March 22, 1966 A. ARUTUNOFF 3,241,492

BREATHING ATTACHMENT FOR USE DURING SHIPMENT OF OIL FILLED SUBMERGIBLE MOTOR AND PUMP ASSEMBLIES

Filed May 19, 1964

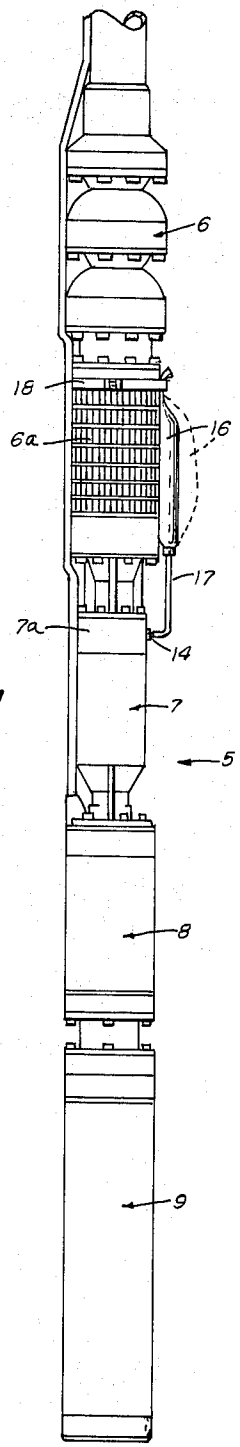


FIG. 1

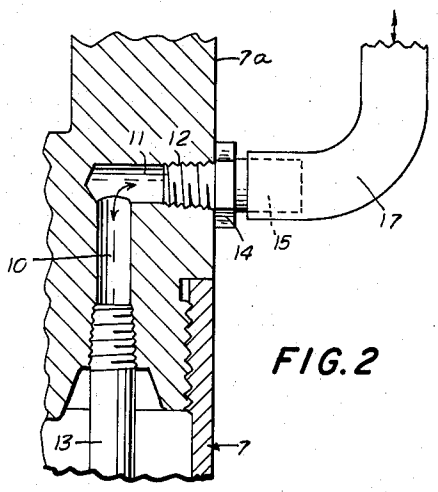


FIG. 2

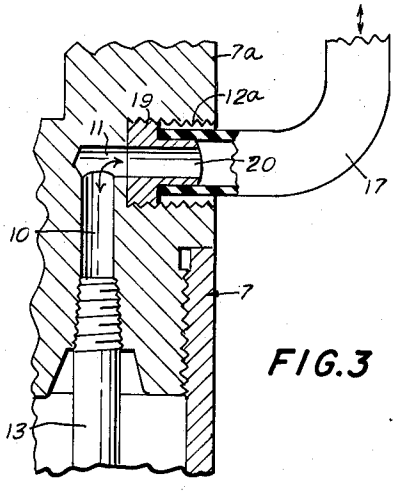


FIG. 3

INVENTOR
ARMAIS ARUTUNOFF

BY

ATTORNEY

United States Patent Office 3,241,492 Patented Mar. 22, 1966

3,241,492

BREATHING ATTACHMENT FOR USE DURING SHIPMENT OF OIL FILLED SUBMERGIBLE MOTOR AND PUMP ASSEMBLIES

Armais Arutunoff, Bartlesville, Okla., assignor to Reda Pump Company, Bartlesville, Okla., a corporation of Delaware

Filed May 19, 1964, Ser. No. 368,616
3 Claims. (Cl. 103—87)

This invention relates to oil filled, deep well submergible pump and motor assemblies, and consists more particularly in new and useful improvements in means for protecting such assemblies from damage prior to installation and during shipment, by reason of expansion of the lubricating and protecting medium therein, as a result of variations in temperature.

These motor and pump assemblies usually comprise a series of coaxial units arranged in superposed relation and including a pump unit, a thrust compensating unit, a motor unit, and a protecting unit, such, for example, as the general assembly disclosed in my prior Patent No. 2,783,400, issued on February 26, 1957. These assemblies are usually shipped in operational condition with the intercommunicating units filled with a maximum volume of oil and protecting medium required for their proper performance. A suitably located breathing vent to compensate for oil expansion and contraction when the assembly is installed and operating is plugged during shipment to prevent the escape of the oil and protecting medium. Prior to installation, this conventional plug is removed from the breathing vent to render the protecting unit operative.

In the course of shipment, these assemblies are subjected to varying degrees of atmospheric temperature, as, for example, when lying in the sun on a shipping dock, and unless some means is provided to compensate for the resulting expansion of the oil and protecting medium with which the assemblies are filled, considerable damage to the assembly may occur.

It is therefore the primary object of this invention to provide an expandible breathing bag, located externally of the assembly, and connected to the breathing vent thereof so as to accommodate any expansion of the medium filling the assembly.

Another object of the invention is to provide a breathing bag of this nature which may be easily attached for shipment and removed prior to installation of the assembly.

A further object of the invention is to provide a breathing bag which is arranged in connection with an oil filled motor and pump assembly in a manner to receive the amount of filling medium which is expelled from the assembly by expansion, and upon subsequent contraction, will return the filling medium to the assembly.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel features herein set forth, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

Referring to the drawings in which numerals of like character designate similar parts throughout the several views:

FIG. 1 is a side elevational view of a typical motor and pump assembly, illustrating one method of attachment of the breathing bag;

FIG. 2 is an enlarged, fragmentary, sectional view, illustrating one manner of connecting the breathing bag to the breathing vent; and

FIG. 3 is a similar view showing a modified bag connecting means.

