more easily manageable connection was developed by the proposer of the present patent application. Said connection is more closely described in European patent application 01902913.1. That connection makes it easier for the cleaner to connect and disconnect various tools but, in
10 common with other technologies, has the particularity that connection is between the upper joint member and the shaft. The entire joint system is thereby permanently interconnected with the mop frame. This particularity means that each mop frame and tool must include all elements of the joint system. Consequently, there are significant disadvantages in the form of large: consumption of materials;
15 manufacturing costs; and, space requirements when storing and using the tools. Bearing in mind the extremely wide use and consumption of these tools, the development of a new type of connection that eliminates said disadvantages is very important. It is also desirable that such a connection should enable the articulated connection of tools other than mop frames to a tool shaft.

20

Explanation of the invention

The main purpose of the present invention is that, as set out in the ingress, it should result in a cost-efficient and resource-conserving device that gives simple and easily manageable connection and disconnection of a tool shaft to/from a tool.

5

A further purpose is that it should result in a connection device that permits interconnection without the operator having to actuate an operating member.

10

Yet another purpose is that it should result in a connection device that allows the articulation in a joint system to be used for tools other than mop frames.

15

These purposes are achieved by a device as set out in the ingress, said device making it possible, via the exertion of an essentially rectilinear force on an operating member, to disconnect the tool from the upper joint member.

20

A number of non-limiting designs of the invention are hereafter more closely described with reference being made to the explanatory figures below.

Fig. 1 is a view, from above, of a mop frame with a mount for a connection.

Fig. 2 is a side view, from the left, of the mop frame in fig. 1.

Fig. 3 is an end view of the mount in figs. 1 and 2.

25

Fig. 4 is a view, from above, of the mount in fig. 3.

Fig. 5 is a side view, from the left, of the mount in fig. 4.

30

Fig. 6 shows the mount in figs. 3 – 5 in perspective, obliquely from above.

Fig. 7 shows the mount in figs. 3 – 6 in perspective, obliquely from below.

Fig. 8 shows, in perspective obliquely from below, a middle element rotatably interconnected with an upper joint member that is fastened to the shortened “tube” of a tool shaft.

5 Fig. 9 shows the device in fig. 8 in perspective, obliquely from above.

Fig. 10 is a partially cutaway view, from the front, of a lower joint member with a fastener.

10 Fig. 11 is a side view, from the left, of the joint member in fig. 10.

Fig. 12 is a view, from above, of the joint member in fig. 10.

Fig. 13 shows the joint member in figs. 10 – 12 in perspective, obliquely from below.

15

Fig. 14 shows the joint member in figs. 10 – 13 in perspective, obliquely from above.

Fig. 15 shows, in perspective obliquely from below, the device in figs. 8 and 9 interconnected with the lower joint member in figs. 10 – 14.

20

Fig. 16 shows, in perspective obliquely from the right and above, the device in fig. 15 in a preparatory position for interconnection with the mop frame in fig. 1, the mop frame being partially shown.

25 Fig. 17 shows, in perspective obliquely from the left and above, the device in fig. 16, the lower joint member's fastener having been partly pushed into the mop frame's mount.

30 Fig. 18 shows, in perspective obliquely from above, the device in fig. 17, the lower joint member's fastener having been wholly pushed into the locked position in the mop frame's mount.

Fig. 19 is a view, from the front, of another design of a middle element.

Fig. 20 is a side view, from the left, of the middle element in fig. 19.

Fig. 21 shows the middle element in figs. 19 and 20 in perspective, obliquely from above.

5

Fig. 22 is a view, from the front, of a connection element.

Fig. 23 is a side view, from the left, of the connection element in fig. 22.

10 Fig. 24 shows the connection element in figs. 22 and 23 in perspective, obliquely from above.

Fig. 25 is a view, from the front, of the connection element in figs. 22 – 24 mounted to the middle element in figs 19 – 21.

15

Fig. 26 is a side view, from the left, of the device in fig. 25.

Fig. 27 shows the device in figs. 25 and 26 in perspective, obliquely from above.

20 Fig. 28 is a view, from the front, of another design of an upper joint member.

Fig. 29 is a side view, from the left, of the joint member in fig. 28.

Fig. 30 is a view, from the front, of a pin.

25

Fig. 31 is a side view, from the left, of a pin as per fig. 30.

Fig. 32 shows the joint member in figs. 28 and 29 in perspective, obliquely from above.

30

Fig. 33 shows the pin in figs. 30 and 31 in perspective, obliquely from above.

Fig. 34 shows a view, from the front, of an upper joint member as per figs 28, 29 and 32 interconnected (via the shaft pin in figs. 30, 31 and 33) with the device in figs. 25 – 27.

5 Fig. 35 is a side view, from the left, of the device in fig. 34.

Fig. 36 shows the device in figs. 34 and 35 in perspective, obliquely from above.

Fig. 37 is a magnified view, from the front, of a component for a lower joint member.

10

Fig. 38 is a side view, from the left, of the component in fig. 37.

Fig. 39 is a view, from above, of the component in fig 37.

15 Fig. 40 shows the component in figs. 37 – 39 in perspective, obliquely from below.

Fig. 41 shows the component in figs. 37 – 40 in perspective, obliquely from above.

Fig. 42 is a view, from above, of a mop frame with two components as per figs. 37 –
20 41, said components forming a complete lower joint member.

Fig. 43 is a side view, from the left, of the mop frame in fig. 42.

Fig. 44 is an end view of the mop frame in fig. 42.

25

Fig. 45 shows the mop frame in figs. 42 – 44 in perspective, obliquely from above.

Fig. 46 shows, in perspective obliquely from above, the device in fig. 36 fastened to the shortened “tube” of a tool shaft, the device being in a preparatory position for
30 interconnection with the mop frame in fig. 45.

Fig. 47 shows, in perspective obliquely from above, the device in fig. 46, the middle element having been pushed into the locked position in the mop frame’s lower joint member.

Figures 1 and 2 show a mop frame in the form of a plate (1) manufactured of, for example, aluminium or a polymer and having a suitable device for the fastening of a textile mop or a disposable cloth to the underside (3) of the mop frame.

5 If the mop frame is aluminium, it is appropriate to provide edge protection for the ends. As they are known technology, neither this edge protection nor the fastening arrangements for textile mops are shown in the figures. On the top face of the mop frame (1), and approximately midway between its ends, a mount (2) is fastened by screws (either from the underside or using any other known technique).

10 In figures 3 – 7, the mount (2) is shown as a female part devoted to disconnectably receiving a lower fastener in the form of an appropriate male part. The mount (2) can be appropriately manufactured from a polymer and include a bottom part in the form of two parallel “beams” (4), said beams (4) holding together two upward-pointing bars (5). These bars (5) are essentially shaped as U-profiles, the insides of which form guide grooves (6) to receive said male part. The bars (5) also include lateral, rectangular, locking through-grooves (7) that form locking surfaces (8). Said locking surfaces (8) provide the means for disconnectably locking the male part. The sections (7) above the locking grooves are bevelled, the “insertion bevel” (9) being
15 devoted to facilitating interconnection. The underside of the mount (2) includes screw holes (10) for fastening (by screws) the mount (2) to the mop frame (1).

Figures 8 and 9 show part of a tool shaft (17), an upper joint member (11) and a middle element (14), all of these being interconnected. The upper joint member (11)
25 is of a known design with two fork prongs (12) that, at their bottom ends, are held together by a shaft pin (13), said shaft pin forming a pivot joint. This shaft pin (13) is rotatably journaled (around axis of rotation “A”) in a through hole in a middle element (14). The middle element (14) includes two shaft pins (15) that form a pivot joint with a second axis of rotation, “B”, the axial direction of which is different from that of the
30 “A” axis of rotation. Preferably, there should be ninety degrees between the axes of rotation. On the upper part of upper joint member (11), there is an upper fastener (16) for fastening to the tool shaft. Said tool shaft (17) is here shown simply as a section of tube. The upper fastener (16) includes a neck integrated into a part with the forks (12). This neck is appropriately designed as a tube with radially aligned

holes. In these holes, there are locking pins (18) that are sprung in an outward direction. Said locking pins fit into corresponding radial holes in the tool shaft (17). In the figures, the neck of the fastener (16) is inserted in, and mostly obscured by, the tool shaft (17). The fastener (16) and middle element (14) as described above are known technology and are thus only shown summarily in the figures.

In figures 10 – 14, a lower joint member (20) is shown with a lower fastener (26) for fastening to the mount (2). Joint member 20, which can be appropriately manufactured in a single piece from a tough and durable polymer, includes a bottom plate (21) from which two bars (22) project. On the inside of each bar (22), there is a base hole (23). The base holes face each other and are designed to receive the shaft pins (15) of the middle element (14). Outside each of the above-mentioned bars (22), another bar (24) projects from the bottom plate (21). Each of these latter bars (24) includes a lower part that has a relatively narrow, rectangular cross section. Said part forms a leaf spring (25). Above each leaf spring (25), there is an outward-pointing locking pin (27). Each of these locking pins (27) includes a lower insertion bevel (28) and an upper locking surface (29). These are devoted to interacting with, respectively, an insertion bevel (9) and a locking surface (8) of the mount (2). Each bar labelled 24 further includes a projection (30). Together, these form an operating member (31). The bars labelled 24, the locking pins labelled 27 and, partly, the bars labelled 22 constitute the lower fastener (26), which forms a male part for insertion into, and releasable interconnection with, the mount (2).

