(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 August 2020 (20.08.2020)

WIPO | PCT

(10) International Publication Number
WO 2020/167165 A2

(51) International Patent Classification:
F16L 11/00 (2006.01) *F16L 21/00* (2006.01)

(21) International Application Number:
PCT/RU2020/00006 1

(22) International Filing Date:
07 February 2020 (07.02.2020)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2019103962 12 February 2019 (12.02.2019) RU

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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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,

(54) **Title:** FLEXIBLE PIPELINE

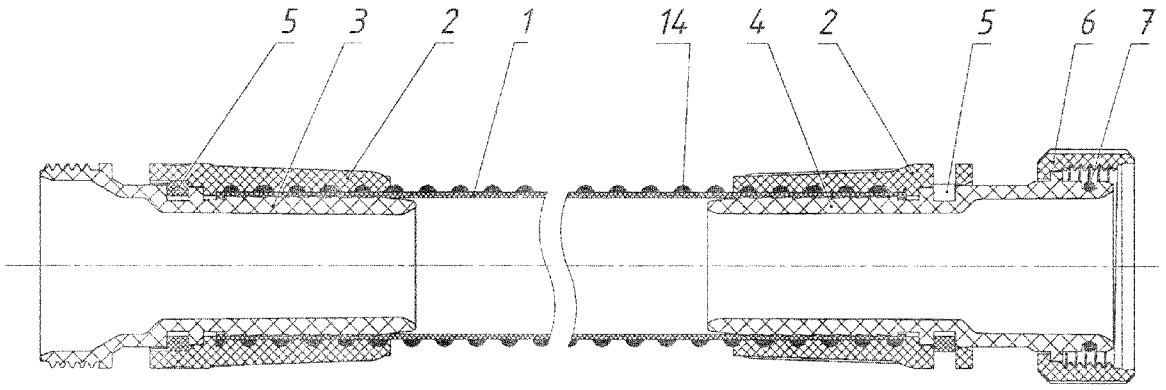

Fig. 1

(57) Abstract: The flexible pipeline contains elastic hose (1) with external reinforcing spiral winding (14), connecting fittings at each end of the elastic hose in the form of a through connecting outlet or input fittings (3, 4), respectively, and one of two identical couplings (2). Corresponding end of hose (1) is sealed between each connecting pipe (3, 4) and coupling (2). Each coupling (2) is hollow with internal spiral groove (10) along the longitudinal axis of symmetry of coupling (2). Spiral groove (10) of coupling (2) has a turn pitch equal to the turn pitch of spiral winding (14) of the hose. Each end of hose (1) is screwed completely into coupling (2). Each connecting pipe (3) and (4) is made with a cylindrical surface, pressed coaxially into coupling (2) into the corresponding end of elastic hose (1) in the area of the latter screwed into coupling (2), and with the threaded part protruding outward. At the same time, at each end of elastic hose (1), connecting pipe (3 or 4) and corresponding coupling (2) are fixed from mutual movement by means of retaining ring

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UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, Cl, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

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(5) installed in a groove made on the outer surface of connecting pipe (3 and 4) and protruding into windows (13) made in coupling 2 wall. The cylindrical surface for pressing in each connecting pipe (4, 5) is made inclined with conical protrusions. Elastic hose (1) is made of plasticized food-grade polyvinyl chloride and with external spiral wire winding (14) made of polyvinyl chloride (PVC). The retaining ring (5) is made split of the spring material, with flat side surfaces supported on walls (10, 11) of the windows of coupling (2) and with a cut, which ends protrude into window (13) made in coupling (2) wall. The advantage is durability, since the hose is reliably sealed between the coupling and the connecting pipe, as well as the convenience and speed of installation of the pipeline.

Flexible pipeline

Field of the invention

The invention relates to the water supply and can be used for the needs of domestic and drinking water supply, in particular for water distribution structures, providing for the connection of flexible pipelines by means of sleeves or couplings, the connection of flexible pipelines to each other with devices for gripping the hose between the inner and outer parts, the connection of flexible pipelines to the rigid elements of water supply systems.

Prior art

Commonly available are flexible pipelines with end fittings RU №№ 94661, 121891, 2622341, 2471 113, 2446341, 2350825.