In the drawings, referring first to FIG. 1, one form of conventional assembly with which the present invention may be employed, is generally represented by the numeral **5** and consists of a pump unit **6**, the intake area of which is enclosed by a cylindrical screen **6***a*. Below and coaxial with the pump unit is a thrust compensating unit **7** connected to the pump unit by a head **7***a*, and coaxially connected below the thrust compensating unit **7**, are a motor unit **8** and a protecting unit **9** including a protecting fluid reservoir. It will be understood that the assembly here illustrated represents only one example of an oil filled motor and pump assembly with which the invention may be employed and that the usefulness of the invention is not confined to this particular assembly.

Conventionally, the housings of all of the units below the pump unit are filled with a lubricating and protecting fluid, and ordinarily, the unit immediately below the pump unit, in this instance, the thrust unit connecting head **7***a*, is provided with a vertical vent passageway **10**, as seen in FIG. 2, which terminates at its upper extremity in a right-angular, radially directed branch passageway **11** which opens to the exterior at the periphery of the thrust unit head **7***a*, where it is provided with internal threads **12** which normally receive a closing plug when the assembly is being shipped. The vent passageways **10** and **11** are connected by tubing **13** in a conventional manner to the protecting system and reservoir **9**.

Ordinarily, when an oil filled assembly is shipped, the threaded passageway opening **12**, as before stated, is closed by a conventional plug to prevent the escape of the lubricating and protecting fluid contained in the assembly, and this plug is removed when the assembly is installed so as to permit normal breathing through the protecting system and compensate for expansion and contraction of the filling medium. However, according to the present invention, instead of inserting a closure plug in the threaded vent passageway **11**, a tubular adaptor **14** is screwed into the threaded opening **12** after the assembly is filled with the required volume of protecting fluid. This adaptor **14** is provided with a tubular projection or nipple **15** by means of which the breathing bag of the invention is connected, as hereinafter described.

The breathing bag **16**, shown in FIG. 1, may be formed of rubber or any other suitable expandible material having the necessary properties to withstand prolonged contact with lubricating oil and protecting fluid. The bottom of the bag **16** is provided with an opening which is connected to the adaptor **14** by means of a flexible tube **17** of a material similar to that of the bag **16**, the lower extremity of the tube **17** being forced over the nipple **15** with a tight fit. The upper end of the inverted bag **16** is attached to the unit immediately above the thrust unit **7** by any suitable means. In the present embodiment, the bag lies against the periphery of the cylindrical inlet screen **6***a* and its upper end is secured in place by a removable band or strap **18** of any convenient form, which encircles the unit **6** immediately above the inlet screen **6***a*.

Thus, during shipment, when the oil filled assembly **5** is subjected to a temperature sufficient to cause an expansion of the filling medium, any fluid which is expelled due to expansion, passes through the breathing passageways **10** and **11**, and the connecting tube **17**, into the bag **16**, causing the latter to expand as shown in dotted lines in FIG. 1. Upon a reduction in the surrounding temperature, as the fluid in the assembly contracts, the previously expelled fluid is returned from the bag **16** into the protecting system so that none of the lubricating oil or protecting medium is lost.

It will be understood, of course, that when the assembly is installed for operation in a well, the bag **16** is

removed by disconnecting the band **18** and unscrewing the adaptor **14** from the passageway **11**, so that the normal breathing system of the assembly can function in the usual manner.

In the modified connecting means shown in FIG. 3, the outer end of the breathing passageway **11** is enlarged and threaded as at **12***a* to receive the complementary threads of the base flange **19** of a modified adaptor which, when inserted, lies entirely within the peripheral boundaries of the connecting head **7***a*. From the base flange **19**, a tubular nipple **20** extends outwardly in inwardly spaced relation to the threaded enlargement **12***a*, providing an annular clearance to permit the end of the tubing connection **17** to be slipped thereover, as shown. With this modified form, when the assembly is installed for operation, it is only necessary to slip the end of the tubing connection **17** off of the nipple **20**, leaving the adaptor in place and entirely confined within the peripheral boundaries of the assembly.

From the foregoing, it is believed that the invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of the invention as set forth in the following claims.

I claim:

1. In combination with an oil filled submergible motor and pump assembly of superposed, cylindrically housed units having a breathing vent communicating with the oil filled interior of said assembly; means for protecting said oil filled assembly prior to installation, against damage resulting from expansion of the oil contained therein due to temperature increase while preventing loss of said oil, said means comprising an expandible breathing bag, detachable means for securing said bag alongside the outer wall of the housing of one unit of said assembly, and tubular means detachably connecting the interior of said bag to said breathing vent, whereby oil expelled from said assembly during expansion is received by said bag and returned therefrom upon contraction.

2. The combination as claimed in claim **1**, wherein said last-named means comprise a tubular adaptor threadedly engaging said breathing vent, and a nipple projecting from said adaptor for removably receiving the end of said flexible tubing.

3. The combination as claimed in claim **1**, wherein said breathing vent opens into an enlarged, threaded recess in the outer wall of one of said housed units, and an adaptor threadedly engaging said recess and lying entirely within the confines thereof, for removably receiving one end of said tubular means.

References Cited by the Examiner

UNITED STATES PATENTS

2,674,194	4/1954	Arutunoff	103—87
2,682,229	6/1954	Luenberger	103—87
2,703,371	3/1955	Wightman	103—87
2,857,181	10/1958	Myers	103—87

ROBERT M. WALKER, *Primary Examiner.*