Figure 13 shows how the locking pins labelled 27 are, on interconnection, subject to a force that presses them towards each other in the arrows' C directions, the leaf springs (25) being thereby bent towards each other as indicated by the dash-dotted lines. At disconnection, the operator subjects the operating member (31) to an essentially rectilinear force in the arrows' D directions, the leaf springs (25) thereby once again bending towards each other.

Figure 15 shows how, via the middle element (14), the lower joint member (20) has been connected to the device in figures 8 and 9. Connection has been effected by the bottom plate (21) of the lower joint member (20) being bent so that the bars labelled 22 have pulled away from each other, thereby making it possible for the

shaft pins (15) on the middle element (14) to be introduced into the corresponding holes (23) in the lower joint member (20). The device in figure 15 thus includes: an upper joint member (11) fastened to the “tube” of a tool shaft (17); a middle element (14); and, a lower joint member (20). These parts together constitute a connection
5 between a tool shaft and a tool, said connection being articulated around two axes, AA and BB.

The tool can be releasably interconnected with the lower fastener (26) which, as shown in figures 16 – 18, is adapted for a mop frame (1). At interconnection, the
10 lower fastener (26) is inserted (in the arrow’s E direction) into the guide grooves (6) of the mount (2). On continued movement in the arrow’s E direction, the insertion bevels (9 and 28) of, respectively, the mount (2) and the lower joint member (20) come into interactive contact with each other. Being thereby bent by the leaf springs (25), the locking pins labelled 27 are pressed towards each other and, acted on by
15 the spring force from the leaf springs (25), can “snap-fit” into the corresponding locking grooves (7). This causes the locking surfaces labelled 29 to come into locking engagement with the locking surfaces (9) of the mount (2). In this way, a tool (1) can be easily interconnected with a part on a tool shaft (17) and thereafter function, in a known manner, with articulation between the tool shaft and the tool. At
20 disconnection, the operator presses the projections (30) of the operating member (31) towards each other in the arrows’ D directions. This is appropriately done by gripping between thumb and index finger. This exerts an essentially rectilinear force. The locking surfaces (29) of the locking pins labelled 27 are thereby released from the corresponding locking surfaces (8) of the mount (2) and the lower fastener (26)
25 can be pulled out from the mount (2), this releasing the mop frame (1) from the tool shaft (17).

Because interconnection is between the lower joint member and the tool, most of the connection can be permanently fastened to the tool shaft and, as required,
30 interconnected with various tools. As there is a need to effect articulated interconnection between a tool shaft and a number of different tools, this is highly advantageous. Because at least the upper joint member can be permanently fastened to the individual tool shaft, and because fewer parts of the joint system need to be fastened to a number of tools, the tools can be most considerably

simplified. Overall, this entails a significant reduction in the number of parts and, consequently, savings as regards manufacturing costs and consumption of materials. Lower storage and transport costs also result.

5 Figures 19 – 47 show various aspects of an alternative design of the invention.

Figures 19 – 21 show a symmetrical frame (40) that includes a tube-shaped part (41) that has an opening (42), the boundary edges of which are made up of guide pins (47). Adjacent to this part (41), there are two partly curved side walls (43), said side
10 walls being joined to a bottom wall (44). In this way, a coherent frame (40) is formed. This can be appropriately manufactured in a single piece from an injection moulded polymer (e.g. polyamide). If necessary, this frame (40) can be strengthened with a bottom plate. Each side wall (43) has openings – a rectangular hole (45) through the
15 side wall's curved section and a circular hole through (46) the side wall's straight section.

Figures 22 – 24 show a connection element (50) that can be appropriately manufactured in a single piece from an injection moulded polymer (e.g. acetal plastic). The connection element (50) includes an essentially U-shaped beam (51),
20 the upper part of which is made up of a curved leaf spring (52) that has a rectangular cross section. On the outside of both legs of the beam (51), there are: cylindrical shaft pins (15) that, with a certain play, fit into holes (46) in the frame (40); and, projections (30) that, with a certain play, fit into other holes (45). Thanks to the leaf spring (52), the connection element (50) can be compressed in the arrows' C
25 directions and then introduced past the guide pins (47) into the frame (40). The dimensions of the connection element (50) are such that, in the uncompressed state, it fits, with a certain play, in the inner space of the frame (40) with the shaft pins (15) and the projections (30) projecting from their respective holes (46 and 45).

30 Figures 25 – 27 show the connection element (50) fitted in the frame (40), these parts together making up a middle element (14) where the inside (53) of the tube-shaped part (41) of the frame (40) is designed to serve as a guide surface for an interconnection that is articulated around the AA axis with an upper joint member. Interacting with a lower joint member, the shaft pins labelled 15 also form a pivot joint

with a second axis of rotation, BB, the axial direction of which is different from that of the AA axis of rotation. Preferably, there should be ninety degrees between the axes of rotation. Through the exertion of force (in the arrows' C directions) on the shaft pins labelled 12, the leaf spring (52) bends and said shaft pins move into the holes labelled 46. In the same way, through the exertion of force in the arrows' C directions, the shaft pins labelled 15 move into the projections (30). The projections (30) thereby together form an operating member (31).

Figures 28, 29 and 32 show one design of an upper joint member (11), which can be appropriately manufactured in a single piece from a polymer. The joint member (11) includes: an upper fastener (16) for fastening to a tool shaft; and, two fork prongs (12). The fastener (16) is shaped as a tube designed to be introduced into a lower tube on a tool shaft. The fastener (16) also includes radially aligned locking pins (18) that are sprung in an outward direction. As per previous explanations and known technology, said locking pins fit into corresponding radial holes in the lower tube on a tool shaft. On the lower part of each fork prong (12), there are circular through-holes (55) that, on the inside of each fork prong (12) are surrounded by cylindrical flanges that have guide surfaces (56). The diameter of the flanges is such that the guide surfaces (56) can be housed, with a certain play, inside each guide surface (53) in the middle element (14) in figure 25. The upper joint member (11) interacts with a pin (60) that is preferably manufactured from an injection moulded material. Said pin is shown schematically in figures 30, 31 and 33. In principle, this pin (60) includes a shaft pin (61) that has a diameter slightly less than that of the holes (55) in the joint member in figure 28. The pin (60) also includes two heads (62). In practice, it is appropriate for the pin (60) to be manufactured in at least two parts. One of these parts can include the shaft pin and a head. The other part can include the second head.

Figures 34 – 36 show how the middle element (14) has been introduced between the fork prongs (12) of the upper joint member (11) in such a way that the guide surfaces (53) of the middle element partially enclose the guide surfaces (56) of the fork prongs. To hold the fork prongs (12) together, the shaft pin (61) on one part of the pin (60) has been inserted through the holes (55) of the fork prongs, a second head (62) having then been fastened, in an appropriate manner, to the shaft pin's free

end. These parts together constitute a connection between a tool shaft and a tool, said connection being articulated around two axes, AA and BB.

Figures 37 – 41 show one design of a part (70) for a lower joint member. The part (70), which can be appropriately manufactured from an injection moulded polymer, is shaped as a block that has a base plate (71). On the underside of the base plate, there is a screw hole (72). One side of part 70 has: an opening in the form of a bottom hole (73); and an insertion bevel (74) enclosed on both sides by guide surfaces (75). The bottom hole (73) is essentially aligned parallel with the underside of the base plate (70) and is of such a diameter that a shaft pin (15) on the previously described connection element (50) can, with a certain radial play, be inserted into it. Together, two of these parts (70) form a lower joint member (20) as in figures 42 – 45 where the parts are shown fastened (using, for example, screws from the mop frame's underside) to a mop frame (1). The parts (70) are oriented so that the holes (73) face one another. They can be appropriately secured so that they do not rotate around the screws.

Figure 46 shows how the device in figures 34 – 36 has been connected to a tool shaft (17) and placed in a preparatory position for releasable interconnection with a tool – in this case a mop frame (1) – that has a lower joint member (20). Here, the shaft pins (15) of the middle element (14) are inserted (in the arrow's E direction) between the guide surfaces (75) of the lower joint member (20). On continued movement in the arrow's E direction, the insertion bevels (74) come into interactive contact with the shaft pins labelled 15. Being thereby bent by the leaf spring (52) on the connection element (50), the shaft pins labelled 15 are pressed towards each other (as previously explained) and, acted on by the spring force from the leaf spring (52), can "snap-fit" into the corresponding holes (73) of the lower joint member (20).

This is shown in figure 47, where a tool (1) has, in this simple way, been connected to a tool shaft (17), the whole thereafter functioning, in a known manner, with articulation between the tool shaft and the tool. At disconnection, the operator presses the projections (30) of the operating member (31) towards each other in the arrows' D directions. This is appropriately done by gripping between thumb and index finger. This exerts an essentially rectilinear force. The shaft pins labelled 15 are

thereby released from the corresponding holes (73) of the lower joint member (20), this releasing the mop frame (1) from the tool shaft (17).

In this case too, interconnection is between the lower joint member and the tool.