There exists a device for the end connection of an elastic pipeline, which consists of an elastic pipeline including an inner pipe with a layer of cord filaments, a spiral wire winding and an outer pipe, and where the axial channel of the inner pipe grips the lower end of the nipple with a notch on its outer side facing towards the elastic pipeline, a female connecting thread on the upper opposite end and an annular protrusion on the outside, whereon the union nut rests mounted on the outer annular protrusion of the nipple, which is provided with a male connecting thread, onto which a coupling is screwed to enclose the outer pipe, here, an annular groove is made inside the coupling with a cylindrical section turning into a conical section, whereas the conical section of the coupling is provided with dies equipped with an internal screw-type notch facing the body of the inner pipe of the elastic pipeline, and a cylindrical groove is made at the dies location on the outer pipe section, with the release of the spiral wire winding turns and preservation at the end of the section of the outer pipe on which the bandage is installed, made with the possibility of end interaction with the nipple body, thereat, the pitch of the internal screw-type notch is taken equal to the winding pitch of the turns of the spiral wire winding, and the depth is greater than the diameter of the wire of the turns of the spiral wire winding by 0.1-0.25 mm, and the channel shape of the internal screw-type notch on the inner surface of the dies 16 is adopted in the form of an unequal trapezoid (RU 24394 18).

There exists a design of a flexible pipeline with integral end fittings of a high pressure hose, which includes a rubber-reinforced hose with removed outer and inner layers at the end, a nipple with two outer annular protrusions made in the area of the positive seal of the hose carcass, with the first external annular protrusion from the connection side being equipped with a truncated apex, and the coupling with the inner annular protrusions of different heights with the sealing zone and the zone of reduced hose compression being formed while compressing the zone of positive seal of the hose carcass, characterized in that the truncated part of the apex of the first outer annular protrusion of the nipple next the connection is made conical, and on the outside of the coupling a triangular annular groove is made, which coincides in the same plane in the area of the positive seal of the hose carcass with the inner annular protrusion of the coupling, which prior to compression is located close to a higher first outer annular protrusion of the nipple next the connection node than to the second outer annular protrusion of the nipple by the value of elongation of the coupling when it is compressed (RU 2355937, prototype).

The disadvantages of the known flexible pipelines are the low degree of unification of fittings, insufficient reliability and durability, technological complexity of production, as well as high cost and low maintainability.

The problem solved by this invention is the creation of a flexible pipeline with an increased service life, providing multiple quick and convenient connection of flexible pipelines to pumps, filters, valves and other elements of water supply systems, as well as the expansion of the flexible pipeline range.

Summary of the Inventions

The technical result that ensures a solution to this problem is to simplify and unify the fittings design, to ensure produce-ability for the assembly of flexible pipelines with fittings, increase the durability and reliability of the seals, ensure tightness under the required overpressure value.

The essence of the invention lies in the fact that the flexible pipeline comprises an elastic hose with an external spiral winding, a connecting fitting at each end of the elastic hose in the form of a connecting pipe and a coupling, the corresponding end

of the specified hose is sealed therebetween, each coupling being equipped with an internal spiral groove having a turn pitch equal to the turn pitch of the spiral winding of the hose screwed into the coupling, and the connecting pipe with a cylindrical surface, pressed into the hose at the section of the latter screwed into the coupling, and with a protruding threaded part, while at each end of the hose the connecting pipe and coupling are secured against mutual movement by means of a retaining ring installed in a groove made on the outer surface of the connecting pipe and protruding through the windows made in the coupling wall.

Preferably, the cylindrical surface of each connecting pipe is made inclined with conical protrusions.

Preferably, the elastic hose is made of food-grade plasticized polyvinyl chloride.

Preferably, the elastic hose is equipped with an outer spiral wire winding of polyvinyl chloride.

Preferably, the retaining ring is made split from the spring material, with flat side surfaces and with a cut, which ends protrude into the windows made in the coupling wall.

Preferably, the inner spiral groove of each coupling is configured with a transverse profile similar to that of the outer spiral winding.

Preferably, the fittings attached to each end of the elastic hose are made of flexible material in the form of coaxially mounted connecting pipe and coupling.

Preferably, the coupling at each end of the elastic hose is equipped with a cylindrical girdle in which windows are made for the retaining ring, and with a conical outer surface along the inner spiral groove.

Preferably, radial stiffeners are made on the conical outer surface of the coupling.

Preferably, the connecting pipe at one end of the elastic hose is provided with a union nut and an elastic seal.

