

232.2 87IN

MANUAL PUMP

TROPIC III & VII

ENVIRONMENTAL PERFORMANCE CENTRE
ROYAL CANADIAN MOUNTED POLICE

232 2-87IN-13551



WARNING

If the following instructions and informations are strictly adhered to, the installation of your TROPIC III or VII pump will be easy and correct, even if the job is done by non-qualified personnel.

The designation of items and their numbering can be found on the drawings EA0831 and FA1428.

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- I. Foundation
- II. Assembly of the rising main pipe
- III. Assembly of the piston unit (wooden connecting rod)
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- VII. Drawings EA0831 and FA1428

I. FOUNDATION (fig.1)

1. Make a concrete foundation around the casing pipe of the bore hole, dimensions are given in figure 1. Thickness 25 cm at least, eventually more, according to the quality of the surrounding soil.
Caution : This horizontal foundation should be at right angle to the casing of the bore hole.
2. 4 Holes must be left open in this foundation as indicated on drawing fig.1, in order to receive the foundation bolts. The holes will be square or round and - 10 cm diameter.
3. Let foundation dry.

II. ASSEMBLY OF THE RISING MAIN PIPE

4. Check if the suction (foot) valve is in place in the pumping cylinder and take the piston (plunger) out of the cylinder. Take one element of the rising main pipe. Assemble the cylinder on the element of the rising pipe equipped with a sleeve on the other side.

Warning:

Never place a spanner or a clamp on the cylinder n°59 but only on the coupling sleeve of the rising pipe n°58 and/or the housing of the suction valve n°66.

Caution :

It is not absolutely necessary to use a sealing product on the screwthreads. Although we strongly advice to use a coating with an antirust paint; this will help a lot, in future disassembling and will protect the screw threads against oxydation.



NOTE : By adding a suction pipe of maximum 8 meters underneath the pumping cylinder, water can be pumped from this lower level. Therefore the housing of the suction valve n°66 has a female thread according to the cylinder diameter given in following table.

<u>Ø Cylinder</u>	<u>Ø Suction pipe</u>
50 mm	1" G
60 mm	1 1/2" G
70-75 mm	2" G
90-100 mm	2 1/2" G

5. The cylinder, with or without suction pipe, assembled with the first element of the rising pipe should be brought in the well (fig.2). A lifting device (e.g. tripod) with cable or chain centered on the well can be used. Also at least two clamps (fig.3) adapted to the diameter of the pipes are needed.
- Depending on the possible maximum height of the lifting device, the first clamp is attached to the pipe and the whole cylinder-pipe is dropped in the well up to the point where this first clamp settles down on the foundation.
 - Fix a second clamp to the pipe at a convenient height. Attach the cable of the tripod to the second clamp and secure it.

Caution : Only after this is done the first clamp shall be removed.

- Continue to bring in this way the pipe into the well, up to the point where the clamp is just underneath the sleeve of the pipe, while resting on the foundation.
6. Fix a sleeve on the next pipe. Put the pipe vertically with the threaded end on the sleeve of the first pipe and screw the pipes together. Use two spanners to do this job. Again we advice to use an antirust paint in the screwthreads. Drop all pipes in the same way as the first until the correct depth is obtained and the cylinder is at the wanted level.

7. Instead of a sleeve the last pipe receives the flange for rising pipe n°15 delivered with the pump.

Caution : While descending the pipes pay attention that the holes of the flange are lined-up with the holes of the foundation.

Put the foundation bolts in the 4 holes and fill them with a fluid cement.

III. ASSEMBLY OF THE PISTON UNIT

8. See fig.4. Assemble the whole piston (this means: the valve housing with valve n°60 and leather cups) together with the coupling rod n°57, the fork n°55, the guide n°53 and the first wooden rod.

Warning : All connections shall be tightened very well especially the counter lock nuts.