- 5 Consequently, most of the connection can be permanently fastened to the tool shaft and, as required, interconnected with various tools. Because all known tools (in practice, mop frames) that require articulated connection to a tool shaft have a joint system that has an upper fastener for the tool shaft, the invention allows considerable savings to be made. An arrangement as per the invention also allows
- 10 the articulation in a joint system to be used for tools other than mop frames. Such tools need only to have a body that receives a part of a joint system, for example, a middle element.

- It is preferred that as many parts as possible of the connection should be
- 15 permanently connected to the tool shaft. This is so that only the lower joint member (or a mount in the form of a body that receives the lower joint member) has to be included in the tool. However, it is also possible for the releasable interconnection to take place between the upper joint member and the middle element. In this case, only the upper joint member would be permanently connected to the tool shaft. A
- 20 further possibility is for the lower joint member to include a lower fastener for direct interconnection with the tool. This could be achieved by having suitable cut-outs directly on a mop frame plate, the lower fastener then interconnecting with said cut-outs.
- 25 These and other design variants that are obvious to professionals in this area are all considered to be within the idea embodied in the invention as it is formulated in the following patent claims.

Patent claims

1. A connection for the releasable interconnection of a tool (1) and a tool shaft (17),
said connection including an upper joint member (11), a middle element (14) and
5 a lower joint member (20), said upper joint member (11) including an upper
fastener (16) for fastening to the tool shaft (17) and said lower joint member (20)
including a lower fastener (26) for fastening to the tool (1), each of these joint
members (11 and 20) including a pivot joint for articulated interconnection with
the middle element (14), the axial alignments of said pivot joints being different,
10 the whole being characterised by:
it being possible, by the exertion of an essentially rectilinear force on an operating
member (31), to disconnect the tool (1) from the upper joint member (11).
2. A connection as per patent claim 1, characterised by:
15 it being possible to disconnect the tool (1) from the middle element (14).
3. A connection as per patent claim 2, characterised by:
it being possible to disconnect the tool (1) from the lower joint member (20).

Fig 1

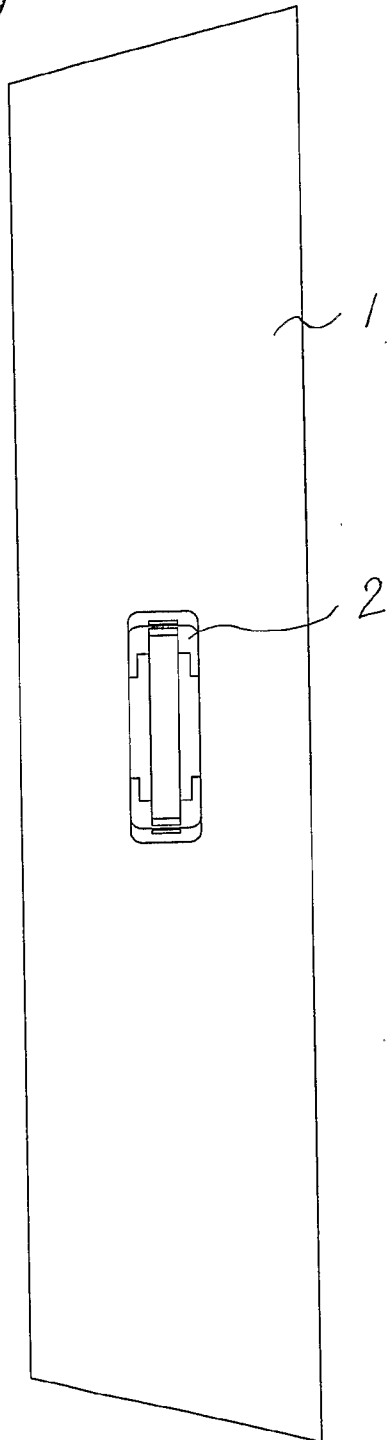
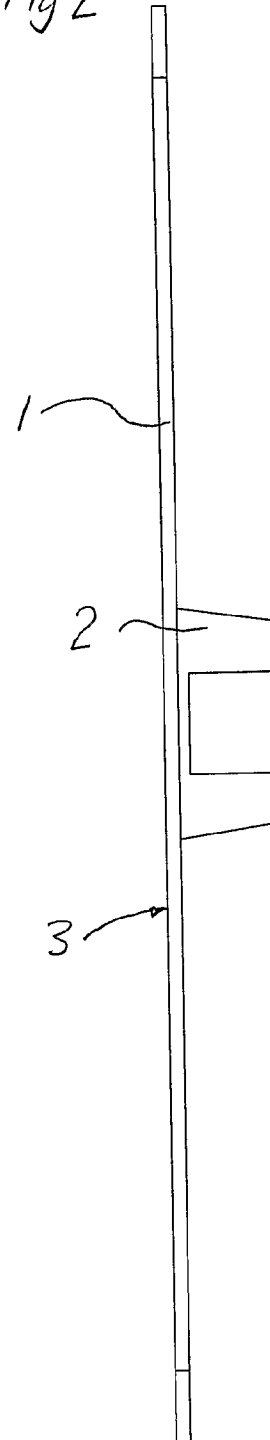
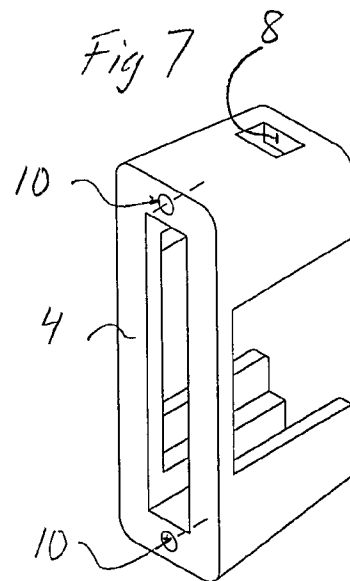
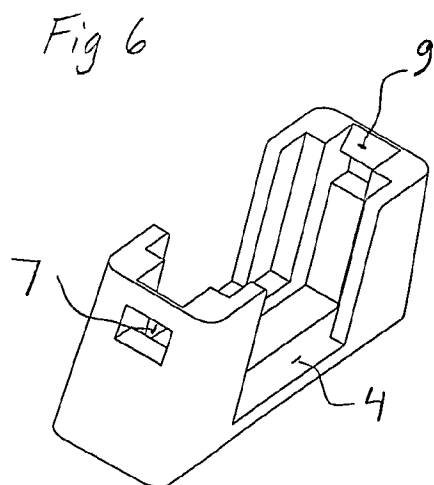
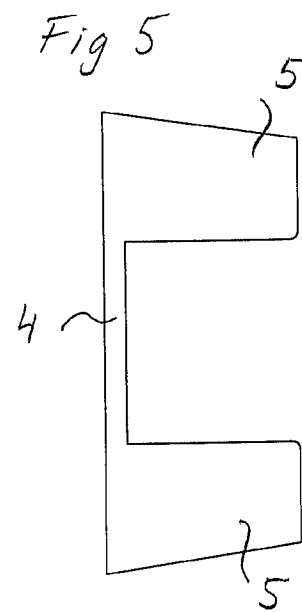
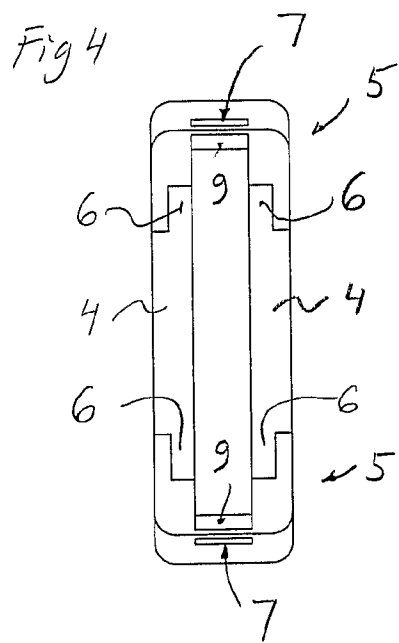
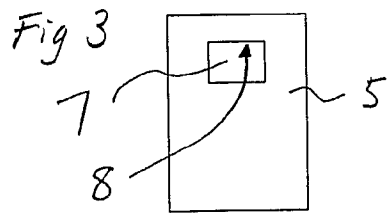


