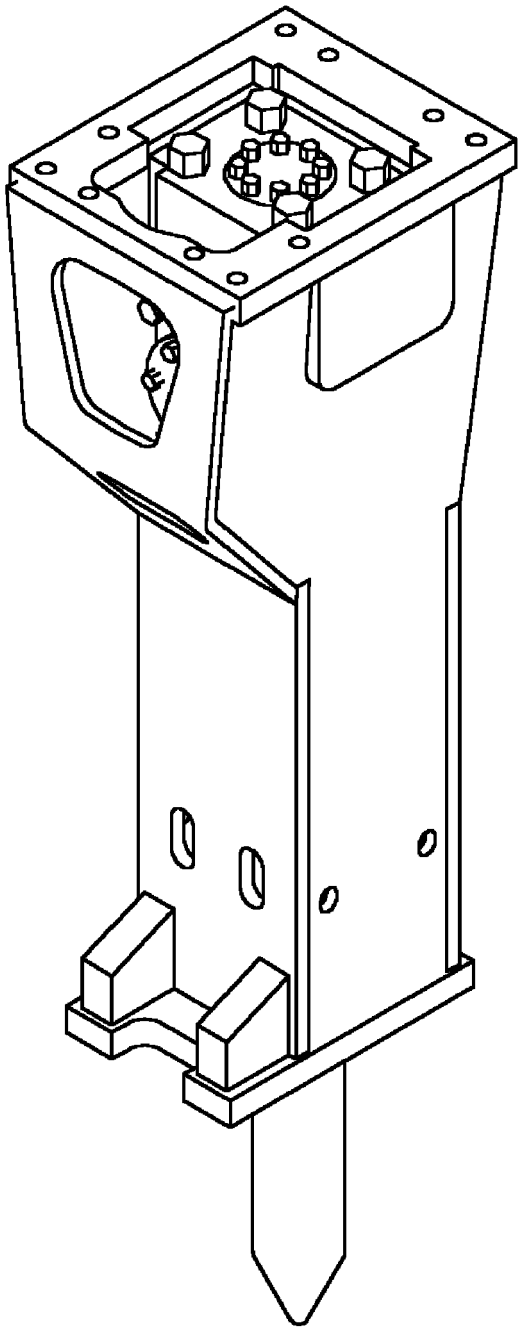
KRUPP BERCO BAUTECHNIK

Repair manual
Krupp hydraulic hammers
HM 1000 / 1000 Marathon®



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Contents

Contents

1. General

In order to maintain the operational safety of all versions of the HM 1000 hydraulic hammer, repair work should only be carried out by Krupp trained specialists using genuine Krupp spare parts. Krupp trained specialists know which parts need replacing and when.

Although this repair manual applies to all versions of the HM 1000 hydraulic hammer, the manual refers only to the HM 1000 by way of simplification. Specific differences between the versions are however highlighted.

1.1 Explanation of the symbols in the repair manual

To emphasise their importance, certain points in the repair manual are marked with symbols, which are described below.

Please note!

Theses passages contain information on the correct use of the hydraulic tool and are aimed at avoiding mistakes during operation.

Warning!

Passages marked in this way contain safety information and instructions aimed at **avoiding damage.**

Caution!

Passages marked in this way contain safety information and instructions aimed at **preventing accidents** and **avoiding injury.**

2. Operational safety

2.1 General

In order to maintain the operational safety of the hydraulic hammer, repair work should only be carried out by trained specialists using genuine Krupp spare parts. This work should therefore only be entrusted to Krupp trained specialists who know which spare parts need replacing and when.

2.2 Accident prevention regulations

Caution!

To avoid the possibility of injury, please observe the following instructions

Before starting work:
Please familiarise yourself with the repair manual and the appropriate regulations before starting work on the hydraulic hammer.
When using or working on hydraulic hammers in the countries of the European Union, the regulations of the EC machinery directive 98/37/EG must be observed and followed, as must national accident prevention regulations and regulations covering pressurised vessels.
In countries outside the European Union, the valid local statutes and regulations will apply.
The hydraulic hammer should only be repaired by specialists.
When lifting/transporting the hydraulic hammer, use only the lug provided and hoisting equipment with sufficient capacity.
Clear hand signals must be agreed on with the hoist operator beforehand.
Never stand beneath hoisted loads.
Stand the hydraulic hammer in a suitable device and secure it against falling over.
The repair area must be clear and easily accessible.
Always wear protective glasses when fitting or removing the working tool since metal splinters may fly off when hammering out the locking pins.
Working tools should only be fitted as described in the operating manual.