9. Bring the first wooden rod with the piston into the rising pipe.
10. See fig.5. Finally the rod is resting on the flange retained by an iron pin put in the first hole of the rod.
11. See fig.6. Fasten two metal extension pieces to the next rod at the edges with two holes.
Caution : Only one end of the wooden rods has three holes (two for the bolts, one for the iron pin).
12. Put this rod vertical and assemble to the rod resting on the frame.
13. Take away the iron pin and lower the rods up to the position as in fig.5.
14. Prepare the third rod. (fig.7) Two metal extension pieces at the side with the 2 holes, two metal extension pieces and two half guides at the side with the three holes.
15. Assemble with the rod resting on the frame, guides upside. Lower again in the rising pipe.
16. The next rod will be assembled as indicated in fig.8.
17. Continue the same way. A guide has to be installed every three rods (- every 15 metres).
18. The moment that the piston is lowered up to the entrance of the pumping cylinder, a first resistance will be felt. Overcome this and push the rods so that the piston enters the cylinder. Continue up to the point that the piston touches the footvalve.
Warning : Do not turn the rods clockwise. Otherwise the piston would be screwed on the footvalve.
19. At this moment put a marking on the rod, just level with the flange n°15 (fig.9)
 - Draw the rods out of the rising pipe for $\frac{1}{2}$ 1 metre.
Drill a hole diameter 10 mm in the rod at that point.
Put in the iron pin and let the rod rest on the flange.
 - Cut the rod at exactly 22 cm below the marking (fig.10) and put a fork on top of it (fig.11).
Drill two holes \emptyset 10 mm in the rod and take away the fork.
20. At this stage the rods are at the correct length. Follow now the instructions of the section IV : "Assembly of the pump mechanism".



IV. ASSEMBLY OF THE PUMP MECHANISM

21. Attach the mechanism to the lifting device (fig.13) with its connecting rod downward. The connecting rod should be cut off the mechanism.
22. Screw the fork to the threaded end of the connecting rod coming out of the pump (fig.12). (Do not forget the counter nut).
23. Check if the gasket n°44 is well in place.
24. Lower the mechanism gently. Connect the wooden rod with the fork and two half guides as indicated in fig.14.
25. Take away the pin or clamp that holds the connecting rods and lower the entire unit on the center of the base n°15. Do this gently so that the gasket n°44 is not damaged.
26. Fix the mechanism to its base with the 4 bolts M20 and your pump is ready for operation.

V. MAINTENANCE OF THE PUMP MECHANISM

27. Replacement of the leather cups

After a certain extended working period, or if the unit is pumping water contaminated with sand, there could be a decrease of the capacity of the pump. This will indicate the wearing of the leather cups of the piston.

Proceed with the following steps:

- Unscrew the 4 bolts joining the mechanism on the base and move the mechanism - 30 cm upwards.
- Unscrew the 2 bolts fixing the fork 55.
- Bring the mechanism backwards.
- Bring up all rods up to the piston.
- Unscrew the piston and replace the leather cups (n°69: seal cups) check the valves and only if necessary change the rubber of the valve n°63 and/or the valve spring n°62.
- Assemble the rods back in the opposite way.
- Bring the mechanism back.

28. Repair of the suction valve (footvalve)

- Fix a tube of ca. 1m to the upper part of the connecting rods (to the fork)
- Let down the rods completely. The piston is resting on the suction valve.
- Turn the rods clockwise (5 to 6 rounds) to allow the piston to be screwed on the suction valve.
- Knock one blow upwards. This will allow the suction valve to come loose from its seat.
- Bring up the rods with piston and suction valve.
- Clean and if necessary replace the rubber and or the spring of the suction valve etc.. Assemble in the opposite way.
- The suction valve is put back in place with one blow downwards.

29. Lubrication of the bearings N°3

The life time of the bearings will be increased by a yearly lubrication.



Warning : Don't forget to separate the piston from the suction valve by turning the rods anti-clockwise, otherwise the pump can not operate.

