

(19) **DANMARK**

(10) **DK/EP 2310593 T3**



(12)

Oversættelse af
europæisk patentskrift

Patent- og
Varemærkestyrelsen

-
- (51) Int.Cl.: **E 04 D 13/14 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2016-01-11**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2015-09-30**
- (86) Europæisk ansøgning nr.: **09765960.1**
- (86) Europæisk indleveringsdag: **2009-06-10**
- (87) Den europæiske ansøgnings publiceringsdag: **2011-04-20**
- (86) International ansøgning nr.: **FI2009050491**
- (87) Internationalt publikationsnr.: **WO2009153394**
- (30) Prioritet: **2008-06-16 FI 20085590**
- (84) Designerede stater: **AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR**
- (73) Patenthaver: **SK Tuote Oy, Kauppatie 9 , Sepänkylä, 65610 Mustasaari, Finland**
- (72) Opfinder: **SAIKKONEN, Eero, Pohjoinen Puutarhatie 8, FI-65370 Vaasa, Finland**
- (74) Fuldmægtig i Danmark: **PLOUGMANN & VINGTOFT A/S, Rued Langgaards Vej 8, 2300 København S, Danmark**
- (54) Benævnelse: **FLEKSIBELT RØR TIL EN RØRKONSTRUKTION SOM STRÆKKER SIG IGENNEM ET TAG**
- (56) Fremdragne publikationer:
EP-A1- 0 339 234
EP-A2- 0 131 086
WO-A1-89/05893
DE-C2- 19 605 462
US-A- 3 436 880
US-A- 3 874 138
US-A- 5 245 804
US-A- 5 694 724
US-A1- 2003 037 498

DESCRIPTION

[0001] This invention relates to a flexible pipe for a pipe construction extending through a roof, whereby the flexible pipe is an accordion-like pipe made of rubber and having a cylindrical upper end intended to be slipped onto the lower end of a pipe part extending above the roof, and a cylindrical lower part intended, in turn, to be slipped onto i.e around the upper end of a lower pipe part which ends underneath the roof, said cylindrical parts being attachable to the ends of said pipe parts by means of hose clamps. Such constructions are used when sewer vent pipes, ventilation pipes for air-conditioning, cooker-hood exhaust pipes etc. are passed through the roof out of the building. Due to the flexible pipe, the pipes do not need to be aligned while the accordion-like construction compensates the contractions of the pipes and the movements of the structures.

[0002] A drawback of a flexible pipe of the above-mentioned type is a risk of leakage which may occur especially in the winter, when condensate is formed inside the pipe flowing along the wall of the pipe and penetrating partly at the upper part of the flexible pipe, into the space between the cylindrical part of the flexible pipe and the pipe part surrounding said pipe part, a possible water leakage being thus prevented only by a hose clamp.

[0003] Such water leakage has been attempted to prevent with a solution in which to the lower end of the flexible pipe a rigid plastic part having a greater thickness than the accordion-like part has been attached, the free end of which has been formed to fit tightly inside the socket of the pipe to be connected. According to one embodiment the accordion-like part of the flexible pipe has been made of plastics, whereby the wall thickness has been less than one millimetre. The accordion-like part has been attached to the thick cylindrical plastic part by gluing. Drawbacks of such flexible pipe are its complicated manufacture and laborious mounting; furthermore, there is a risk that the glue-joint will break. In addition, higher expenses are caused by the fact that according to the provisions the pipe end to be connected must be provided with a socket.

[0004] Also from EP 0 339 234 A1 a flexible pipe is known having cylindrical lower end intended to be slipped into the upper end of a lower pipe part. The problem with such a lower end is that it has to be dimensioned very exactly is also the pipe part into which it is intended to be slipped, in order to have a sufficiently strong and secure joint.

[0005] The object of the present invention is to provide such a flexible pipe in which these problems have been eliminated. This object is achievable by a pipe which is characterized in that inside the cylindrical lower end of the flexible pipe a cylindrical collar has been mounted having an outer diameter corresponding to the inner diameter of the pipe part to be connected to the lower end of the flexible pipe and said collar being joined in its upper end tightly to the inner surface of the cylindrical lower end so that between the cylindrical collar and the cylindrical part surrounding the collar a receiving space is formed to receive the upper end of the pipe part to be connected thereto. Due to this, a flexible pipe is obtained being simply to manufacture and secure to use, whereby the flexibility of the rubber allows the wall thickness of the flexible pipe to be of the same dimension as the wall of the pipe to be connected, which flexible pipe can be manufactured in one manufacturing step without gluing or other joining of the components. Due to the above-described construction the flexible pipe according to the invention, the pipe to which it is to be connected does not have to be a socket pipe.