Short description of drawings

Figure 1 shows a longitudinal section of a flexible pipeline with clamps of connecting fittings, Figure 2 is a drawing of a coupling in section, frontal and side projections, Figure 3 is a general view of a flexible pipeline.

Detailed Description of the Invention

The flexible pipeline contains an elastic hose 1 with an external reinforcing spiral winding 14, connecting fittings at each end of the elastic hose in the form of a through connecting outlet or inlet connecting pipes 3, 4 respectively, and one of two identical couplings 2, between which (each connecting pipe 3, 4 and the coupling 2) there is a sealed corresponding end of hose 1.

Each coupling 2 is hollow with an internal spiral groove 10 along the longitudinal axis of symmetry of coupling 2. The spiral groove 10 of coupling 2 has a turn pitch equal to the turn pitch of hose spiral winding 14. Each end of hose 1 is screwed completely into coupling 2. Each connecting pipe 3 and 4 is made with a cylindrical surface, pressed coaxially into coupling 2 at the corresponding end of elastic hose 1 in the area of the latter screwed into coupling 2, and protruding outward (from hose 1) threaded part (not shown).

At the same time, at each end of elastic hose 1, connecting pipe 3 or 4 and the corresponding coupling 2 are fixed in a concentric position to each other against mutual movement by means of retaining ring 5 mounted in a groove made on the outer surface of connecting pipe 3 and 4, and protruding in window 13 made in coupling 2 wall.

The cylindrical surface for pressing in each connecting pipe 4, 5 is made inclined with conical protrusions (ring notches).

Elastic hose 1 is made of food-grade plasticized polyvinyl chloride (PVC). Elastic hose 1 is equipped with an outer spiral wire winding 14 of polyvinyl chloride (PVC).

Retaining ring 5 is made split of the spring material, with flat side surfaces supported on flat walls 11, 12 of one or more windows of coupling 2 and with a cut, which ends protrude into windows 13 made in coupling 2 wall.

The inner spiral groove 10 of each coupling 2 is configured with a transverse profile, similar to the configuration of wire outer spiral winding 14.

The fittings mounted on each end of elastic hose 1 are made in the form of coaxially mounted connecting pipe 3 or 4 and one of couplings 2.

Coupling 2 at each end of elastic hose 1 is made with a cylindrical girdle in which windows 13 for retaining ring 5 are made, and with a conical outer surface along inner spiral groove 10.

On the conical outer surface of coupling 2, radial stiffeners are made in the form of conical protrusions 15.

At least one (input) connecting pipe 4 at one end of elastic hose 1 is provided with union nut 6 on fitting's threaded part, and elastic seal 7.

Flexible pipeline is assembled and used as follows.

Couplings 2 are mounted to the ends of hose 1; the couplings have spiral groove 10, repeating the configuration of reinforcing spiral 14 of hose 1. As a result, it is possible to screw hose 1 into coupling 2 until it stops, while the corresponding part of the turns of the spiral winding 14 is located in turns spiral grooves 10 of couplings 2. After installing both couplings 2 in hose 1 with the help of simple industrial equipment, inlet and outlet connecting pipes 3 and 4 are pressed in tightly with their cylindrical surface.

Thus, at each end of hose 1, its wall is compressed between the outer surfaces of connecting pipes 3, 4 and the inner surfaces of couplings 2. In this case, the turns of spiral winding 14 of hose 1 are clamped in the radial direction and fixed on their outer surface mating with the inner surface of the turns of spiral of grooves 10 of each coupling 2, from any radial or longitudinal displacement or unscrewing, which ensures the strength and tightness of the pipe fittings.

Each connecting pipe 3 and 4 has conical protrusions (inclined notches) on its cylindrical surface pressed into hose 1, creating additional contact pressure on the material of hose 1 and preventing it from sliding off connecting pipes 3 and 4. In coupling 2, the hose 1 is reliably held by reinforcing spiral 14, which is in a compressed state in groove 10 and simultaneously fulfills the function of an extended seal of the inner surface of coupling 2 from environmental pollution.

Finally, each coupling 2 and connecting pipes 3 or 4 are mutually fixed by split retaining ring 5 located in the groove of connecting pipe 3 and 4 and windows 13 of coupling 2. When mounting connecting pipes 3 and 4, ring 5 is initially completely forced into the groove of connecting pipe 3 and 4, and then protrudes from this groove, since it increases in diameter due to its spring properties, after connecting pipes 3 and 4 are completely pressed with their cylindrical surface into hose 1.

