



- (51) International Patent Classification:
F16L 33/16 (2006.01) *F16L 33/22* (2006.01)
- (21) International Application Number:
PCT/IB2018/054185
- (22) International Filing Date:
09 June 2018 (09.06.2018)
- (25) Filing Language: Slovak
- (26) Publication Language: English
- (30) Priority Data:
PUV 50056-2017 09 June 2017 (09.06.2017) SK
PUV 50058-2018 07 June 2018 (07.06.2018) SK
- (71) Applicant: **BJV RESEARCH, S. R. O.** [SK/SK]; Nobelo-
va 9, 831 02 Bratislava (SK).
- (72) Inventors: **MÁTYÁS, Tibor**; Bartók Béla utca 11, 3909
Mád (HU). **JAŠŠ, Branko**; Jašš Branko, Ing., Podhradie
183, 972 42 Lehota Pod Vtáčnikom (SK). **TOMÁŠ, Ján**;
Tomáš Ján, Ing., Sienkiewiczova 2541/2, 811 09 Bratisla-
va (SK). **KOKOŠ, Valér**; Kokoš Valér, Mgr., Révová
4358/44, 811 02 Bratislava (SK). **BATÓ, Gábor János**;
Bakó József utca 17, 3900 Szerencs (HU).
- (74) Agent: **PORUBČAN, Róbert**; Kancelária pre patenty a
známky, Puškinova 19, 900 28 Ivanka Pri Dunaji (SK).
- (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,

(54) Title: HOSE ENDING, MAINLY AS CONNECTING ELEMENT

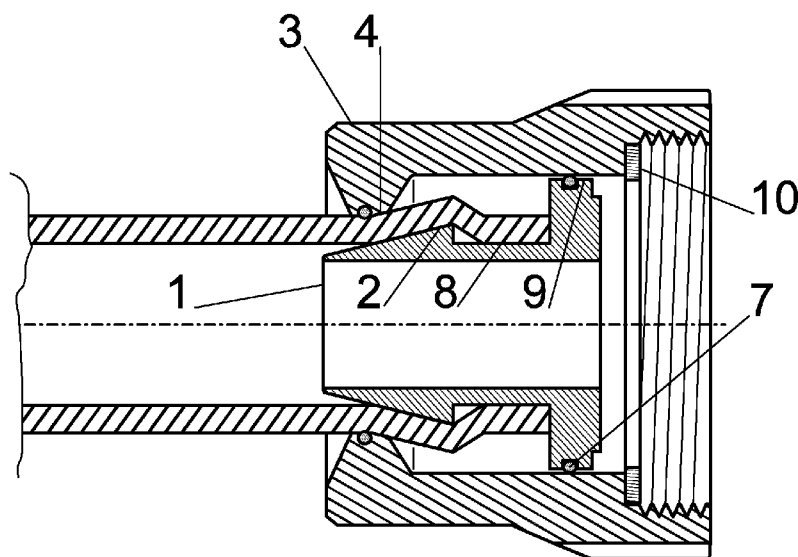


Fig. 7

(57) Abstract: Hose has a body (3) and a mouthpiece (1) connected with the body (3). The mouthpiece (1) is slidably placed against the body (3); it is designed for mounting of the end of the hose and it has a thickening (2). The ending has a circumferential stop (4) placed in the axis of the mouthpiece (1), whereby the stop (4) has on its circumference a touch surface which is oriented inside, against the thickening (2) on the mouthpiece (1). The mouthpiece (1) can be sealed by sealing ring (7) against the body (3), whereby the ring (7) is placed in the sealing zone (9), or the mouthpiece (1) can be connected with the body (3) by a flexible bellow. During the movement of the mouthpiece (1) outside the touch surface of the stop (4) and the outer surface of the hose in the zone with the thickening (2) draw closer and the hose is held on the mouthpiece (1) by the underpressure between the surface of the stop (4) and the thickening (2). The increasing pressure in the hose increases the underpressure of the hose on the mouthpiece (1), which increases



OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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, 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, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report (Art. 21(3))*
- *with amended claims and statement (Art. 19(1))*

Hose ending, mainly as connecting element

Field of technology

Technological solution concerns the ending of the hose or flexible pipe. The
5 ending is designed mainly for production of a joint (connection) between the ending of
the hose and other element which can be part of the connecting element, end
blinding, flange connection, armature, and so on.

Prior state of the art

10 Various technical solutions are used in order to connect the ending of the
flexible hose with the solid connecting element, where the hose is stuck onto the
mouthpiece, where it is held by various mechanical connecting members. Hose clips
are common, as are metal pulling straps by means of which the hose is clamped on
the mouthpiece.

15 There exist solutions with outer sleeve (socket) which has a conical surface
and during the screwing it presses the segments distributed on the circumference of
the ending in such a way that these segments press the ending of the hose to the
mouthpiece. Such solution is relatively simple, but not reliable enough; during the
higher pressure the holding of the hose on the mouthpiece is problematic and the little
20 segments are prone to breaking. Similarly, the solution pursuant to publication
JP2016044763A uses a thickening of the mouthpiece, on which the hose is pressed
by the screw sleeve. The solution is relatively difficult and the mounting of the hose
always requires screwing.

Published patent file US2012/0274064A1 discloses an ending of the hose
25 which has a solid mouthpiece with thickening on its end and which has a slidable
sleeve which enters into the cavity in the body of the hose (see mainly figure 17). The
sleeve during sliding out encircles the hose on the mouthpiece. In order to produce
sufficient pressure, it is necessary to press the sleeve outside; the pressure in the
hose than acts in a direction which pulls the hose from the mouthpiece and, at the
30 same time, from the connection with the sleeve. The separability of the sleeve is
another disadvantage; the sleeve can get lost during mounting or operation. The
sleeve requires relatively precise guiding inside the cavity of the body of the ending.

Publication GB 2251044 A discloses an arrangement with the divided mouthpiece, which has a solid part produced as a part of the body of the ending, and slidable part placed within the solid part of the mouthpiece. The thickening is divided into two relatively similar parts and it is produced on the solid part of the mouthpiece
5 and on the slidable part of the mouthpiece, too. The hose is stretched, pulled over the thickening to the solid part of the mouthpiece. The stop which acts against the thickening on the slidable part of the mouthpiece is produced on the sleeve and it is connected to the body of the ending by means of a thread. Such solution requires multiple components and the hose is unsuitably connected to the solid part of the
10 mouthpiece, whereby the pressure in the hose causes the hose to slip out of the solid part of the mouthpiece without the mouthpiece pressing to the stop more by means of the same force. The grip of the hose between the stop and thickening is produced only by screwing of the sleeve with the stop to the body of the ending, and it can get loosened later.

15 Such simple technical solution is desired and not known, which will allow quick mounting of the ending on the hose without tools, and which will be reliable during operation and easy to produce.

Essence of the invention

20 The deficiencies in the prior state of the art are significantly remedied by the ending of the hose, mainly as connecting element, where the ending includes a body with an opening and a mouthpiece connected with the body, where the mouthpiece is designed for being slid or pushed onto the ending of the hose, where the mouthpiece has on the outer end a thickening designed for holding the hose on the mouthpiece
25 according to this technical solution which essence lies in the fact that the mouthpiece is slidably placed inside the body, the ending has a circumferential stop with the opening for the hose, placed in the axis of the mouthpiece; the stop is connected with the body whereby the stop has a touch surface alongside the circumference, whereby this surface is oriented inside the body, against the thickening on the mouthpiece. The
30 mouthpiece is sealed against the body; this sealing does not prevent the slidable placement of the mouthpiece inside the body. Usually the mouthpiece will be placed in the axis of the body. The opening in the place of the circumferential stop will usually have a diameter which corresponds to the outer diameter of the hose, or, eventually,

there is a certain gap for easier insertion, sliding of the hose. From the outer side, that is, opposite to the circumferential stop, the cone can follow the opening, which makes the directioning of the hose into the opening easier.