29. Changing the cylinder

It is possible that after a long period of working the pump-cylinder is worn.

If the cylinder itself is out of working order (hole or crack due to extreme wear) it has to be changed. In this case the connecting rods have to be taken out and also the rising main pipe by unscrewing the tubes one after another (see par. II).

Once the cylinder is out of the well, unscrew the suction valve housing n°66 and the worn out cylinder n°59. Adapt the new cylinder n°59 and screw the suction valve and the housing to it, after having checked the valve itself. Start lowering the rising main pipe as described in par II and the piston with connecting rods as described in par. III.

VI. WHAT COULD GO WRONG ? WHY ? HOW TO FIX IT.

30. The capacity of the pump is much lower than initially

Possible causes in order of priority.

1) Impurities in the valves.

Action : - Try to dislock the valves by turning the flywheels as fast as possible.
- If this is unsuccessfull, the suction valve should be brought up with the piston and thoroughly cleaned, how to do see par. V. 27 & 28.

2) The leather cups of the piston are worned out.

Action : Change the leather cups (apr. V. 27)

3) Valves or valve springs are broken.

Action : Bring up suction valve with piston and repair if necessary (par 27 & 28)

31. The pump delivers no water at all

Possible causes :

1) The connecting rods are broken.

Action : Disassemble the connecting rods and the rising pipe up to the point of trouble. During reassembling check especially the locking nuts.

2) After first installment or repair

The footvalve (suction valve) is not in his seat and/or still attached to the piston.

Action : Put suction valve in place (see par.28)

3) The valves are completely blocked or obstructed by mud or cloth.

Action : Disassemble and repair (see par. 27 & 28)

4) Leather piston cups completely worn out

Action : Replace leathercups (see par. 27)

5) Pumping cylinder or rising pipe perforated.

Action : Replace broken element.



32. The flywheels cannot be moved

Possible causes:

- 1) The rods get stuck in the rising pipe due to sand etc...
Action : Disassemble rods and rising pipe. Clean the well.
Check carefully all items before reinstallation.
- 2) The mechanism is jammed. This is an extremely rare case.
Action : Verify grease. Try to put in working order if
without success contact the dealer.

33. Water leaks at the stuffingbox (only by TROPIC III)

The stuffingbox should be tightened or the stuffing should be replaced.