Moreover, each ring 5 in the axial direction is bounded by the walls of the grooves of connecting pipes 3 or 4 and the walls (planes) 11 and 12 of window 13 of coupling 2, as a result, the specified fitting (coupling and connecting pipe) is reliably fixed in a state that is fastened together at each of the end sections of hose 1 and its winding 14.

Inlet connecting pipe 4 is equipped with union nut 6 and elastic seal 7 for quick connection to a pump or other components of the water supply system having a corresponding counterpart. Outlet connecting pipe 3 has a configuration that allows to connect inlet connecting pipe 4 of the adjacent hose to it, etc. for jointing a single or branched water supply line from the required number of standardized hoses.

The inlet and outlet connecting pipes 3, 4 can be interchanged, depending on the configuration of the water supply system and the composition of its equipment. Pipeline repair is possible, including, if necessary, at the place of operation.

The operation of the flexible pipeline ensures the water flow from a pump to consumers connected by flexible pipelines to the water supply system.

This design allows for tightness at the required overpressure in the hose of the flexible pipeline. The advantage of the invention is durability, since each end of the

hose is securely and tightly sealed between the coupling and the connecting pipe, as well as the convenience and speed of pipeline installation when used by the consumer, the low cost and high manufacturability of both single and serial production of sets of flexible pipelines with connecting fittings.

Industrial application

The present invention is implemented with multipurpose equipment extensively employed by the industry.

Claims

1. A flexible pipeline comprising an elastic hose with an external spiral winding, connecting fittings at each end of the elastic hose in the form of a connecting pipe and a coupling, the corresponding end of the specified hose is sealed therebetween; each coupling is equipped with an internal spiral groove having a turn pitch equal to the turn pitch of the spiral winding of the hose screwed into the coupling, and the connecting pipe - with a cylindrical surface, pressed into the hose in the area of the latter inserted into the coupling, and with a protruding threaded part, while at each end of the hose the connecting pipe and the coupling are secured against mutual movement by means of a retaining ring mounted in a groove made on the outer surface of the connecting pipe and protruding into the windows made in the coupling wall.

2. The pipeline as claimed in claim 1, wherein the cylindrical surface of each connecting pipe is made inclined with conical protrusions.

3. The pipeline as claimed in any claim 1, 2, wherein the elastic hose is made of food-grade plasticized polyvinyl chloride.

4. The pipeline as claimed in any claim 1, 2, wherein the elastic hose is equipped with an external spiral wire winding of polyvinyl chloride.

5. The pipeline as claimed in any claim 1, 2, wherein the retaining ring is made split of a spring material, with flat lateral surfaces and with a cut, the ends of which protrude into the windows made in the coupling wall.

6. The pipeline as claimed in claim 5, wherein the inner spiral groove of each coupling is made with a configuration of the transverse profile, similar to the configuration of the outer wire spiral winding.

7. The pipeline as claimed in any claim 1, 2, wherein the fitting fixed at each end of the elastic hose is made in the form of a coaxially mounted connecting pipe and coupling.

8. The pipeline as claimed in any claim 1, 2, wherein the coupling at each end of the elastic hose is equipped with a cylindrical girdle in which windows for the

retaining ring are made, and with a conical outer surface along the inner spiral grooves.

9. The pipeline as claimed in claim 8, wherein the radial stiffeners are made on the conical outer surface of the coupling.

10. The pipeline as claimed in any claims 1, 2, 6, 9, wherein the connecting pipe at one end of the elastic hose is provided with a union nut and an elastic seal.

