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(21) International Application Number: PCT/SE99/01358 (22) International Filing Date: 10 August 1999 (10.08.99) (30) Priority Data: 9802717-0 13 August 1998 (13.08.98) SE (71) Applicant (for all designated States except US): NIKE HYDRAULICS AB [SE/SE]; P.O. Box 1107, S-631 80 Eskilstuna (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): AIKIONIEMI, Vilho [SE/SE]; Lagrädsgatan 18 A, S-632 35 Eskilstuna (SE). (74) Agents: STRÖM, Tore et al.; Ström & Gulliksson AB, P.O. Box 4188, S-203 13 Malmö (SE).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: A FLUID ACTUATED RESCUE TOOL (57) Abstract A fluid actuated rescue tool for spreading and cutting action by means of two arms (4, 5) pivotably attached (at 7) to the body (6) of the tool comprises in a cylinder (10) a piston (9) with a piston rod (14) having a yoke (15) connected to the arms (4, 5) by means of pivotably attached links (16, 17). For obtaining a maximum guiding length for the piston independent of its position and without adding to the normal length of the tool, the yoke is provided with an external, generally cylindrical yoke guide (18) with an outer diameter corresponding to the inner diameter of the cylinder (10).		

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A FLUID ACTUATED RESCUE TOOL

5 **Technical Field**

The present invention relates to a fluid actuated rescue tool for spreading and/or cutting action by means of two arms pivotably attached to the body of the tool, comprising in a cylinder a piston with a piston rod having
10 a yoke connected to the arms by means of pivotably attached links.

Background of the Invention

A rescue tool of this kind is nowadays a frequently used implement at rescue operations, where a vehicle has to
15 be cut-up or opened, for example for freeing a person trapped in the vehicle. Extremely high forces act within the tool at use, which makes it important to provide a satisfactory guiding for the piston in the cylinder.

At the same time the weight and dimensions of the
20 tool have to be kept down, among other things because the tool is hand-held. For this reason it may be difficult to obtain a sufficient guiding length for the piston in the cylinder. It is accordingly a main object of the invention to obtain the longest possible guiding length for the
25 piston without adding to the overall length of the tool.

The Invention

This is according to the invention obtained in that the yoke is provided with an external, generally cylindrical yoke guide with an outer diameter corresponding
30 to the inner diameter of the cylinder.

Hereby the guiding length will be as great as possible and independent of the position of the piston. No length is added to the tool. Due to the fact that the distance between the two guides is so great, the axial
35 length of each guide (i.e. the length of the piston and of the yoke guide) can be kept at a minimum.

Brief Description of the Drawings

The invention will be described in further detail below under reference to the accompanying drawings, in which the different Figures are drawn to different scales
5 and in which

Fig 1 is a side view of a rescue tool embodying the invention,

Fig 2 is a partly sectional view of a part of the rescue tool according to Fig 1 along the line II-II in
10 Fig 1,

Fig 3 is a view corresponding to Fig 1 of the forward part of the rescue tool with a portion sectioned,

Figs 4-6 are a side view, a partly sectional top view, and an end view, respectively, of a yoke in the
15 rescue tool embodying the invention, and

Figs 7-9 are a side view, a section along the line VIII-VIII in Fig 7, and a top view, respectively, of a yoke guide in the rescue tool embodying the the invention.

Detailed Description of a Preferred Embodiment

20 A rescue tool 1 of the kind shown in an overall view in Fig 1 is well known in the art. The tool is provided with hoses 2 and 3 for the supply to and removal from the tool of high pressure hydraulic fluid from and to, respectively, an external source therefore. The tool is
25 provided with internal means to be described for transforming the hydraulic pressure into a spreading or cutting movement of arms 4 and 5 pivotably attached to the body 6 of the tool at 7. The tool is provided with a handle 8 for its positioning and manipulating.

30 As the rescue tool 1 is well known in the art, the description of its known parts will be kept brief.

Referring to Fig 2, a double-acting piston 9 is axially movable in a cylinder 10. High pressure hydraulic fluid can alternatively be supplied directly to the left of
35 the piston 9 for movement of the piston to the right or

- through a tube 11 and a bore 12 - to the right of the piston 9 for movement of the piston to the left. A sealing arrangement 13 is provided to the right of the piston 9 in the cylinder 10.

