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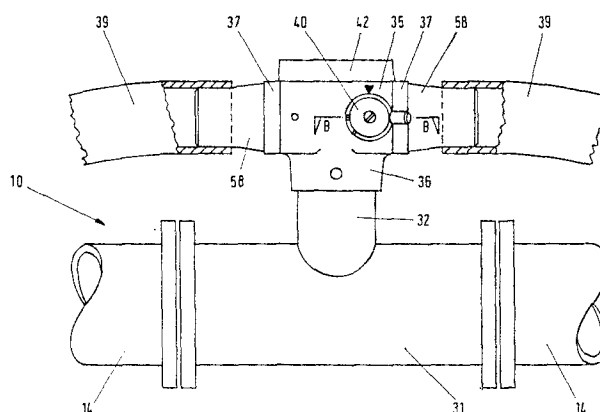
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EUROPEAN PATENT APPLICATION(21) Application number: **83301972.2**(51) Int. Cl.³: **E 02 D 19/10**(22) Date of filing: **07.04.83**(30) Priority: **08.04.82 GB 8210407**(71) Applicant: **SLD PUMPS LIMITED, Portobello Trading Estate, Chester-Le-Street County Durham DH3 2RY (GB)**(43) Date of publication of application: **26.10.83**
Bulletin 83/43(72) Inventor: **Benjamin, Trevor James Francis, 24 High View, Ponteland (GB)**(84) Designated Contracting States: **AT BE CH DE FR GB IT LI LU NL SE**(74) Representative: **Bedggood, Guy Stuart et al, Haseltine Lake & Co. Hazlitt House 28 Southampton Buildings Chancery Lane, London WC2A 1AT (GB)**(54) **Wellpoint system.**

(57) A plurality of wellpoints inserted into the ground are connected to a header pipe (10) from which water is pumped to remove excess ground water. The header pipe lengths (14) are coupled together by coupling connectors (31, 35) which are provided with two or more branch pipe connections (37) to which the individual wellpoint hoses (39) are connected. The coupling connectors (32, 35), which may be integral or in two parts, avoid the need to provide individual tapping points along the lengths of header pipe. The coupling connectors (32, 35) may include integral valves (40) for adjusting the flow from each wellpoint, and a sight glass (42) for viewing the flow.

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WELLPOINT SYSTEM

This invention relates to a wellpoint system for de-watering ground.

A wellpoint system is installed at a site,
5 usually a construction site, for pumping water from the ground to ensure that the site is free of excess water. Such a system generally comprises a plurality of individual wellpoints driven into the ground at appropriate intervals around or alongside the site, each
10 wellpoint being connected by a hose or other pipe at its top end, which usually projects above ground level, to a common header pipe of larger diameter leading to a pump.

All the wellpoints are connected into the common header pipe conventionally at respective individual tapping
15 or take-off points provided in the wall of the header pipe, which tapping points are usually spaced uniformly along the header pipe. Lengths of suitably tapped header pipe are joined end-to-end, for example by flanged or ball couplings, to provide the complete pipework to the pump.
20 The tapping points in the wall of the header pipe are usually at the same spacings as are the intervals between the wellpoints to which they are connected.

Such header pipe sections are purpose built with drillings at the correct spacings and are therefore
25 expensive. Naturally they can be used repeatedly at different sites but transportation of long lengths of header pipe provides its own difficulties and increases installation costs.

According to one aspect of the present invention,
30 there is provided a wellpoint system comprising lengths of header pipe which are joined in end-to-end alignment by respective relatively short coupling connectors each of which is provided with one or more take-off branch pipes of less than half the diameter of the header pipe, the take-
35 off branch pipes being connected to individual wellpoints.

By wellpoint is meant any de-watering element which is located in the ground and which acts as a filter and riser so that suction applied at its top end pumps the water (or other liquid) which enters the element from the surrounding ground, out from the inside of the element.

The advantage of the present invention is that a wellpoint pipe system can be made up from relatively compact and easily handled coupling connector pieces together with standard or plain pipe lengths obtainable from non-specialised sources.

Setting up and laying out of a wellpoint ring, i.e. a wellpoint system extending around a site, is greatly facilitated by being able to choose from the variety of pipes available which can be used with the coupling-connectors of the present invention; pipes of different materials for example that can be bent or shaped to the site ground conditions or supplied in such lengths as may be desirable; or pipes of different lengths from each other, or pipes with standard bends.

The coupling-connectors may have any convenient number of take-off branch pipes but two on each coupling will usually be adequate. The branch pipes of each coupling may each branch directly from the body of the coupling at discrete take-off points, or there may be a single tapping or branch connecting to the coupling body to which the individual wellpoint branch pipes are connected.

Thus, in the former case, the two take-off branch pipes may be provided at appropriate positions offset from each other in the circumferential and/or axial directions (relative to the axial, i.e. longitudinal, direction of the header pipe at the coupling), and at appropriate angles of projection from the connector, to suit individual requirements, but generally they will be arranged, in the installed system, on the top or side of the header pipe system.