If the outer surface of the hose is smooth enough, the mouthpiece does not
5 have to be sealed against the body of the ending; the contact of the circumferential stop with the outer surface of the hose will become the place of sealing. It is more reliable to produce a sealing zone within the mouthpiece, which does not prevent the sliding and seals the mouthpiece against the body of the ending.

Slidable placing allows the mouthpiece to move inside the body towards the
10 stop, and to slide back inside the body of the ending. On one side the ending can be delimited by the body which has a mouthpiece inserted in its opening from the inside; on the other end the ending can be delimited by the stop. The stop can be connected with the body of the ending in various ways pursuant to the size and pursuant to the cross-section shape of the ending. In case the ending has a circular cross-section,
15 which is common in cases of the hoses with circular cross-section, it is preferable if the stop is produced at the end of the circumferential wall which is a continuation of the body of the ending. In such case the circumferential wall with the stop produces a cavity inside which the mouthpiece is, whereby between the circumferential wall and the mouthpiece there is a gap whose thickness is at least corresponding to the
20 thickness of the wall of the hose; in this way the cavity allows for the movement of the hose on the mouthpiece. The cavity in the body is thus designed for introduction of the hose onto the mouthpiece inside the cavity. In such arrangement the stop, the circumferential wall and the body of the ending, too, can be formed by a single body, whereby the simple construction with only two independent components is achieved.

25 In another arrangement the stop can be connected to the body of the ending by two or multiple draw rods. The connection of the stop to the body must be capable of transferring the forces from the stop to the body of the ending. It is a task of the stop to capture the mouthpiece during its movement out of the body of the ending. Any mechanical connection between the stop and the body of the ending, for example
30 circumferential wall, at least two and preferably at least three cords, draw rods, and so on, corresponds to this task.

The stop does not allow the mouthpiece to slide out of the body's cavity if the hose is put on the mouthpiece. In the place of deformation, where the hose is put over

the thickening on the mouthpiece, the hose has a diameter which is larger than the inner diameter of the circumferential stop. After the putting of the hose on the mouthpiece the pair mouthpiece/circumferential stop produce a self-locking joint, an increase of the pressure of the medium; an increase of the pulling produces large
5 force of lock (grip). The difference between the inner diameter of the touch surface of the stop and the outer surface of the thickening on the mouthpiece is less than twice the thickness of the wall of the hose, so that the capturing of the surface of the hose on the circumferential stop takes place.

The mouthpiece has a thickening on one end. This thickening is in the ending
10 oriented outside, that is towards the connection of the hose. The mouthpiece has a waist which is designed to lean to the ending of the hose. The waist has a diameter less than the diameter of the thickening; usually the diameter of the waist will correspond to the inner diameter of the hose. During the pulling induced, for example, by the pressure of the medium in the hose, or induced by the outer force, these forces
15 are transferred from the hose put on the waist onto the mouthpiece, and by this the mouthpiece is pulled out of the body towards the stop.

A sealing zone of the mouthpiece follows the waist of the mouthpiece; the task of this zone is the slidably seal the mouthpiece placed against the body of the ending. The sealing zone of the mouthpiece can in one group of realizations be formed by a
20 continuation of the waist with the same diameter or with the diameter that is less than the diameter of the thickening. In such case the mouthpiece has largest diameter in the place of the thickening and the diameter of the thickening is at the same time equal to or smaller than the diameter of the opening in the circumferential stop. This allows to put, slide the mouthpiece to the body through the opening in the
25 circumferential stop. The body of the ending in such case can have a mount (or flange) on the side opposite to the circumferential stop, whereby this mount delimits the extreme position of the mouthpiece inside the body.

In another group of realizations, the mouthpiece can be construed in such a way that it is inserted from the other side of the body. In such case the thickening can
30 have a larger outer diameter than is the inner diameter of the opening in the circumferential stop. The sealing zone of the mouthpiece in this arrangement has an outer diameter that is identical or larger than the outer diameter of the thickening. The larger outer diameter of the sealing zone ensures the production of the larger force

which presses the mouthpiece against the circumferential stop. This produces a
hydraulic multiplication of the force. The surface upon which the medium acts
through its pressure in the cross-section of the sealing zone grows quadratically with
the growth of its diameter. The doubling of the diameter of the mouthpiece in its
5 sealing zone causes a quadruple increase of the force by which the mouthpiece is
pressed against the circumferential stop. This effect can be used to achieve a reliable
sealing even with hoses which are not very flexible.

With the second group of realizations there has to be an opening in the body of
the mouthpiece on the side opposite to the circumferential stop which is larger than
10 the outer diameter of the thickening; usually it will be larger than the outer diameter of
the sealing zone of the mouthpiece. Such shape of the body is preferably used with
larger endings which are designed for connection, for example, to the water valves,
where the body of the ending is ended by the inner thread for the connection with the
respective armature or fitting.

15 The term "mouthpiece" in this text denotes a pipe, mainly of the cylindrical
cross-section, on which the ending of the hose is put, or pulled. The mouthpiece can
have different cross-section, for example elliptical, flat or rectangular with the rounded
corners. The thickening of the mouthpiece constitutes an enlargement of the diameter
of the pipe at its end; it can have, for example, conical shape that is common in case
20 of the mouthpieces on which the hose is secured by the pulling tape or fastener,
where usually there are multiple conical thickenings placed one behind each other,
ended by the jump reductions of the diameter to the diameter of the waist of the
mouthpiece. "Outer ending" or "outer side" is an ending or a side on the side of the
end of the hose which is connected to the ending. The term "hose" denotes any pipe
25 element regardless of the material its composed of; it can be plastic, rubber or other
pipe which allows to pull on a mouthpiece with the thickening.

The significant feature of the proposed technical solution is the fact that the
mouthpiece in the body of the ending is placed in such a way that partial movement
against the body of the ending is allowed. It will be preferable if the movement or
30 sliding of the mouthpiece is delimited by the stops; the sliding in order of millimeters
suffices. On one side the fold of the mouthpiece can be restricted by the gradation of
the opening in the body of the ending.

The end of the hose is inserted inside the ending where the end of the

mouthpiece is led through the middle opening in the circumferential stop. The end of the mouthpiece has a diameter which allows to lead the end of the hose at least to the beginning of the mouthpiece. Further pressure moves the end of the hose through the thickening. During such guiding of the hose the mouthpiece is moved towards the

5 body of the ending where the front of the mouthpiece leans to the mount (flange) inside the opening of the body of the ending. The end of the hose thanks to its flexibility passes through the zone with the thickening and usually it is pressed through to the waist of the mouthpiece and towards the body of the ending. The hose is now mounted on the mouthpiece, but aside of the flexibility of the material of the

10 hose the hose lacks other source of lock or grip on the mouthpiece. With any pressure in the hose the mouthpiece is pressed outside the body of the ending. This movement creates a state where the hose presses onto the touch surface in the place where it encircles the thickening on the mouthpiece. Since by the movement of the mouthpiece outward the touch surface of the stop and the outer surface of the hose in

15 the zone with thickening are getting closer and the difference between the diameter of the touch surface and the diameter of the thickening is less than double the thickness of the wall of the hose, the hose is kept on the mouthpiece by the pressure between the touch surface and the thickening. The force necessary to move the mouthpiece in the opening of the body has to be smaller than the force necessary to pulling the hose

20 off the mouthpiece, which is simply ensured by the dimension of the thickening and the length of the mouthpiece. The overpressure in the hose in such arrangement acts mainly on the sliding of the mouthpiece to the stop, and thereby creates a pressure of the hose on the mouthpiece in the place of thickening.

The lock of the hose between the stop surface and the mouthpiece can –

25 except of the mechanical lock of the hose on the mouthpiece – ensure the tightness, seal of the hose against the mouthpiece, or a sealing can be inserted between the hose and the mouthpiece.