5 From the piston 9 a hollow piston rod 14 extends to the right in Fig 2 through the sealing arrangement 13. A yoke 15 to be further described below is threadingly attached to the piston rod 14. Two force-transmitting links 16 and 17, which are most clearly shown in Fig 3, are at
10 their inner ends pivotably attached to the yoke 15 and at their outer ends to the cutting and spreading arms 4 and 5, which are pivotably mounted on a common pivot shaft 7 in the cylinder 10. By this arrangement the arms 4 and 5 will open or spread at a movement of the piston 9 to the left in
15 Fig 2 and move together (for a cutting action) at a movement to the right of the piston 9.

 A generally cylindrical yoke guide 18 to be further described below is attached to the yoke 15 by means of two screws 19 and is guided by the cylinder 10 for axial
20 movements therein.

 The yoke 15 is shown in Figs 4-6. From right to left in Figs 4 and 5 (left to right in Figs 2 and 3) the yoke 15 has the following portions: a cylindrical stem 20 (with a circumferential groove 21 for a sealing ring 22, Figs 2 and
25 3) for closing insertion in the hollow piston rod 14, a threaded portion 23 for attachment to the piston rod 14, and a fork-shaped yoke portion 24 having two through bores 25 for the pivotal attachment of the two links 16 and 17 as well as a threaded hole 26 for the screws 19, intended for
30 the attachment of the yoke guide 18.

 The yoke guide 18 is shown in Figs 7-9. It is basically a hollow cylinder with an outer diameter corresponding to the inner diameter of the cylinder 10 and an inner diameter corresponding to the outer diameter of
35 the yoke portion 24. The yoke guide 18 has two axial slots

18' for the yoke portion 24 to laterally extend out through. Also the cylinder 10 has axial slots in this region for the yoke portion 24. For the attachment to the yoke 15 by means of the screws 19 the yoke guide is
5 provided with holes 27.

CLAIMS

1. A fluid actuated rescue tool for spreading and/or cutting action by means of two arms (4, 5) pivotably attached (at 7) to the body (6) of the tool, comprising in
5 a cylinder (10) a piston (9) with a piston rod (14) having a yoke (15) connected to the arms (4, 5) by means of pivotably attached links (16, 17), c h a r a c t e-
r i z e d in that the yoke (15) is provided with an external, generally cylindrical yoke guide (18) with an
10 outer diameter corresponding to the inner diameter of the cylinder (10).

2. A tool according to claim 1, c h a r a c t e-
r i z e d in that the yoke guide (18) has axial slots (18') for the yoke (15) to extend through.

15 3. A tool according to claim 1, c h a r a c t e-
r i z e d in that the yoke guide (18) is attached to the yoke (15) by means of screws (19).