Alternatively, in the latter case, the coupling body may have a single spigot branch to which is connected a two (or more) branch pipe connector piece, for example in the form of a T-piece connector with the stem of the
5 T connecting with the branch spigot on the coupling and the two ends of the arms of the T being adapted to be connected to two wellpoints.

The connectors and/or the take-off branch pipes may be fitted with individual valves to control the flow
10 rate of water and air into the header pipe from the wellpoint.

The couplings and/or connector pieces and/or the branch pipes may be provided with sight glasses so that the flow of water or liquid can be seen.

15 According to another aspect of the present invention there is provided a method of installing a wellpoint system comprising assembling a header pipe at a site from straight, angled or curved pipe lengths by inter-connecting the pipe lengths in end-to-end alignment by
20 means of respective coupling connectors joining adjacent pipe ends, each coupling connector having one or more take-off branch pipes of diameter less than half that of the header pipe, and connecting the take-off branch pipes to individual wellpoints in the ground.

25 The invention may be put into practice in a number of ways but certain specific embodiments will now be described by way of example with reference to the accompanying drawings, in which:-

Figure 1 shows a length of conventional header
30 pipe for a wellpoint system;

Figure 2 shows a coupling connector for use in a wellpoint system in accordance with the invention;

Figure 3 shows, in section, an alternative coupling connector of a wellpoint system of the invention;

35 Figure 4 shows diagrammatically a plan view of a

section of a wellpoint system of the invention as installed at a site;

Figure 5 is an elevation of a further embodiment of a coupling connector in accordance with the invention, in position between two header pipe sections;

Figure 6 is a plan view of the coupling connector shown in Figure 5;

Figure 7 is an axial section taken on the line A-A in Figure 6;

Figure 8 is a section of one of the valve members of the coupling, as taken on the line B-B of Figure 5;

Figures 9A and 9B are respectively an end and a side view of the valve member of Figure 8; and

Figure 10 is a side view of an alternative valve member.

The known header pipe 10 shown in Figure 1 as presently used in wellpoint systems is typically of about 150 mm diameter and, for wellpoints spaced at $3/4$ metre intervals, the individual tapings 12 or take-off points for each wellpoint will also be at $3/4$ metre spacings; the pipe shown is therefore about 6 metres long. The ends are provided with flanges or other configurations 13 to enable adjacent similar pipe lengths to be connected directly to each other end to end. For the tapings 12 or take-off branches, holes have to be individually drilled along the pipe, and tapped, or the take-off pipes are welded into the holes in the header pipe.

By contrast, a wellpoint system of the invention uses coupling connectors such as are shown at 15 in Figure 2 which can be used to interconnect or couple two adjacent, aligned ends of plain, i.e. untapped, standard 150 mm diameter header pipe 14, and serve as connector pieces for the wellpoint hoses. The coupling connector 15 of Figure 2 has simple flanges 16 which connect with similar flanges 17 on the pipe ends but naturally any suitable type

of coupling arrangement may be provided such as a ball coupling as shown in the embodiment of Figure 3 or quick release or J bolt couplings. The coupling 15 comprises a coupling body formed of a short section of 150 mm diameter pipe provided with two short take-off branch pipes 18 welded or tapped into holes in the wall of the coupling 15 and projecting on the same side generally perpendicular to the axis, i.e. longitudinal direction, of the header pipe at that point.

10 In use, the take-off branch pipes 18 are connected by flexible hose 20, as shown in Figure 4, to respective individual wellpoints 21 which are located in the ground alongside the header pipes 14 at the appropriate spacings required. The header pipe 14 may simply be laid
15 on the ground or it may be raised above ground level on suitable supports, or it may be placed below ground level in a suitable trench. The header pipe 14 will often extend in a 'ring' around the site and is connected at one end to a suction pump (not shown) for pumping the water from the
20 wellpoints via the header pipe 14 to a drain region.

It will be appreciated that for wellpoint spacings of 1 metre, pipework comprising 2 metre lengths of standard pipe 14 as shown in Figure 4 may be used with coupling connectors having two take-offs 17 between each
25 pipe length.

The invention is not, however, limited to the use of only two take-off branch pipes 18 on each coupling 15; more than two take-off branch pipes can be provided and in which case longer plain pipe lengths could be used.
30 However, the individual hoses 20 connecting the wellpoints to the take-off branch pipes would then have to be longer for a given wellpoint spacing and since friction losses are proportionately greater the smaller the diameter of the pipe, there will be a limit to the lengths of hose 20 which can
35 be used in practice. The take-off branch pipes 18 and the

hoses 20 will normally be of diameter less than half that of the header pipes 14, typically about 40 mm diameter.

For wellpoint spacing intervals greater than 1 metre, for example 1.50 m centres, the advantage of the invention is greater because longer lengths of standard pipe, which are relatively less expensive, may be used.

In Figure 2 the take-off branch pipe spigots 18 are shown projecting parallel to each other and perpendicular to the pipe axis at different axial positions. They may however also or alternatively be positioned at different circumferential points and/or be angled more or less towards the pipe axis; for example in Figure 4 each take-off spigot 18 could be angled towards the wellpoint 21 to which it is connected. A wellpoint system according to the invention may utilise different types of connectors e.g. ones with different numbers or positions of take-offs at different locations depending upon particular requirements.

