

Patents Act 1990

PATENT REQUEST: STANDARD PATENT

We, the Applicants/Nominated Persons specified below, request we be granted a patent for the invention disclosed in the accompanying standard complete specification.

[70,71] Applicants/Nominated Persons:

Minnesota Mining and Manufacturing Company, of 3M Center, Saint Paul, Minnesota 55144-1000, United States of America, and Colder Products Company, of 1001 Westgate Drive, Saint Paul, Minnesota 55114, United States of America.

[54] Invention Title:

Quick Disconnect for Aerosol Spray Can

[72] Inventor(s):

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[74] Address for Service in Australia:

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Basic Convention Application Details

[31] Application No	[33] Country	[32] Date of Application
263,717	US	28 October 1988

DATED this THIRD day of MARCH 1992

Minnesota Mining and Manufacturing Company
and Colder Products Company


Registered Patent Attorney



TRN: 106310

INSTR CODE: 52225

RLF/9030U

SPRUSON & FERGUSON

Australia

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NOTICE OF ENTITLEMENT

I, John Gordon Hinde, of Level 32, 31 Market Street, Sydney, New South Wales, 2000, Australia, being authorised by the Applicant/Nominated Person in respect of Application No 42394/89 state the following:-

The Applicants/Nominated Persons have entitlement from the actual inventors, as follows:-

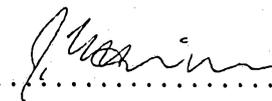
Minnesota Mining and Manufacturing Company is the assignee of the inventor, Roy J Krahn, and Colder Products Company is the assignee of the inventor, Brian J Blenkush.

The Applicants/Nominated Persons are entitled to rely on the basic application listed on the Patent Request as follows:

Minnesota Mining and Manufacturing Company is the assignee of the basic applicant, Roy J Krahn, and Colder Products Company is the assignee of the basic applicant, Brian J Blenkush.

The basic application listed on the Patent Request is the application first made in a Convention country in respect of the invention.

DATED this 4th day of MARCH 1992


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IRN: 106310

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(12) PATENT ABRIDGMENT (11) Document No. AU-B-42394/89
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- (54) Title
QUICK DISCONNECT FOR AEROSOL SPRAY CAN
- International Patent Classification(s)
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- (21) Application No. : **42394/89** (22) Application Date : **28.09.89**
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263717 28.10.88 US UNITED STATES OF AMERICA
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- (71) Applicant(s)
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- (56) Prior Art Documents
US 4745948
US 4703958
US 4576359
- (57) Claim

1. A quick connect/disconnect assembly for coupling a line to a source of fluid under pressure having a port with a normally closed valve therein, comprising:

an insert having a threaded portion at one end for connection to the line, a cylindrical male portion at the other end, and an axial first fluid passage extending therebetween;

a hollow actuator pin positioned in the first fluid passage and extending axially outward from the male end of said insert for extension through the port of the fluid source and engagement with the valve therein;

an adapter having a cylindrical female portion at one end for receiving said insert, a threaded portion at the other end for connection to the port of the fluid source, and an axial second fluid passage extending therebetween;

seal means within the second fluid passage of said adapter for defining a sealed connection between said insert, said adapter, and the fluid source upon insertion of said insert into said adapter;

slide means mounted on the female end of said adapter for transverse movement into and out of locking engagement with a groove on the male end of said insert; and

means for normally biasing said slide means into locking engagement with the groove on said insert.

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FORM 10

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE:

Class Int Class

Complete Specification Lodged:
Accepted:
Published:

Priority:

Related Art:

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Complete Specification for the invention entitled:

Quick Disconnect for Aerosol Spray Can

The following statement is a full description of this invention, including the best method of performing it known to me/us

QUICK DISCONNECT FOR AEROSOL SPRAY CAN

Abstract

A quick connect/disconnect assembly (10) comprises a male insert (50) secured to one end of a hose assembly (14), a separate female adapter (52) for attachment to an aerosol can (12), a dual seal arrangement (68, 70) within the adapter, and a releaseable latch (78) for positively interconnecting the insert and adapter. Upon insertion of the male insert (50), leakage of any fluid is contained within the female adapter (52).

QUICK DISCONNECT FOR AEROSOL SPRAY CAN

Technical Field

The present invention relates generally to a
5 coupling device. More particularly, this invention
concerns a quick connect/disconnect assembly for
interconnecting a hose and a source of fluid under
pressure, such as an aerosol can of solvent, with little or
no leakage for greater safety.