Fig 2





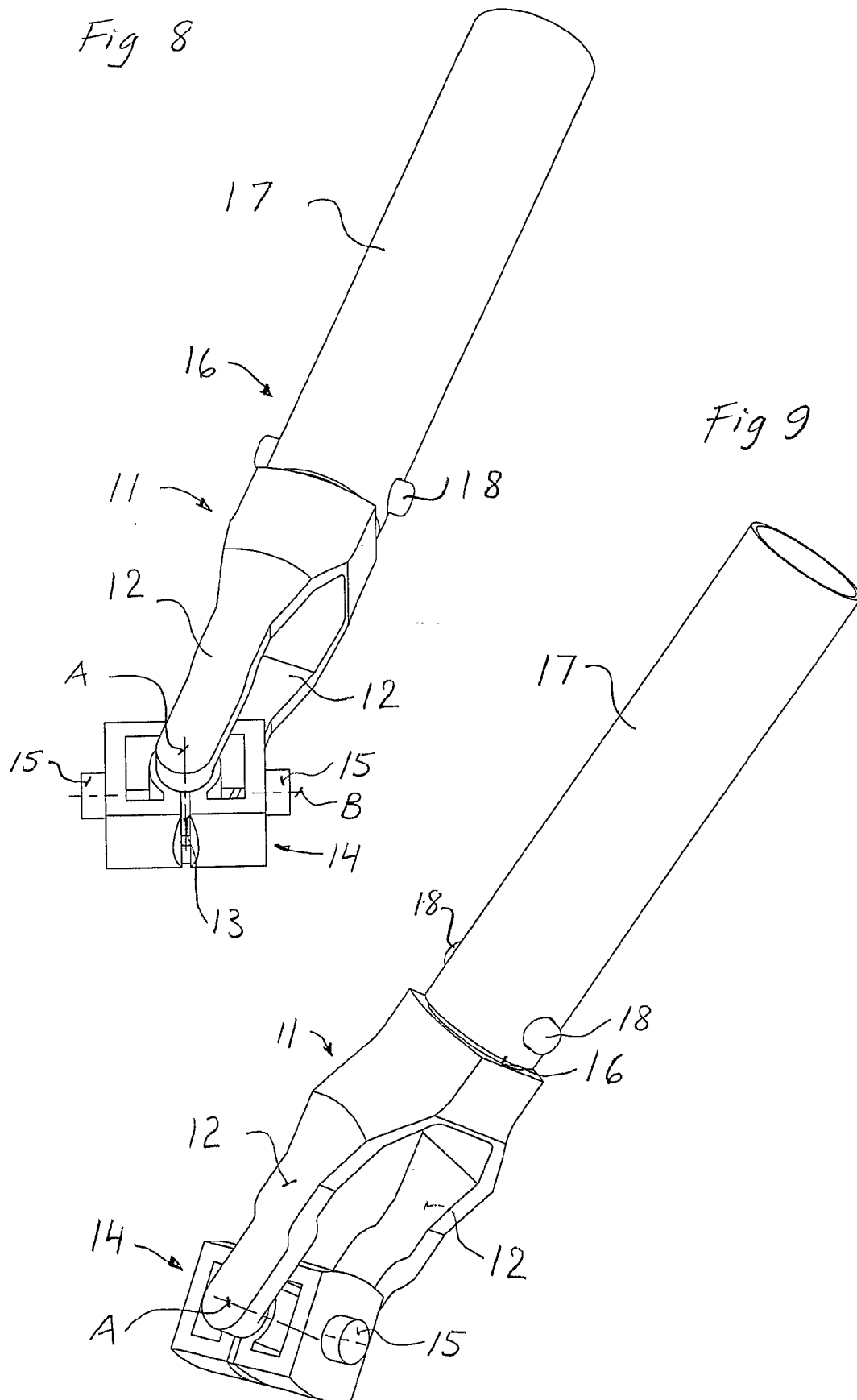


Fig 10

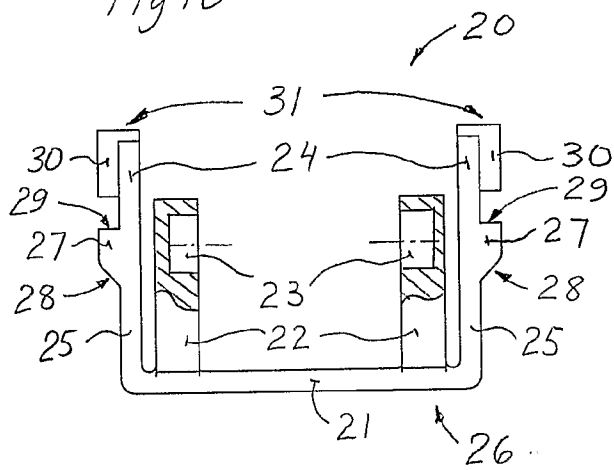


Fig 11

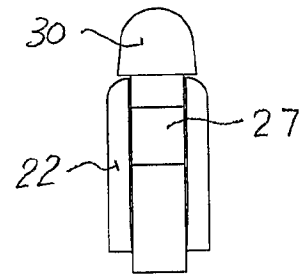


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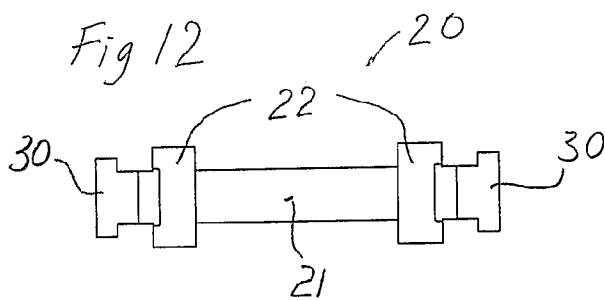


Fig 13

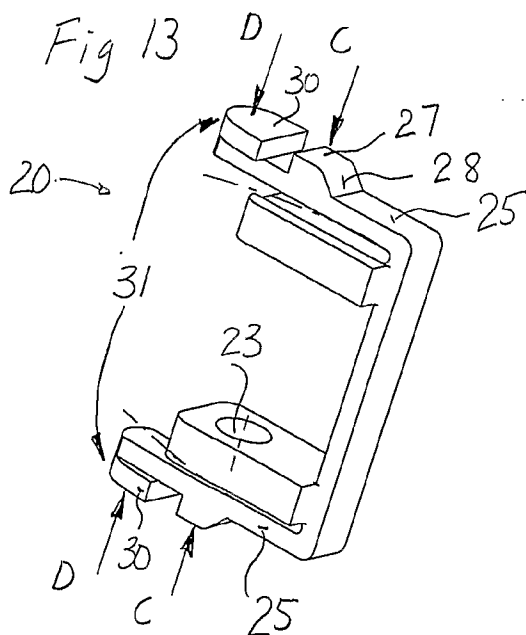
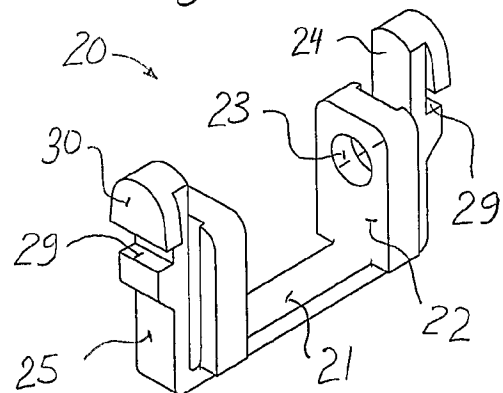


