



(19)

Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 884 139 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.12.1998 Bulletin 1998/51

(51) Int. Cl.⁶: **B25D 17/11**

(21) Application number: **98110511.7**

(22) Date of filing: **09.06.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **12.06.1997 IT MO970109**

(71) Applicant:
**Socomec - Societa' Costruzioni Meccaniche
Societa' per Azioni
43014 Medesano, Parma (IT)**

(72) Inventor: **Gazza, Nello
43100 Parma (IT)**

(74) Representative:
**Modiano, Guido, Dr.-Ing. et al
Modiano Gardi Patents,
Via Meravigli, 16
20123 Milano (IT)**

(54) Oleohydraulic demolition hammer

(57) The hammer is meant to reduce the noise pollution produced by the vibrations generated by the work of the tool (5). This is achieved by hot-pouring a polyurethane substance (13) between coaxial walls (10, 11) of the casing (7). The substance tensions the walls and thus reduces the vibrations emitted by the casing. The hammer is used in rock and building demolition machines.

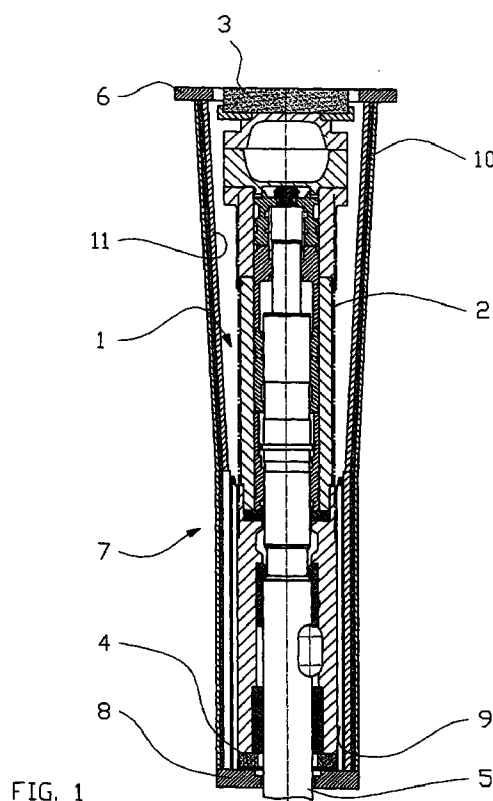


FIG. 1

EP 0 884 139 A2

Description

The present invention relates to an oleohydraulic demolition hammer, i.e., a tool which is actuated by means of oil or other adapted pressurized fluid, which can be advantageously installed in machines such as excavators, without restrictions, to demolish rock or masonry even if made of reinforced concrete.

Prior art devices include demolition hammers provided with an outer casing in which recesses or hollows are internally provided in order to insert therein sheets of foamed materials such as cellular polyurethane meant to be crushed due to the forced insertion of the body of the hammer in order to reduce transmission of vibrations from said body to the casing, so as to decrease noise pollution.

Conventional hammers have, between said body and the outer casing, sheet-like elements made of elastomeric material which are interposed between said body and the outer casing, which is suitably thickened, in order to act as a guide for the axial oscillation of said body, reducing the transmission of vibrations and therefore noise pollution in this case as well.

However, in the first case, besides not obtaining satisfactory results, assembly difficulties are observed due to the attention and equipment which are necessary, with a consequent significant waste of time and high costs, also due to the onerous purchase of the expensive raw material.

In the second case, in addition to the drawback of having to thicken the outer casing, an even less satisfactory result is achieved even though the cost of the raw material is lower.

The conventional devices are susceptible of numerous improvements in relation to the possibility of avoiding the above drawbacks.

Accordingly, the aim of the present invention is to solve the problem of drastically reducing the noise emission of the hammer, not only to avoid exceeding the allowed values but to actually advantageously drop below the limits prescribed by statutory provisions, further avoiding the early breaking of components which occurs in the current state of the art due to the extent of the vibrations: all this being achieved at a modest cost and without structural complications.

The above aim is achieved by adopting the insertion by pouring, into an interspace which is coaxial and external to the body of the hammer, of a noncellular polyurethane substance adapted to produce tension among the parts that are separated by said substance during the shrinkage that follows polymerization in an oven, thus eliminating or in any case drastically reducing the vibrations that are the source of noise emission.