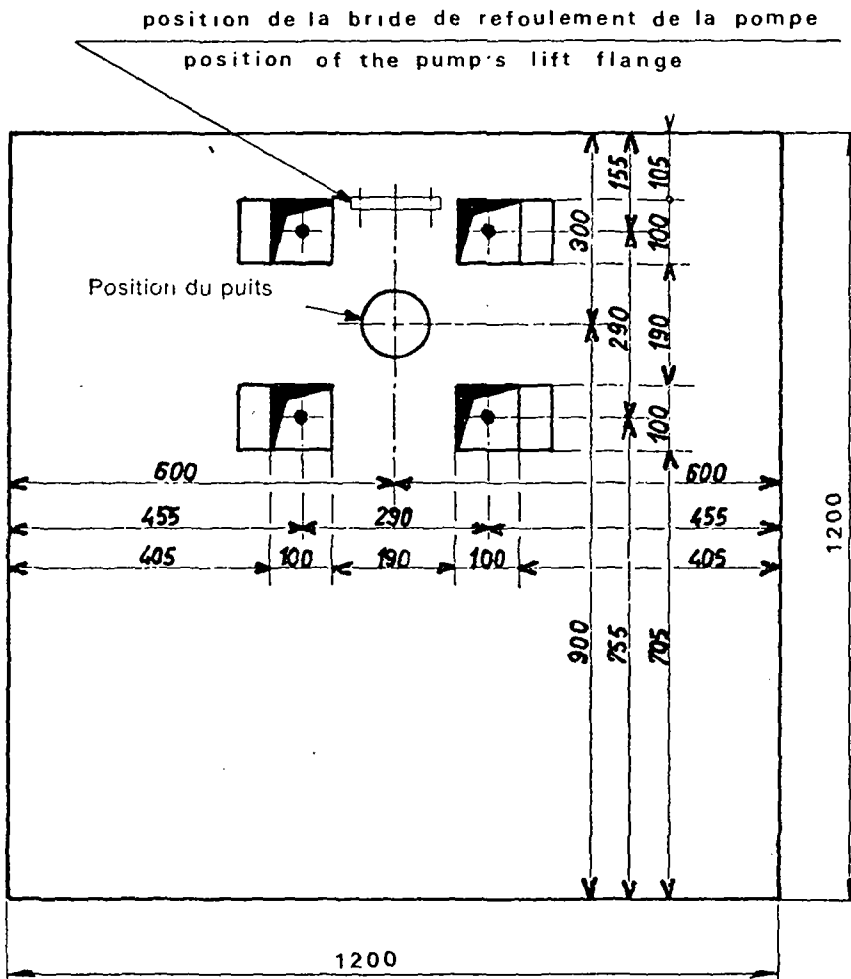
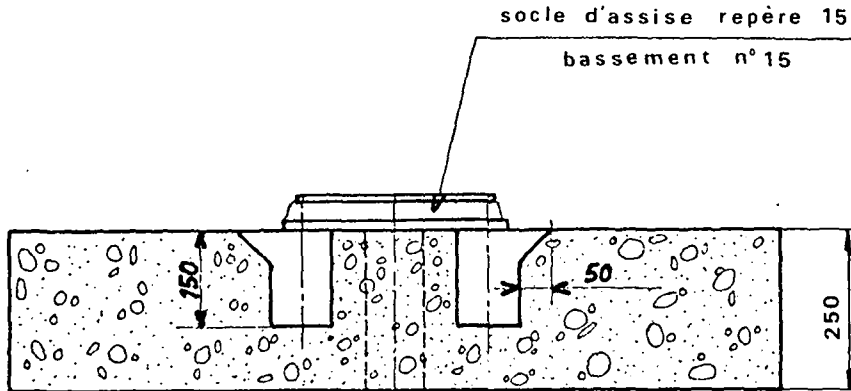
NOTE: Some leakage of water is needed to protect the stuffing.