Fig 14



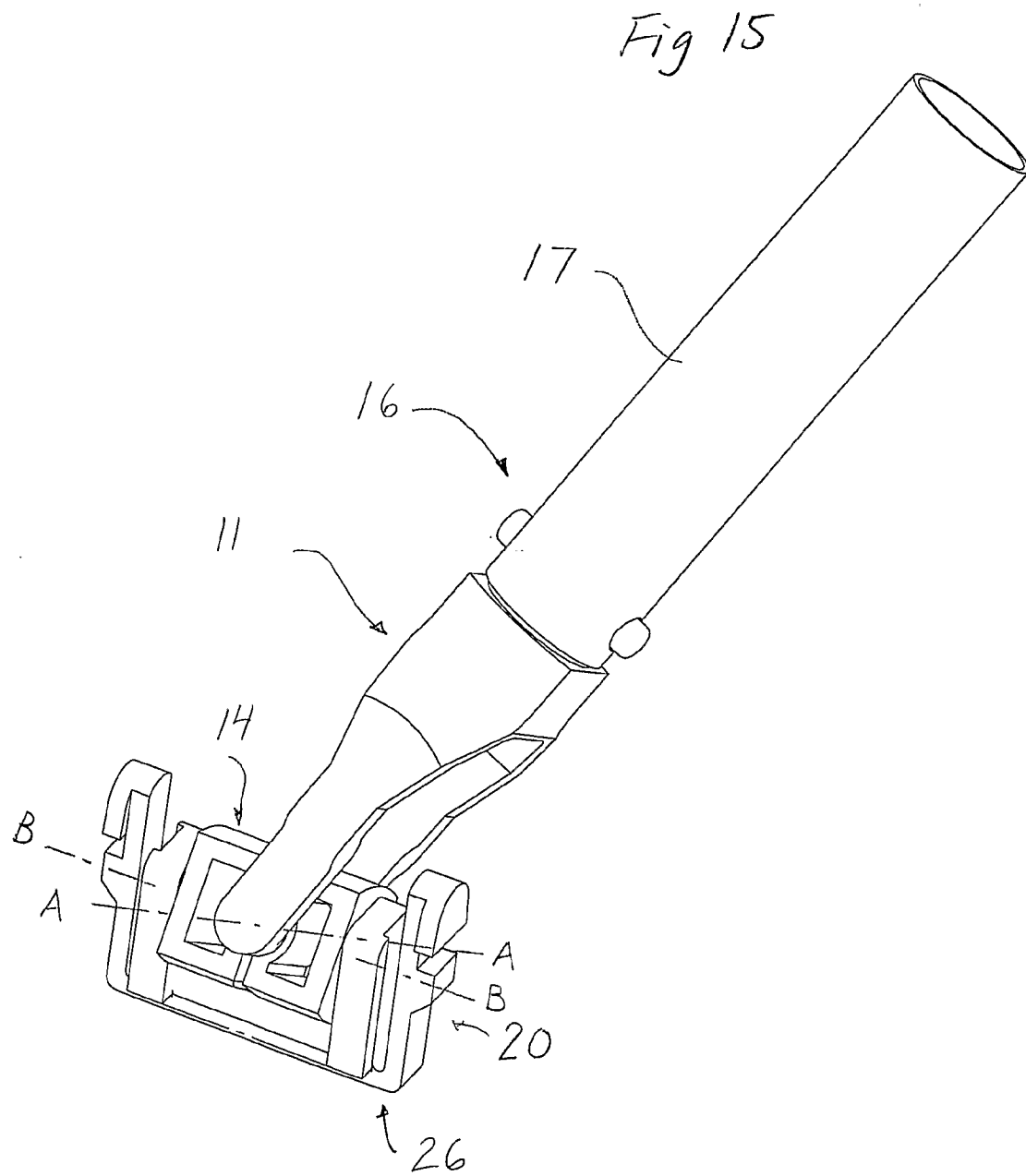
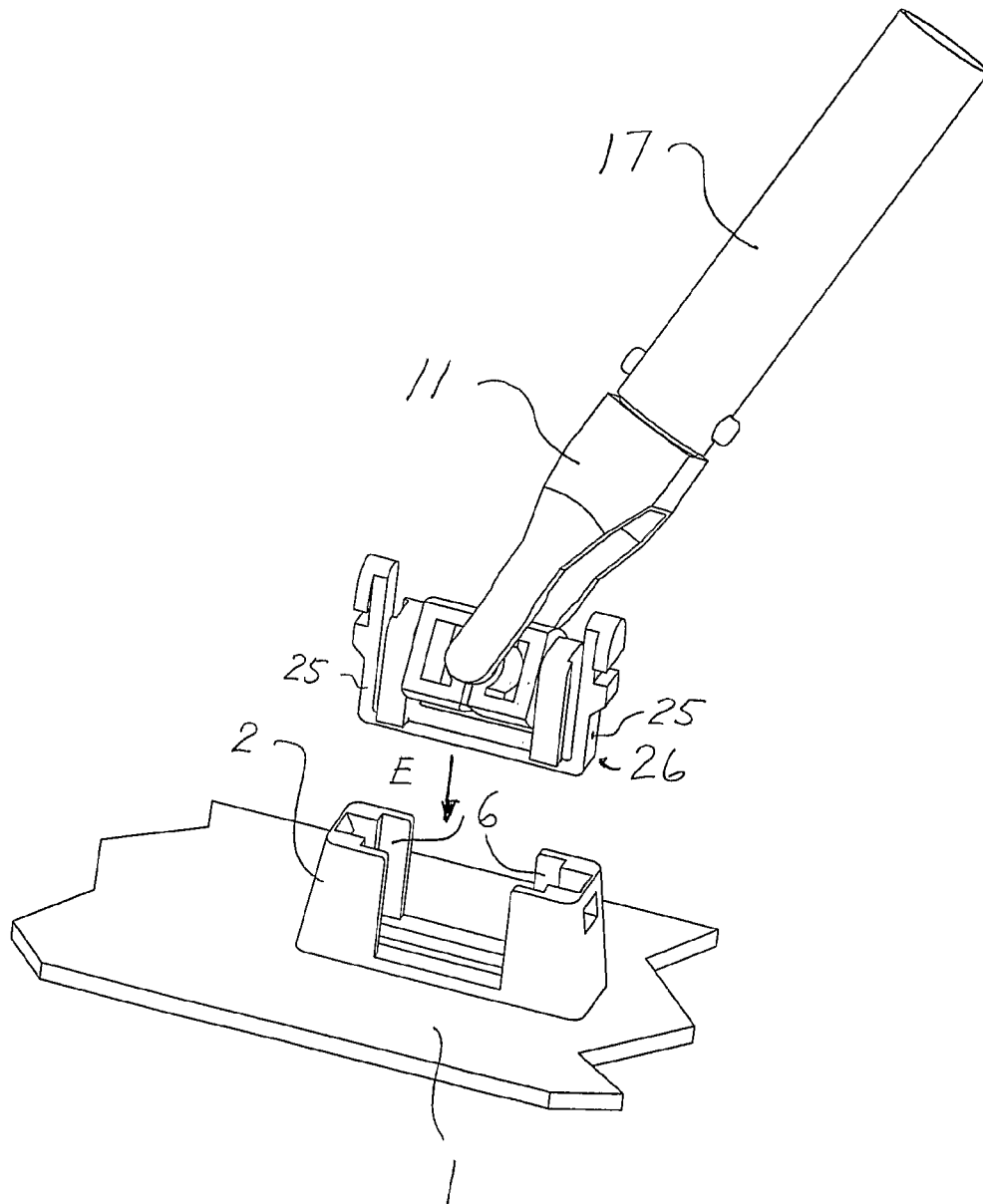
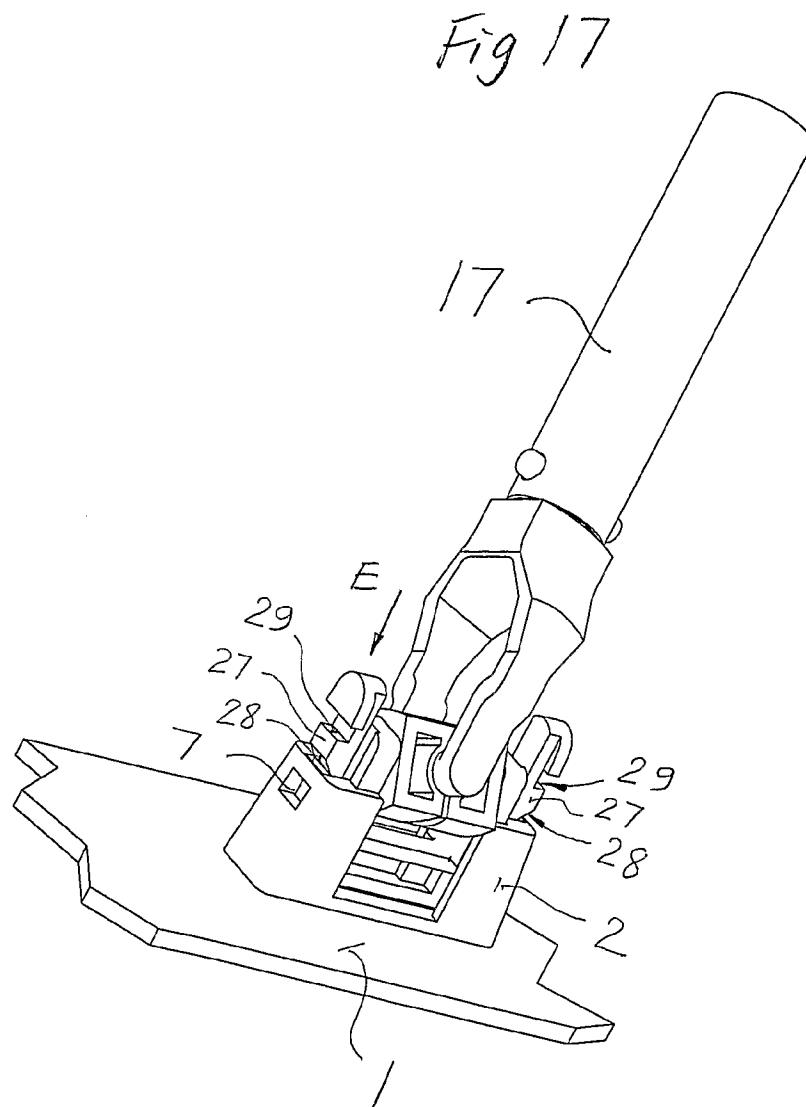


