PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :		(11) International Publication Number:
F16L 33/00, B21K 1/16	A1	WO 91/10859
		(43) International Publication Date: 25 July 1991 (25.07.91)

(21) International Application Number: PCT/SE91/00026

(22) International Filing Date: 16 January 1991 (16.01.91)

(30) Priority data:
9000150-4 16 January 1990 (16.01.90) SE

(71) Applicant *(for all designated States except US):* AB VOLVO [SE/SE]; S-405 08 Göteborg (SE).

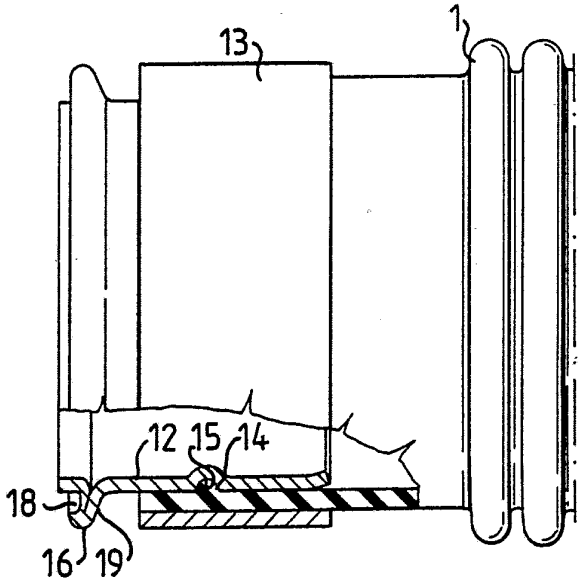
(72) Inventor; and
(75) Inventor/Applicant *(for US only) :* TENGLUND, Lars [SE/SE]; Näs 1311, S-440 90 Henån (SE).

(74) Agents: KIERKEGAARD, Lars-Olov et al.; H. Albihns Patentbyrå AB, Box 3137, S-103 62 Stockholm (SE).

(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent), US.

Published
With international search report.

(54) Title: PROCESS FOR MANUFACTURING A HOSE COUPLING COMPONENT INTENDED PARTICULARLY FOR A HOSE CONNECTION BETWEEN A TURBO UNIT AND AN AIR COOLER, AND A HOSE COUPLING COMPONENT OF THIS TYPE



(57) Abstract

Hose coupling component, especially for a hose connection between a turbo charger and an air cooler in an internal combustion engine. The coupling component comprises a pipe sleeve (12) of pressed sheet metal, which has a peripheral flange (16) to be fixed by means of a V-shaped clamp to a corresponding mirror image flange on a complementary coupling component. The sleeve has a groove (18) for a gasket in the flange and has a circumferential depression (15) for indexing a hose (1) forced onto the coupling component.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	**ES**	Spain	**MG**	Madagascar
AU	Australia	**FI**	Finland	**ML**	Mali
BB	Barbados	**FR**	France	**MN**	Mongolia
BE	Belgium	**GA**	Gabon	**MR**	Mauritania
BF	Burkina Faso	**GB**	United Kingdom	**MW**	Malawi
BG	Bulgaria	**GN**	Guinea	**NL**	Netherlands
BJ	Benin	**GR**	Greece	**NO**	Norway
BR	Brazil	**HU**	Hungary	**PL**	Poland
CA	Canada	**IT**	Italy	**RO**	Romania
CF	Central African Republic	**JP**	Japan	**SD**	Sudan
CG	Congo	**KP**	Democratic People's Republic of Korea	**SE**	Sweden
CH	Switzerland			**SN**	Senegal
CI	Côte d'Ivoire	**KR**	Republic of Korea	**SU**	Soviet Union
CM	Cameroon	**LI**	Liechtenstein	**TD**	Chad
CS	Czechoslovakia	**LK**	Sri Lanka	**TG**	Togo
DE	Germany	**LU**	Luxembourg	**US**	United States of America
DK	Denmark	**MC**	Monaco		

Process for manufacturing a hose coupling component intended particularly for a hose connection between a turbo unit and an air cooler, and a hose coupling component of this type.

