

- 1 - 9702597-7

METHOD FOR MANUFACTURING THE COMPONENT CONNECTING MOTOR
AND PUMP, IN PERIPHERAL ELECTRIC PUMPS, AND COMPONENT
THUS MANUFACTURED ✓

DESCRIPTION

The present invention relates to a method for manufacturing the component connecting motor and pump, in peripheral electric pumps, and the component thus
5 manufactured.

As is known, the component in question consists of a body with a complex shape which performs a triple function:

- a) providing the front shield for the motor, provided with a suitable seating for the bearing of the drive
10 shaft;
- b) forming the mechanical component connecting the motor casing and the pump body;
- c) forming the rear part of the pump body inside which the peripheral impeller is housed, provided with the
15 seat for the mechanical seal of the drive shaft.

The particular constructional solutions which can be adopted may be of the most varied kind, while always having to guarantee the functions described above.

Therefore, for example, any number of screws or ties for
20 connecting the component in question and the motor casing

and the same component and the front body may be provided. Similarly, any external shape may be assumed by the pump body (three-lobed, four-lobed, round or the like) or the structure of the connecting part (in the form of spokes) with a hollow continuous shape and solid structure.

In order to fulfil the three functions mentioned above, while ensuring the variety of specific constructional solutions which may be adopted, the component in question must be provided with:

- a front part having a flat surface substantially in the form of a circular rim provided with a coplanar radial projection against which the peripheral impeller makes sliding contact;
- an internal seating, for the mechanical seal, concentric with the aforementioned circular rim;
- a part external to the aforementioned rim and set back with respect thereto, forming a circular chamber which guarantees externally centring between the component in question and the front pump body.

The aforementioned three parts are characterized by the fact that they are in contact with the pumped fluid, unlike the remaining following parts:

- a rear chamber which forms the front shield of the motor and in which the central zone forms the seating for the shaft bearing and the peripheral zone ensures centring and connection with the casing of the motor;
- an intermediate part connecting the aforementioned rear chamber and the "wet zone" formed by the three front parts described further above.

At present, as is known, the connecting component in question is made of cast iron.

This fact involves certain drawbacks of both an economic and functional nature.

In fact, the part made of cast iron is somewhat costly owing to its structural complexity and its small dimensions. In fact, fairly complicated internal cores are required inside the mould, as well as the use of high-quality cast iron in view of the limited thicknesses envisaged. Moreover, at the end of casting, somewhat laborious finishing operations must be performed by specialized personnel.

A further drawback of the known art consists in the high weight of the cast-iron component, this having a negative effect on the costs of transportation of the electric

pumps.

From a functional point of view the main drawback which arises is the formation of rust in the circular rim zone against which the impeller makes sliding contact. This
5 formation of rust occurs whenever the electric pump is not used for periods of the order of a few months. As is known, the formation of rust, irremediably damages operation of the electric pump which must therefore be replaced.

10 The essential object of the present invention is therefore that of overcoming the drawbacks of the art known hitherto, by developing a method for the manufacture of the connecting component in question which can be performed at lower costs and in an automated
15 manner.

A further object of the present invention is that of providing a component for connecting motor and pump, in peripheral electric pumps, which has a low weight and which completely overcomes the drawback of rust formation
20 in the zone with which the pump impeller makes contact.

These and still further objects are all achieved by the method in question and by the component thus manufactured, the main characteristic features of which

are indicated in the claims which follow.

Further characteristic features and advantages of the present invention will emerge more clearly from the description which follows of the method and the connecting component, in two constructional variants, thus manufactured, given with reference to the accompanying drawings provided purely by way of a non-limiting example, in which:

- 10 - Figure 1 shows a front view, from the pump side, of a first embodiment of the connecting component according to the invention;
- Figure 2 shows the connecting component viewed in section along the line II-II of Fig. 1;
- Figure 3 shows the connecting component viewed in section along the line III-III of Fig. 1;
- 15 - Figure 4 shows the connecting component viewed laterally;
- Figure 5 shows a front view, from the pump side, of a second embodiment of the connecting component;
- 20 - Figure 6 shows the connecting component viewed in section along the line VI-VI of Fig. 5;
- Figure 7 shows a second embodiment of the connecting component, viewed from the motor side (opposite view

to Fig. 5);

- Figure 8 shows the connecting component viewed in section along the line VIII-VIII of Fig. 7.