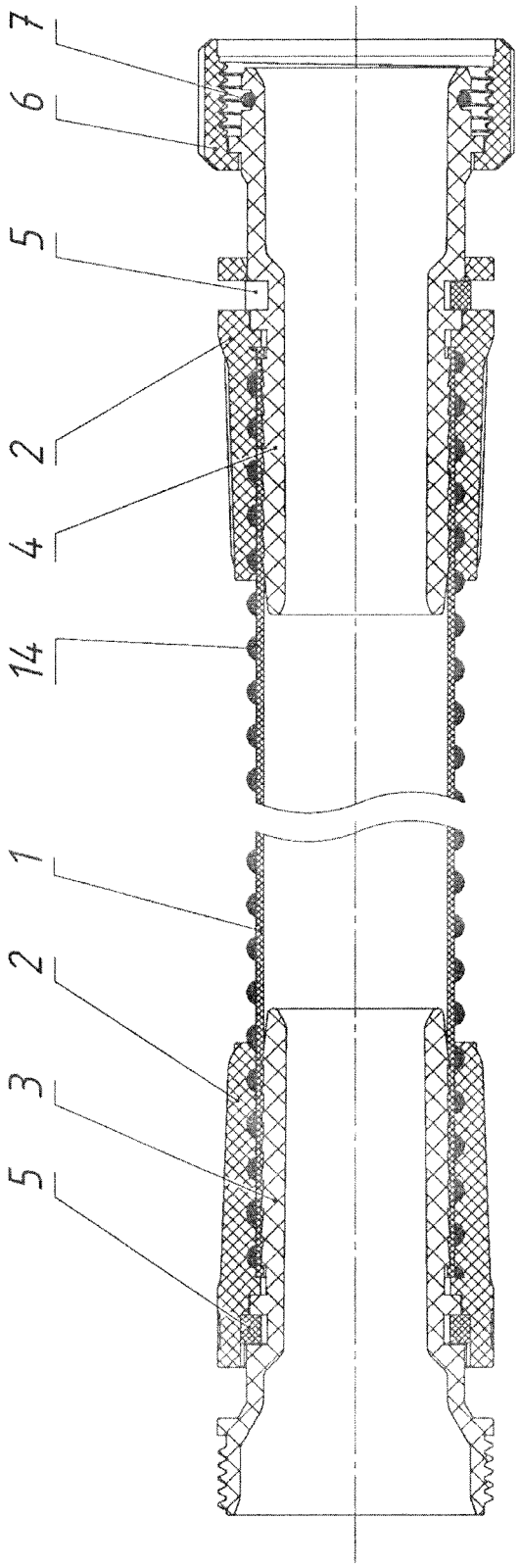

Fig. 1

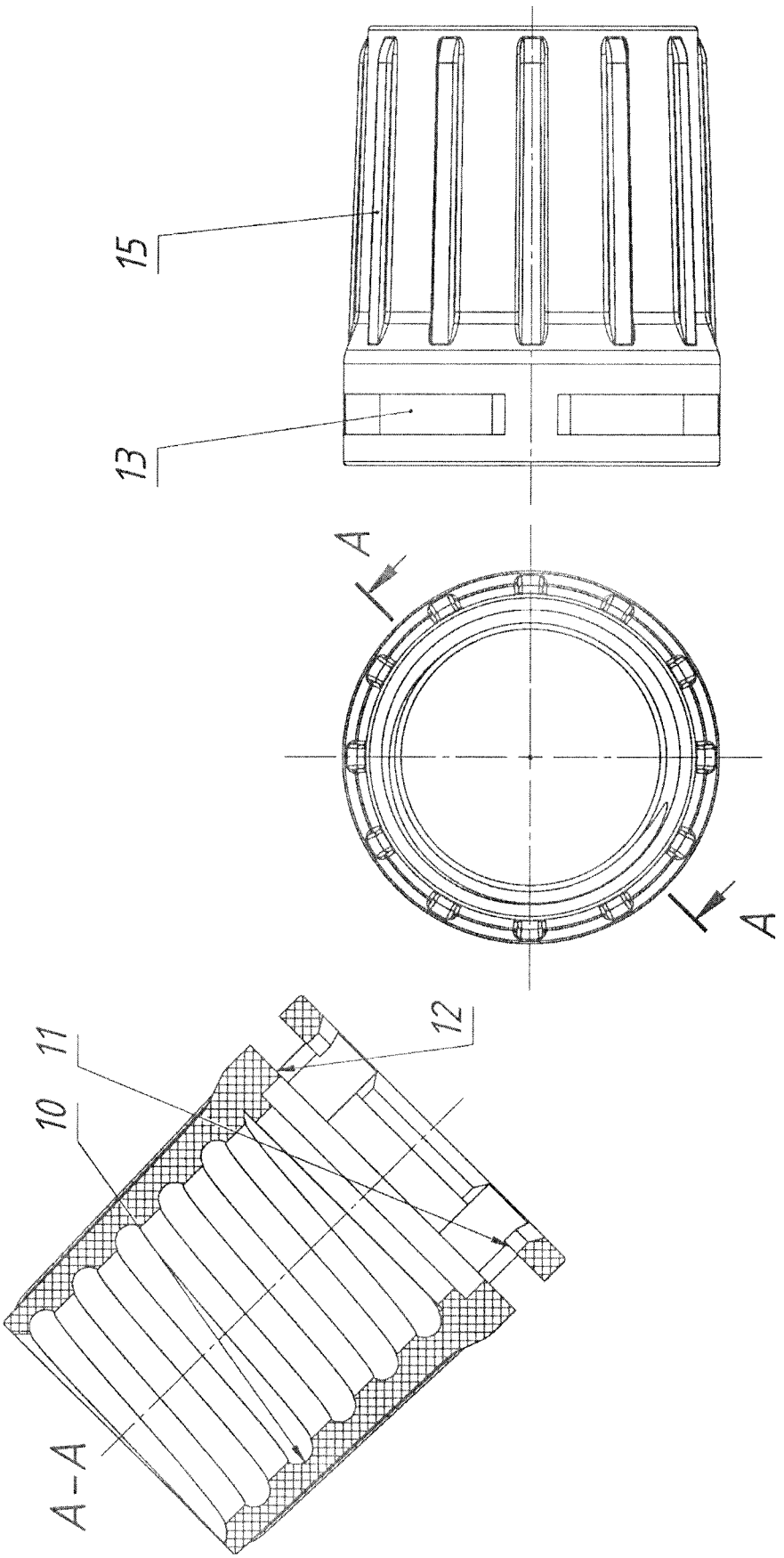