Fig 16





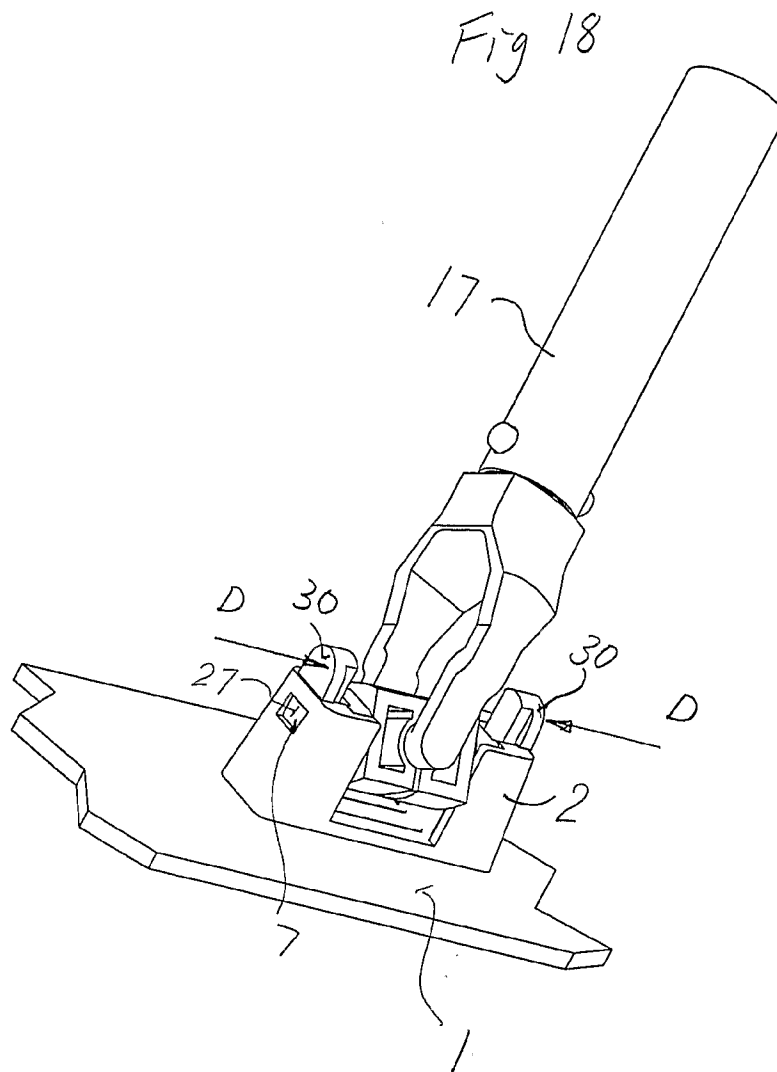


Fig 19

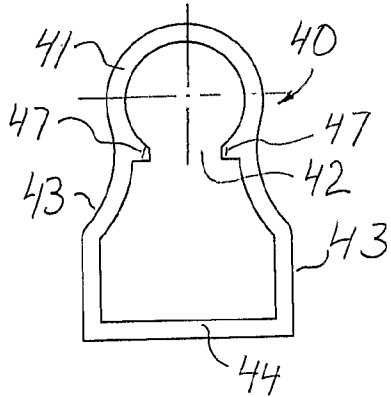


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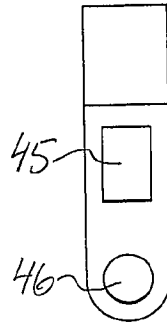


