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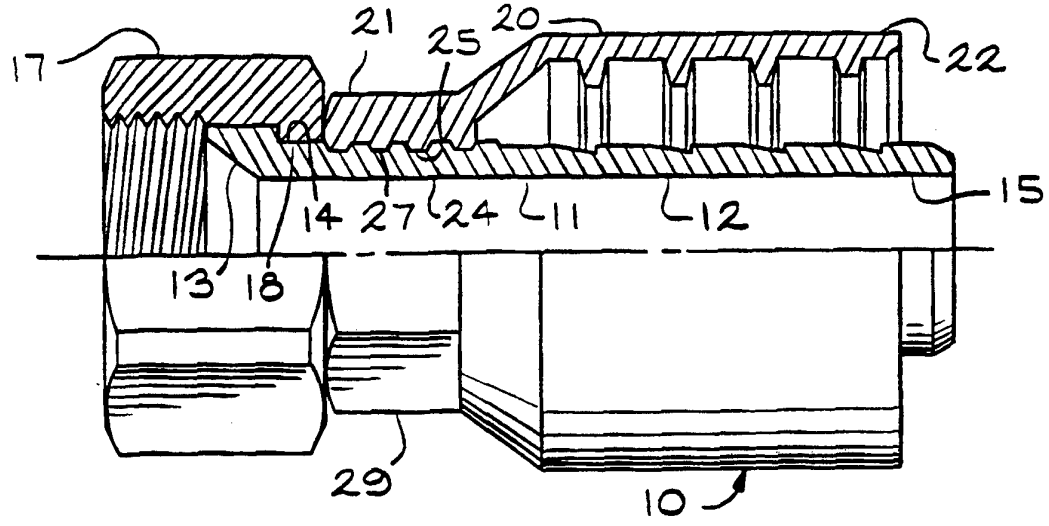

(57) Abstract

An improved hose fitting (10) and method of making the hose fitting (10) is disclosed. The hose fitting (10) has a body (11), a surrounding socket (20) and a coupling (17). The body (11) has a coupling end (13), while the socket (20) has a first end (21) and a second end (22). The socket (20) is positioned over the body (11). A support (62) is introduced into the body (11) and the socket (20) is compressed onto the body (11) to form a tight fit.

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DESCRIPTION

IMPROVED HOSE FITTING AND METHOD OF MAKING

BACKGROUND OF THE INVENTION

The present invention relates to an improved hose fitting and to a method of making the hose fitting.

Hose fittings are well known in the art. An example of a prior art hose fitting is shown in United States Patent No. 4,366,841. Normally, the end of a hose is inserted between a socket member of the hose fitting and the exterior of the hose fitting body.

The hose fitting normally includes a plurality of wrench flats which define a wrenching hex. In many prior art hose fittings, the hose body was machined from hex-shaped bar stock. A retaining groove or annular channel was then machined behind the wrenching hex. A hose coupling nut was then crimped to the body forming a lip which engaged with the previously machined annular channel. In a separate operation, the socket was then crimped to the body in an opposed relationship with the coupling nut to complete the final hose fitting.

Often, the method of manufacturing the prior art hose fittings required a considerable waste of material and time together with at least a two-step process to assemble the completed fitting.

The present invention is directed to an improved hose fitting and method in which material waste is substantially reduced and the method requires only a one-step assembly process.

SUMMARY OF THE INVENTION

The improved hose fitting and the method of making the hose fitting, according to the present invention, results in a fitting which reduces waste and allows a one-step assembly process. The improved hose fitting includes a longitudinally extending body having a central opening therethrough. The body has a coupling end and a hose end. Preferably, the body defines an annular channel adjacent the hose connection end. A coupling nut is slid over the body and an annular lip or shoulder on the coupling nut is received in the annular channel of the body. In another embodiment a coupling member is positioned on the coupling end of the body. A socket surrounds the body and has a first end and a second end. A mandrel or support is introduced or moved into the central opening within the body. One end of the socket is then engaged by a plurality of movable jaws which compress the end of the socket onto the body to form a tight fit. At the same time, the compression by the jaws form wrench flat surfaces which define an overall wrench hex in the hose fitting.