Figure 3 shows the alternative coupling arrangement comprising a ball joint 25 at one end and a corresponding socket 26 with a sealing ring at the other end. This may be used as an alternative to the standard coupling arrangements such as the conventional flange, screw or compression rubber couplings, but the flexible ball type couplings, in particular, are favoured for the quickness of setting up and the reliability of sealing under dirty conditions.

Figure 3 also shows a coupling body with a take-off 28 which has a valve 29 operable by an external lever 30 (or by any other suitable means) for controlling the flow of water from the particular wellpoint to which it is connected. The valve 29 is integrally formed in the take-off 28. A separate valve could be connected to a take-off which does not have an integral valve.

Normally the couplings 15 will have at least two take-off branch pipes though there may be situations in which a contractor would want to use single take-off connections.

In addition, coupling connectors of the same or of different types may be paired up or tripled up or any other number connected in series in order to provide a plurality of take-
5 off branch pipes for a closely condensed concentration of wellpoints for ground/site areas requiring special de-watering treatment.

In the further embodiment and its variant, shown in Figures 5 to 10, the coupling connector comprises two
10 parts, a coupling part 31 and a connector part 35.

The coupling part 31 as shown in Figure 5 has a short pipe body portion with flanges or other means at each end for coupling to the adjacent ends of two lengths of header pipe, and projecting from the coupling body a single
15 branch pipe 32 of smaller diameter than that of the body.

The connector part 35 as shown in Figures 5 to 7 is in the form of a T-piece connector the stem 36 of which connects by a screwthreaded connection with the coupling branch pipe 32 and the arms 37 of which are
20 adapted for connection to two wellpoint hoses 39. The T-piece connector part 25 is aligned so that the arms 37 are parallel to the header pipe, though in other arrangements it may be arranged perpendicular to the header pipe or at an angle. The connector part 35 also incorporates two valves
25 40, one for each wellpoint branch connection for adjusting the flow from each wellpoint individually, and also a sight glass 42 for viewing into the connector part 35 to see the liquid flow from each wellpoint.

The two valves 40 are identical and are in the form of respective bores 45 entering the body of the
30 connector part 35 from opposite sides, into each of which is inserted a valve member in the form of a spool or bobbin 46 of plastics material which is held rotatably in the bore by a central screw 47. The inner end of each valve bobbin
35 46 is hollow and the end is angled acutely to the rotational axis. The wall of each bore 45 is formed on

one side with a circular inlet port 48 communicating with the branch connection 37 from the wellpoint, and a circular outlet port 49 at the top of the bore 45 through which liquid can flow from the bore 45 into the inside 50 of the
5 body of the connector part 35 and down the stem 36, pipe branch 32 into the coupling port 31.

From Figure 6 in particular, it will be appreciated that by rotating the valve bobbin 46, the exposed cross-sectional area of flow of the outlet part
10 49 can be altered as required.

Rotation of the valve bobbin 46 is done manually by turning the head 51 by means of an operating lever 52. The head 51 is provided with position markings 53 so that it can be set accurately. These markings and the levers
15 52 serve as a readily and easily visible indicator of the valve setting, an important feature where an operator has to check many such settings in a wellpoint installation.

A further visual aid is provided by the sight glass 42 which is held in a bezel ring 55 with a
20 strengthening rib 56. A glance into the top of the connector part 35 will enable an operator to see immediately the flow of liquid coming up through the outlet port 49.

A notable feature of the above construction is that a valve bobbin 46 of one form can be changed to one of
25 another form, to suit particular local conditions or requirements. Thus, Figure 10 shows an alternative valve bobbin 60 adapted for use in silt conditions. In place of the angled inner end, the spool is provided with a slot 61 the cross-section of which varies around the
30 circumference of the spool so that its rotational position will determine the flow through the valve 40.

Each valve bobbin 46, 60 has an annular groove 58 under the head 51 for accommodating an O-ring for sealing purposes.

35 In use, the wellpoint hoses 39 are attached to

the end connections 37 of the connector part 35 by means of hose tails 38 which are sleeves of a particular diameter and taper to suit the wellpoint hose 39, and the valve bobbins 46 are set to the required positions. Then
5 during pumping . the flow from each wellpoint can be inspected and the appropriate valve adjusted accordingly to an optimum position.

It will be appreciated that the form of the valves 40 and of the valve bobbins 46 can be varied from those
10 illustrated. Also, the sight glass can be provided at other locations than at the top. Furthermore, the connector part 36 does not have to be in the form of a T-piece connector; other forms of two-branch connector pieces could be used, or in other applications connector
15 pieces with more than two branches might be suitable.

It will be appreciated that the use of short coupling connectors having take-off branch pipes, with lengths of standard pipe is much more convenient both as regards the provision of the equipment and the ease of
20 handling during installation than having to provide inconvenient, long lengths of specialised pipework often needing to be specially produced for a particular system. The system according to the invention is also much more flexible (whole sections can be readily changed) and
25 versatile in adapting from one job to another.