The mouthpiece can be sealed against the body of the ending by the sealing ring (gasket) which is mounted on the mouthpiece in its sealing zone. The sealing ring

30 can lean with its outer diameter on the inside of the circumferential wall or on the opening in the body of the ending. This sealing ring can also work as a stop against the movement of the mouthpiece outside the body in case there is no hose mounted on the mouthpiece. After the mounting of the hose it is not possible to move the

mouthpiece over the circumferential stop.

The thickening can have various shape; it is preferable if the shape is conical, by which the end of the hose is led onto the mouthpiece. It is also preferable if the touch surface of the stop has conical shape which corresponds to the conical shape of the thickening on the mouthpiece. This produces two parallel conical surfaces between which the material of the hose is gripped. The thickening can be produced during the injection molding of the mouthpiece or, in case the mouthpiece is metal, the thickening can be produced by shaping, rolling of the end of the mouthpiece.

In the preferable arrangement of the first group of realizations the body of the ending will have cylindrical shape. On the side designed for the insertion of the hose the ending will have central opening passing to the cavity of the ending. In the axis of the body a cylindrical mouthpiece is placed which is slidably led in the opening of the body of the ending. This opening is graduated in such a way that the inner front of the mouthpiece leans onto the mount in the opening of the body of the ending in the position where a gap is produced between the thickening on the mouthpiece and the touch surface of the stop, whereby this gap corresponds at least to the thickness of the wall of the hose. During the pressing of the hose onto the mouthpiece there is no significant force acting of the touch surface of the stop and the outer surface of the hose, which could prevent the sliding of the hose onto the mouthpiece. The cavity in the body of the mouthpiece has dimensions and shape which allow the flexible pushing of the end of the hose through the thickening onto the mouthpiece. The inner diameter of the cavity in the place of thickening which exists in the position when the mouthpiece is pressed into the body of the hose is larger than the sum of the diameter of the thickening and double of the thickness of the wall of the hose.

In case of second group of the realizations it will be preferable if the end of the hose is pulled firstly on the body of the ending without the mouthpiece and then the hose is pulled on the mouthpiece. The pulling of the hose on the mouthpiece in this phase is not hidden inside the body, which simplifies the pulling. Subsequently the body is moved on the hose towards the mouthpiece and the mouthpiece with the pulled-on hose is pushed inside the body. The advantage of the second group of the realizations is the compact and short construction of the ending which allows for connection of the larger diameters of the threads, for example outlets of the water or irrigation valves. The inner thread on the ending with its diameter suitable follows the

cavity of the body with the sealing zone of the mouthpiece. The body has an effective shape with the gradual transitions of the diameters and can be productively produced by the injection molding with relatively simple mold. Nor mouthpiece, neither body have small protruding segments or flexible elements which would have complicated the mold.

On one side the hose enters the body of the ending; on the other side the ending can have various connecting shape or it can be blinded in case the ending should close the hose. The other side of the ending can be equipped with thread and/or sealing for connection with another element and/or can be equipped by a flange or it can continue as a part of another component with which it forms a whole. The ending does not have to have cylindrical outer shape necessarily; mainly, for example, if it will be part of the other, superior component. What is essential is that the mouthpiece is placed slidably and against the thickening on the mouthpiece there is a touch surface of the stop produced and directed outside the hose and inside the ending; that is, so that force action of the stop acts against the pulling off of the mouthpiece with the mounted (pulled on) hose. The ending can also on the other side continue with the similar arrangement with the slidable mouthpiece, where the ending will form the connecting element for the connection of the two hoses.

The cylindrical mouthpiece is slidably inserted inside the body of the ending. In order to allow the sliding the mouthpiece in a different arrangement can be connected with the body of the ending by means of a flexible member, for example bellows, accordion joint. Such solution allows to produce the body of the ending together with the mouthpiece, for example, by means of the injection molding.

The advantage of the proposed technical solution is the simple construction with small number of components, and mainly the simple and very quick mounting of the hose onto the ending without tools; it suffices to press the end of the hose onto the mouthpiece in the cavity of the ending, or independently. The produced joint is very reliable since the increased pressure in the hose increases the pressure of the hose onto the mouthpiece, which increases the sealing effect of the joint. The joint is resilient against the material degradation of the hose, too, which hitherto required subsequent tightening of the screws of the endings. The proposed technical solution ensures continual delimiting and tightening of the connection of the hose with the mouthpiece even in applications where the ending is exposed to the vibrations, for

example in the engine space of the vehicles. Another advantage is the shape freedom of the cross-section of the hose; the solution is not limited to the cylindrical cross-section as is the case in case of screw mounts (sockets); the solution can be used even in cases of the hoses of rectangular shape, whereby the pressure of the hose
5 onto the mouthpiece is even alongside the circumference and it is not limited to the corners of the profile.

Suitable design of the technical solution can achieve the rotational freedom of the hose against the ending, too; given the absence of the pressure of the medium the hose can freely rotate together with the mouthpiece in the body of the ending.
10 Such solution is preferable in cases of many technical applications where there is a constant relative movement of the hose against the element to which the hose is connected by means of the ending.

Both main components – the body and the mouthpiece – have solid form without fragile protrusions and without flexible lamellas which in cases of known
15 solutions form means for pressing of the hose to the mouthpiece. Thanks to this the proposed solution is compact and durable even if it is used roughly and inconsiderately.

Another advantage of the proposed solution is the option of inability to disassemble the connection of the hose and the ending. The pull on the sliding out of
20 the hose from the mouthpiece creates a stronger lock of the hose in the mouthpiece, but only in case the mouthpiece is held on the stop directed inside the body of the hose; for example, by a simple tool it is possible to simply pull the hose off.

Description of drawings

25 The technical solution is further disclosed by means of the drawings 1 to 8. The used scale of the depiction and ratio of sizes of individual elements, for example, ratio of sizes of the mouthpiece and the body of the ending, does not have to correspond to the description in the examples and these scales and ratios of sizes cannot be interpreted as limiting the scope of protection.

30 Figures 1 to 4 depict the ending in the first group of realizations, where the mouthpiece is inserted to the body through the opening in the circumferential stop.

Figure 1 is a view of the ending during the insertion of the hose to the opening

of the ending, where the hose is directed onto the mouthpiece. The arrow denotes a direction of pushing of the hose onto the mouthpiece.

Figure 2 depicts the pushing of the hose onto the mouthpiece, which is leaned onto the stop in the opening of the body.

5 Figure 3 is a view of the working surface of the connection of the ending and the hose, where the hose is gripped between the stop and the thickening of the mouthpiece. The arrow denotes a direction of the force by which the mouthpiece with the hose are pressed against the circumferential stop.

10 Figure 4 depicts individual parts of the mouthpiece, where the waist gradually passes to the sealing zone.

Figure 5 depicts a solution where the mouthpiece is connected with the body of the ending by means of flexible bellows. The fold of the bellows is enlarged for the purposes of clarity; in reality the bellows can have different shape and size.

15 Figures 6 to 8 depict the ending from the second group of realizations, where the mouthpiece is pressed into the body from the opposite side than where the body has a circumferential stop with the opening for the hose.

Figure 6 depicts a hose during the pulling of the hose onto the mouthpiece. The arrow shows a direction of the movement of the mouthpiece inside the hose.

Figure 7 depicts an ending with the mounted hose in the active position.

20 Figure 8 depicts individual parts of the mouthpiece from the second group of the realizations; the sealing zone of the mouthpiece has an outer diameter larger than the waist and thickening.