The present invention relates to a process for manufacturing a hose coupling component, which comprises a pipe sleeve, which is provided at a first end with a periferal flange projecting from the lateral surface of the sleeve, said flange having a side facing towards a second end of the pipe sleeve and inclined towards said first end, said flange forming an outer limitation of a circumferential groove which is open towards said first end for a gasket ring, said pipe sleeve having as well between its ends a portion with a circumferential profile. The invention also relates to a hose coupling component of this type.

Such a coupling component is used, for example, in hose connections between a turbo charger unit and an air cooler in turbo charged internal combustion engines. The hose connections are intended to absorb the relative movement between the spring suspended engine and the charge-air cooler rigidly mounted on the vehicle frame and it must therefore be able to withstand high temperatures, excessive pressure and mechanical stresses.

A known hose coupling of the type in question consists of an inner pipe sleeve, over which a flexible hose is forced, and an outer ring which is pressed over the hose coaxially with the inner sleeve. The inner sleeve is made of aluminum and the details described in the introduction, such as the flange, the periferal gasket groove and the profiles are made by turning a sleeve blank. In addition to these details, a radial flange is made during the lathe turning of the sleeve blank axially inside the first mentioned flange. The radial flange is intended, inter alia,

to serve as an end abutment for the hose and thereby assure that the hose will always be forced the same distance onto the sleeve for assembly, which is important to prevent variations in the total length of the hose and the hose connection between vehicles produced on the assembly line.

This known coupling component, due to its two flanges and the periferal gasket groove at one end, thus has a relatively complicated shape which cannot be produced effectively in any other manner than by machining.

The purpose of the present invention is to achieve, through a simple modification of the design of the known coupling component, a simpler and less expensive method for its manufacture.

This is achieved according to the invention by virtue of the fact that a bowl is pressed from a sheet metal element, that the upper edge portion of the bowl is folded, so that said flange and the circumferential groove are formed, that the bottom of the bowl is cut away, and that a portion between the flange and an opposite end of the sheet metal element is press rolled so that a profile in the form of a depression is formed in the lateral surface of the pipe sleeve.

This simplification of the end portion of the pipe sleeve due to elimination of the flange serving as a hose abutment, makes it possible to manufacture the pipe sleeve of the coupling component by a pressing process instead of by machining. The depression formed between the two steps serves as a reference for axially positioning the hose on the sleeve. The hose can thus be made with an inner periferal bead at a specific distance from the end of the hose, and when the hose is forced onto the sleeve, the bead will slip into the depression and indicate the correct relative positioning of the components.

The invention will be described in more detail below with reference to examples shown in the accompanying drawings, where

Figure 1 shows a partially sectioned side view of a previously known coupling component with hose,

Figure 2 is a view corresponding to Figure 1 of a coupling component according to the invention, and

Figures 3a and 3b are cross-sections through the inner pipe sleeve in Figure 2 in different stages of manufacture.

Figure 1 shows a known design, where 1 designates a corrugated hose of elastic material, which is forced onto an inner coupling sleeve 2 of turned aluminum. An outer ring 3 of steel is pressed over the hose. The sleeve 2 has a profiled portion in the form of a ridge 4, while the ring 3 has a complementary depression 5 for securely fixing the hose on the inner sleeve.

The sleeve 2 has at its left hand end a first flange 6 which forms an end abutment for the hose 1, and a second flange 7 which forms the outer boundary of a groove 8 for a gasket ring. The flange 7 is intended to be brought into contact with a similar but mirror image flange on the component (not shown) to which the hose is to be connected. The flange 7 has an inclined side 9 and thus forms together with said mirror image flange a two-part V-shaped bead, which is held together with the aid of a V-shaped clamp (not shown).