Fig 21

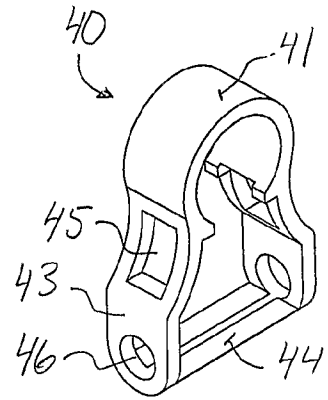


Fig 22

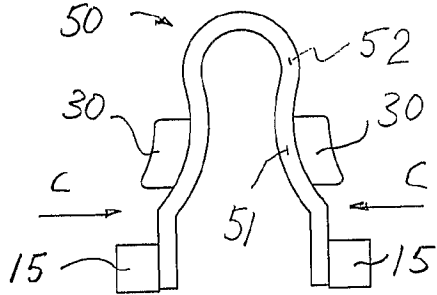


Fig 23

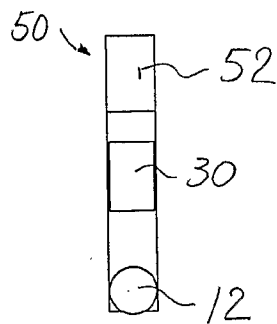


Fig 24

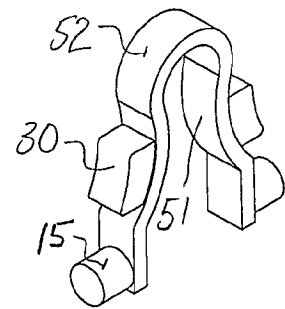


Fig 25

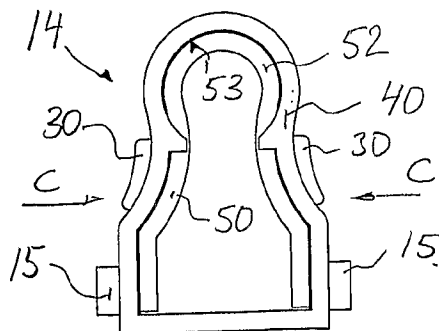


Fig 26

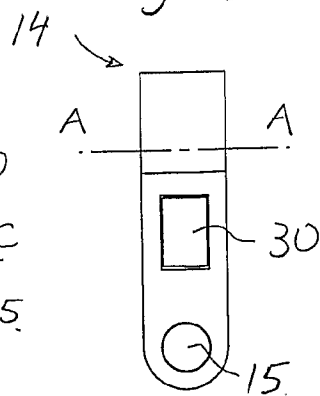


Fig 27

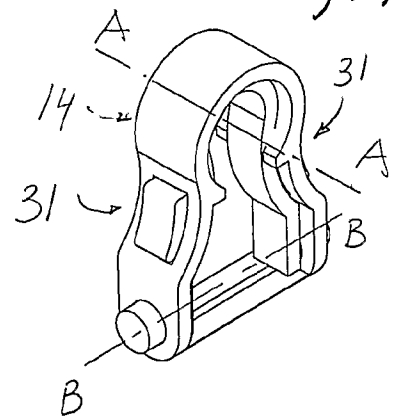


Fig 28

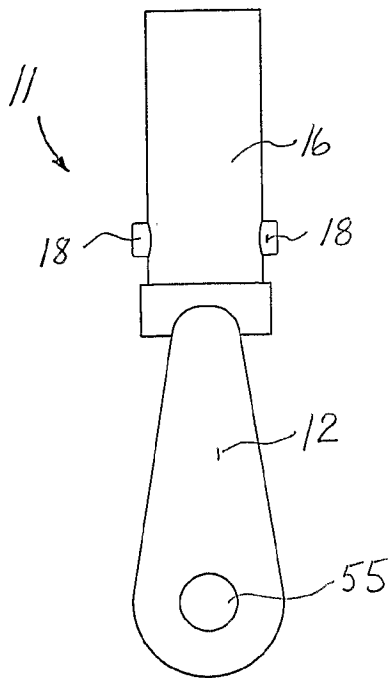


Fig 29

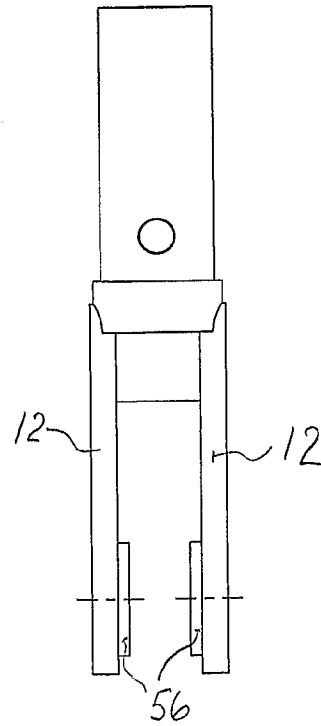


Fig 30

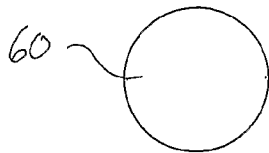


Fig 31

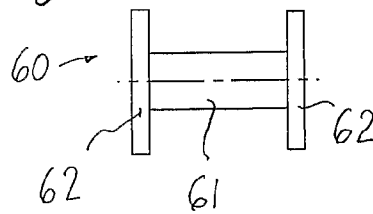


Fig 32

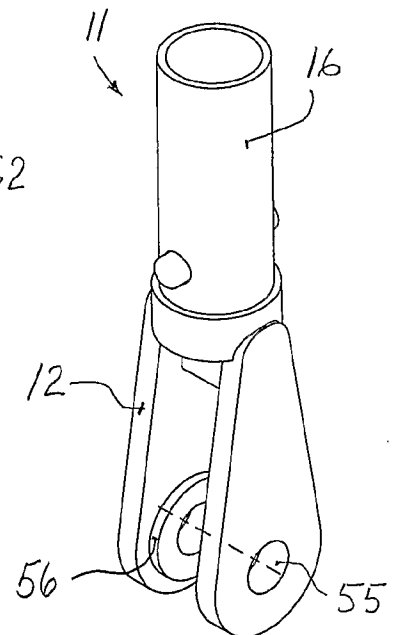


Fig 33

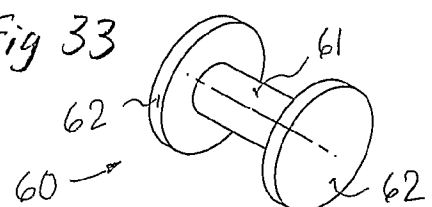


Fig 34

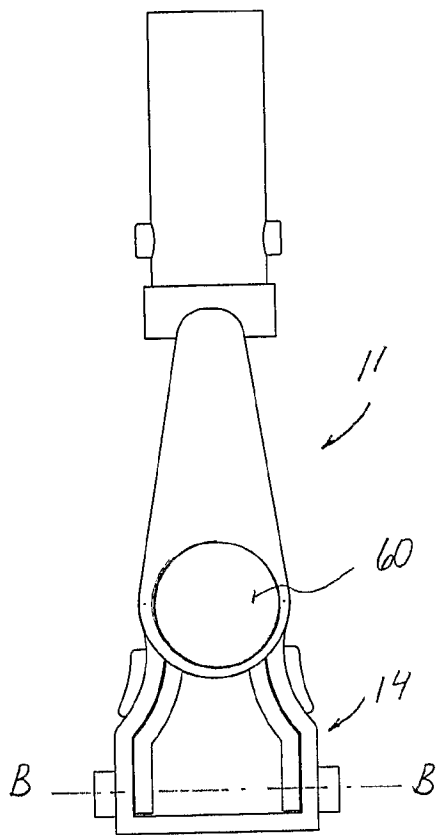


Fig 35

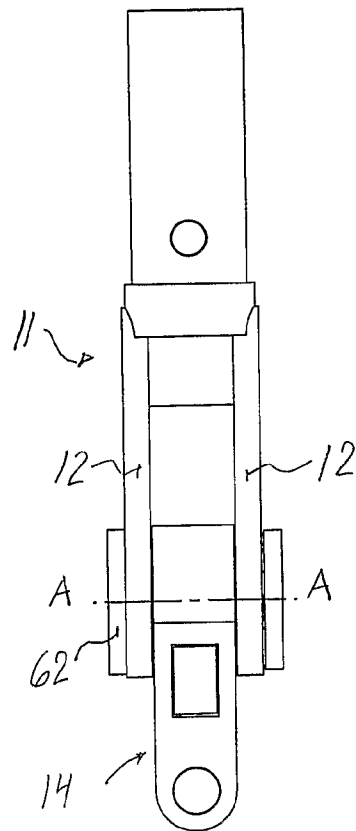


Fig 36

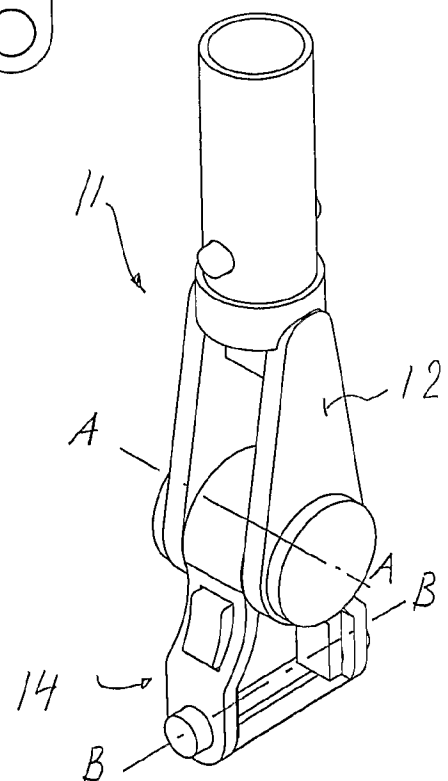


Fig 37

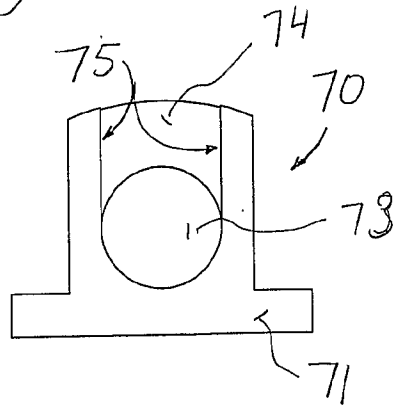


Fig 38

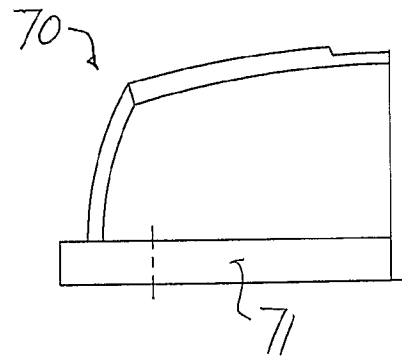


Fig 39

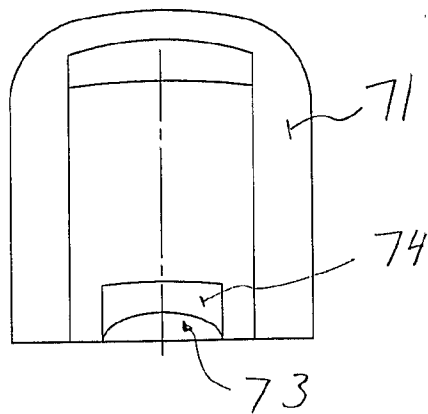


Fig 40

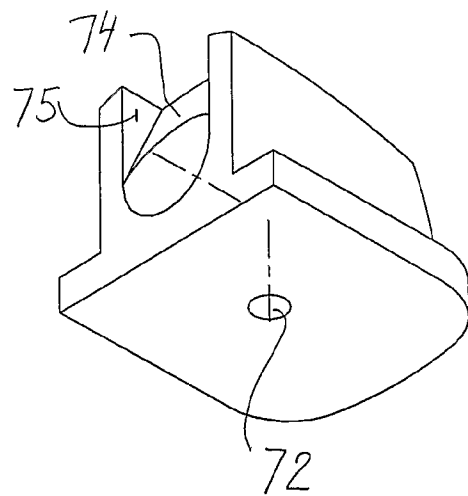


Fig 41

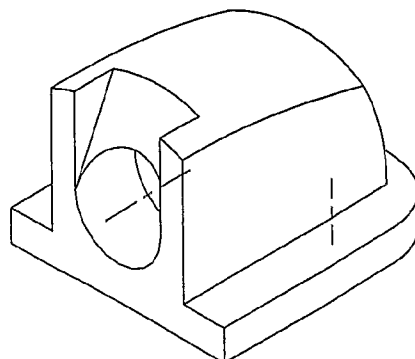


Fig 42

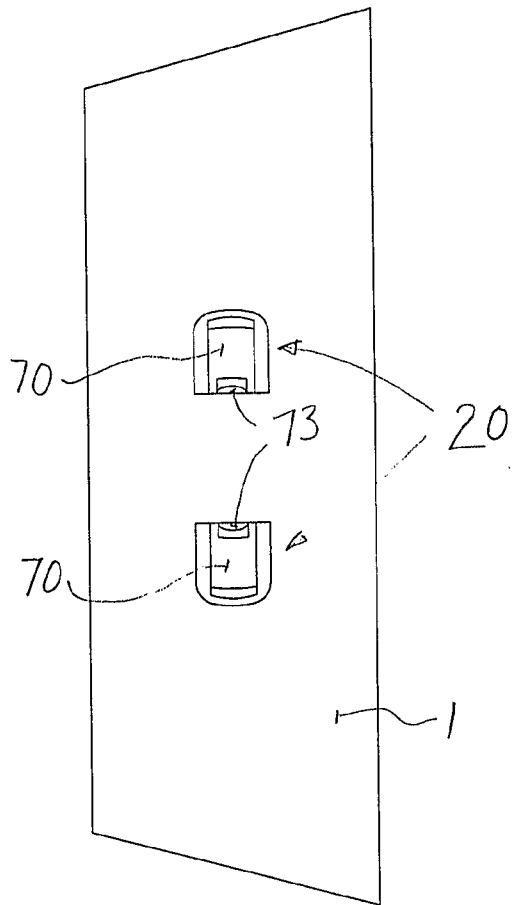


Fig 43

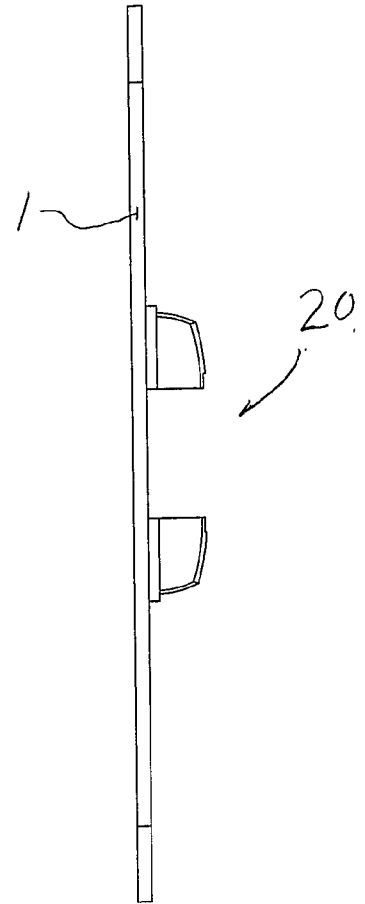


Fig 44

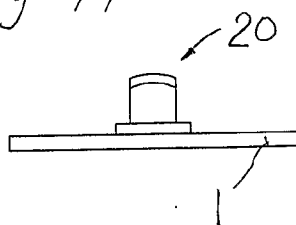
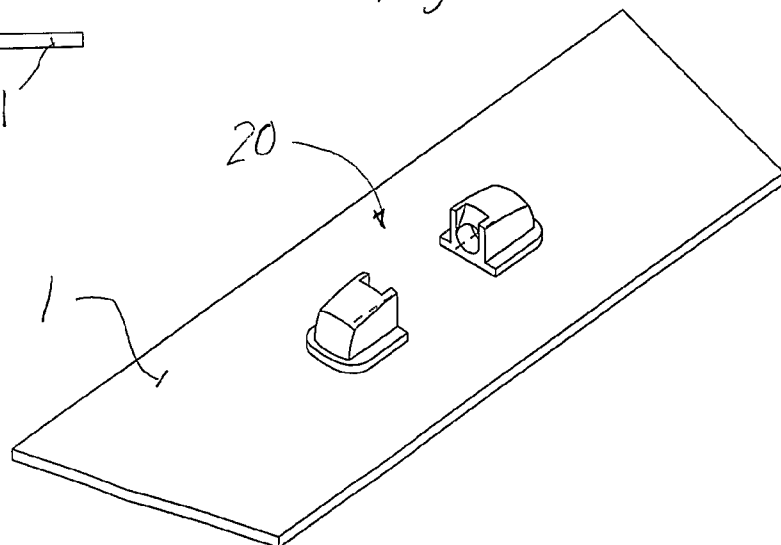