Caution!

The hammer's integrated piston accumulator is pressurised.
Before dismantling the hydraulic hammer and before removing the complete filling valve **"G"**, the piston accumulator must be fully depressurised.
Never use nails, screwdrivers or similar objects to bleed off the gas since this would damage the filling valve. Bleed off the gas using only the nozzle of the filling/test hose.
Never use your fingers to check the alignment of the working tool recesses to the oblong holes for the locking bars.
Never dismantle a hydraulic hammer which is still hot from running as there is a high risk of injury through burns. Always wait until the hammer has cooled down before dismantling it. Collect any oil which runs out and dispose of it correctly.

Caution
Risk of explosion!

The piston accumulator must only be filled with nitrogen from the green cylinder.
Make sure that no other gas (e.g. air or oxygen) is allowed into the piston accumulator.
When attaching the adapter use only Allen screws with a material quality of σ_s = 640 N/mm^2 (material quality 8.8)!

2.3 Tools, measuring and testing equipment

The tools required for dismantling and reassembling the HM 1000 are to be provided by the user (see Chapter 3.1).

The special accessories used in this section are listed in Chapter 3.3

2.4 Operating media / consumables

	Use	Comments
HP oil HLP 32	Running the HM 1000	In warmer climates, oils with a higher viscosity class should be used.
High-performance bearing grease with solids content	Working tool lubrication	**Krupp chisel paste** (see operating manual)
Nitrogen N_2	Filling the - high-pressure accumulator – piston accumulator	 **Caution!**
Abrasive polishing paper, grain 600	Removing scores	

3. Tools
3.1 General tools

The tools required for repair work are listed below:

Designation		Part ID no.	Qty.
Sledgehammer	2 kg	1031811	1
Sledgehammer	4 kg	1146433	1
Grease gun	cpl.	3034567	1
Slugging ring spanner	size 55	0439439	1
Heavy-duty box spanner	size 55	0478217	1
Jaw spanner	size 41/46	0430613	1
Socket spanner	size 24/27	0431002	1
Socket spanner	size 22	1031835	1
Socket spanner	size 14	3031396	1
Claw spanner	size 46/50	0478861	1
Allen key	size 22	0209445	1
Allen key	size 19	0209253	1
Allen key	size 17	0209252	1
Allen key	size 14	0204963	1
Allen key	size 12	0209251	1
Allen key	size 5	0209249	1
Power screwdriver insert	size 55 / 1 ½”		1
Adapter	1” J / 1 ½” A		1
Adapter	¾” J / 1” A		1
Screwdriver	8 mm	328143	1
Torque wrench	140-760 Nm / ¾”		1

3.2 Toolbox 3

The tools required for service work on the hammers are contained in Toolbox 3

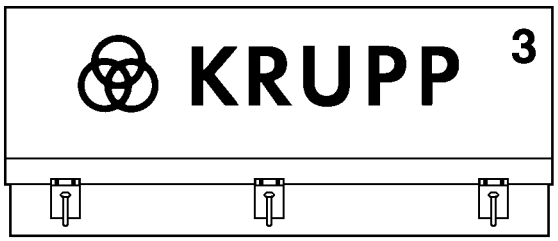

Fig. 1
Toolbox 3

Dimensions

Length 760 mm
Width 215 mm
Height 250 mm

Toolbox 3 and contents can be ordered under part ident. no. 3034016.