In a preferred embodiment, a plurality of circumferentially extending grooves are defined in the body member and the socket defines a plurality of annular projections. During the compressing step, the projections are received by the mating grooves on the body. This helps to ensure a tight fit in the final hose fitting.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of an improved hose fitting according to the present invention;

Fig. 2 is an exploded view, partially in cross section, of the improved hose fitting shown in Fig. 1;

Fig. 3 is an enlarged partially sectional view taken along the line 3-3 of Fig. 1;

Fig. 4 is a simplified perspective view of a prior art forming machine used to produce the hose fitting shown in Fig. 1;

Fig. 5 is an enlarged perspective view, shown partially in cross section, of a portion of the machine shown in Fig. 4 illustrating the method of making the improved hose fitting of Fig. 1 and showing the jaws in an open position;

Fig. 6 is a fragmentary cross-sectional view, partially in cross section, taken along the line 6-6 of Fig. 5;

Fig. 7 is a view similar to Fig. 5, showing the jaws in a closed position;

Fig. 8 is another embodiment of an improved hose fitting, according to the present invention; and

Fig. 9 is a sectional view, taken along the line 9-9 of Fig. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

An improved hose fitting, according to the present invention, is generally indicated in Fig. 1 by the reference number 10. The hose fitting 10 includes a longitudinally extending body 11 having a central opening 12 extending therethrough. The body 11 includes a coupling end 13, which defines an annular shoulder or annular channel 14 and a hose end 15. A coupling nut 17 having an annular flange or lip 18 is mounted over the body 11 (see Fig. 3) in a manner wherein the annular lip 18 of the coupling nut 17 is received in the annular channel 14 defined by the body 11.

A socket 20 having a first end 21 and a second end 22 surrounds the body 11. Referring to Fig. 2, the first end 21 has a reduced diameter and surrounds a band portion 24 of the body 11. A portion of the socket 20 is compressed onto the body 11 forming a tight fit. The band portion 24 defines a plurality of grooves 25 and the first end 21 of the socket 20 defines a plurality of inwardly directed projections 27. After compression, as shown in Fig. 3, the projections 27 of the socket 20 are received and tightly engage the grooves 25 of the body 11. In the present embodiment, all three components of the hose fitting 10, namely the body 11, the coupling nut 17 and the socket 20, are comprised of metal.

After assembly and compression, the first end 21 of the socket 20 defines a plurality of wrench flats 29, which in the embodiment shown in Fig. 1, forms a well known wrenching hex.

Referring to Figs. 8 and 9, another embodiment of a hose fitting, according to the present invention is generally indicated by the reference number 30. The hose fitting 30 includes an elbow shaped body 31 having a coupling end 32 and a hose end 33. A socket 35 having a first end 36 and a second end 37 surrounds the body 31. A hose 39 is received between and tightly held by the socket 35 and the body 31 of the hose fitting 30. In the present embodiment, the first end 36 of the socket 35 includes an in-turned lip 41 which is received in an annular channel 42 defined in the body 31. After compression, the lip 41 and channel 42 are tightly engaged and a plurality of arcuate surfaces 44 are formed on the first end 36 of the socket 35. In the preferred embodiment, shown in Fig. 8, a plurality of arcuate surfaces 45 are also defined on the enlarged portion of the socket 35. A coupling, namely an end ring 47, is mounted on the coupling end 32 of the body 31.

In another embodiment (not shown), an elbow shaped body, such as shown in Fig. 8 can be connected to the socket in a manner similar to the Fig. 3 connection.

Referring to Figs. 4-7, the method of making the improved hose fittings 10 and 30 are illustrated. Fig. 4 shows a prior art forming machine 50 which includes a fixed ring 51 and a hydraulically driven platen 52. A plurality of rods 53 extend from the platen 52 and mount a ring platform 54. Pins 57 extending from the jaws 56 are guided by radial guide tracks 58 defined in the ring platform 54. The jaws 56 are spring-biased outwardly toward the fixed ring 51. The jaws 56 include contact faces 60 which engage and compress the sockets 20 and 35 of the hose fittings 10 and 30.