FONDATION TROPIC III

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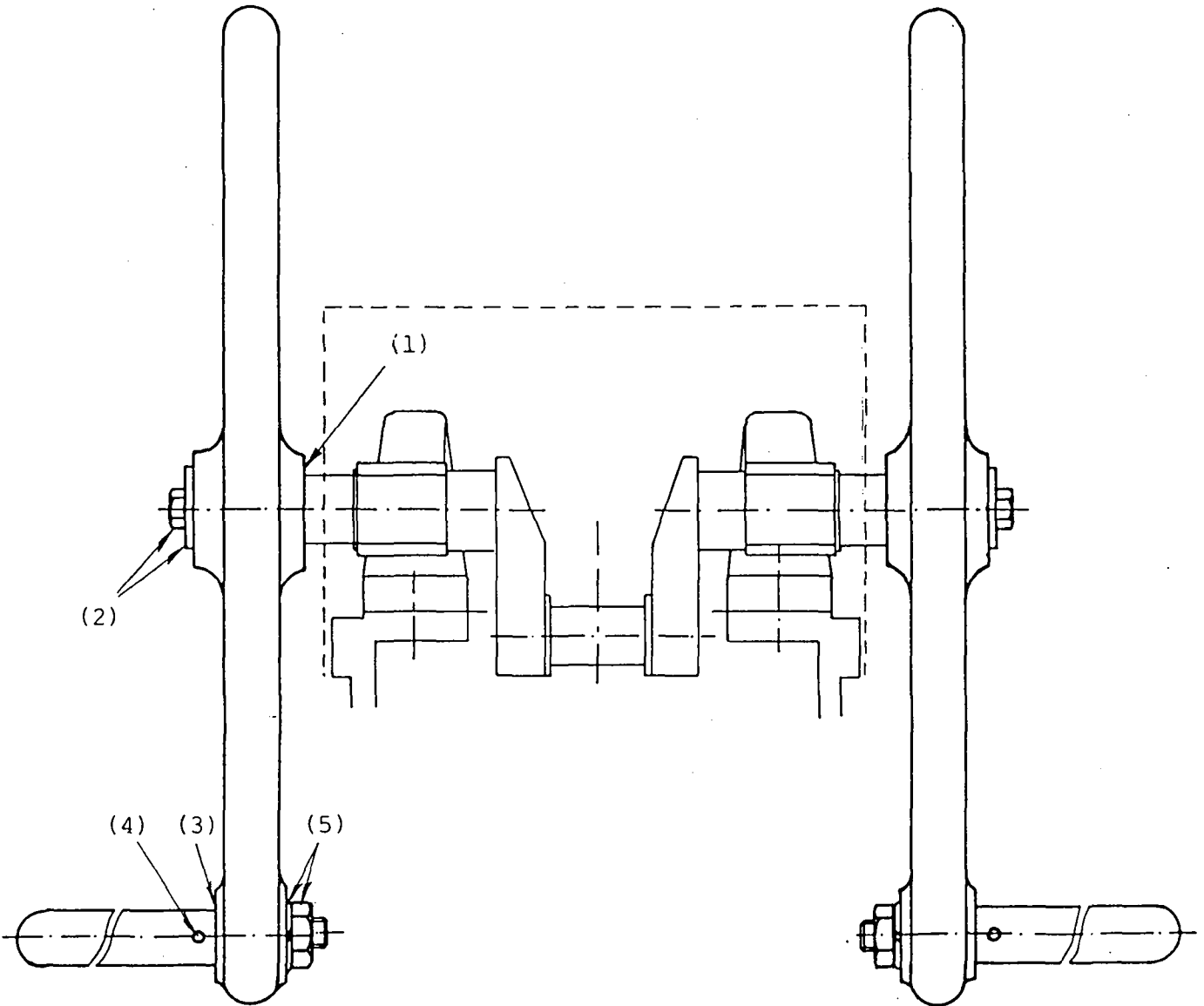
FIG 1