Fig. 2

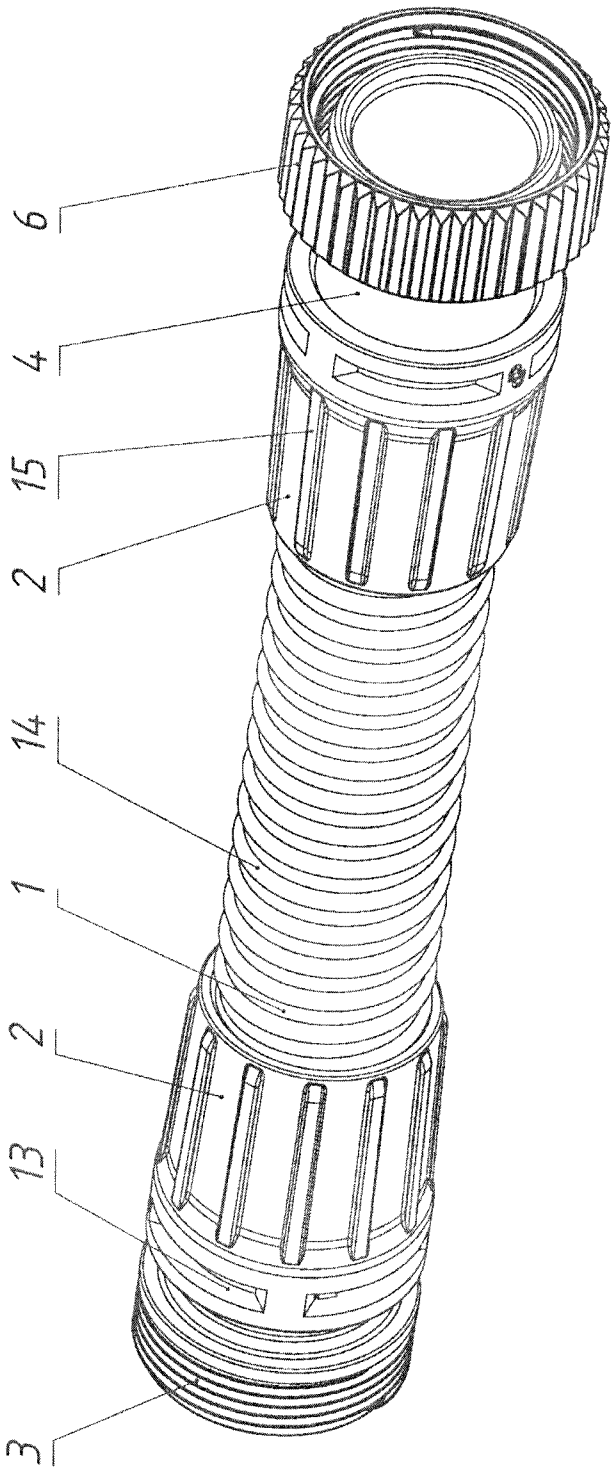

Fig. 3