Examples of realization of technical solution

25 Example 1

In this example according to figures 1 to 4 the ending is connected with the hose for the distribution of water. The ending has a body 3 produced from plastic, which is designed for connection with the armature. The ending has a stop 4 with the inner conical surface 6 which is oriented against the conical surface 5 on the
30 mouthpiece 1. The mouthpiece 1 is placed in the cavity of the ending; it is slidably led in the body 3 and it is sealed against the body 3 by means of the sealing ring 7. On

the mouthpiece 1 there is a thickening 2. The mouthpiece 1 proceeds further by the waist 8 with the diameter which corresponds to the inner diameter of the hose. The sealing zone 9 follows upon the waist 8. The mouthpiece 1 in this example of realization is inserted inside the body 3 through the opening in the circumferential stop 4. The outer diameter of the thickening 2 is smaller than the inner diameter of the opening in the circumferential stop 4 and at the same time the difference between the diameter of the stop 4 and the outer diameter of the thickening 2 is less than twice the thickness of the wall of the hose.

The hose is inserted into the opening in the ending and pushed onto the mouthpiece 1 by pressure. Thereby the mouthpiece 1 is pushed into the body 3. The subsequent pulling of the hose or the effect of the overpressure of the medium inside the hose causes a movement of the mouthpiece 1 with the mounted hose outside the body 3. The hose, deformed in the zone thickening 2, has a diameter that is larger than the opening in the stop 4 and the pushing out of the mouthpiece 1 from the body 3 is stopped at the stop 4. The conical surface 6 on the stop 4 and the conical surface 5 on the mouthpiece 1 hold the hose and thereby ensure its tightness against the mouthpiece 1.

After the release of the pressure in the hose the mouthpiece 1 can be once again moved into the body 3 of the ending; the visible space of the movement of the hose with the mouthpiece 1 does not affect the tightness of the join in any way.

In this example of realization there are inner conical surfaces produced in the cavity of the ending. The first conical surface leads the hose during the pushing onto the mouthpiece 1. The second conical surface forms a support for the sealing ring 7, whereby it delimits its course of movement during the pulling out of the mouthpiece 1.

In this example the body 3 with the circumferential wall and stop 4 is pressed from the plastic as a single component. The other independent component of the ending is the plastic mouthpiece 1. The sealing ring 7 keeps the mouthpiece 1 in the body 3 during the state without the mounted hose. After the hose is mounted, the mouthpiece 1 cannot be pulled out of the ending.

Example 2

Ending in this example according to figure 5 forms a part of the suction pipe of

the engine. The mouthpiece 1 and the body 3 are produced as one whole from the plastic. In order to allow the movement of the mouthpiece 1 against the body 3, the mouthpiece 1 is connected with the body 3 by means of flexible bellow, so-called accordion. A hose is mounted onto the mouthpiece 1 with approximately rectangular cross-section with rounder corners; the reverse movement of the mouthpiece 1 with the hose causes its locking on the stop 4. The stop 4 in this example has a form of a ring which has opening corresponding to the profile of the hose and the profile of the mouthpiece 1, and it is connected with the body 3 by four draw rods. The draw rods produce an advantageous semi-solid fixing of the hose into the body 3, whereby the bellow causes prestress which keeps the pressure of the stop 4 on the hose, which ensures the tightness of the joint even in case of underpressure in the suction pipe.

Example 3

In this example according to figures 6 to 8 the ending is designed for connection of the hose with the water valve. The ending has a plastic body 3 which has grooves on the outer circumference in order to simplify the screwing of the body 3 to the outer thread on the water valve. A flat circular seal (sealing) 10, leaning on the mount in the body 3, is used in order to seal the ending against the water valve.

The body 3 has a circumferential stop 4 on one end, whereby the stop 4 is oriented against the thickening 2 on the mouthpiece 1. The mouthpiece 1 is inserted inside the body 3 from the side which has a thread for connection to the water valve. The mouthpiece 1 has thickening 2 with a conical surface 5, it also has a waist 8 which is followed by a sealing zone 9. The sealing zone 9 in this example has a disc with a diameter larger than the outer diameter of the thickening 2. There is a groove in the disc, and inside the groove is a sealing ring 7. The mouthpiece 1 is placed in the cavity of the ending; it is slidably led in the body 3 and it is sealed against the body 3 by means of the sealing ring 7. The disc is slidably led in the cylindrical cavity of the body 3.

The hose is first mounted on the body 3 without the mouthpiece 1. Then the end of the hose is pulled onto the mouthpiece 1. The end of the hose is pulled on the thickening 2 and on the waist 8 towards the disc in the sealing zone 9. The body is moved to the end of the hose and the end of the hose together with the mouthpiece 1 is pushed inside the body 3. The body 3 with the sealing 10 is connected to the outlet

of the water valve. The pressure of the water pushes the mouthpiece 1 against the stop 4 which presses onto the surface of the hose in the place of thickening 2. After the release the joint and the ending are simple to disassemble and they can be used repeatedly on other hoses with approximately similar diameter and thickness of the
5 wall.

The outer pull on the hose, for example during the manual pulling of the hose, acts in the direction of the movement of the mouthpiece 1 with the mounted hose outside the body 3. The hose in the zone of thickening 2 has a diameter which is larger than the opening in the stop 4 and the pulling out of the mouthpiece 1 from the
10 body 3 is stopped at the stop 4.

In this example of realization, the groove is produced on the inner diameter of the opening in the circumferential stop 4 and the “O” ring is inserted into the groove, whereby the ring holds the hose and allows the rotation of the hose with the mouthpiece 1 against the body 3.

15 The body 3 is pressed from the plastic as a single component; the mouthpiece 1 is pressed as the other component. Both main components have solid form without fragile protrusions and flexible lamellas, such as those known in the state of the art.

Industrial applicability

20 Industrial applicability of the technical solution is obvious. According to this technical solution it is possible to industrially and repeatedly produce and use the endings of hoses for various uses, such as air, water or other liquids distribution in the industry or in vehicles, agriculture and at home.

List of related symbols

- 1 - mouthpiece
- 2 - thickening
- 3 - body
- 5 4 - stop
- 5 - conical surface on the mouthpiece
- 6 - conical surface on the stop
- 7 - sealing ring
- 8 - waist of the mouthpiece
- 10 9 - sealing zone
- 10 - seal / sealing

PATENT CLAIMS

1. An ending of a hose, mainly as a connecting element, where the ending includes a body (3) and a mouthpiece (1) connected with the body (3); the mouthpiece (1) is designed in such a way that an end of the hose can be pushed onto it, and the mouthpiece (1) has a thickening (2) on its outer end designed for holding of the hose on the mouthpiece (1); whereby the ending has a circumferential stop (4) with an opening for the hose placed in an axis of the mouthpiece (1); the mouthpiece (1) has a waist (8) for a pulling on of the hose and the waist (8) follows upon the thickening (2),
- is characterized by the fact, that
- the mouthpiece (1) is slidably placed inside the body (3) in order to achieve a movement freedom of the mouthpiece (1) towards the stop (4);
- the stop (4) is connected with the body (3), whereby the stop (4) has a touch surface on its circumference, whereby the touch surface is oriented inside, against the thickening (2) on the mouthpiece (1); and
- an outer diameter of the thickening (2) is larger than an inner diameter of the stop (4); or a difference between the outer diameter of the thickening (2) and the inner diameter of the stop (4) is less than twice the thickness of a wall of the hose.
2. The ending of the hose, mainly as the connecting element, according to the claim 1 is characterized by the fact, that the mouthpiece (1) has a sealing zone (9) which is designed for slidable connection with an inner surface of the body (3), and the slidable connection includes a sealing ring (7).
3. The ending of the hose, mainly as the connecting element, according to the claim 1 is characterized by the fact, that the mouthpiece (1) is connected with the body (3) by means of a flexible bellow.
4. The ending of the hose, mainly as the connecting element, according to the claim 2 is characterized by the fact, that the sealing zone (9) and the thickening (2) have the outer diameter that is identical to or smaller than the inner

diameter of the opening in the stop (4) and the mouthpiece (1) is designed for an insertion into the body (3) through the opening in the stop (4).