10

Background Art

Various fluid couplers or coupling devices have
been available heretofore. For example, the ordinary
garden hose typically includes adapters at both ends. Each
15 adapter generally includes an internally threaded portion,
an externally knurled portion to facilitate manually
screwing it onto a water spigot or the like, and a gasket
therein for sealing. More recently, quick
connect/disconnect adapters have been developed for this
20 purpose. Of course, while the water supply is under
pressure, a manual valve is provided in the spigot so that
it can be turned off during connection or disconnection.

In contrast, aerosol cans of fluid, be it liquid
or gas, have no such separate manual valves. Instead,
25 aerosol cans generally include a port at one end that is
normally closed off by an internal diaphragm which, when
displaced or punctured, allows the pressurized fluid
therein to escape through the port. A press nozzle with an
actuator pin is typically used for this purpose. Aerosol
30 cans of paint and the like are thus convenient and easy to
use, but can present certain difficulties in some
applications.

For example, aerosol cans of solvent have been
used for years to clean automotive fuel systems. One
35 popular manner of application has been to spray the solvent
directly into the throat of a carburetor. This technique,

however, cannot be used with fuel injection systems because
a closed connection is required. Hose assemblies with a
manual on/off valve have been available for this purpose.
However, the hose assemblies of the prior art utilize
5 simple threaded connections which can allow excess fluid to
escape during connection as well as disconnection,
particularly when used by inexperienced or unskilled
personnel. This in turn can lead to harmful and even
potentially dangerous consequences. It will be understood
10 that solvents of this type are hazardous and extremely
flammable.

A need has thus arisen for a new and improved
coupling assembly for quickly connecting or disconnecting a
hose assembly to an aerosol can without leakage.

15

Summary of the Invention

The present invention comprises a coupling assembly which overcomes the foregoing and other difficulties associated with the prior art. In accordance with the invention, there is provided a quick connect/disconnect assembly for interconnecting a hose assembly and an aerosol can, particularly an aerosol can of flammable fluid wherein leakage can present a safety and health hazard. The quick connect/disconnect assembly herein comprises a male insert which is mounted on one end of the hose assembly, and a separate female adapter for mounting on the can. The insert includes a hollow actuator pin and is configured for receipt by an axial bore in the adapter. After the adapter has been mounted on the can and upon insertion of the insert therein, a cylindrical portion of the insert slidably engages a seal arrangement within the adapter as the hollow actuator pin of the insert extends through the adapter and engages the diaphragm in the aerosol can for fluid communication. Any leakage of fluid is minimized and contained within the adapter. A spring-biased latch is provided for releaseably interconnecting the insert and the adapter.

Brief Description of Drawings

A better understanding of the invention can be had by reference to the following Detailed Description in conjunction with the accompanying Drawings, wherein:

5 Fig. 1 is a side view of an aerosol can and hose assembly interconnected by the quick connect/disconnect assembly of the invention;

 Fig. 2 is an enlarged, partially cutaway view of a prior art device;

10 Fig. 3 is an enlarged, partially cutaway exploded side view of the quick connect/disconnect assembly herein;

 Fig. 4 is a top view of the adapter taken along lines 4-4 of Fig. 3 in the direction of the arrows; and

15 Fig. 5 is an exploded side view of the adapter of the quick connect/disconnect assembly herein.

Detailed Description

Referring now to the Drawings, wherein like reference numerals designate like or corresponding elements throughout the views, and particularly referring to Fig. 1, there is shown, the quick connect/disconnect assembly 10 of the invention coupled between an aerosol can 12 and a hose assembly 14 of the type used in cleaning automotive fuel systems, for example. The aerosol can 12 contains a suitable solvent and is of substantially conventional construction. A suitable solvent for this purpose can be selected from a wide variety of solvents and includes a mixture of solvents such as a mixture of methanol, diacetone alcohol, toluene, and xylene. The hose assembly 14 is also of substantially conventional construction. Hose assembly 14 includes a suitable length of flexible hose 16, one end of which is connected to a nut or coupling 18 that is adapted to be screwed onto the pressure tap 20 in a fuel rail 22, shown schematically in dotted lines. For example, the hose 16 can be about 21 inches long and be constructed from rubber or other suitable material. The threaded coupling 18 can be constructed of any suitable material, such as metal and preferably brass. The other end of the flexible hose 16 can be connected to another nut or coupling like coupling 18, but is preferably connected to one side of an on/off valve 24. A valve of any suitable construction can be utilized such as that shown in U.S. Patent No. 2,929,406. Valve 24 includes a control handle 26 which can be manually actuated between an open position as shown in solid lines, and a closed position as shown in dotted lines, to control fluid flow in the hose 16.