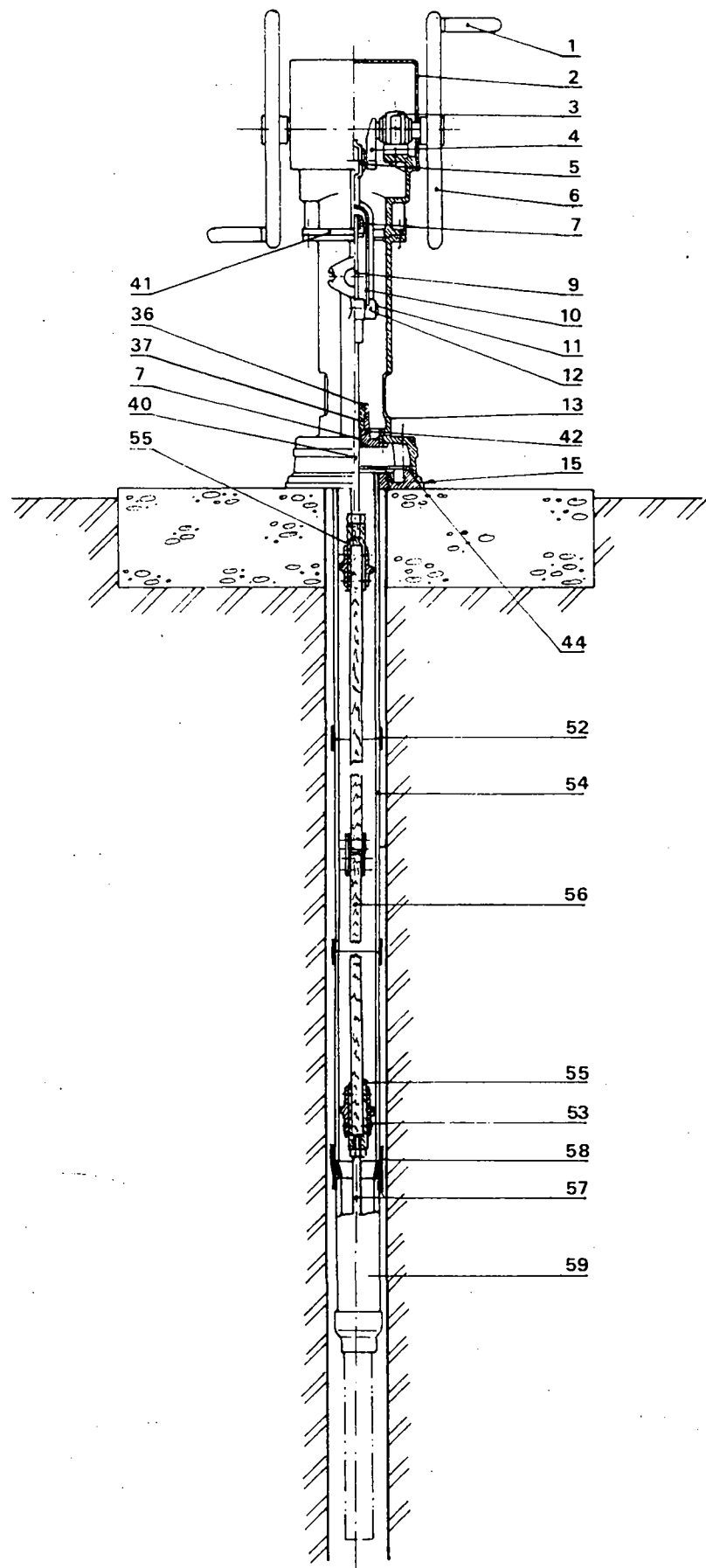
POMPES TROPIC III & VII PUMPS
MONTAGE DES VOLANTS ET DES POIGNEES
FIXING THE FLY WHEELS AND HANDLES

IMO - E/F
TRO III
TRO VII
Ann. 1



1. Put both fly wheels on the axis ; the machined side of the central hub (1) facing the bearings
 2. Secure the fly wheels to the axis by means of a washer and a screw (2)
 3. Screw the handles into the fly wheels ; the machined side of the hub (3) facing the handle
 4. Introduce a rod in hole (4) and tighten the handle firmly
 5. Secure the handle with a counter-nut and "grower" washer (5)
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1. Placer les deux volants sur l'arbre, côté usiné du moyeu central (1) vers les paliers
 2. Fixer les volants par serrage des vis et rondelles (2)
 3. Visser les poignées dans les volants, côté usiné de la douille vers les poignées (3)
 4. Fixer les poignées à l'aide d'une tige dans le trou (4)
 5. Bloquer les poignées par rondelle "grower" et écrou (5)