5. The ending of the hose, mainly as the connecting element, according to the claim 4 is characterized by the fact, that a cavity in the body (3) has a mount as the stop (4) for a front surface of the mouthpiece (1).
6. The ending of the hose, mainly as the connecting element, according to the claim 2 is characterized by the fact, that the sealing zone (9) has the outer diameter that outer diameter that is larger than the inner diameter of the opening in the stop (4) and the mouthpiece (1) is designed for the insertion of the body (3) from a side that is opposite to the stop (4).
7. The ending of the hose, mainly as the connecting element, according to the claim 6 is characterized by the fact, that the sealing zone (9) includes a disc with a groove into which the sealing ring (7) is inserted, whereby the disc follows upon the waist (8) of the mouthpiece (1).
8. The ending of the hose, mainly as the connecting element, according to the claim 6 or 7 is characterized by the fact, that the thickening (2) has the outer diameter that is larger than the outer diameter of the opening in the stop (4).
9. The ending of the hose, mainly as the connecting element, according to any of the claims 6 to 8 is characterized by the fact, that the body (3) has an inner thread with a diameter larger than the outer diameter of the sealing zone (9) on a side opposite to the stop, and the body (3) has a flat sealing (10) for sealing of a connection of the ending with a connected element; whereby the sealing (10) leans onto the mount in the body (3) by an end of the inner thread.
10. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 9 is characterized by the fact, that the mouthpiece (1) is placed in the cylindrical cavity of the body (3), whereby the axis of the mouthpiece (1), the axis of the body (3) and the axis of the stop (4) with the opening are identical.

11. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 10 is characterized by the fact, that the stop (4) is connected with the body (3) by a circumferential wall; the circumferential wall produces the cavity inside which the mouthpiece (1) is placed, whereby there is a gap with a dimension at least identical to the thickness of the wall of the hose between the circumferential wall and the mouthpiece (1).
12. The ending of the hose, mainly as the connecting element, according to the claim 11 is characterized by the fact, that the circumferential wall is a continuation of the cylindrical body (3).
13. The ending of the hose, mainly as the connecting element, according to the claim 11 or 12 is characterized by the fact, that the circumferential wall has an inner conical surface for leading of the hose and an inner conical surface for a delimitation of a movement of the sealing ring (7).
14. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 13 is characterized by the fact, that the opening in the circumferential stop (4) is equipped by a cone oriented outside for purposes of the leading of the hose into the body (3).
15. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 14 is characterized by the fact, that the opening in the circumferential stop (4) has the groove with the ring in order to seal the hose against the body (3).
16. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 10 is characterized by the fact, that the stop (4) is connected with the body (3) by means of at least two, preferably three draw rods.
17. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 16 is characterized by the fact, that the stop (4) has an inner conical surface (6) and the mouthpiece (1) has on the thickening (2) an outer conical surface (5); preferable both conical surfaces (5, 6) have a same angle.

18. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 17 is characterized by the fact, that the mouthpiece (1) has a cylindrical or elliptical or flattened cross-section, or rectangular or polygonal cross-section with rounded corners.
- 5 19. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 18 is characterized by the fact, that the body (3) is a part of a piping system.
20. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 19 is characterized by the fact, that the body (3) is
10 plastic.
21. The ending of the hose, mainly as the connecting element, according to any of the claims 1 to 20 is characterized by the fact, that the mouthpiece (1) is plastic or metal.

AMENDED CLAIMS

received by the International Bureau on 16 November 2018 (16.11.18)

1. An ending for a hose, mainly as a connecting element, where the ending includes a body (3) and a mouthpiece (1) connected with the body (3); the mouthpiece (1) is designed in such a way that an end of the hose can be pushed onto it, and the mouthpiece (1) has a thickening (2) on its outer end designed for holding of the hose on the mouthpiece (1); whereby the ending has a circumferential stop (4) with an opening for the hose placed in an axis of the mouthpiece (1); the mouthpiece (1) has a waist (8) for a pulling on of the hose and the waist (8) follows upon the thickening (2),
- is characterized by the fact, that
- the mouthpiece (1) is slidably placed inside the body (3) in order to achieve a movement freedom of the mouthpiece (1) towards the stop (4);
- the stop (4) is connected with the body (3), whereby the stop (4) has a touch surface on its circumference, whereby the touch surface is oriented inside, against the thickening (2) on the mouthpiece (1); and
- an outer diameter of the thickening (2) is larger than an inner diameter of the stop (4); or a difference between the outer diameter of the thickening (2) and the inner diameter of the stop (4) is less than twice the thickness of a wall of the hose, hose, for which the ending is intended.
2. The ending for the hose, mainly as the connecting element, according to the claim 1 is characterized by the fact, that the mouthpiece (1) has a sealing zone (9) which is designed for slidable connection with an inner surface of the body (3), and the slidable connection includes a sealing ring (7).
3. The ending for the hose, mainly as the connecting element, according to the claim 1 is characterized by the fact, that the mouthpiece (1) is connected with the body (3) by means of a flexible bellow.
4. The ending for the hose, mainly as the connecting element, according to the claim 2 is characterized by the fact, that the sealing zone (9) and the thickening (2) have the outer diameter that is identical to or smaller than the inner

diameter of the opening in the stop (4) and the mouthpiece (1) is designed for an insertion into the body (3) through the opening in the stop (4).

- 5 5. The ending for the hose, mainly as the connecting element, according to the claim 4 is characterized by the fact, that a cavity in the body (3) has a mount as the stop (4) for a front surface of the mouthpiece (1).
6. The ending for the hose, mainly as the connecting element, according to the claim 2 is characterized by the fact, that the sealing zone (9) has the outer diameter that outer diameter that is larger than the inner diameter of the opening in the stop (4) and the mouthpiece (1) is designed for the insertion of the
10 body (3) from a side that is opposite to the stop (4).
7. The ending for the hose, mainly as the connecting element, according to the claim 6 is characterized by the fact, that the sealing zone (9) includes a disc with a groove into which the sealing ring (7) is inserted, whereby the disc follows upon the waist (8) of the mouthpiece (1).
- 15 8. The ending for the hose, mainly as the connecting element, according to the claim 6 or 7 is characterized by the fact, that the thickening (2) has the outer diameter that is larger than the outer diameter of the opening in the stop (4).
9. The ending for the hose, mainly as the connecting element, according to any of
20 the claims 6 to 8 is characterized by the fact, that the body (3) has an inner thread with a diameter larger than the outer diameter of the sealing zone (9) on a side opposite to the stop, and the body (3) has a flat sealing (10) for sealing of a connection of the ending with a connected element; whereby the sealing (10) leans onto the mount in the body (3) by an end of the inner thread.
- 25 10. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 9 is characterized by the fact, that the mouthpiece (1) is placed in the cylindrical cavity of the body (3), whereby the axis of the mouthpiece (1), the axis of the body (3) and the axis of the stop (4) with the opening are identical.

11. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 10 is characterized by the fact, that the stop (4) is connected with the body (3) by a circumferential wall; the circumferential wall produces the cavity inside which the mouthpiece (1) is placed, whereby there is a gap with a dimension at least identical to the thickness of the wall of the hose between the circumferential wall and the mouthpiece (1).
12. The ending for the hose, mainly as the connecting element, according to the claim 11 is characterized by the fact, that the circumferential wall is a continuation of the cylindrical body (3).
13. The ending for the hose, mainly as the connecting element, according to the claim 11 or 12 is characterized by the fact, that the circumferential wall has an inner conical surface for leading of the hose and an inner conical surface for a delimitation of a movement of the sealing ring (7).
14. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 13 is characterized by the fact, that the opening in the circumferential stop (4) is equipped by a cone oriented outside for purposes of the leading of the hose into the body (3).
15. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 14 is characterized by the fact, that the opening in the circumferential stop (4) has the groove with the ring in order to seal the hose against the body (3).
16. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 10 is characterized by the fact, that the stop (4) is connected with the body (3) by means of at least two, preferably three draw rods.
17. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 16 is characterized by the fact, that the stop (4) has an inner conical surface (6) and the mouthpiece (1) has on the thickening (2) an outer conical surface (5); preferable both conical surfaces (5, 6) have a same angle.

18. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 17 is characterized by the fact, that the mouthpiece (1) has a cylindrical or elliptical or flattened cross-section, or rectangular or polygonal cross-section with rounded corners.
- 5 19. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 18 is characterized by the fact, that the body (3) is adapted to be a part of a piping system.
20. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 19 is characterized by the fact, that the body
10 (3) is plastic.
21. The ending for the hose, mainly as the connecting element, according to any of the claims 1 to 20 is characterized by the fact, that the mouthpiece (1) is plastic or metal.

Statement under Article 19(1)

Written opinion evaluates the first claim without the last three lines of the feature part where the hose thickness is stated. The hose is not part of a defined ending, but the ending is literally intended for a particular hose. We have added wording „for which the ending is intended“ to the term hose at the end of the first claim.

Hose is not part of the ending, but each ending is intended for a particular hose and therefore the dimensional arrangement of the ending relates to the dimensions of the hose. This feature is not presented in prior state of the art according to D1 to D7 and at the same time it provides a substantial advantage. Thanks to this dimensional relation the mouthpiece connected with the hose is supported by a stop and the pressure in the hose increases that downforce. This also results in a simple construction without a twist connection of the stop to the body of the ending. Prior state of the art is characterized by multiple components and complicated constructions.

This feature can not be created by any combination of the documents D1 to D7 and we consider it to be a novelty and inventive.

Other claims 2 to 21 are dependent on the first claim and they meet criteria for novelty and inventive step based on the dependency on the first claim.

We have amended the wording of the claim 19 to make it clear, that the piping system is not a part of the claimed subject-matter, but claimed ending can be intended as a part of piping system.

We have corrected wording „An ending of a hose“ to "An ending for a hose" in all claims.

Amendments of claims 2 to 18, 20 and 21 are only of grammatical nature and no new feature was moved into the claims by those amendments.