Figs. 5-7 illustrate the method of constructing the hose fitting 10. The hose fitting 30 is made in a generally similar manner. Referring to Fig. 2, when constructing the hose fitting 10, initially the

coupling nut 17 is slid over the body 11 until the annular lip 18 is in position adjacent the annular channel 14 of the body 11. The socket 20 is the positioned over the body 11 wherein the first end 21 of the socket 20 is adjacent the coupling end 13 of the body 11. This assembly is then mounted in the forming machine 50, as indicated in Fig. 5. A support mandrel 62 is inserted in the body 11 through the central opening 12. The mandrel 62 fills the opening 12 and supports the body 11 during compression so that the body 11 is not deformed on its interior. The fixed ring 51 of the forming machine 50 includes an inclined face 64 and the jaws 56 include mating inclined faces 65. The forming machine 50 includes cylinder means which move the ring platform 56 and the jaws 56 outwardly whereby the mating inclined faces 65 of the jaws 56 engage the inclined face 64 of the machine fixed ring 51. The continual outward movement of the platform 54 forces the jaws 56 inwardly. In other machines (not shown) the platen and jaws remain stationary and the ring platform is driven inwardly to obtain the desired relative movement. The jaw faces 60 engage and compress the first end 21 of the socket 20 onto the body 11 of the hose fitting 10 to form a tight fit. At the same time, the plurality of annular and inwardly directed projections 27 mate with the circumferentially extending grooves 25 defined by the body 11. This further ensures a tight fit after compression. The compressed position of the components is indicated in Fig. 7. The contact faces 60 of the radially movable jaws 56 have compressed the socket 20 and have defined the wrench flats 29. Lastly, the support mandrel 62 is removed together with the finished hose fitting 10 and another hose fitting assembly cycle started.

At the end of the cycle, the forming machine 50 moves the ring platform 54 to the Fig. 5 position wherein the jaws are urged by spring means outwardly to the Fig. 5 position for the start of another cycle.

The method of making the improved hose fitting 30 is similar.

The socket 35 is positioned on the body 31 and the assembly inserted in the machine 50. The jaws 60 compress the end 36 of the socket 35 to form the arcuate surfaces 44. In separate operations the 90° bend in the body 31 is formed and the coupling or end ring 47 is mounted on the coupling end 32 of the body 31.

Many revisions may be made to the hose fittings described above and to the method of making the improved hose fittings without departing from the scope of the present invention and from the following claims.

CLAIMS:

1. An improved hose fitting comprising, in combination, a body having a hose end and a coupling end, said body defining an opening therethrough, said body having an exterior surface, a coupling mounted on said body at said coupling end, a socket surrounding said body, a portion of said socket being compressed onto said body forming a tight fit.

2. An improved hose fitting, according to claim 1, wherein said body defines a plurality of circumferentially extending grooves adjacent said body member, a portion of said socket being positioned around said grooves.

3. An improved hose fitting, according to claim 2, wherein said portion of said socket defines inwardly directed projections which mate with said grooves defined on said body.

4. An improved hose fitting, according to claim 1, wherein said body defines an annular channel adjacent, including a coupling nut, said coupling nut defining an annular lip received by said annular channel of said body.

5. A method of making a hose fitting having a body, a socket and a coupling, the body having a coupling end and a hose end comprising the steps of positioning the socket over the body wherein the first socket is adjacent the body, introducing a support

into said body, and compressing the socket onto the body to form a tight fit.

6. A method, according to claim 5, including the step of positioning a coupling nut over the coupling end of the body prior to positioning the socket over the body.

7. A method, according to claim 5, including the step of removing the support from the body.

8. A method, according to claim 5, including forming a plurality of annular grooves on said body.

9. A method, according to claim 6, including forming a plurality of annular projections on the socket and inserting the projections in the grooves during compression of the socket.

10. A method, according to claim 5, including the step of forming wrench flats on the socket during compression of the socket onto the body.

11. A method, according to claim 5, including the step of engaging the socket with a plurality of movable jaws to compress the socket onto the body and to define a plurality of wrench flats.