As will be explained more fully hereinafter, the quick connect/disconnect assembly 10 of the invention

allows the hose assembly 14 to be positively connected in fluid communication with the aerosol can 12 with minimal leakage and thus more safety. Although the quick connect/disconnect assembly 10 is particularly adapted for
5 interconnecting an aerosol can and hose assembly, it will be understood that it can be used in other applications.

Fig. 2 illustrates the manner in which a hose assembly 14 was connected to an aerosol can 12 in the prior art. An adapter 28 was secured to one end of the body of
10 the shutoff valve 24, the end opposite that to which the hose 16 was secured. The adapter 28 included external threads 30 on one end, internal threads 32 on the other end, and wrench flats 34 on an enlarged portion therebetween. A tube or hollow actuator pin 36 was
15 provided by means of an interference fit within an axial bore 38 extending through the adapter 28. The outer end of the hollow pin 36 extended into the end recess containing the internal threads 32, but not beyond the end of the adapter 28. A gasket 40 was also provided therein.
20 However, as the adapter 28 was screwed onto the external threads 42 of the nipple 44, the hollow pin 36 was simultaneously advanced through the axial outlet port 46 and engaged the diaphragm (not shown) in the can allowing fluid to escape before the adapter was fully screwed down
25 with the gasket 40 firmly seated against the end of the nipple. For purposes of clarity, the diaphragm has been omitted. Thus, at least some fluid would be lost. This arrangement was also susceptible to misalignment, cross-threading and thus further leakage. It was also
30 susceptible to over torquing and thus damaging the threads 42 on the can 12. The quick connect/disconnect assembly 10 of the invention avoids these drawbacks.

The structural details of the quick connect/disconnect assembly 10 can be seen in Figs.

3-5. The quick connect/disconnect assembly 10 is a two-part assembly comprising a male insert 50 secured to one end of the hose assembly 14, and a separate female adapter 52 for mounting on the aerosol can 12. In the embodiment 5 shown, the insert 50 can be constructed from any suitable material, such as metal and preferably brass. Insert 50 includes external threads 54 at one end by which it is secured to the valve 24. Wrench flats 56 are provided on an enlarged portion 57 adjacent threads 54, and an 10 intermediate diameter cylindrical portion 58 is provided between a reduced diameter cylindrical portion 60 and the wrench flats. The intermediate diameter portion 58 includes an outside groove 62 for latching purposes as will be explained hereinafter. The insert 50 also includes an 15 axial bore 51 extending therethrough, with a tube or hollow actuator pin 64 fitted therein which extends outwardly from the reduced diameter portion 60 in order to define a fluid passage through the insert. In accordance with the preferred construction, pin 64 comprises a slotted steel 20 spring pin or roll pin.

The female adapter 52 comprises a separate member which is adapted to be screwed onto the nipple 44 of can 12 at one end and for receiving the insert 50 through its other end. A dual seal arrangement is provided within the 25 adapter 52 for defining a sealed connection between nipple 44, insert 50 and the adapter upon insertion of the insert. In particular, the adapter 52 includes an axial bore 66 and an adjacent groove containing an O-ring 68 for slidably receiving in sealing engagement the reduced 30 diameter portion 60 of the insert 50. The O-ring 68 can be made from any suitable polymeric material. Such materials include the fluoroelastomers such as the VITON materials available from DuPont and the FLUOREL materials available from 3M. These materials are believed to be copolymers of

vinylidene fluoride and hexafluoropropylene. In addition, a sleeve gasket 70 is provided between O-ring 68 and the internal threads 72 at one end by which the adapter 52 is screwed onto the nipple 44. At one end, the sleeve
5 gasket 70 abuts and sealingly engages the end of nipple 44 when adapter 52 is mounted thereon such as a polymeric material, and captures the O-ring 68 therein at its other end. The sleeve gasket 70 can be constructed from any suitable material, such as a polymeric material preferably
10 polypropylene. A smooth counterbore 74 is provided at the other end of the adapter 52 for receiving and locating the intermediate diameter portion 58 of the insert 50. The adapter 52 can be constructed from any suitable material, such as metal and preferably brass. A band of knurling 76
15 is preferably provided to facilitate manually screwing the adapter 52 onto the aerosol can 12.