With reference to the accompanying drawings, 1 denotes in
5 its entirety the connecting component forming the subject
of the present invention.

Unlike that which is known in the conventional art, it
consists of two parts which can be distinguished from one
another since they are made of two distinct materials
10 with different characteristics, but forming a whole from
a mechanical point of view.

These two parts are as follows:

- A) A front part 2 designed to be wetted by the pumped
fluid and therefore made of brass, or bronze or
15 stainless steel or other material which is not
affected by degradation phenomena when in contact
with the fluid (formation of rust, rapid abrasion,
electrolytic attack or other phenomena).

In this front part 2, the following in turn may be
20 distinguished:

- a flat surface 4 substantially in the form of a
circular rim against which the peripheral impeller
(not shown) makes sliding contact;

- a seating 5 for the internal mechanical seal (not illustrated) concentric with the circular rim 4;

- a part external to the rim 4 and set back with respect to the latter, forming a circular chamber 13;

- a radial projection 6 which divides up the chamber 13 into an intake zone 7 and into a delivery zone 8.

B) A rear chamber 3, not wetted by the pumped fluid, having purely mechanical functions and therefore made of aluminium, plastic or other relatively lightweight, low-cost and mechanically strong material and designed to be formed using methods such as pressure-casting. This chamber 3 forms a whole with the front part 2 and at the same time forms the motor shield and the component 1 connecting the motor and the pump. The chamber 3 is provided with:

- the seating 9 for the bearing of the drive shaft (not illustrated);

- an intermediate part 14 forming both the motor shield and the connection between motor and pump, which connection is achieved by means of screws which can be inserted into the holes 10 of the lugs

11 on the motor side and by means of screws received in the threaded holes 12 on the pump-body side.

In a first embodiment, illustrated in Figures 1 to 4, mutual fixing between the front part 2 and the rear part 3 is achieved by means of pressure-casting as described below.

The method for manufacturing the connecting component, in the first embodiment, comprises the following operating stages:

- 10 - a first stage involving moulding of the front part 2 with a material such as brass, bronze, stainless steel or the like;
- a second stage involving introduction of the front part 2 into a pressure-casting mould;
- 15 - a third stage involving pressure-casting with aluminium, plastic or the like, for the formation of the rear chamber 3 inside the mould so that the front part 2 is incorporated partially in the rear chamber 3, becoming a whole with the latter from a mechanical point of view;
- 20 - a fourth stage involving extraction of the connecting component 1 from the pressure-casting mould.

In a second embodiment, illustrated in Figures 5 to 8, mutual fixing between the front part 2 and the rear chamber 3 is performed by means of riveting of a plurality of studs 15 after they have been inserted into
5 corresponding through-holes 16 formed in the rear chamber 3.

The studs 15 (see Figs. 6 and 7) form an integral part of the front part 2 and in the example illustrated are six in number, being arranged circumferentially (see Fig. 7).
10 Similarly, six through-holes 16 are formed in the body of the rear chamber 3.

The method for manufacturing the connecting component, in the second embodiment, comprises the following operating stages:

- 15 - a first stage involving moulding of the front part 2 with a material such as brass, bronze, stainless steel or the like, comprising the formation of the studs 15;
- a second stage involving pressure-casting with
20 aluminium, plastic or the like, for the formation of the rear chamber 3, comprising the formation of the through-holes 16;
- a third stage involving joining of the front part 2

with the rear chamber 3, comprising the insertion of the studs 15 inside the holes 16;

- a fourth stage involving riveting of the studs 15.

The invention therefore achieves the preset objects.

5 It should be noted, in fact, that, by means of method described, in the two constructional variants, formation of the connecting component 1 occurs in an automated manner with costs less than those required in the case of construction of the part in cast iron.

10 Moreover laborious finishing operations by specialized personnel are not necessary. The weight of the part, moreover, is much less than that of conventional cast-iron parts and this results in considerable savings in terms of transportation costs.