Item	Qty.	Designation	Pt. ID no.
-	1	Toolbox, empty	2267014
1	1	Chisel paste	3066065
2	1	Nitrogen cylinder 2l	3034504
3	1	Filler valve	1329516
4	1	Test pressure gauge	1329518
5	1	Hose	1329517
6	1	Test gauge HM 1000	3002794
7	1	Pin punch d=15.5 L=130	1848819
8	1	Claw spanner size 50 with tommy bar	0478861
9	1	Screwdriver size 5	3066376
10	1	Hexagonal head bolt M 12x150	0103866

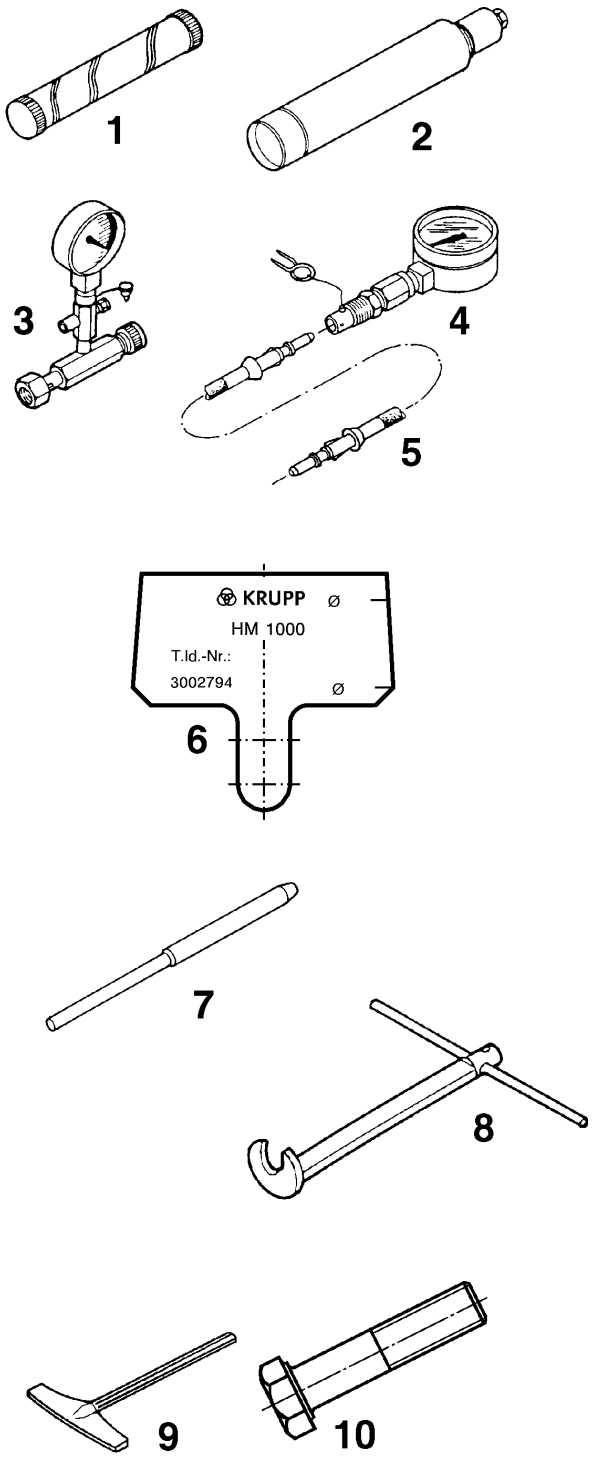

Fig. 2
Service tools

3.3 Special accessories

This chapter lists the special tools and apparatus which can be purchased from Krupp Berco Bautechnik to equip the workshop.

3.3.1 Accumulator filling device

The tools listed in the table below are used to fill the high-pressure accumulator. The filling process also requires the nitrogen cylinder (**2/2**) and the filler valve (**2/3**) from Toolbox 3.

Item	Designation	Pt. ID no.
	Filling device cpl. with pressure gauge, check valve, Phillips screwdriver and tommy screw, as well as items 1 to 3	0920415
1	Filling hose	1329805
2	Phillips screw insert	1329890
3	Mushroom head adapter	1329889