The insert 50 and adapter 52 are releaseably interconnected by means of a latch 78, which is preferably located on one end of the adapter. Any suitable latch can
20 be used. As illustrated, latch 78 comprises a slide 80 movable in a direction transverse to the axis of the adapter 52 in a guideway defined by a pair of opposing notches 82 undercut into spaced apart raised portions on the end of the adapter. The transverse portion of the
25 slide 80 includes an oblong hole 84 which is movable across the counterbore 74 into and out of registry therewith and simultaneous locking engagement with the groove 62 in the insert 50. The hole 84 includes a notch 86 on one side thereof with portions of different widths for engaging
30 different portions of a locking pin 88 which is normally biased outwardly by a small compression spring 90 seated in an offset blind longitudinal bore as shown in dotted lines in Fig. 5. Similarly, the slide 80 is normally biased outwardly by a compression spring 92 seated between thumb

tab 94 and a blind radial bore as also shown in dotted lines in Fig. 5. Thus, when the thumb tab 94 is pressed inwardly against spring 92, the slide 80 is shifted so that hole 84 is generally centered with respect to the counterbore 74 in order to receive the insert 50. Spring 90 urges pin 88 upwardly so that a shoulder 96 on the pin engages the wide portion of notch 86 in order to hold latch 78 open.

After the adapter 52 has been manually screwed onto the can 12, the insert 50 on the hose assembly 14 can then be connected thereto by means of a quick and simple push-on motion. As insert 50 is pushed into the adapter 52, the actuator pin 64 engages the diaphragm (not shown) in can 12; however, any leakage is captured within the adapter. As the insert 50 is pushed into the adapter 52, the raised portion 57 containing the wrench flats 56 comes into contact with the pin 88, which is thus depressed against spring 90 allowing the neck 98 of the pin to register with the notch 86, thereby releasing the slide 80 so that spring 92 can shift it into locking engagement with groove 62 in the insert. When it is desired to release the quick connect/disconnect assembly 10, the thumb tab 94 is pressed to shift slide 80 so that spring 90 extends pin 88 thereby urging the insert and adapter apart.

From the foregoing it will thus be apparent that the present invention comprises an improved quick connect/disconnect assembly having several advantages over the prior art. In contrast to the one-piece devices of the prior art which required screwing one end of the hose assembly onto the aerosol can while at the same time establishing fluid communication, the invention herein utilizes a two-part assembly wherein one part is first screwed onto the can followed by quick axial insertion of

The claims defining the invention are as follows:

1. A quick connect/disconnect assembly for coupling a line to a source of fluid under pressure having a port with a normally closed valve therein, comprising:

an insert having a threaded portion at one end for connection to the line, a cylindrical male portion at the other end, and an axial first fluid passage extending therebetween;

a hollow actuator pin positioned in the first fluid passage and extending axially outward from the male end of said insert for extension through the port of the fluid source and engagement with the valve therein;

an adapter having a cylindrical female portion at one end for receiving said insert, a threaded portion at the other end for connection to the port of the fluid source, and an axial second fluid passage extending therebetween;

seal means within the second fluid passage of said adapter for defining a sealed connection between said insert, said adapter, and the fluid source upon insertion of said insert into said adapter;

slide means mounted on the female end of said adapter for transverse movement into and out of locking engagement with a groove on the male end of said insert; and

means for normally biasing said slide means into locking engagement with the groove on said insert.



RLF/1601h

2. The quick connect/disconnect assembly of claim 1, wherein the threaded end portion of said insert comprises external threads.

3. The quick/disconnect assembly of claim 1, wherein the hollow actuator pin comprises a longitudinally slotted spring steel pin.

4. The quick connect/disconnect assembly of claim 1, wherein the threaded end portion of said adapter comprises internal threads.

5. The quick connect/disconnect assembly of claim 1, wherein said seal means comprises:

an O-ring; and
a sleeve gasket located between said O-ring
and the threaded end portion of said adapter.

6. The quick connect/disconnect assembly according to claim 5, wherein said O-ring and said sleeve gasket are each comprised of a polymeric material.

7. The quick connect/disconnect assembly according to claim 6, wherein said O-ring comprises a copolymer of vinylidene fluoride and hexafluoropropylene.

8. The quick connect/disconnect assembly according to claim 7, wherein said sleeve gasket comprises a polymer of propylene.

9. The quick connect/disconnect assembly of claim 1, wherein the cylindrical male end of said insert includes an intermediate diameter portion having the groove therein, a shoulder portion at a first end of the intermediate portion, and a reduced diameter outermost portion extending from the shoulder portion.