[0006] In order to facilitate mounting of the flexible pipe, the cylindrical collar in the lower end of the flexible pipe is arranged to extend farther out of the flexible pipe than the cylindrical part surrounding it. Due to this it is possible to see during the mounting step that the cylindrical collar does not get wrinkled but the free end of it can be inserted into the pipe to be connected before the cylindrical part surrounding the same is slipped onto said pipe to be connected. Due to the cylindrical collar water dripping from the upper end of the pipe will flow downwards along the pipe and remain permanently inside the pipe thus being prevented from penetrating to the outer surface of the pipe at the point of the host clip clamping the cylindrical part. Thus, the only function of the host clamp clamping the cylindrical part of the lower end of the flexible pipe is to arrest the flexible pipe to the pipe to be connected thereto.

[0007] Suitable material for the manufacture of the flexible pipe is so-called EPDM rubber, i.e. ethylene-propylene-diene monomer rubber.

[0008] In the following the invention is described in more detail with reference to the accompanying drawings, wherein

Fig. 1 shows an example of the construction to which the flexible pipe according to the invention has been mounted, seen from three different directions,

Fig. 2 shows a perspective view of the construction of figure 1, seen diagonally from above,

Fig. 3 shows the detail E of figure 1 in enlarged scale,

Fig. 4 shows the detail D of figure 1 in enlarged scale,

Fig. 5 shows the detail C of figure 1 in even more enlarged scale, and

Fig. 6 shows the detail B of figure 1 in even more enlarged scale.

[0009] The pipe construction shown in figures 1 and 2 passing through a roof, comprises a socket-free lower pipe part 1 for e.g. a ventilation pipe, said pipe part 1 ending underneath the roof, a flexible pipe 2 according to the invention mounted to the upper end of said pipe part 1 as well as a pipe part 3 extending above the roof and being mounted to the upper end of the flexible pipe.

[0010] The flexible pipe is an accordion-like pipe, made of rubber, comprising a cylindrical upper end 2a intended to be slipped onto the lower end of the pipe part 3 extending above the roof, and a cylindrical lower end 2b intended, in turn, to be slipped onto the upper end of the lower pipe part 1 which ends underneath the roof. Said cylindrical parts 2a and 2b are mountable to the ends of said pipe part 3 and said pipe part 1 by means of hose clamps 4a and 4b.

[0011] According to the invention, inside the cylindrical lower end 2b of the flexible pipe a cylindrical collar 2c has been arranged, having an outer diameter corresponding to the inner diameter of the pipe part 1 to be connected to the lower end of the flexible pipe 2, and said collar being joined in its upper end tightly to the inner surface of the cylindrical lower end 2b so that between the cylindrical collar 2c and the cylindrical part 2b surrounding the collar a cylindrical receiving space is formed to receive the upper end of the pipe part 1 to be connected. This construction enables effective prevention of any water leakage from the pipe, since the water flowing along the inner walls of the flexible pipe will flow from the inner surface of the cylindrical part 2b to the inner surface of the cylindrical collar 2c and does not come into contact with the inner surface of the pipe part 1 until it reaches the lower end of the cylindrical collar 2c.

[0012] According to a preferred embodiment, the cylindrical collar 2c of the flexible pipe 2 extends farther away from the accordion-like part of the flexible pipe 2 than the cylindrical part 2b surrounding it which facilitates mounting of the pipe, because the free end of the cylindrical collar can be mounted inside the lower pipe part 1 before the cylindrical part 2b will be slipped onto the upper part of said pipe part 1. This enables to secure that the cylindrical collar 2c does not get wrinkled during mounting.

[0013] The flexible pipe 2 is manufactured from EPDM rubber, i.e. ethylene-propylene-diene monomer rubber, the durability (strength) and flexibility properties of which have been proved suitable for use in the flexible pipe according to the invention.