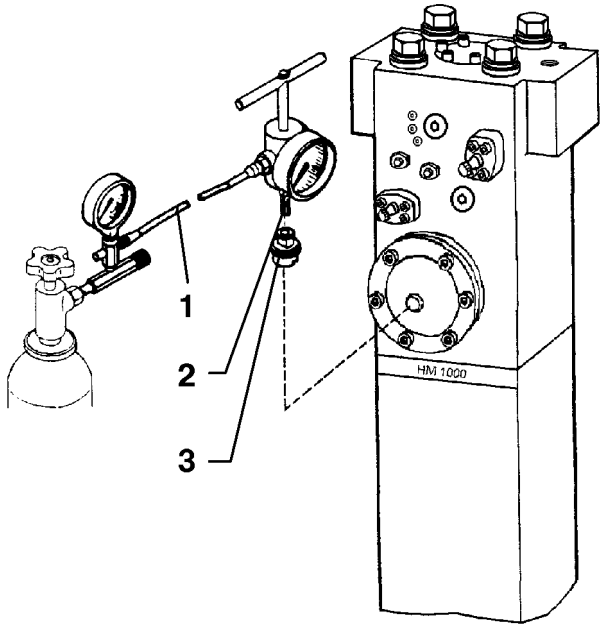

Fig. 3
Accumulator filling device

3.3.2 Power wrench

You can choose between an electronic or a hydraulic power wrench.

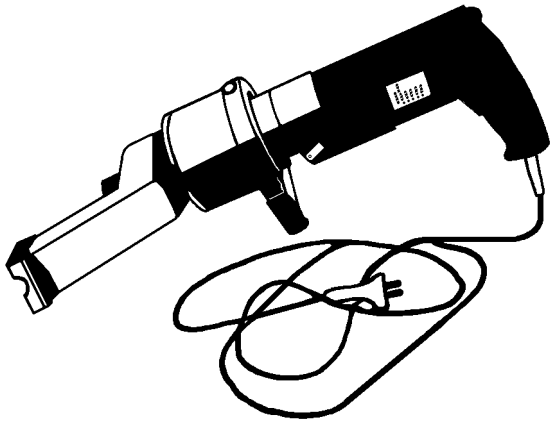

Fig. 4
Electronic power wrench

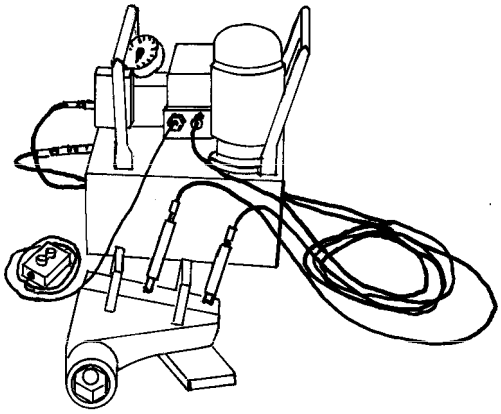

Fig. 5
Hydraulic power wrench

3.3.3 Heli-Coil tools

The tools listed in the table below are used to replace the Heli-Coil inserts.

Item.	Designation	Pt. ID no.	Use
1	Screw tap M 14	3066426	Cylinder-cover (P + T)
2	Threaded insert M 14	1031946	
3	Screw-in tool M 14	3066427	
4	Screw tap M 16	0920358	High-pressure accumulator
5	Threaded insert M 16	1031989	
6	Screw-in tool M 16	0920354	
7	Screw tap M 20	0920359	Cylinder cover (Control system)
8	Threaded insert M 20	1031529	
9	Screw-in tool M 20	0920355	
10	Screw tap M 30	0920360	Adapter
11	Threaded insert M 30	0478261	
12	Screw-in tool M 30	0920356	
13	Screw tap RD 36x5	-	Lower hammer part
14	Threaded insert RD 36x5	3031774	
15	Screw-in tool RD 36x5	3066418	

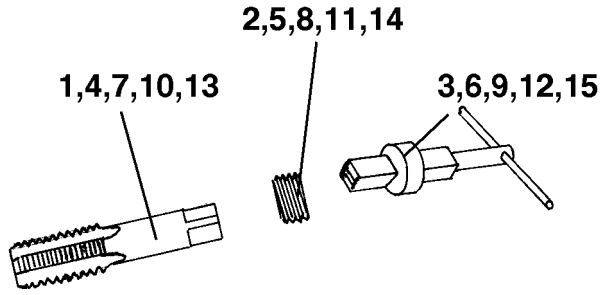

Fig. 6
Heli-Coil tools

3.3.4 Fitting aid for percussion piston

Designation	Pt. Id No.
Eye bolt	0206700

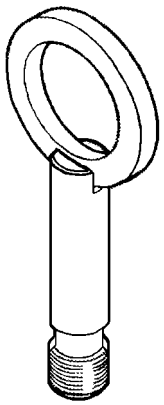

Fig. 7
Fitting aid

3.3.5 Press-out aid for wear bushes

Item	Designation	Pt. Id No.
-	Press-out tool, compl.	-
1	Grip	-
2	Screw	-
3	Press-out element	-