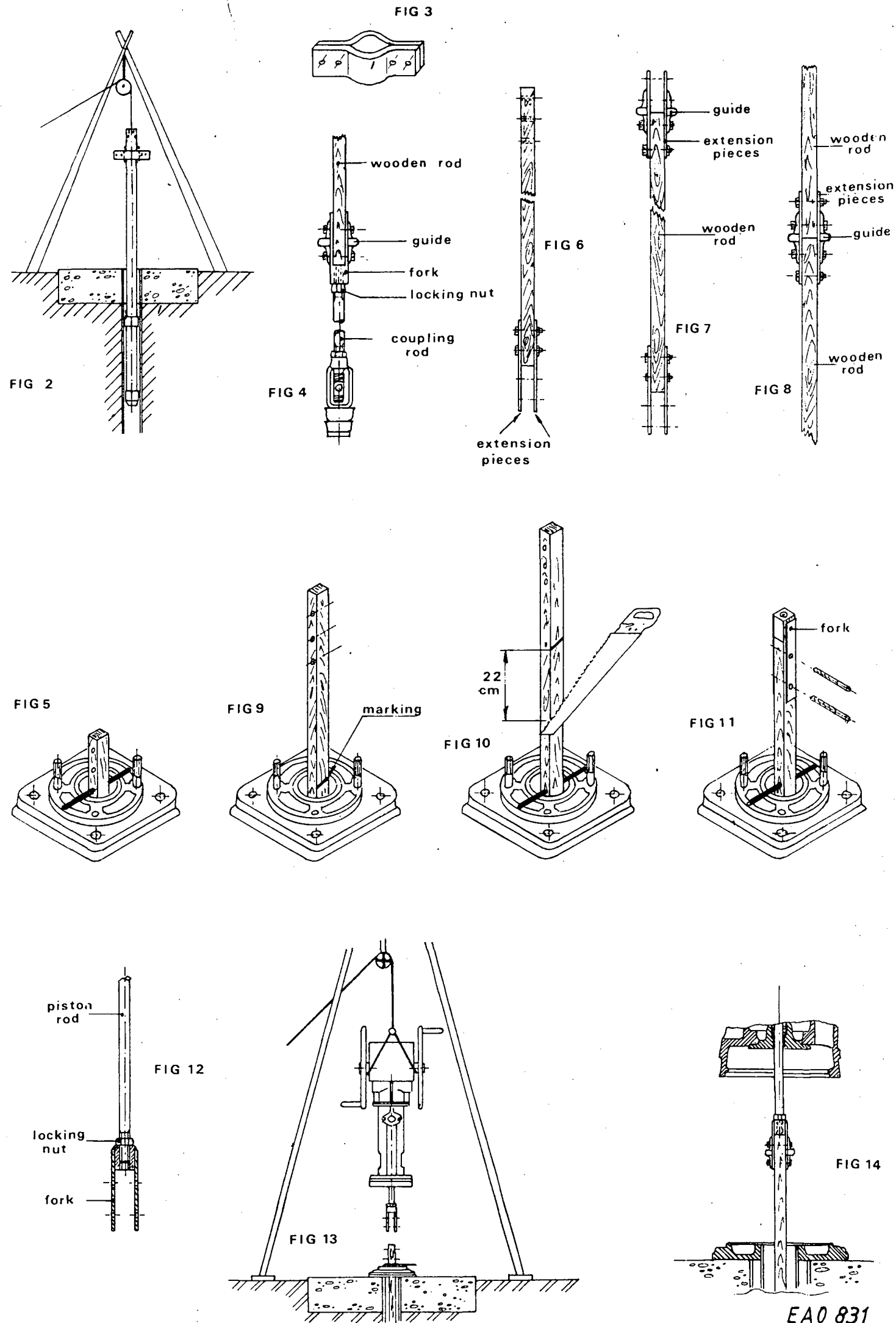
MANUAL PUMP TROPIC III

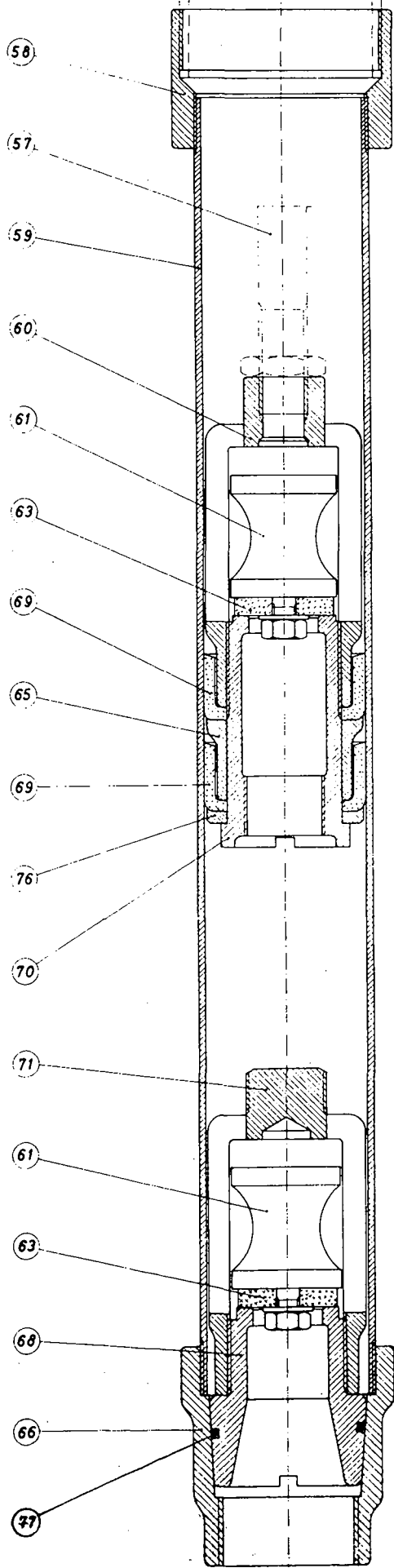


- 1 HANDLE AXLE
- 2 PROTECTION HOUSING
- 3 BALL BAERING
- 4 CRANK SHAFT
- 5 CONNECTING ROD HEAD BEARING
- 6 FLY WHEELS
- 7 RING
- 9 COUPLING NEEDLE
- 10 CONNECTING ROD
- 11 CON.ROD END AXLE + PIN
- 12 CON.ROD BEARING SMALL END
- 13 LOWER MAIN FRAME
- 15 BASEMENT
- 36 STUFFING BOX
- 37 CORD PACKING
- 40 INTERMEDIATE PISTON ROD
- 41 UPPER MAIN FRAME
- 42 PACKING BOX
- 44 GASKET O RING
- 52 SLEEVE
- 53 GUIDE
- 54 RISING PIPE
- 55 FURK
- 56 CONNECTING ROD
- 57 COUPLING ROD
- 58 COUPLING SLEEVE
- 59 CYLINDER
(see detail FA 1428)



WETTEREN
BELGIEUE





- 57. Tige d'accouplement
- 58. Manchon d'accouplement
- 59. Cylindre
- 60. Corps de soupape refoulement
- 61. Clapet aspiration/refoulement
- 63. Soupape
- 65. Intercalaire supérieur
- 66. Emboîtement siège de soupape aspiration
- 68. Siège de soupape aspiration
- 69. Godets d'étanchéité
- 70. Siège de soupape refoulement
- 71. Corps de soupape aspiration
- 76. Intercalaire inférieur
- 77. O ring

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- 57. Coupling rod
 - 58. Coupling sleeve rising pipe
 - 59. Pump barrel
 - 60. Pump shell
 - 61. Delivery suction valve
 - 63. Rubber valve
 - 65. Upper inset
 - 66. Housing seat of suction valve
 - 68. Seat of suction valve
 - 69. Seal cup
 - 70. Seat of delivery valve
 - 71. Shell of suction valve
 - 76. Lower inset
 - 77. O ring

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- 57. Kupplungsstange
 - 58. Kupplungsmuffe
 - 59. Zylinder
 - 60. Gehäuse des Druckventils
 - 61. Druck- / Ansaugventil
 - 63. Ventil
 - 65. Oberes Zwischenstück
 - 66. Saugventilhalterung
 - 68. Sitz des Saugventils
 - 69. Kolbenringe
 - 70. Sitz des Druckventils
 - 71. Gehäuse des Saugventils
 - 76. Unteres Zwischenstück
 - 77. O ring