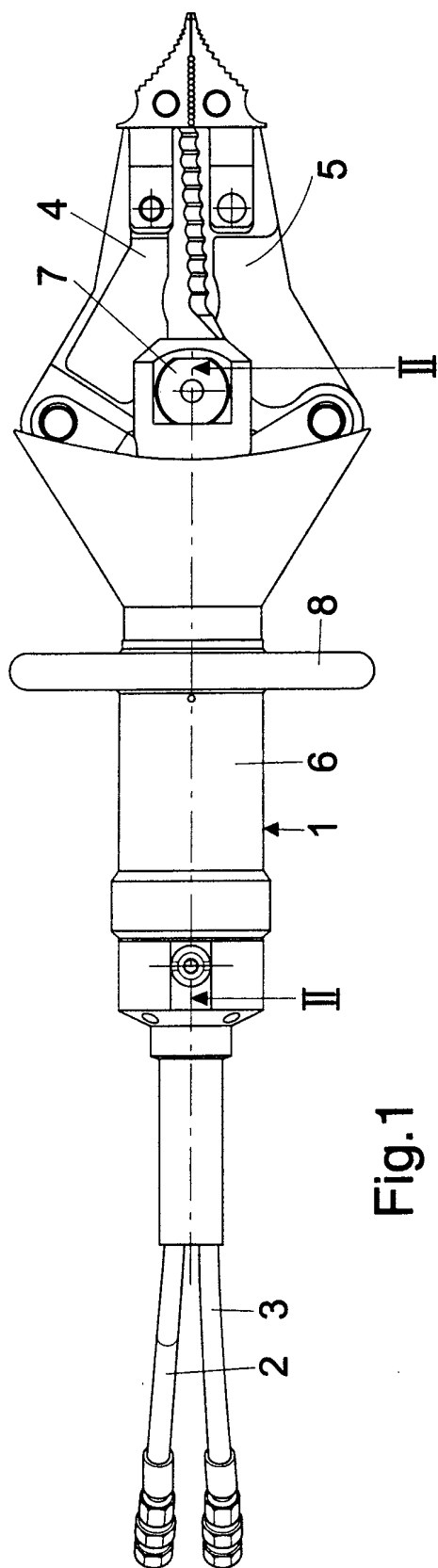


Fig.1

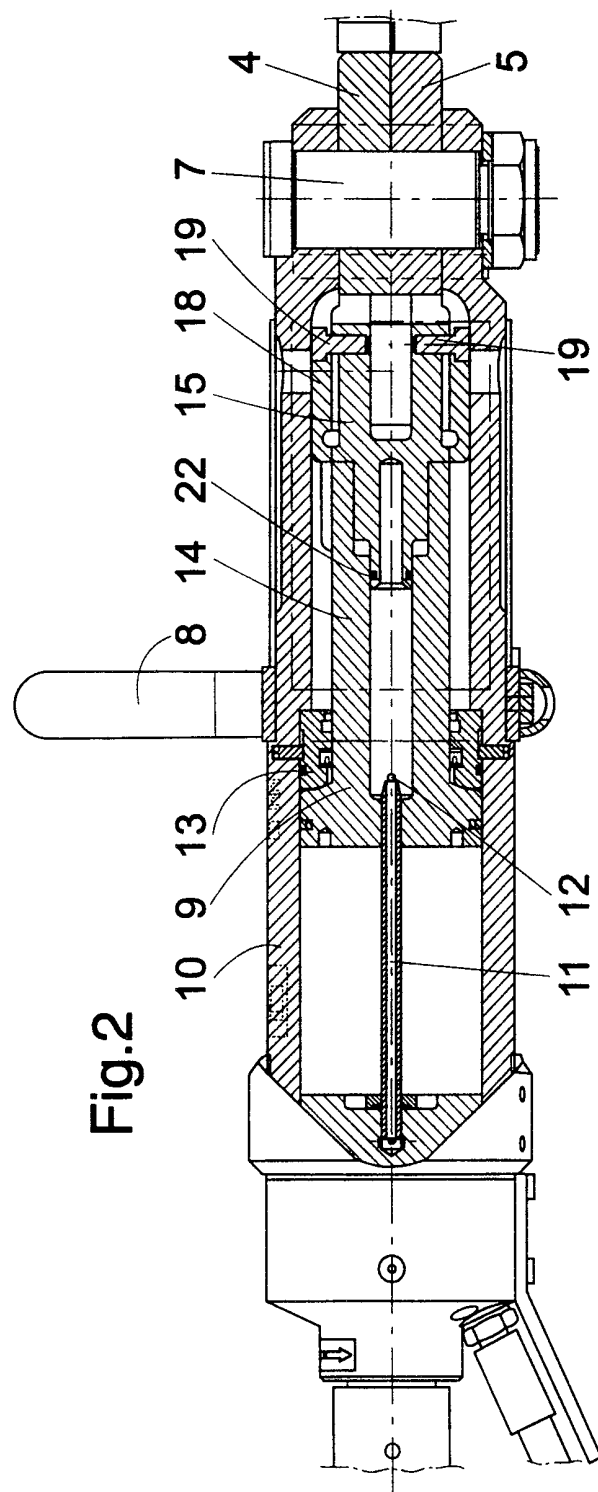
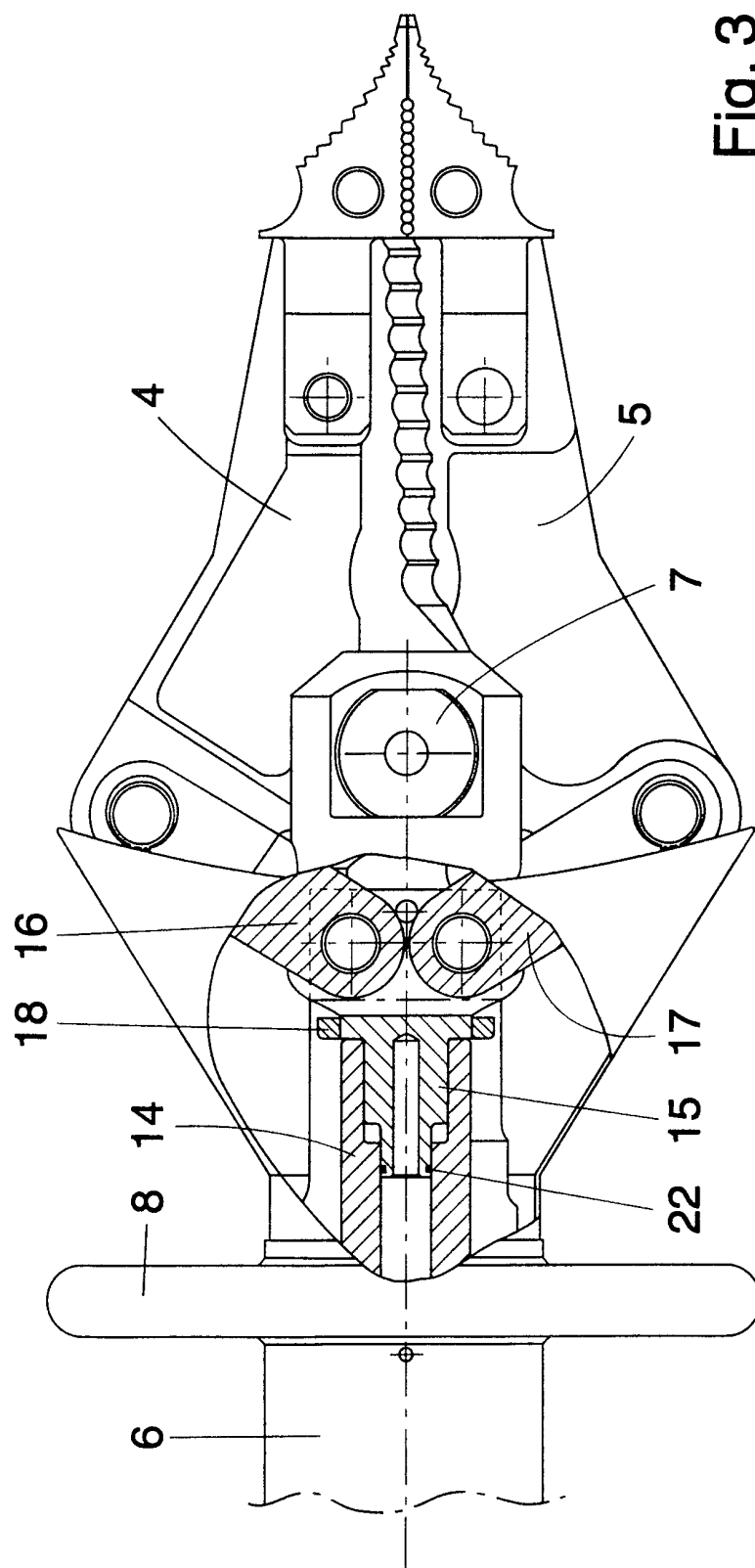
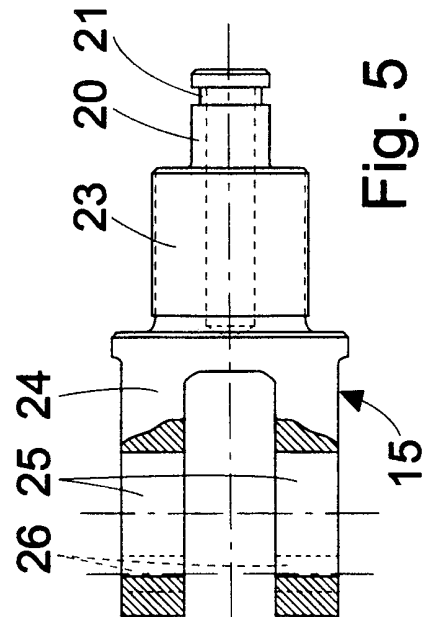
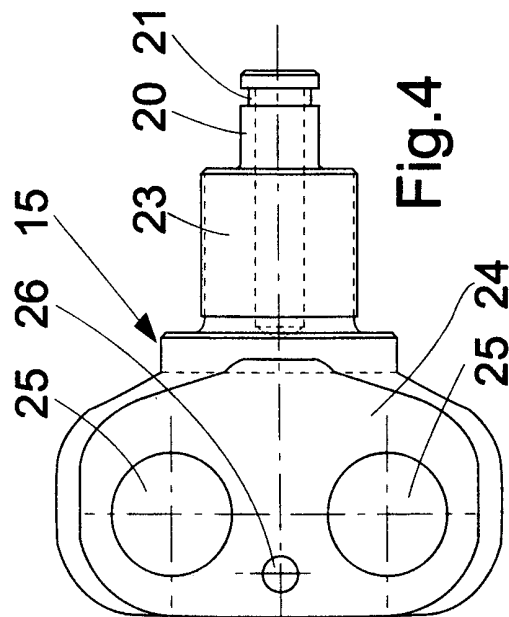
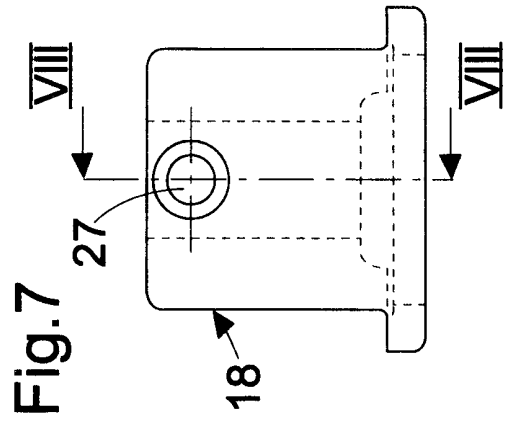
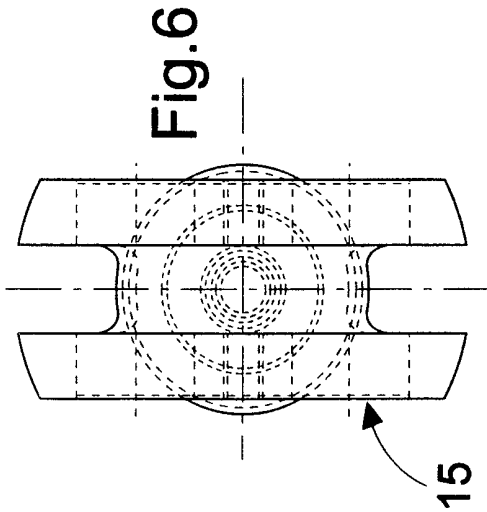
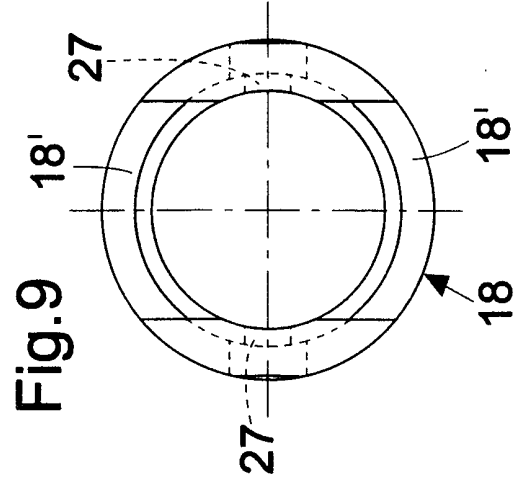
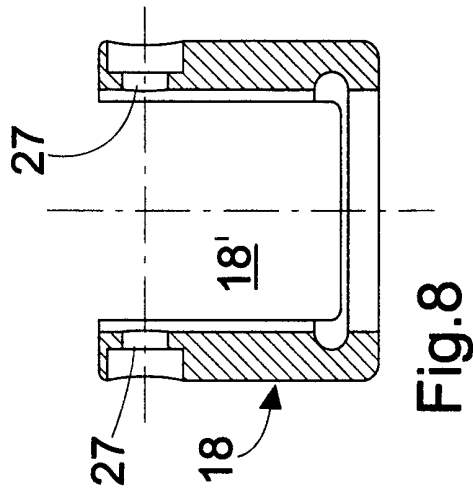


Fig.2





INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01358

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B23D 29/00

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)

IPC6: B23D, B26B

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)

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2930122 A (G.M. PFUNDT), 29 March 1960 (29.03.60), column 1, line 14 - column 2, line 62, figures 1,3	1
Y	--	2,3
Y	DE 2310098 A1 (DAKO WERKZEUGFABRIKEN DAVID KOTTHAUS KG), 19 Sept 1974 (19.09.74), figures 1,2	2,3
A	DE 3809640 A1 (SCHILLING, WALTER), 5 October 1989 (05.10.89), figure 3	1-3
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5272811 A (MICHEL ARMAND), 28 December 1993 (28.12.93), figures 3,4 -- -----	1-3

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Information on patent family members

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