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

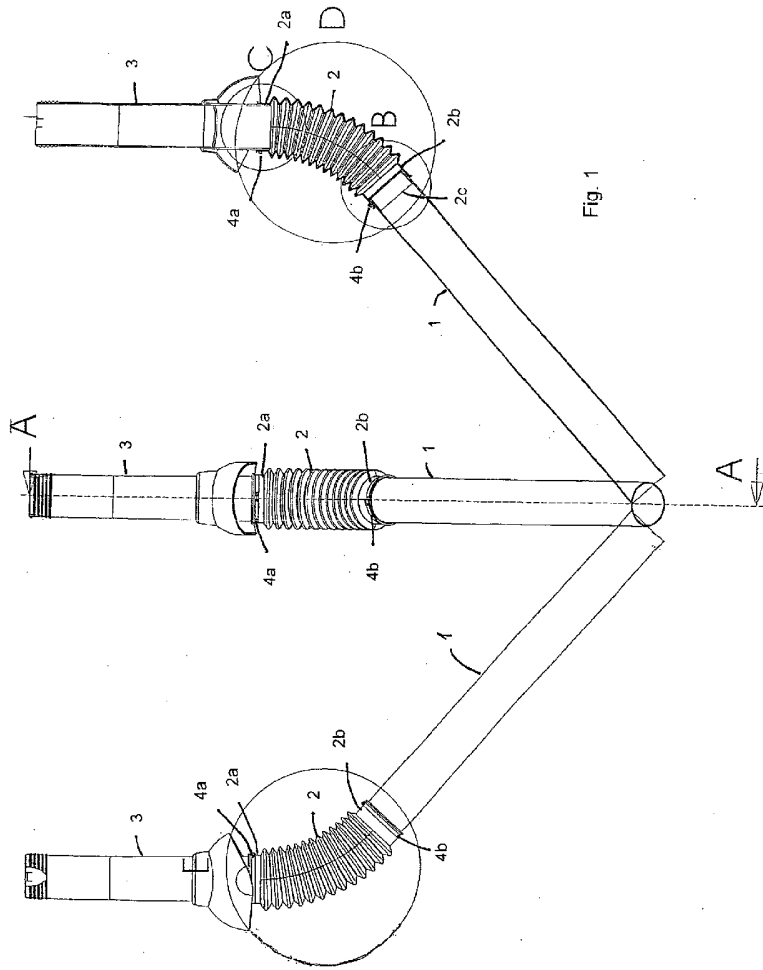
- [EP0339234A1 \[0004\]](#)