The wellpoint system of the invention may be used with almost any kind of wellpoint, for example self-jetting or disposable ones.

The invention also embraces a set of pipework for
30 a wellpoint system, or for a method of installing a wellpoint system, as defined above, comprising lengths of standard pipe; the coupling connectors and individual wellpoints. The invention also resides in the specialist wellpoint couplings themselves.

CLAIMS

1. A wellpoint system comprising lengths of header pipe which are joined in end-to-end alignment by respective relatively short coupling connectors each of which is
5 provided with one or more take-off branch pipes of less than half the diameter of the header pipe, the take-off branch pipes being connected to individual wellpoints.
2. A wellpoint system as claimed in claim 1, in which each coupling connector has two or more branch pipes.
- 10 3. A wellpoint system as claimed in claim 2, in which the branch pipes are provided at different axial and/or circumferential positions relative to the axial direction of the header pipe at the coupling.
4. A wellpoint system as claimed in claim 2 or claim
15 3, in which the branch pipes each branch directly from the body of the coupling at discrete take-off points.
5. A wellpoint system as claimed in claim 2 or claim 3 in which there is a tapping or branch spigot from the coupling body, and a connector piece having at least two
20 branch pipe connections is connected to the spigot.
6. A wellpoint system as claimed in any one of the preceding claims, in which the coupling connector and/or the take-off branch pipes are provided with valves to control the flow rate of liquid into the header pipe
25 from the wellpoint.
7. A wellpoint system as claimed in claim 6 when appendant to claim 5, in which the valves are spool valves provided in the body of the connector piece.
8. A wellpoint system as claimed in any one of the
30 preceding claims, in which a sight glass is provided to enable the fluid flow from each wellpoint to be seen.
9. A method of installing a wellpoint system comprising assembling a header pipe at a site from straight, angled or curved pipe lengths by interconnecting the pipe lengths
35 in end-to-end alignment by means of respective coupling

connectors joining adjacent pipe ends, each coupling connector having one or more take-off branch pipes of diameter less than half that of the header pipe, and connecting the take-off branch pipes to individual well-
5 points in the ground.

10. A coupling connector for a wellpoint system, comprising a relatively short pipe body having means at each end for connecting it to adjacent ends of two header pipe lengths, the coupling body having two or more branch
10 pipes each adapted to be connected to individual wellpoints and with a diameter of less than half the diameter of the coupling body, each branch pipe connection being provided with a valve for regulating the fluid flow through that
branch pipe connection.

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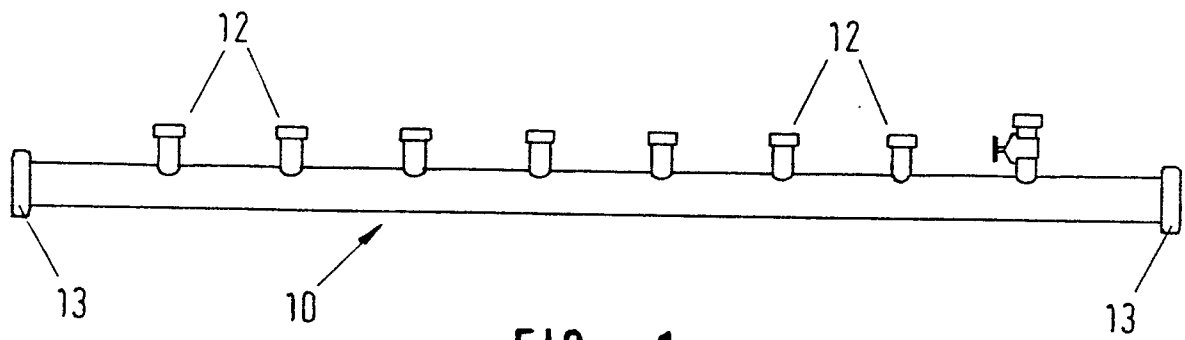