Figure 2 shows a hose coupling component according to the invention. The hose 1 is in this case forced onto an inner coupling sleeve 12 of pressed sheet metal. An outer ring 13 of steel is pressed over the hose 1, which has an inner periferal bead 14, which lies in a periferal depression 15 in the sleeve. The bead 14 and the depression 15 thus are means which determine how far over the sleeve 12 the hose 1 is to be forced. They also contribute to creating a

tight and secure connection between the hose and the sleeve.

The left hand end of the sleeve 12 is folded in a press so that a flange 16 is formed, corresponding to the flange 7 of the known sleeve. This flange 16 also has a groove 18 for a gasket ring and has an inclined side 19. The flange 16 can be brought into abutment with a similar mirror image flange of pressed sheet metal or turned aluminum on the component to which the hose is to be connected and can be fixed thereto in a known manner with the help of a V-shaped clamp.

When manufacturing the sleeve 12 according to the invention, one starts with a sheet metal blank, which is deep drawn so as to form a bowl or cup 30 with the shape formed in Figure 3a. After deep drawing, the bottom 34 of the bowl (see Figure 3a) is cut off, and the depression 15 for the bead 14 is created by press rolling.

The invention thus provides a coupling sleeve which can be manufactured at substantially lower cost than the known coupling sleeve described without any negative defect on function or reliability.

CLAIMS

1. Method of manufacturing a hose coupling component, comprising a pipe sleeve, which is provided at a first end with a periferal flange projecting from the lateral surface of the sleeve, said flange having a side facing towards a second end of the pipe sleeve and inclined towards said first end, said flange forming an outer limitation of a circumferential groove which is open towards said first end for a gasket ring, said pipe sleeve having as well between its ends a portion with a circumferential profile, c h a r a c t e r i z e d in that a bowl (30) is pressed from a sheet metal element, that the upper edge portion of the bowl is folded, so that said flange (16) and the circumferential groove (18) are formed, that the bottom (34) of the bowl is cut away, and that a portion between the flange and an opposite end of the sheet metal element is press rolled so that a profile in the form of a depression (15) is formed in the lateral surface of the pipe sleeve.

2. Hose coupling component, comprising a pipe sleeve, which is provided at a first end with a circumferential flange extending from the lateral surface of the sleeve, and having a side facing a second end and inclined towards the first end, said flange forming the outer limitation of a circumferential groove open towards the first end, for a gasket ring, said pipe sleeve having between its ends a portion with a periferal profile, c h a r a c t e r i z e d in that the pipe sleeve (12) consists of a pressed sheet metal element, which has at a first end a folded edge portion, forming said flange (16) and said circumferential groove (18), said pipe sleeve having a profile portion in the form of a depression (15) in the lateral surface of the pipe sleeve between the flange and its opposite end.