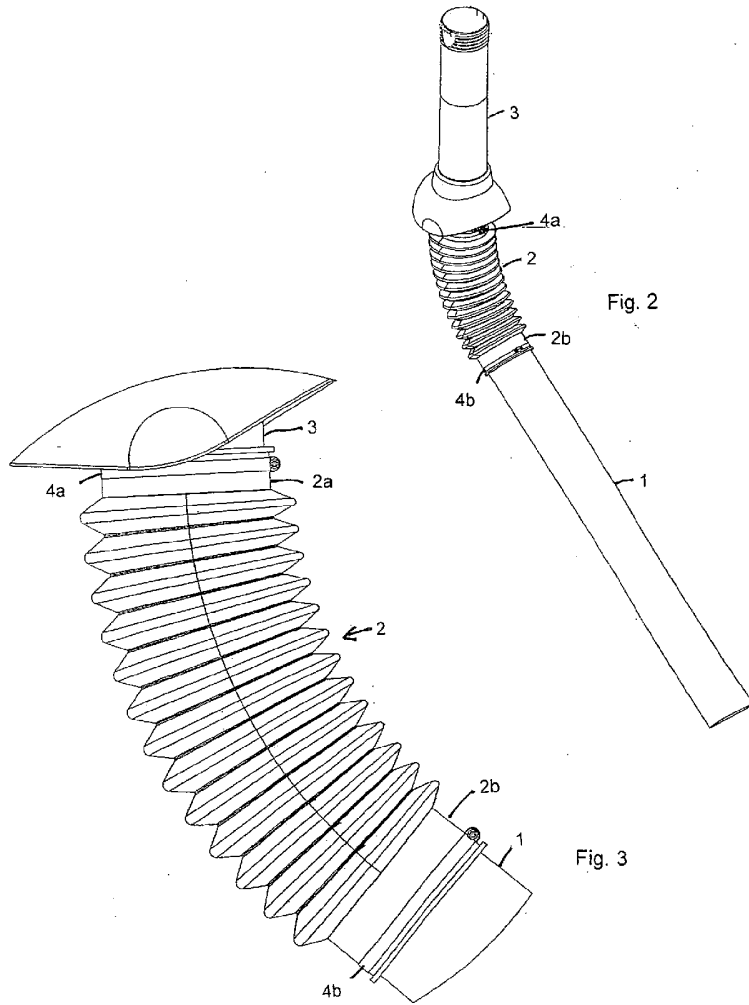
Patentkrav

1. Flexibelt rør (2) til en rørkonstruktion som strækker sig igennem et tag, hvor det fleksible rør er et harmonikagtigt rør, lavet af gummi, med en cylindrisk øvre
5 ende (2a) beregnet til at blive gledet over på den nedre ende af en rørdel (3) som strækker sig over taget, og en cylindrisk nedre del (2b) beregnet, igen til at blive gledet over på dvs. rundt om den øvre ende af en nedre rørdel (1) som slutter under taget, hvor de cylindriske dele (2a, 2b) kan fastgøres til enderne af rørdelene (3,1) ved hjælp af værtsklemmer (4a, 4b), **kendetegnet ved at** inden
10 i den cylindriske nedre del (2b) af det fleksible rør (2) er en cylindrisk krave (2c) blevet anbragt som strækker sig længere ud af det fleksible rør (2) end den cylindriske del (2b) som omgiver den og med en ydre diameter svarende til den indre diameter af rørdelen (1) som skal forbindes med den nedre ende af det fleksible rør (2) og hvor kraven er sammensluttet i sin øvre ende tæt på
15 inderfladen af den cylindriske nedre ende (2b) således at mellem den cylindriske krave (2c) og den cylindriske del (2b) som omgiver kraven er et modtagelsesrum dannet til at modtage den øvre ende af rørdelen (1) som skal forbindes dertil.

2. Det fleksible rør (2) ifølge krav 1, **kendetegnet ved at** som materiale af røret
20 er EPDM-gummi blevet anvendt.

DRAWINGS





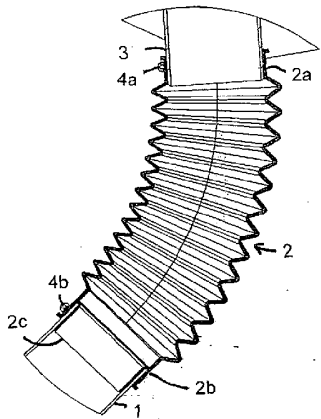


Fig. 4

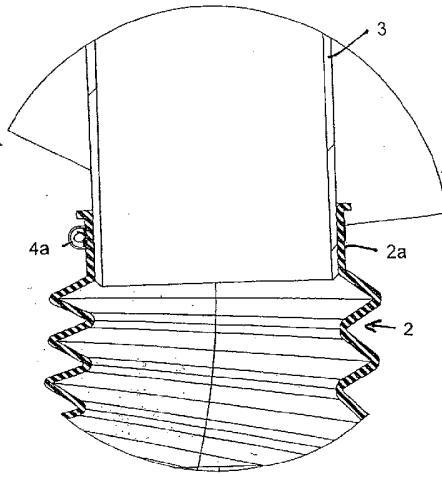


Fig. 5

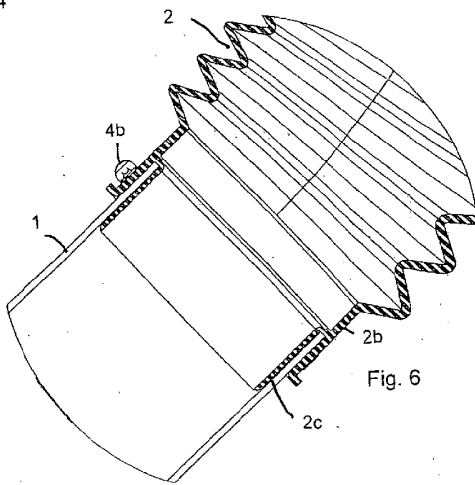


Fig. 6