15 From a technological point of view, moreover, the drawback of rust formation is completely overcome, resulting in more reliable operation of the electric pump even in the case where it is not used for long periods of time.

20 Obviously the connecting component 1 in question may also assume, in its practical embodiment, forms and configurations different from that illustrated above without thereby departing from the present protective

scope. Moreover, all the details may be replaced by technically equivalent elements and the forms, the dimensions and the materials used may be of any nature, in accordance with requirements.



CLAIMS

1. Method for manufacturing the component connecting motor and pump, in peripheral electric pumps, said component (1) comprising a front part (2) located on the pump side and subject to the pumped fluid and provided with a flat substantially circular surface (4) against which the impeller of the pump makes sliding contact and provided centrally with a cylindrical hole (5) designed to receive the shaft of said motor and the mechanical seal, said component (1) comprising moreover a rear chamber (3) located on the motor side and provided centrally with a hollow cylindrical relief (9) designed to receive the shaft of said motor and the motor front bearing, said rear chamber (3) being able to be fixed to the casing of said motor by means of screws which can be inserted into holes (10) formed on lugs (11) extending radially with respect to said rear chamber (3), characterized in that it comprises the following operating stages: a first stage involving moulding of said front part (2) made of a material which cannot be damaged by the pumped fluid; a second stage involving introduction of said front



part (2) into a pressure-casting mould; a third stage involving pressure-casting for the formation of said rear chamber (3) inside said mould so that the front part (2) is incorporated partially in said rear chamber (3); a fourth stage involving extraction of said connecting component (1) from said pressure-casting mould.

2. Method for manufacturing the component connecting motor and pump, in peripheral electric pumps, said component (1) comprising a front part (2) located on the pump side and subject to the pumped fluid and provided with a flat substantially circular surface (4) against which the impeller of the pump makes sliding contact and provided centrally with a cylindrical hole (5) designed to receive the shaft of said motor and the mechanical seal, said component (1) comprising moreover a rear chamber (3) located on the motor side and provided centrally with a hollow cylindrical relief (9) designed to receive the shaft of said motor and the motor front bearing, said rear chamber (3) being able to be fixed to the casing of said motor by means of screws which can be inserted into holes (10) formed on lugs



(11) extending radially with respect to said rear chamber (3), characterized in that it comprises the following operational stages: a first stage involving moulding of said front part (2) made of a material which cannot be damaged by the pumped fluid and provided with a plurality of studs (15); a second stage involving pressure-casting for the formation of the rear chamber (3) provided with a plurality of through-holes (16); a third stage involving joining of the front part (2) with the rear chamber (3), comprising the insertion of said studs (15) inside said holes (16); a fourth stage involving riveting of the studs (15).

3. Component (1) connecting motor and pump, in peripheral electric pumps, comprising a front part (2) located on the pump side and subject to the pumped fluid and provided with a flat substantially circular surface (4) against which the impeller of the pump makes sliding contact and provided centrally with a cylindrical hole (5) designed to receive the shaft of said motor and the mechanical seal, and comprising moreover a rear chamber (3) located on the motor side and provided centrally



with a hollow cylindrical relief (9) designed to receive the shaft of said motor and the motor front bearing, said rear chamber (3) being able to be fixed to the casing of said motor by means of screws which can be inserted into holes (10) formed on lugs (11) extending radially with respect to said rear chamber (3), characterized in that said front part (2) is made of material which cannot be damaged by the pumped fluid and is irremovably associated with said rear chamber (3) forming a mechanical whole therewith.

4. Component (1) connecting motor and pump, according to Claim 3, characterized in that said mechanical whole is achieved by means of partial incorporation of said front part (2) in said rear chamber (3).
5. Component (1) connecting motor and pump, according to Claim 3, characterized in that said mechanical whole is achieved by means of riveting of studs (15) inside corresponding holes (16), said studs (15) and said holes (16) being respectively arranged on said front part (2) and on said rear chamber (3) or vice versa.
6. Connecting component (1) according to Claim 1,



- 16 -

characterized in that said material which cannot be damaged by the pumped fluid is brass, or bronze or stainless steel.

7. Connecting component (1) according to Claim 3, characterized in that said rear chamber (3) is made of aluminium or plastic material.