FIG. 1

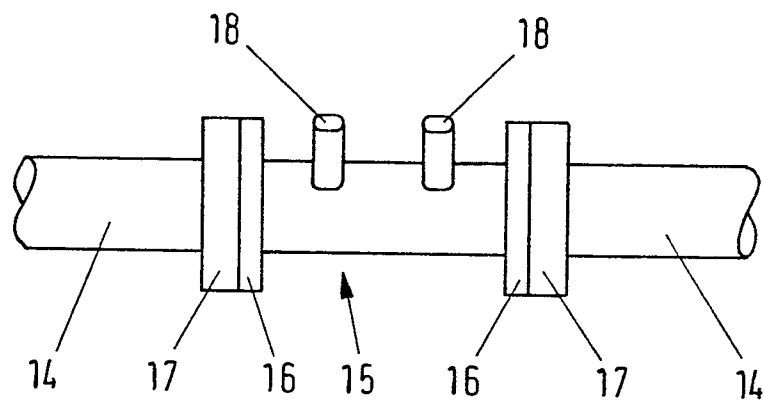


FIG. 2

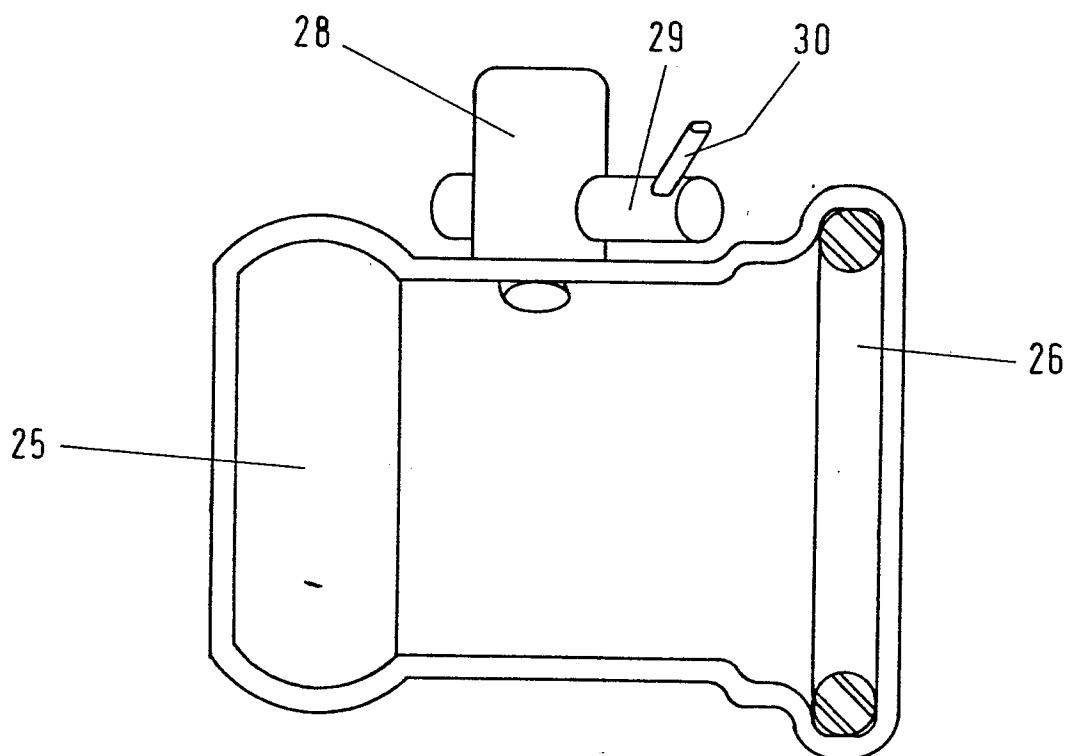


FIG. 3

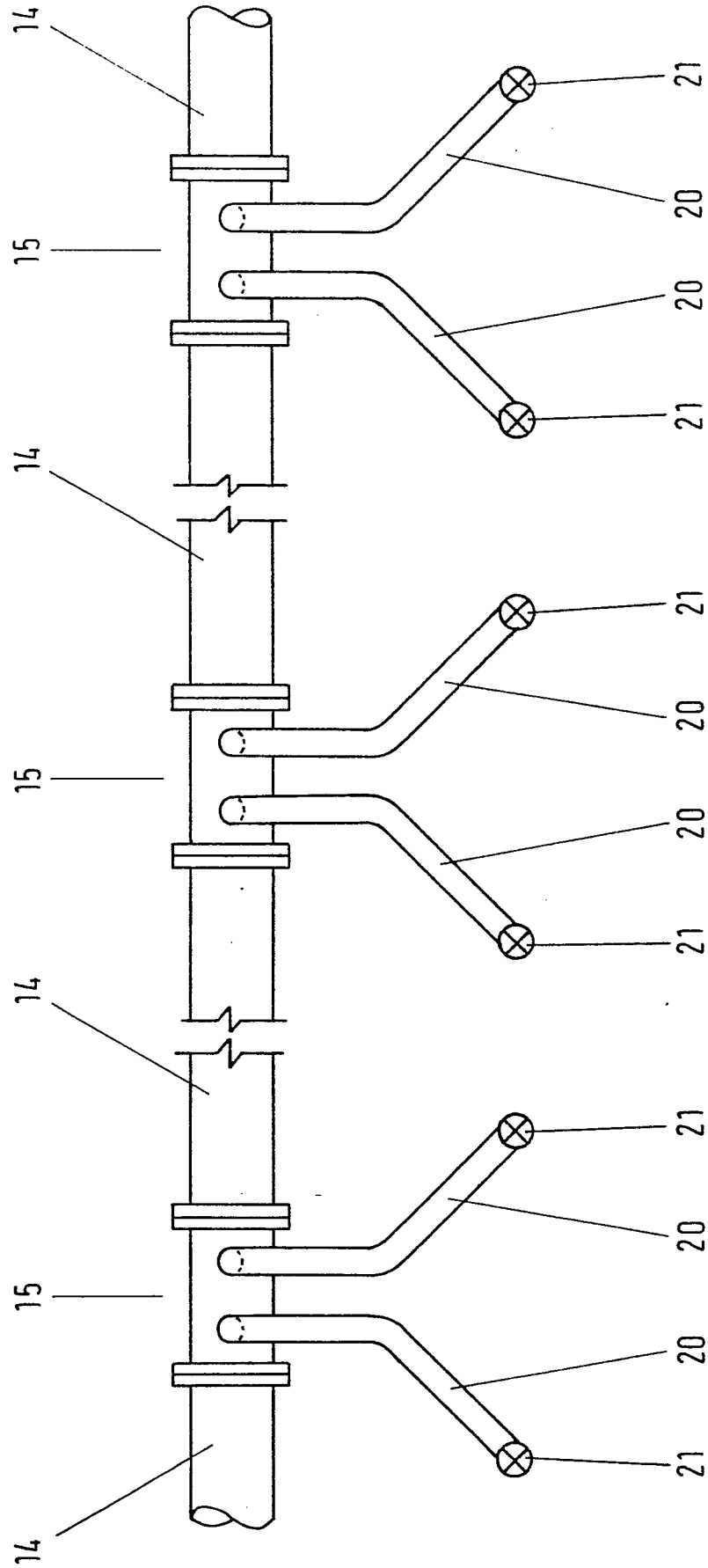


FIG. 4

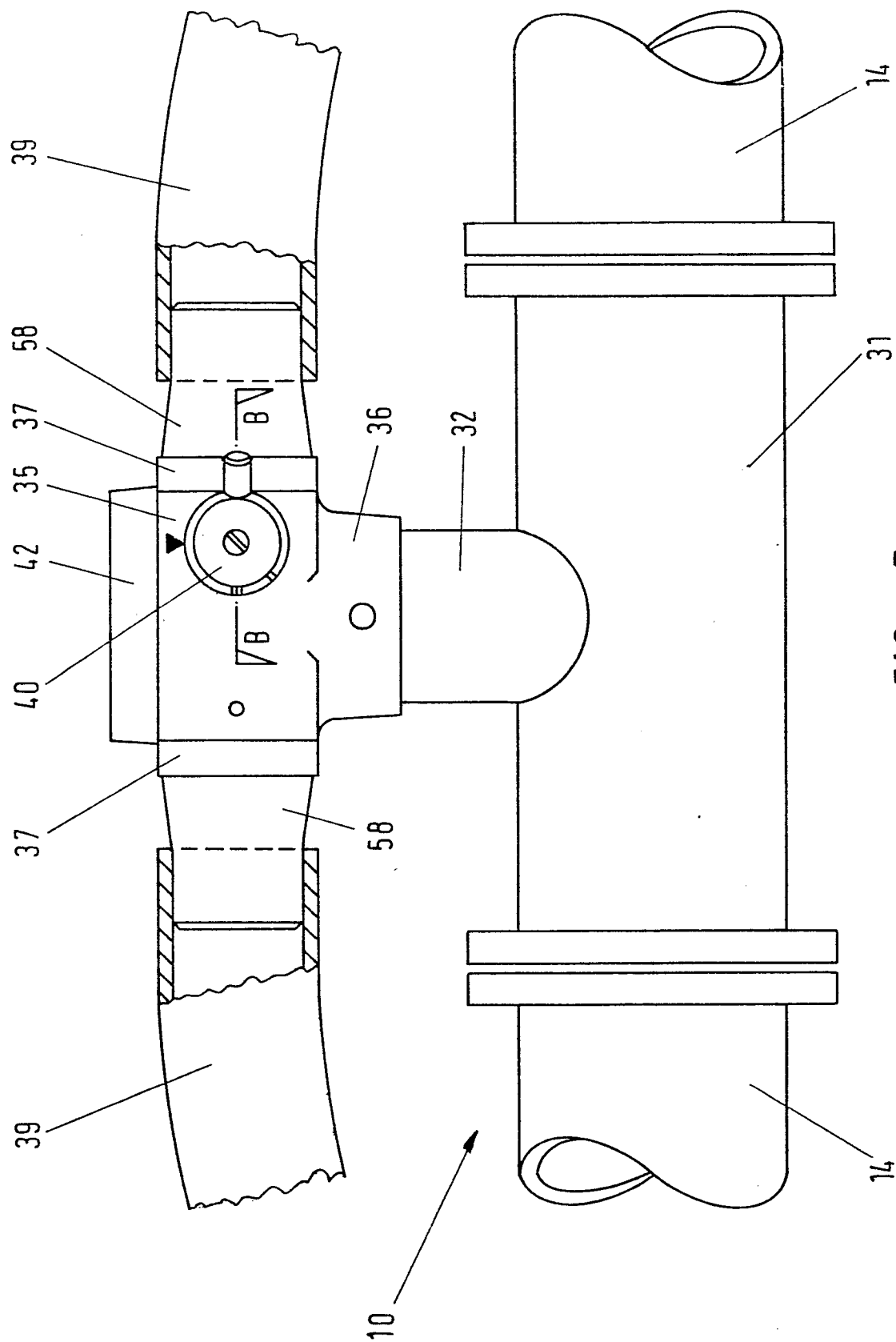


FIG. 5

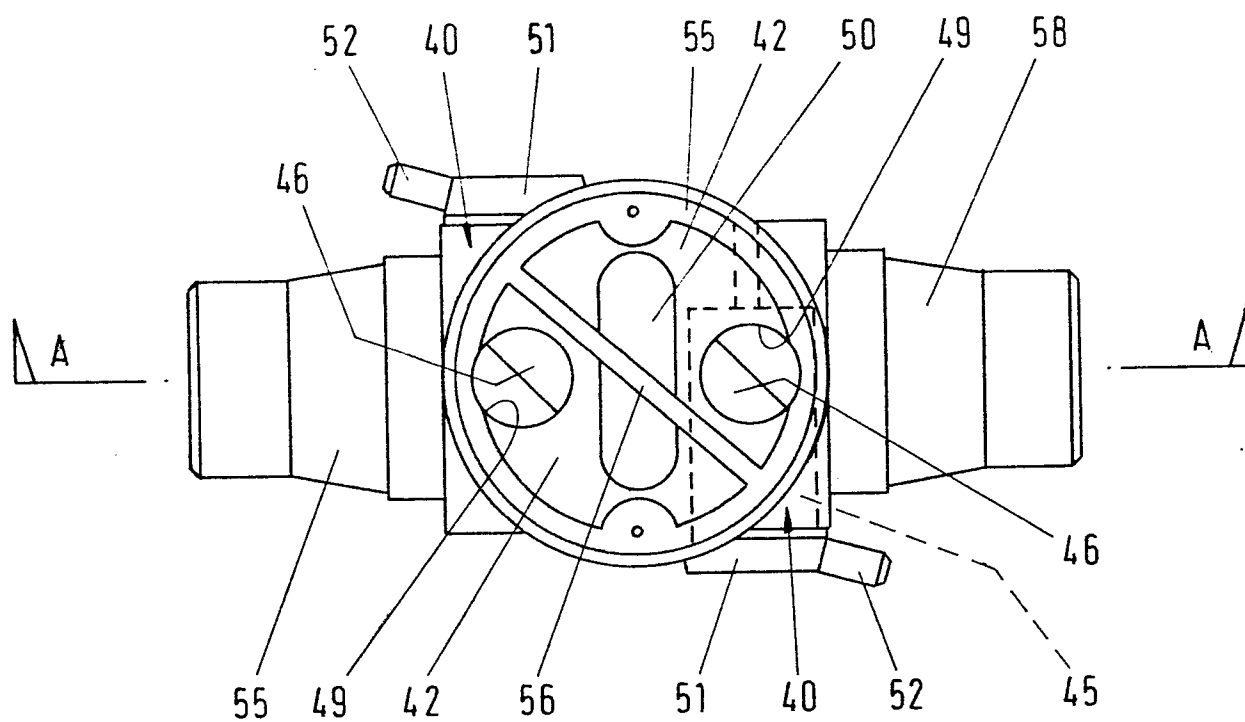


FIG. 6

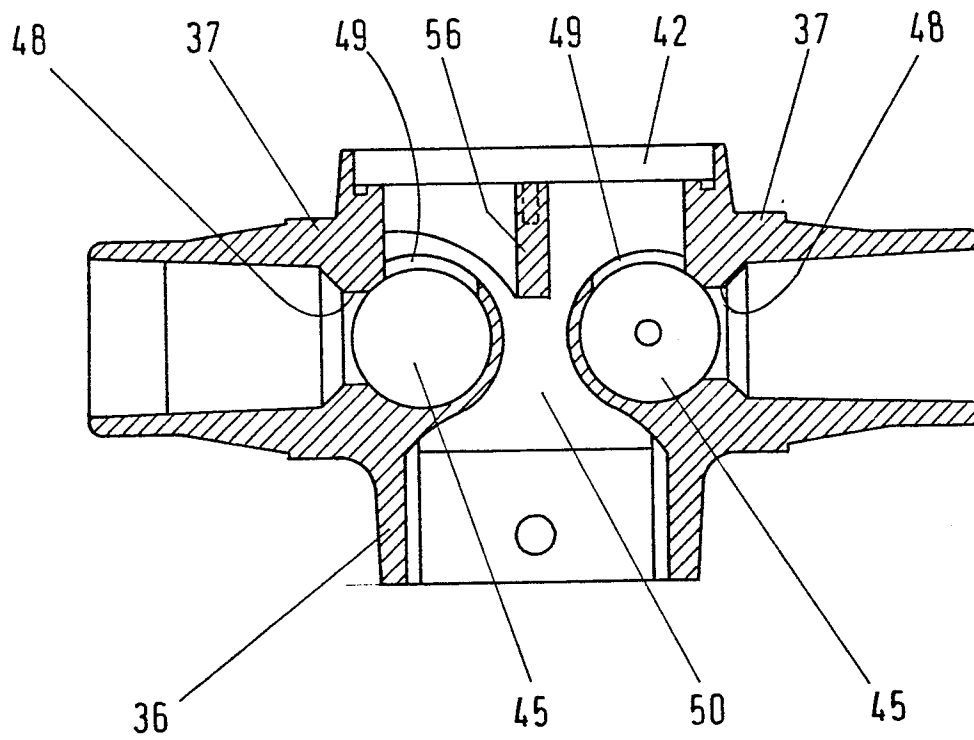