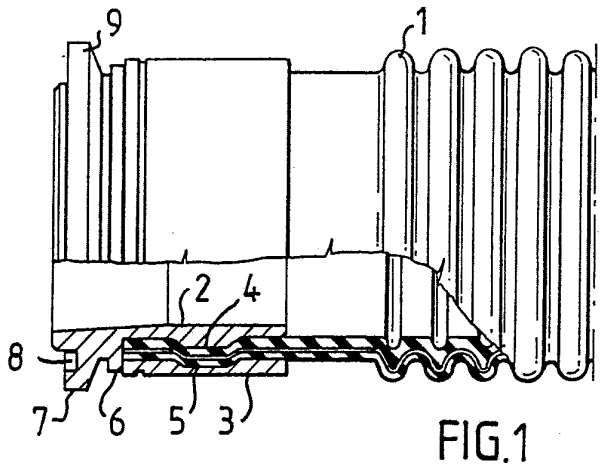


FIG.1

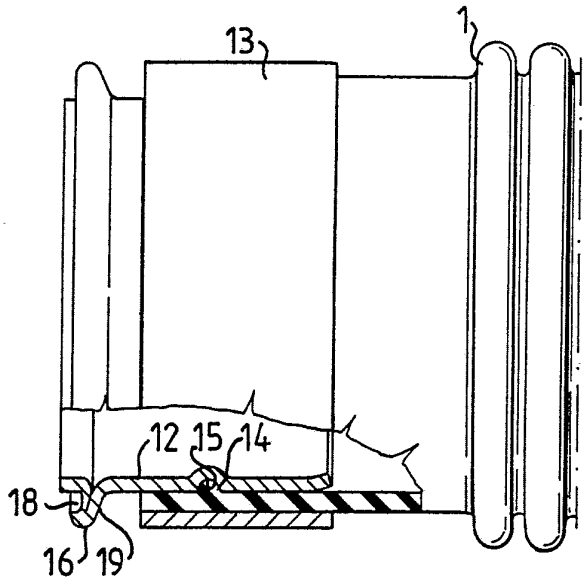


FIG.2

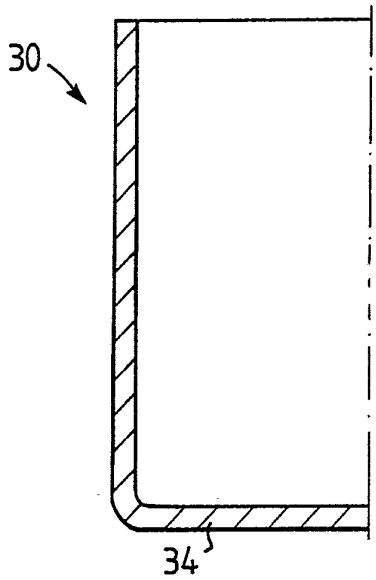


FIG.3A

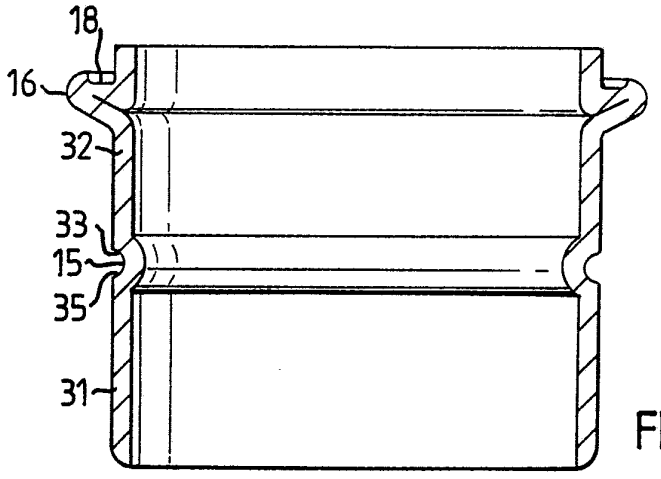


FIG.3B

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 91/00026

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, ind.cate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: F 16 L 33/00, B 21 K 1/16

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	F 16 L; B 21 K

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

SE,DK,FI,NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
A	GB, A, 579395 (F.G.L. BRISSMAN) 1 August 1946, see figure 1 --	2
A	GB, A, 704494 (AEROQUIP CORPORATION) 24 February 1954, see figure 1 --	2
A	GB, A, 1251811 (BTR INDUSTRIES LIMITED) 3 November 1971, see figures 1-4 --	2
A	FR, A, 1167276 (BENDIX AVIATION CORPORATION) 24 November 1958, see figure 4 --	2
A	US, A, 2319024 (HERMAN H. WEHRINGER) 11 May 1943, see figure 2 --	2

* Special categories of cited documents: [10]

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

"E" earlier document 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

"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

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
1st March 1991	1991 -03- 27
International Searching Authority	**Signature of Authorized Officer**
SWEDISH PATENT OFFICE	Axel Lindhult

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US, A, 2432598 (A.J. WEATHERHEAD) 16 December 1947, see figures 5,6 --	1

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. PCT/SE 91/00026

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the Swedish Patent Office EDP file on 91-01-31
The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A- 579395	46-08-01	NONE	
GB-A- 704494	54-02-24	NONE	
GB-A- 1251811	71-11-03	NONE	
FR-A- 1167276	58-11-24	NONE	
US-A- 2319024	43-05-11	NONE	
US-A- 2432598	47-12-16	NONE	