10. The quick connect/disconnect assembly of claim 1, further comprising:

pin means responsive to insertion of said insert into said adapter for normally holding said slide means for release into locking engagement with the groove in said insert.

11. A quick connect/disconnect assembly as hereinbefore described with reference to and as shown on Figures 1, 3, 4 and 5.

DATED this THIRD day of MARCH 1992

Minnesota Mining and Manufacturing Company

Patent Attorneys for the Applicant
SPRUSON & FERGUSON



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FIG. 1

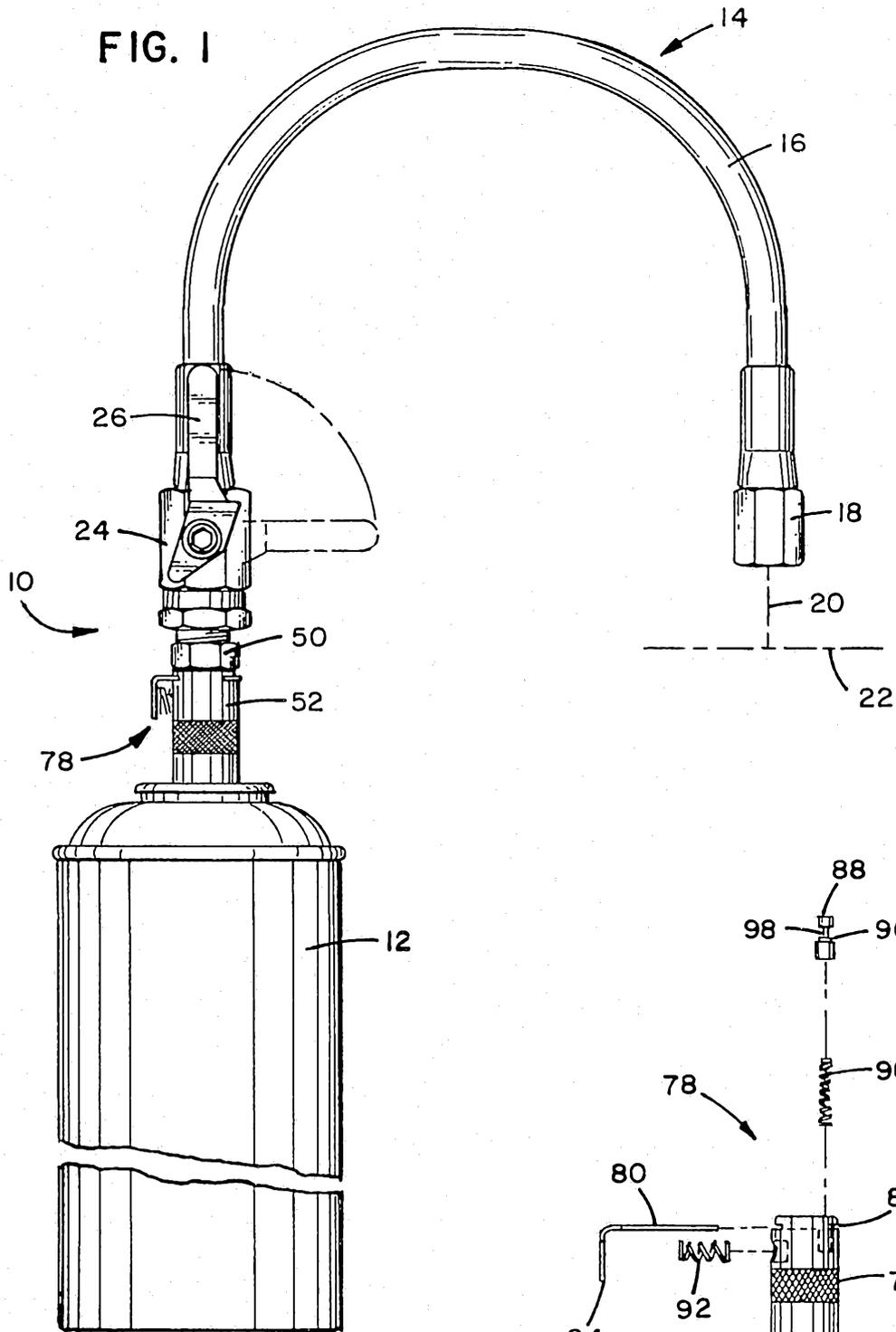
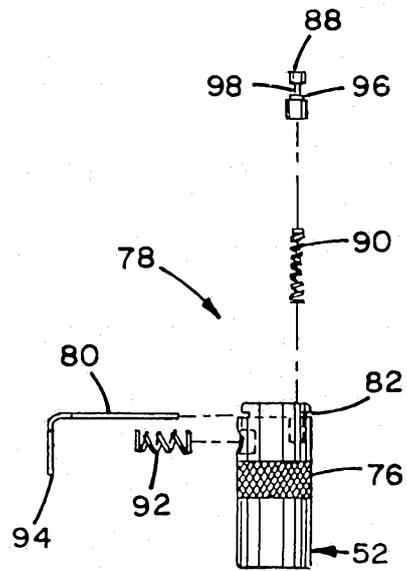