FIG. 7

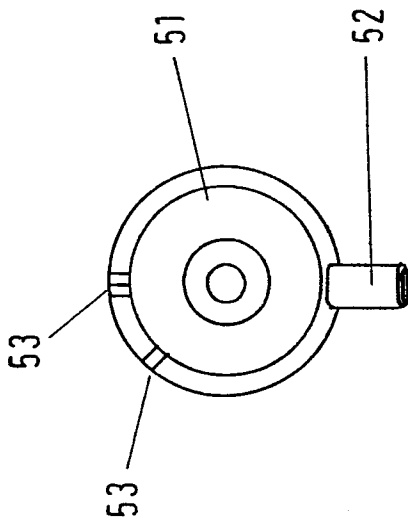


FIG. 9A

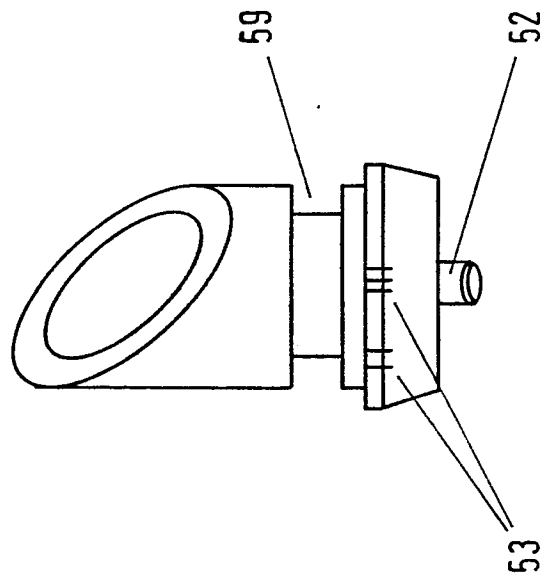


FIG. 9B

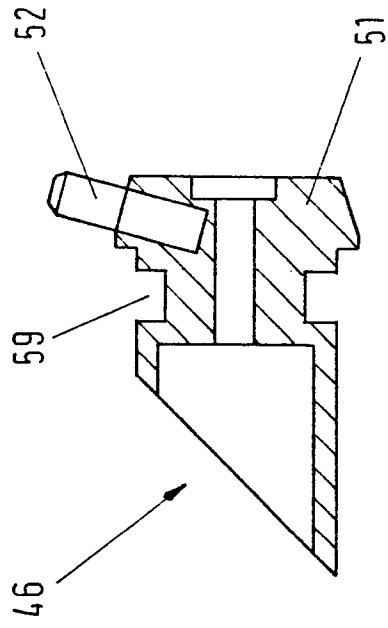


FIG. 8

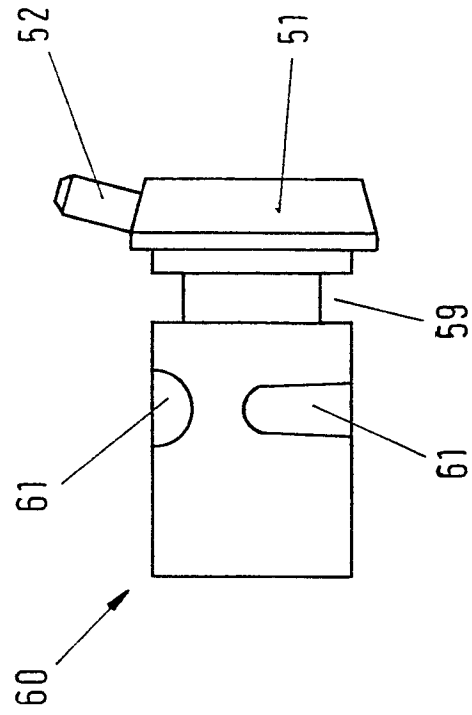


FIG. 10



European Patent
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EUROPEAN SEARCH REPORT

0092349

Application number

EP 83 30 1972

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	GB-A- 639 349 (HANDEL) * Page 1, lines 19-23, 60-65; page 2, lines 73-79, 84-89; page 3, lines 63-76; figure 1, prov. spec.; figure 4, compl. spec. *	1,9	E 02 D 19/10
A	--- US-A-4 260 283 (CROY) * Column 5, lines 45-50; figures 1,2 *	6	
A	--- GB-A- 22 678 (AGOPIAN) (A.D. 1910)		
A	--- DE-B-1 151 228 (MEYER) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			E 02 D E 03 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19-07-1983	Examiner RUYMBEKE L.G.M.
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