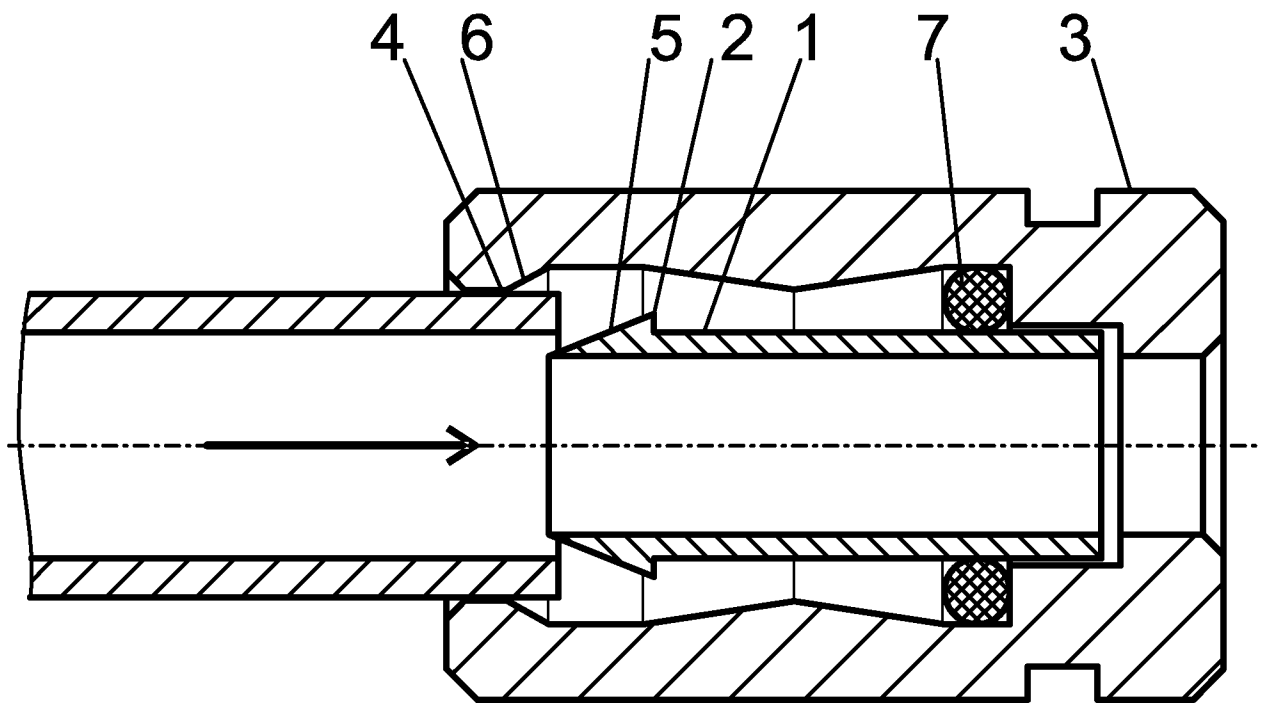


Fig. 1

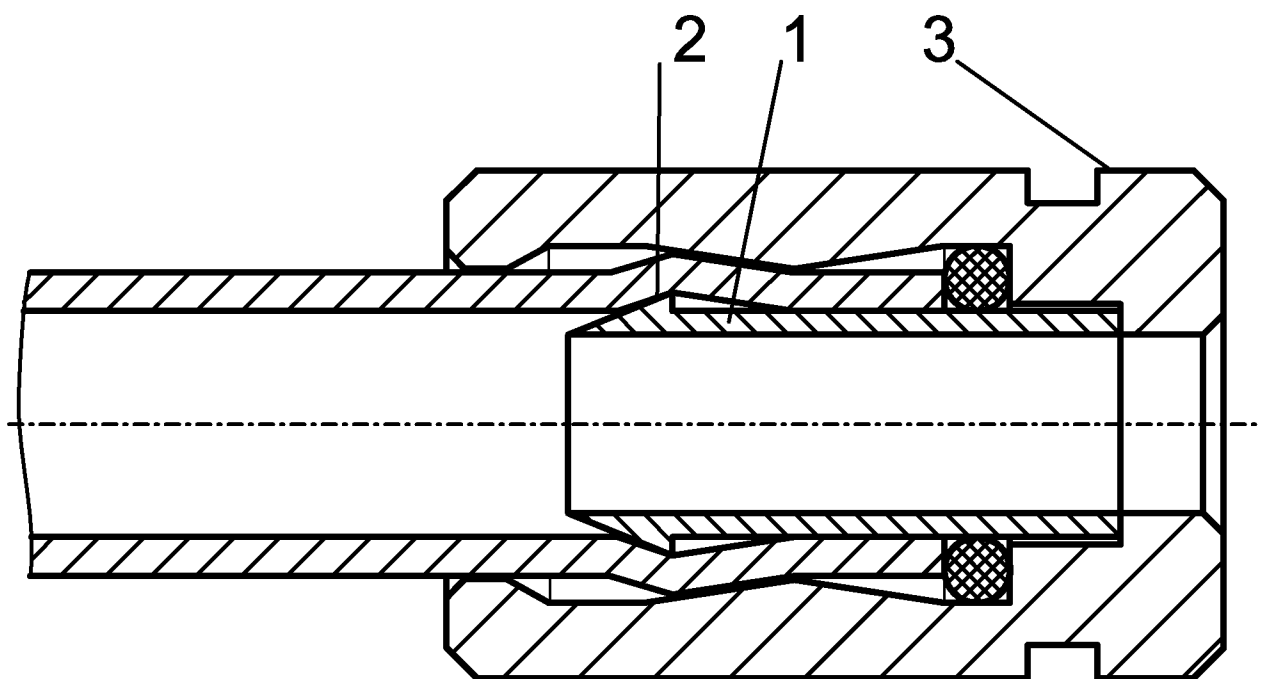


Fig. 2

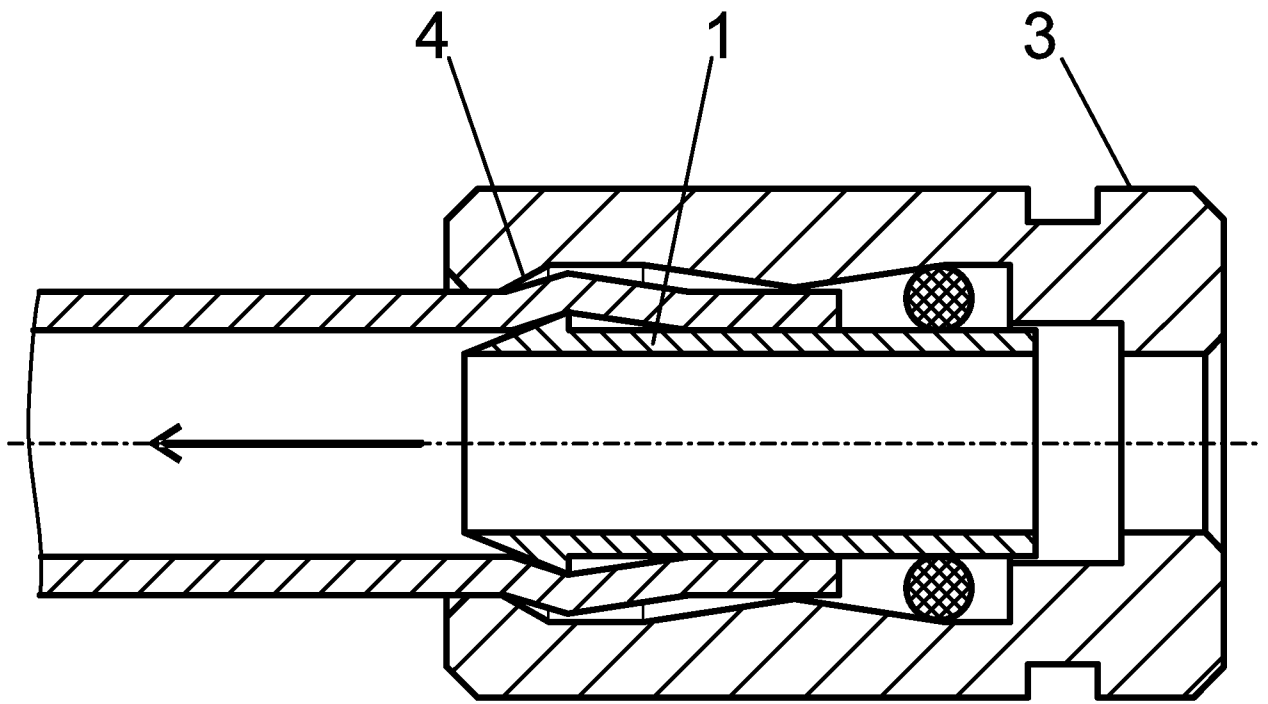


Fig. 3

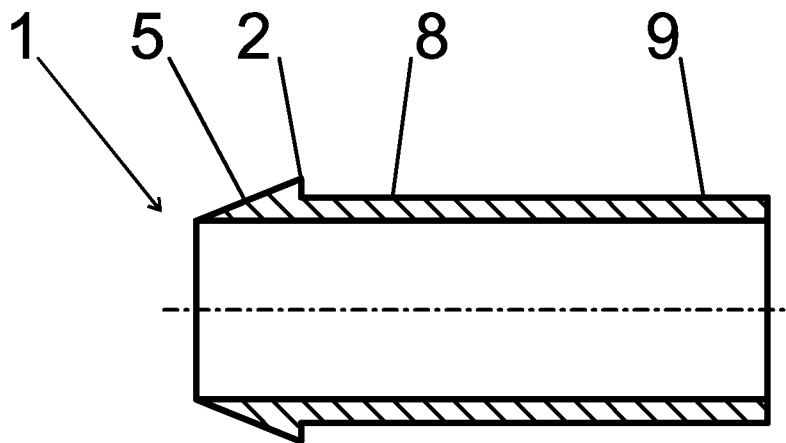


Fig. 4

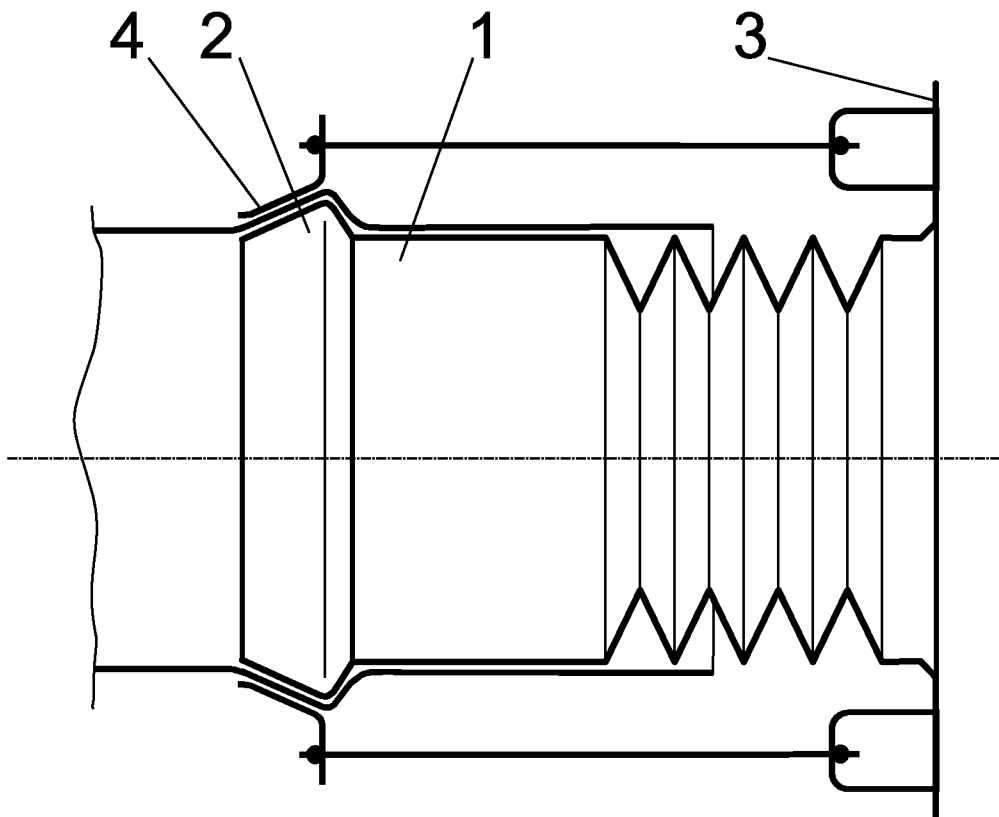


Fig. 5

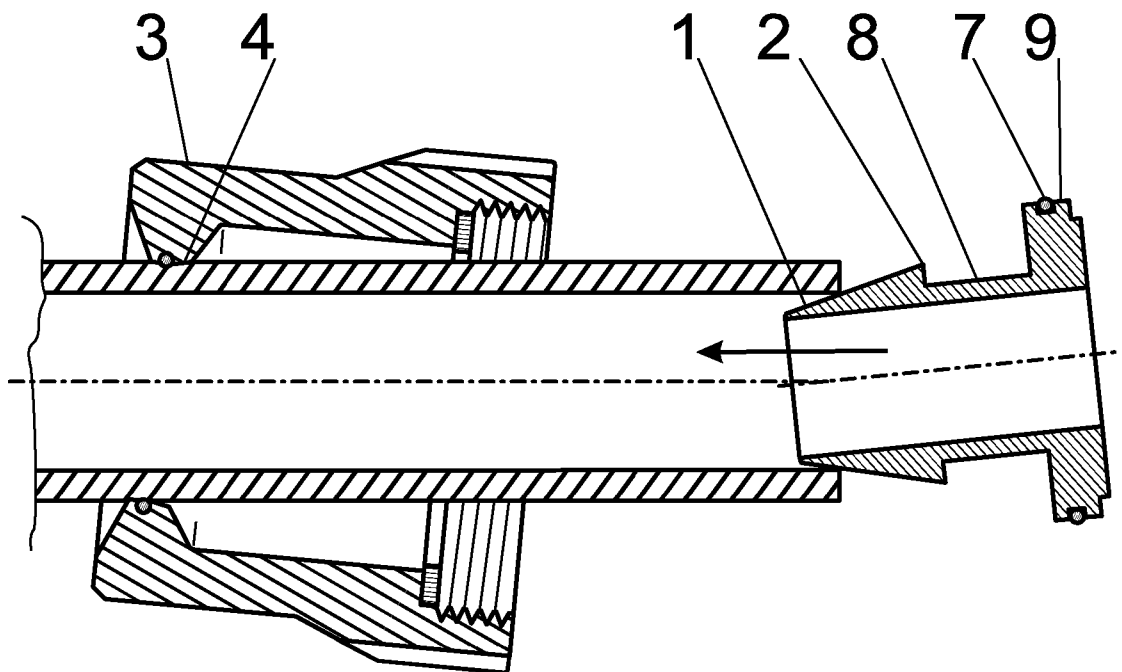


Fig. 6

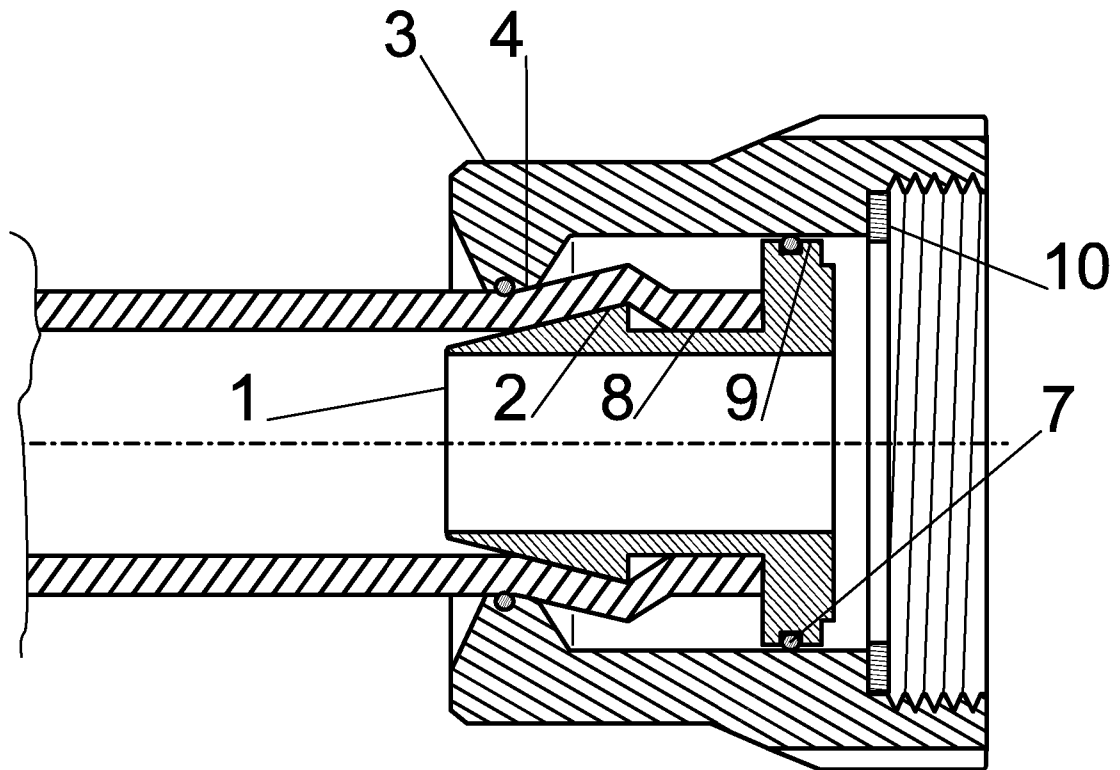


Fig. 7

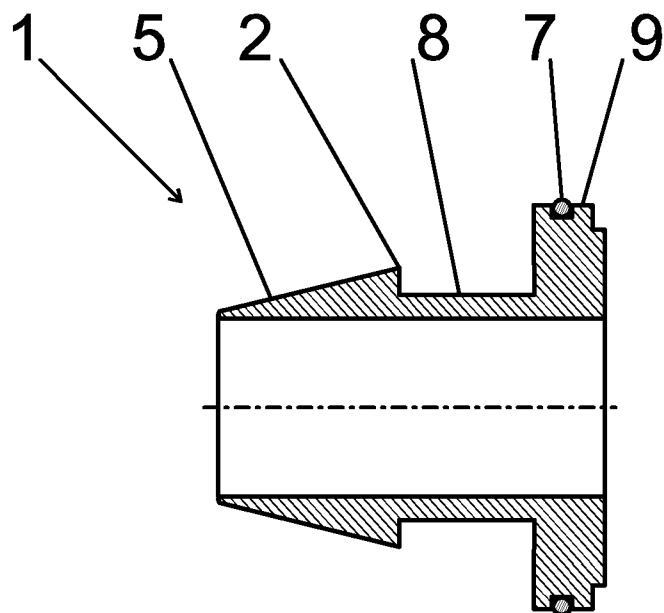


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2018/054185

A. CLASSIFICATION OF SUBJECT MATTER
 INV. F16L33/16 F16L33/22
 ADD.

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)
 F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH 128 924 A (PLANQUE FRANCOIS [CH]) 16 November 1928 (1928-11-16)	1,2, 10-12, 14,17-21
A	page 1, right-hand column, last paragraph - page 2, left-hand column, paragraph 1; figures	3
X	EP 0 310 234 A2 (BRIDGESTONE FLOWTEC [JP]) 5 April 1989 (1989-04-05)	2,4-15, 17,18, 20,21
A	figures	3
X	US 1 853 584 A (STODDARD ALBERT D) 12 April 1932 (1932-04-12) figures	1,16
	----- -/--	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

5 September 2018

Date of mailing of the international search report

18/09/2018

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

dall'Amico, Mauro