Fig 45



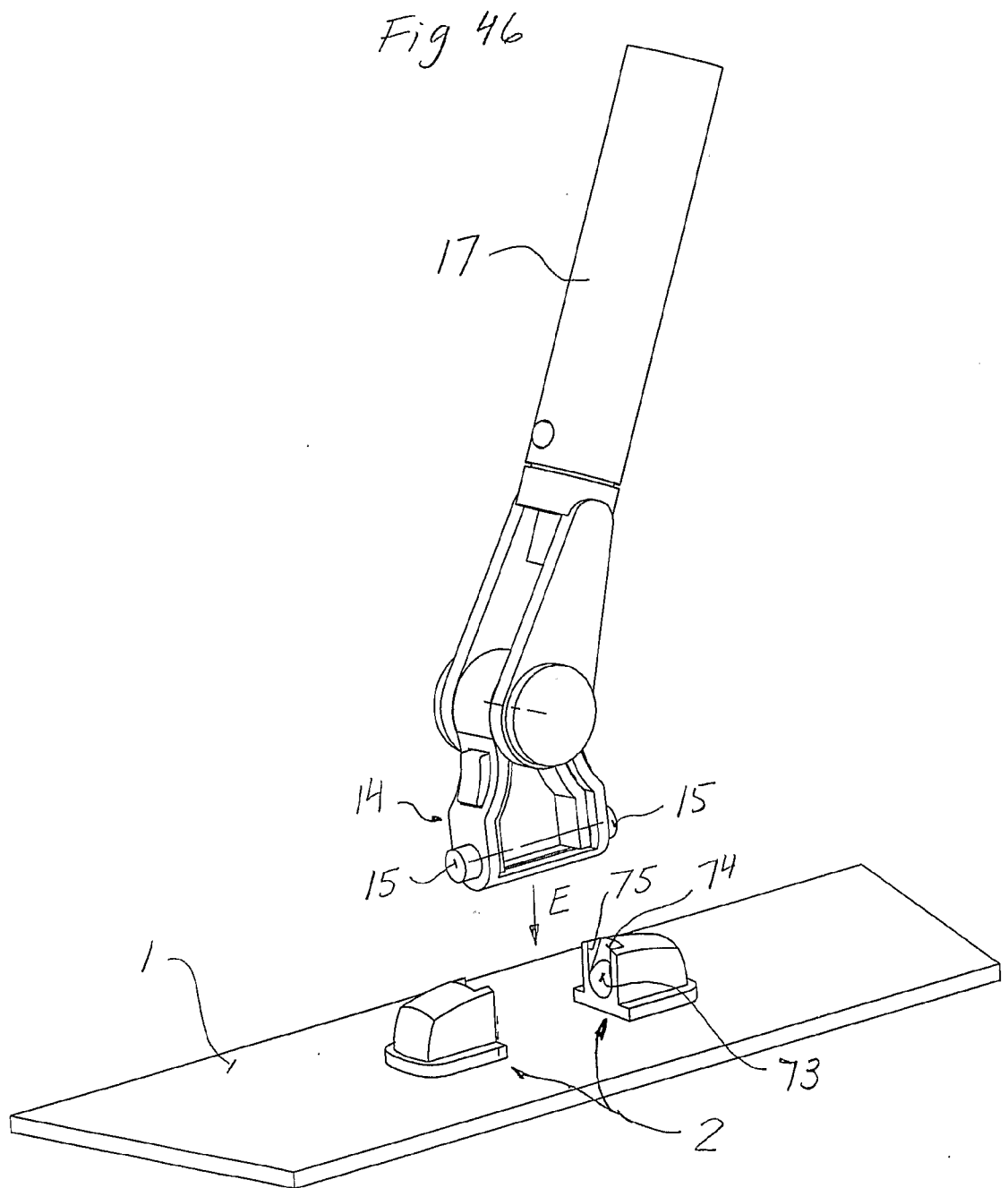
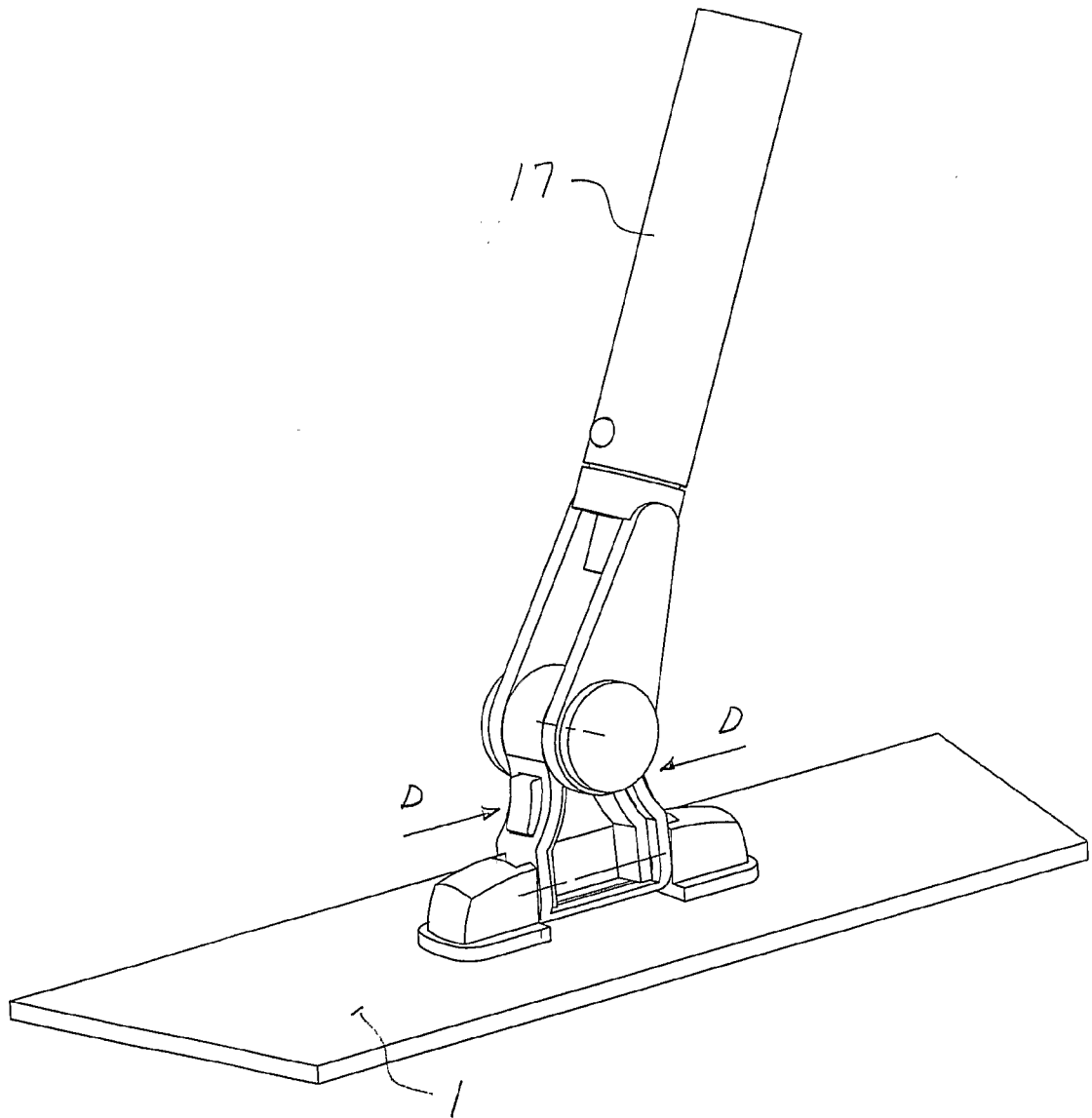


Fig 47



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2008/000643

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B25G, A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 19908259 A1 (LIKOSAR, FERDINAND, DORNBIRN ET AL), 31 August 2000 (31.08.2000), whole document --	1-3
A	DE 19930778 A1 (LIOSAR, FERDINAND, DORNBIRN ET AL), 4 January 2001 (04.01.2001), whole document --	1-3
A	US 5548864 A (P. VOSBIKIAN ET AL), 27 August 1996 (27.08.1996), whole document --	1-3
A	US 20030210952 A1 (P.-W. HSIAO), 13 November 2003 (13.11.2003), whole document -----	1-3

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Date of mailing of the international search report

16-02-2009

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International patent classification (IPC)

B25G 3/18 (2006.01)
A47L 13/20 (2006.01)
A47L 13/42 (2006.01)
B25G 3/26 (2006.01)

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Information on patent family members

01/11/2008

International application No.

PCT/SE2008/000643

DE	19908259	A1	31/08/2000	NONE

DE	19930778	A1	04/01/2001	NONE

US	5548864	A	27/08/1996	NONE

US	20030210952	A1	13/11/2003	NONE