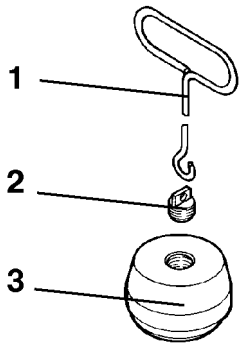

Fig. 8
Press-out aid

4. Dismantling the hydraulic hammer

4.1 Removing the working tool

- Lay the hydraulic hammer on a suitable base.
- Remove the plugs (**1/5**) and (**1/9**) from the hammer box.
- Using the pin punch from Toolbox 3 (**1/7**), and a hand-held hammer (**1/8**), knock the locking pins (**1/2**) for the retainer bars (**1/3**) out of the side of the lower hammer part (**1/1**).

Caution!

- Wear protective glasses!
  Risk of injury from flying metal splinters.

- Remove the two sealing plugs (**1/4**) from the oblong holes for the retainer bars.
- Remove the retainer bars (**1/3**).
  The retainer bars have an M12 thread on the front end.
  Take an M 12x150 hexagonal head screw from Toolbox 3, screw it into the threaded bore and use it to pull out the retainer bar.
- Remove the working tool (**1/6**) from the bore in the lower hammer part and deposit safely.

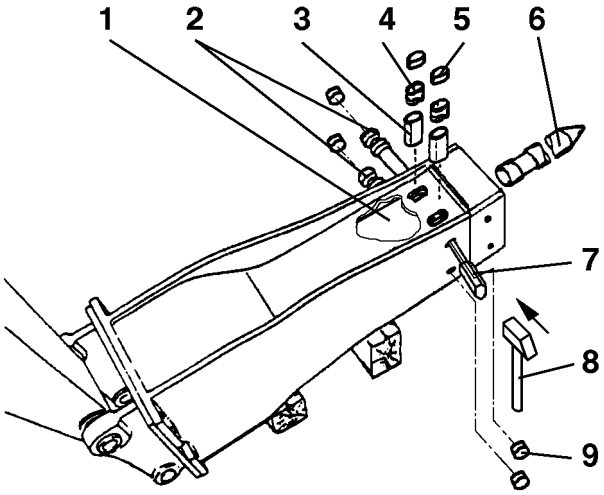

Fig. 1
Removing the working tool

4.2 Removing the percussion mechanism of the HM 1000 from the hammer box

Caution!

- Stand hammer box with hydraulic hammer vertically and secure against falling over.
- Remove Allen screws (**2/2**) using Allen key size 22 (**2/3**) and remove adapter from hammer box using a hoist/crane.
- Remove elastic pad (**Fig. 3**).

Warning!

- **Marathon® version:**
  Remove grease/oil line between ContiLube® II and hydraulic hammer.

- Screw two eye bolts M24 into the two threaded bores on the upper face of the cylinder cover as far as they will go.
- Using a hoist/crane, lift the percussion mechanism of the HM 1000 out of the hammer box (**Fig. 4**).

Caution!

- If the percussion mechanism has jammed in the hammer box, e.g. due to heavy contamination, the hoist must not be used as a pulling device with the hammer box held firmly.
- Secure hammer box against falling over.
- Stand percussion mechanism of HM 1000 vertically and secure against falling over (e.g. place on a stand similar to that in **Fig. 5**).