FIG. 5



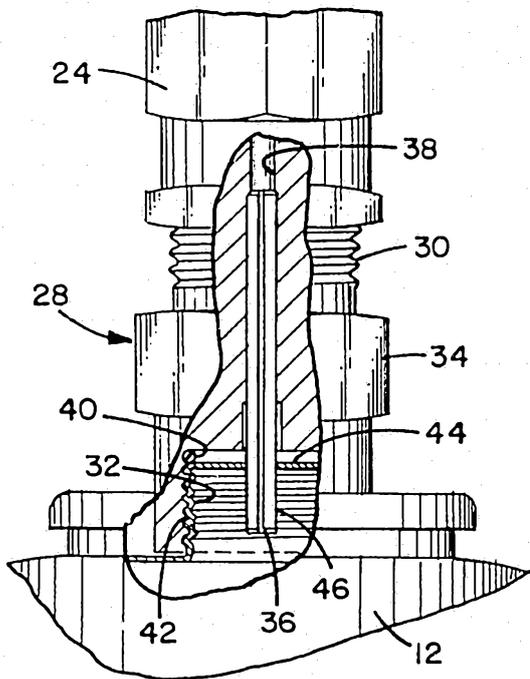


FIG. 2
(Prior Art)

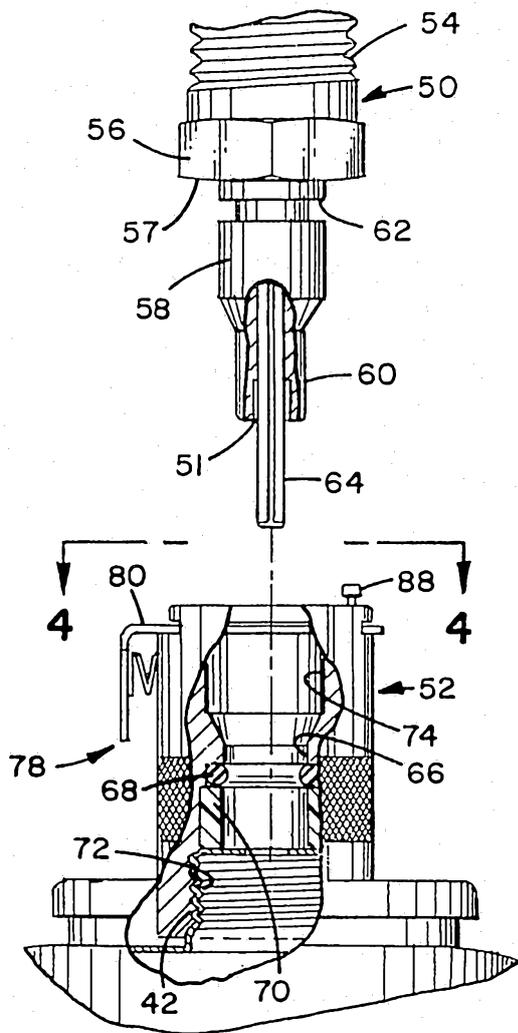


FIG. 3

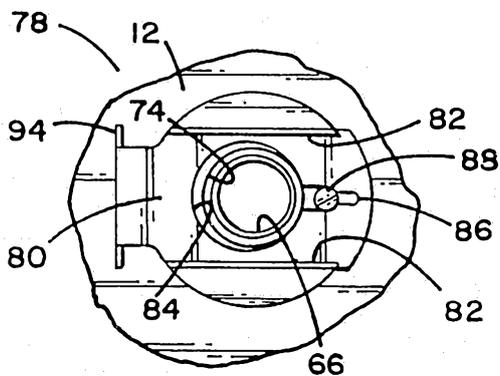


FIG. 4