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2018/054185

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 047 714 A (SMITH WILLIAM A) 14 July 1936 (1936-07-14) figure 3 -----	1,6,11, 13
X	GB 2 051 280 A (GUEST SOUTHERN LTD JOHN) 14 January 1981 (1981-01-14) figures 5, 6 -----	1
X	GB 692 787 A (BOWDEN ENG LTD) 17 June 1953 (1953-06-17) figure 3 -----	1
A	WO 2016/132745 A1 (HITACHI METALS LTD) 25 August 2016 (2016-08-25) paragraph [0002]; figures & US 2018/038533 A1 (IBAYASHI MAKOTO [JP] ET AL) 8 February 2018 (2018-02-08) -----	3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2018/054185

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CH 128924	A	16-11-1928	NONE
EP 0310234	A2	05-04-1989	AU 2142688 A 06-04-1989
		DE 3850549 D1	11-08-1994
		DE 3850549 T2	26-01-1995
		EP 0310234 A2	05-04-1989
		JP H0633844 B2	02-05-1994
		JP H01153891 A	16-06-1989
		US 4906030 A	06-03-1990
		US 5076614 A	31-12-1991
		US 5150924 A	29-09-1992
US 1853584	A	12-04-1932	NONE
US 2047714	A	14-07-1936	NONE
GB 2051280	A	14-01-1981	NONE
GB 692787	A	17-06-1953	NONE
WO 2016132745	A1	25-08-2016	CN 107250644 A 13-10-2017
		JP WO2016132745 A1	30-11-2017
		US 2018038533 A1	08-02-2018
		WO 2016132745 A1	25-08-2016