In practice the demolition hammer according to the invention has the features as set forth in the appended claims.

The advantages achieved by the present invention are as follows.

Elimination or drastic reduction of the primary cause of the noise emission produced by the tool of the oleohydraulic demolition hammer; simplicity of the structure; its modest costs; longer life of the components of the hammer.

A non-limitative exemplary embodiment of the invention is shown in the accompanying drawings, wherein:

Figure 1 is an axial sectional view of a medium- and high-power oleohydraulic demolition hammer, for example having a total weight of more than 500 kg, ready for use; and

Figure 2 is a sectional view, similar to Figure 1, in the small-to-medium power case, i.e., less than approximately 500 kg, advantageously without braces, which tend to break.

The reference numeral 1 designates the body of the hammer, which is constituted in any manner and is assembled by means of braces whose axis is designated by 2. The body is inserted between an upper circular shock-absorbing pad 3 and a lower ring 4, both of which are made of elastic material in order to cushion the stroke limit impacts of the tool 5. The reference numeral 6 designates an upper flange of the casing 7 (optionally divided into multiple parts along its length) for coupling to the arm of an earth-moving machine or the like. The reference numeral 8 designates a wear-resistant bottom plate of the casing 7. The reference numeral 9 designates a guide made of elastomeric material or in any case of a material which is adapted to guide the axial oscillation of the body 1. The reference numerals 10 and 11 respectively designate the outer wall and the inner wall of the casing 7, which have a different thicknesses. Advantageously, the inner wall 11 is thicker, said walls being separated by an interspace 12 formed by two coaxial surfaces. The interspace is filled by pouring by means of a noncellular polyurethane substance 13 (Figure 1a), for example the one currently marketed by Uniroyal Chemical under the name Diprene LF Esters, advantageously having a Shore hardness between 65 and 95, depending on the increasing thicknesses of the casing, and meant to polymerize in an oven. The reference numeral 14 designates the casing that encloses the interspace 15, which is part of a medium-to-low power hammer without braces.

The two coaxial surfaces between which the substance 13 is poured are constituted by the inner surfaces of the outer wall 10 and, respectively, of the inner wall 11, which are separated by the interspace 12 and constitute the casing 7.

The inner wall 11 of the casing 7 is thicker than the corresponding outer wall 10; the two walls are separated by the substance 13 along at least part of the interspace 12.

The two coaxial surfaces between which the sub-

stance 13 is poured are constituted by the inner surface of the wall constituted by the casing 14 which faces the outer surface of said body.

Preparation for drastic reduction in noise emission by the oleohydraulic demolition hammer occurs during a hot polymerization step (for example at a temperature of approximately 90°) due to the shrinkage of the substance used, which acts between the body of the hammer and the thinner outer casing, as in the case of Figure 2, in any case mutually tensioning two structures which have different vibration frequencies, so as to eliminate or greatly reduce vibrations, i.e., the source of the noise rather than just the transmission of said noise, as usually occurs. In the case of Figure 1, the tension develops between the walls 10, 11 which have different thicknesses.

In practical execution, the materials, the dimensions, the details of execution, the shape of the body 1 of the hammer and of its parts, of the casings 10, 11, 14 may be different from those described herein, but technically equivalent thereto, without thereby abandoning the scope of the present invention.

Accordingly, the substance 13 may be poured along the entire extension of the interspace 15 of Figure 2; vice versa, the substance 13 may be poured only along part of the extension of the interspace 12 of Figure 1.

Moreover, the substance used may be different from the above cited polyurethane substance, so long as it is adapted to produce tension between the body 1 and the casing 14 and/or between the walls of the casing 7.