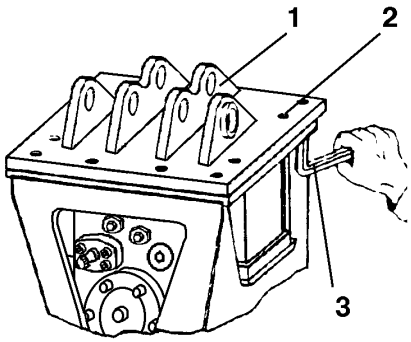

Fig. 2
Unscrewing the adapter from the hammer box

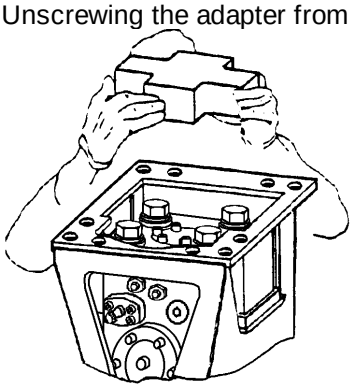

Fig. 3
Removing the elastic pad

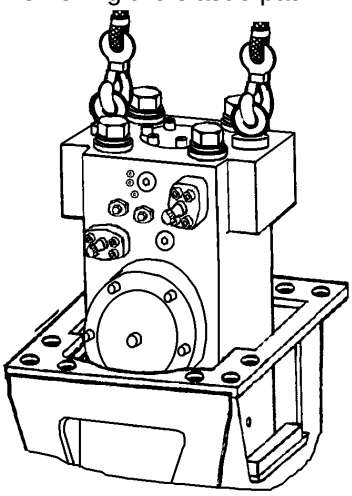

Fig. 4
Lifting the percussion mechanism out of the hammer box

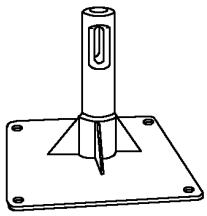

Fig. 5
Stand

4.3 Removing the high-pressure accumulator

- Stand hydraulic hammer vertically and secure against falling over (e.g. on a stand similar to **Fig. 5**), or lay flat.

Caution!

If the HM 1000 is still attached to the carrier, the hydraulic system must be depressurised prior to removing the high-pressure accumulator.

e.g.
- On hoses with screw couplings, relieve pressure on check valves and depressurise (open the hose ports on the hammer).
- Release Allen screws (**6/1**) on accumulator using a size 14 Allen key (**6/2**) and screw them out (**Fig. 6**), removing the locking washers at the same time.

Collect any oil which runs out and dispose of it correctly.

- Remove high-pressure accumulator (**Fig. 7**).
- Check threaded insert (part no. 54), replace if necessary.

Warning!

The high-pressure accumulator on the HM 1000 has a capacity of 0.9 l and a max. permissible operating pressure of 200 bar (2900psi).

If repairs are necessary, the statutory regulations of the country in question must be observed and followed (see repair manual for high-pressure accumulator, part ident. no. 1855714).

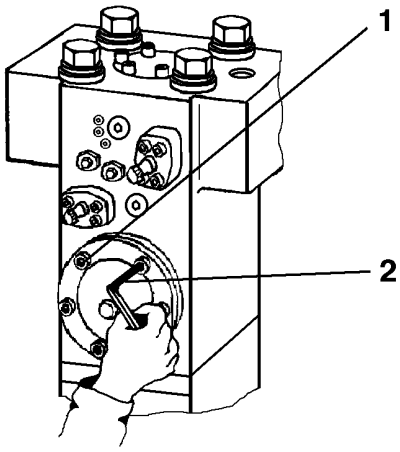

Fig. 6
Releasing and unscrewing the Allen screws

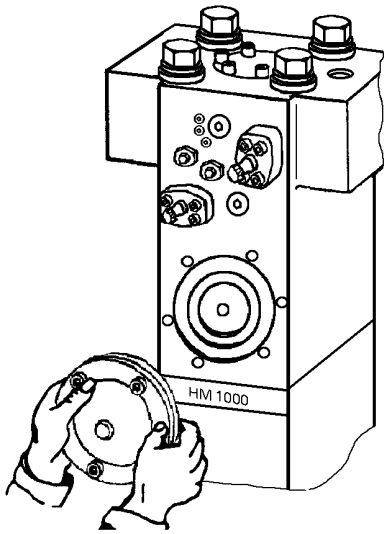

Fig. 7
Removing the high-pressure accumulator

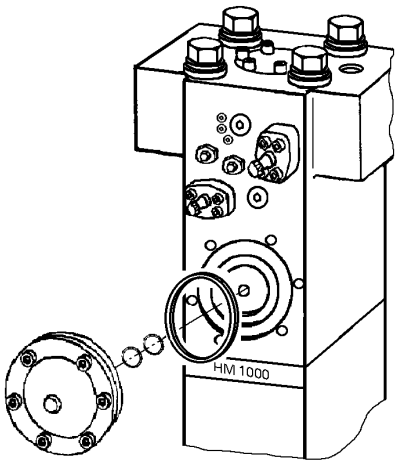

Fig. 8
Removing the O-ring and back-up ring