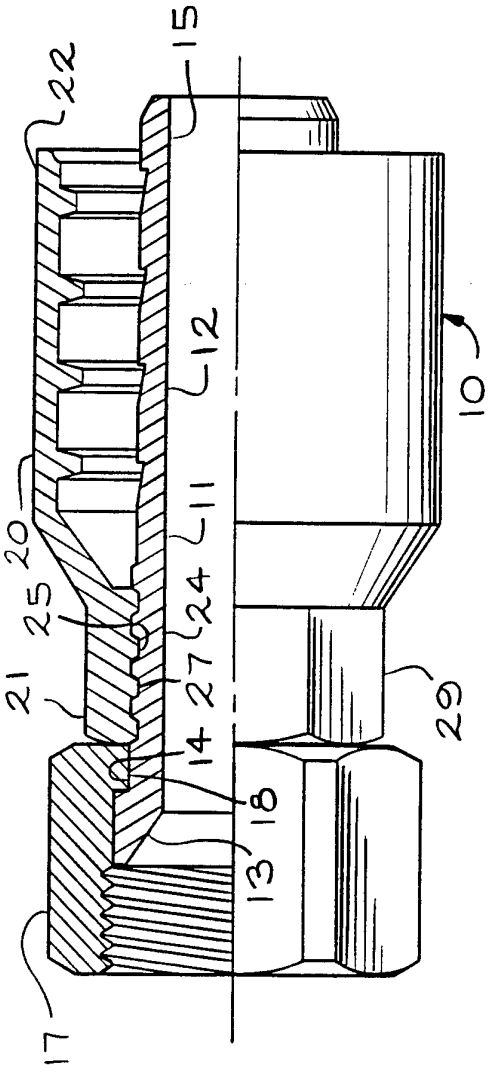

FIG. 3

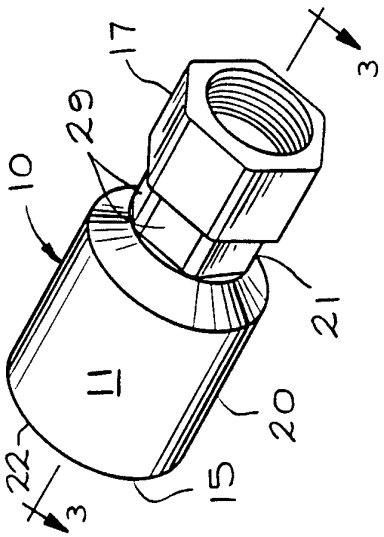

FIG. 1

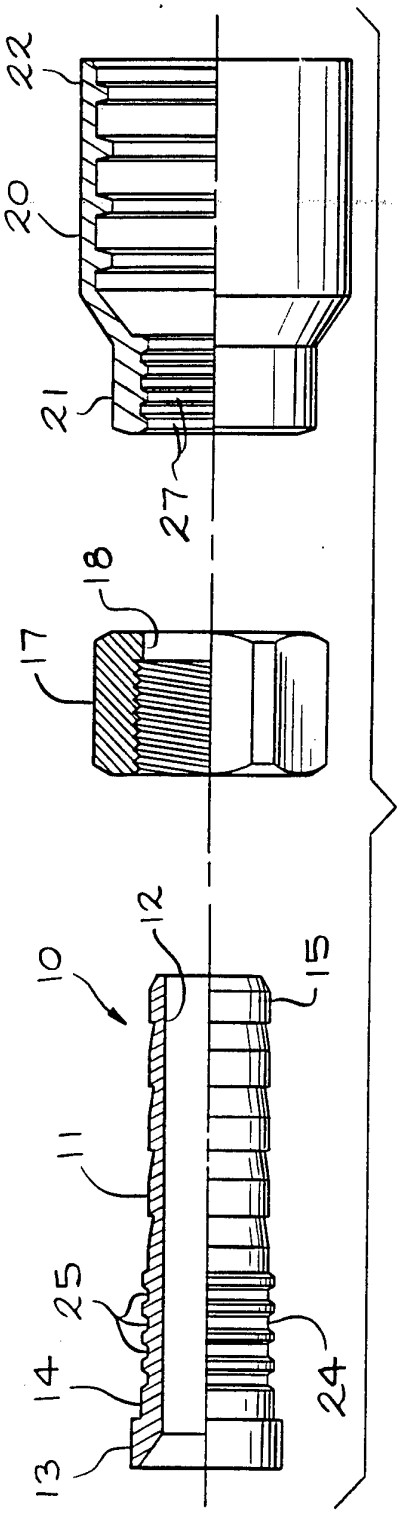

FIG. 2

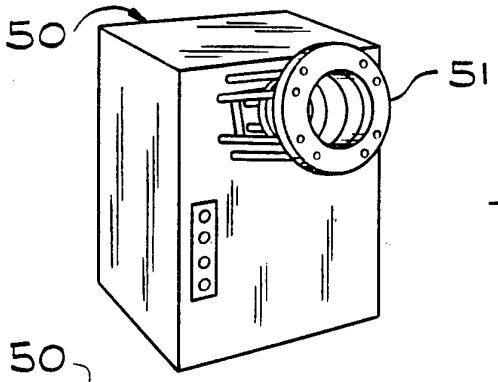

FIG. 4

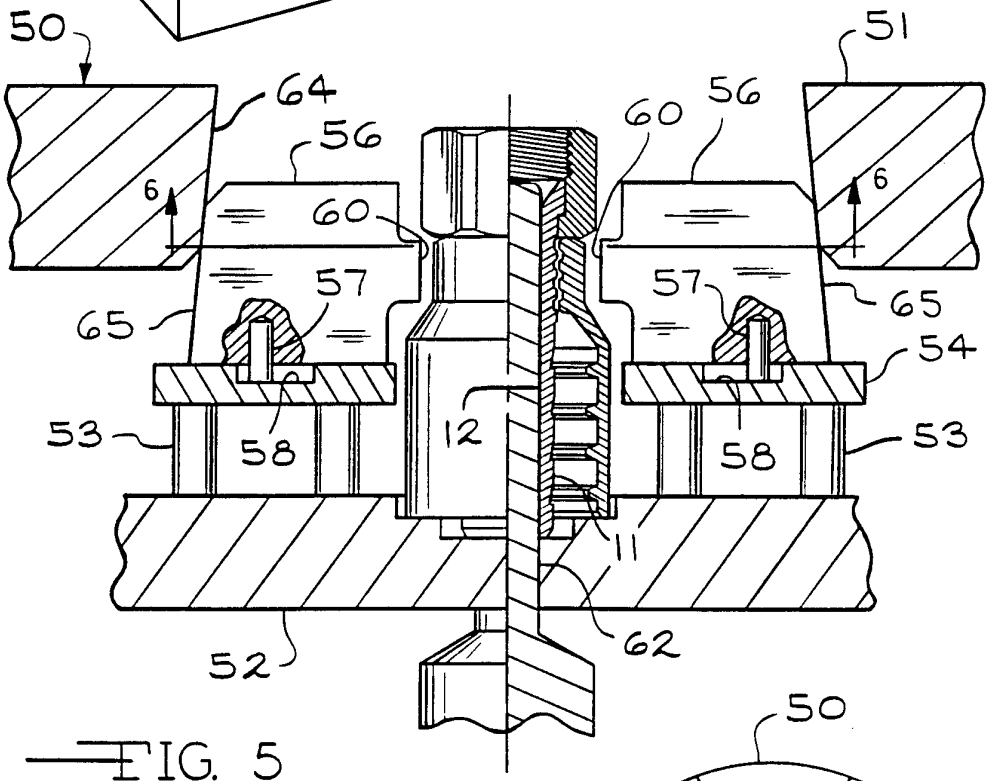

FIG. 5

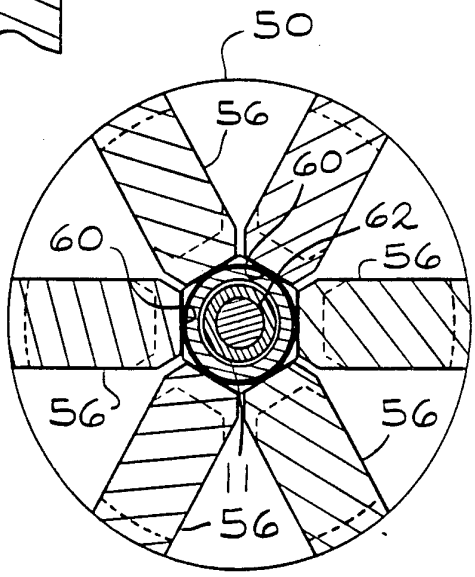

FIG. 6

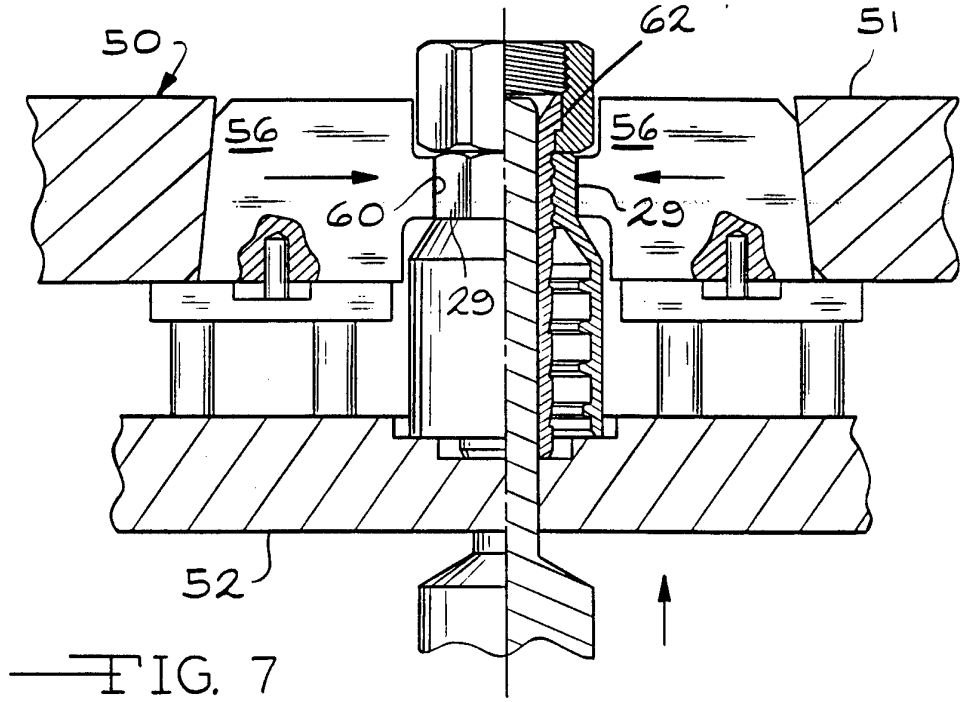

FIG. 7

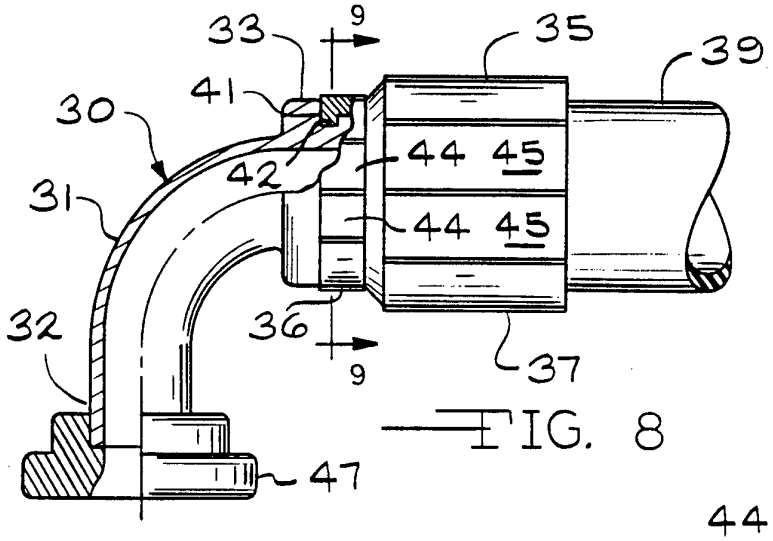

FIG. 8

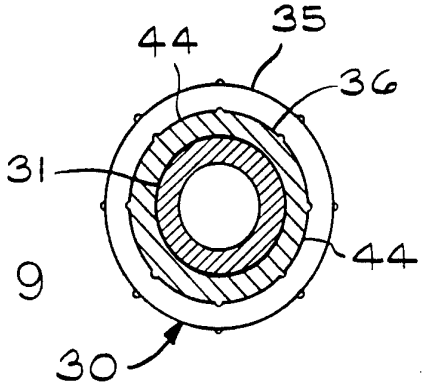

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/12197

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :F16L 33/207
US CL :285/256,259

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)

U.S. : 285/256,259; 29, 508,523

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- Y	US,A, 4,804,212 (Vyse) 14 February 1989, cols. 2-3 and figs. 2-4	1 and 4 ---------- 2,3 and 5-11
Y	US, A, 5,044,671 (Chisnell) 03 September 1991, figs. 1-2 see grooves and projections 56.	2,3 and 9-11
Y	US,A, 2,008,175 (Cowles) 16 July 1935, page 2, lines 58-72 and see mandrel 18 in fig. 2	5-11
A	US,A 4,366,841 (Currie et al.) 04 January 1983, note interlock 18.	1-11
A	US, A, 2,292,421 (Wolf) 11 August 1942, note polygon crimping of socket 11.	1-11

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

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Form PCT/ISA/210 (second sheet)(July 1992)*

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 2,329,281 (MacWilliam) 14 September 1943, note interlock 24,30.	1-11
A	FR,A, 2594205 (Pineda) 14 August 1987, note interlock 17,18,26 in fig. 2.	1-11