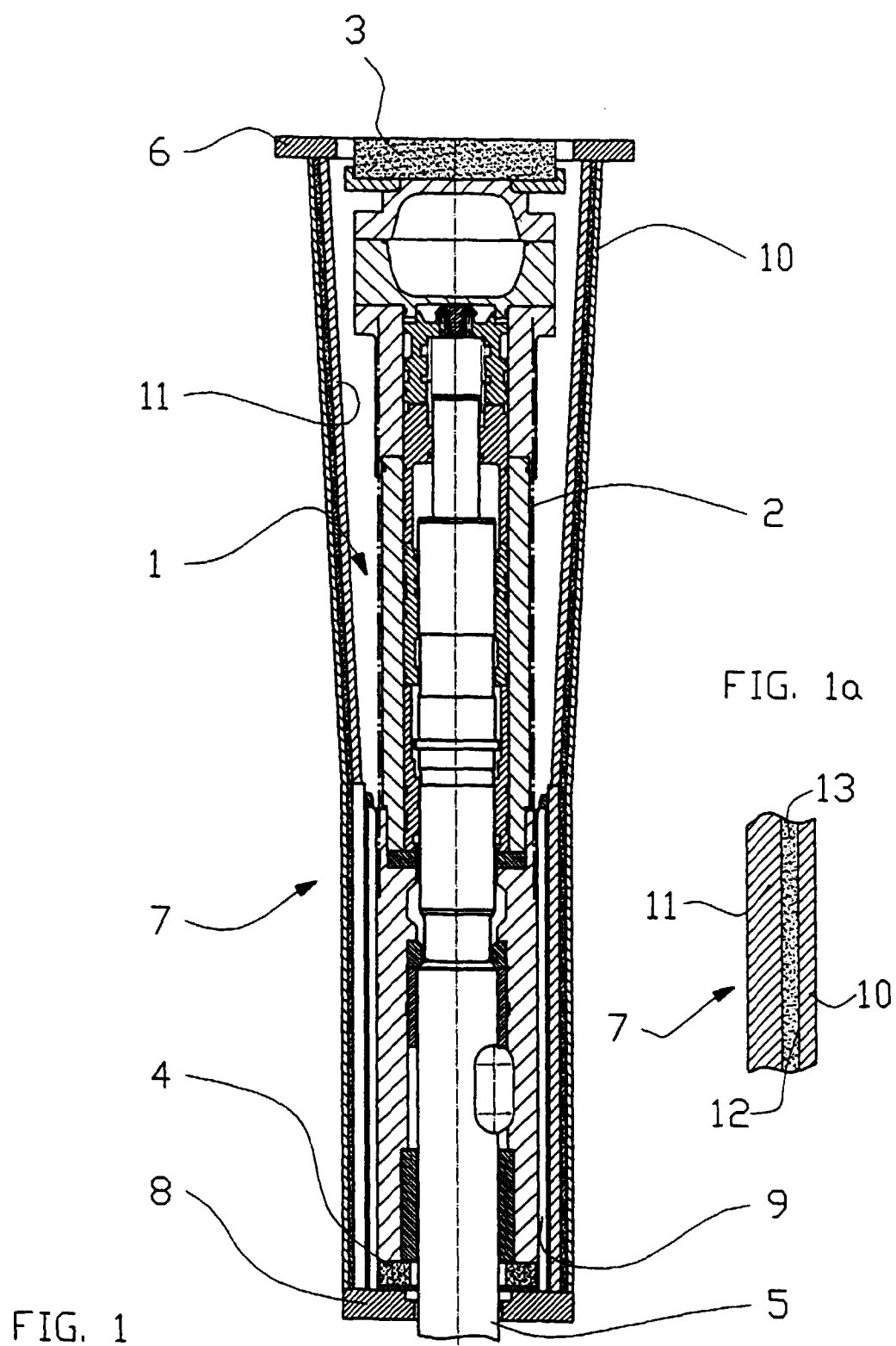
Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An oleohydraulic demolition hammer, comprising a body (1), an outer casing and a substance inserted in an interspace defined within said casing, characterized in that a substance (13) adapted to produce tension between two facing surfaces of the interspace is introduced by pouring in the interspace formed between two coaxial surfaces orientated along the length of the hammer, so as to constitute an element for mutually tensioning the walls to which said surfaces belong.
2. A hammer according to claim 1, characterized in that said substance (13) is a polyurethane substance.
3. A hammer according to claim 2, characterized in that said polyurethane substance (13) is hot-polym-

erizable in the interspace of said hammer.

4. A hammer according to claim 3, characterized in that said hot-polymerizable substance (13) has a hardness between 65 and 95 Shore.
5. A hammer according to claim 1, characterized in that the two coaxial surfaces between which said substance (13) is poured are constituted by the inner surfaces of the outer wall (10) and, respectively, of the inner wall (11), which are separated by the interspace (12) and constitute the casing (7).
6. A hammer according to claim 5, characterized in that the inner wall (11) of said casing (7) is thicker than the corresponding outer wall (10); the two walls being separated by said substance (13) along at least part of the interspace (12).
7. A hammer according to claim 1, characterized in that the two coaxial surfaces between which said substance (13) is poured are constituted by the inner surface of the wall constituted by the casing (14) which faces the outer surface of said body.
8. A hammer according to claim 7, characterized in that the interspace (15) is at least partly occupied by said substance (13).



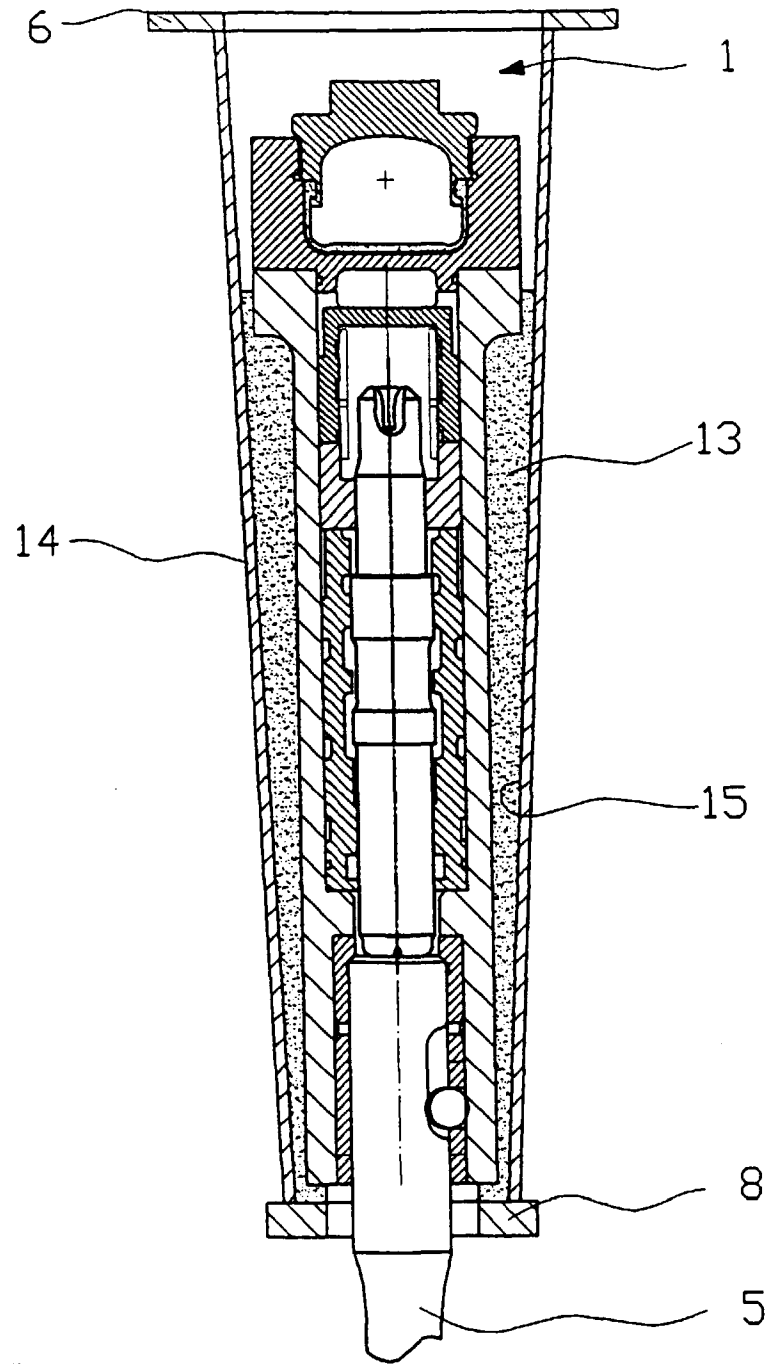


FIG. 2