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(54) **Pipe-bending machine having an improved movement transmission to a bending die**

(57) A pipe bending machine having an improved movement transmission to a bending die comprises a body (1) and a head (2). Housed in the body (1) is a motor (3) having an output shaft (4) supporting a driving gear

wheel (5), which is located in the machine head (2). Located in the same machine head (2) is a driven gear wheel (8), which is connected to a pipe bending die (6). A couple of intermediate gear wheels (9, 10) engage both the driving gear wheel (5) and the driven gear wheel (8).

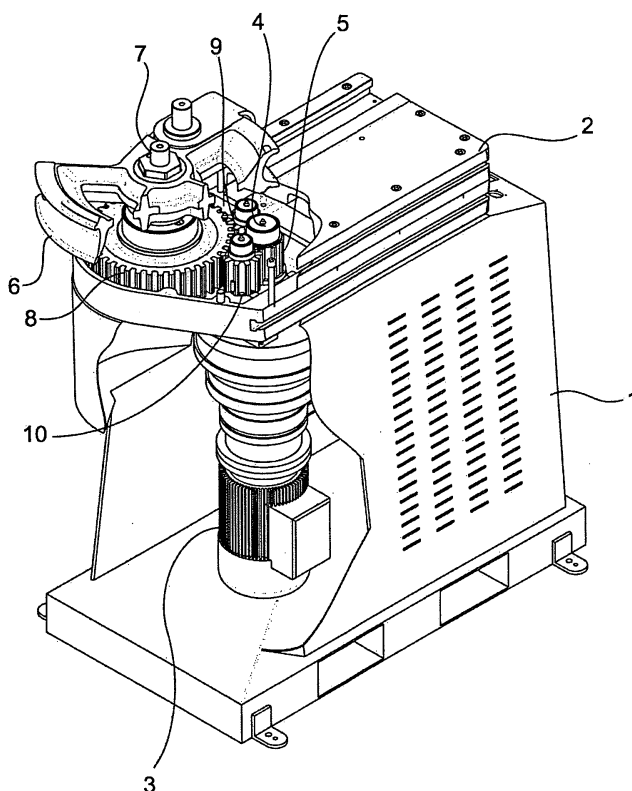


Fig. 1

Description

[0001] The present invention relates to a pipe bending machine having an improved movement transmission to a bending die.

[0002] In the existing pipe bending machines the machine comprises a body and a head. Housed in the body is a motor, whose output shaft supports a driving gear wheel in the machine head. The driving gear wheel engages a driven gear wheel that is rigidly connected to a pipe bending die. It is evident that greater is the diameter of the pipes to be bent, higher is the required motor power, and also the transmission gear wheels must be suitable to the required torque. Increased required torque needs increased sizes of the machine, and as a result also the cost of the machine rises.

[0003] U.S. Patents Nos. 3,302,505 and 5,709,144 in the name of Shiokawa both relate to a machine press characterised by being small in size but producing a high pressure. Among the solutions chosen by that inventor for achieving his objects, provision is made that the power is transmitted from a driving gear wheel to a driven gear wheel by interposing a couple of idle pinion gears between said gear wheels. Whereby, as said in those patents, "the force conveyed by the rotation is doubled, so that the diameter of the gear wheel can be reduced by half. As the result, it becomes possible to reduce the measurements of the machine by placing all the gears in the frame and also to reduce the wear and noise of each part".

[0004] According to the present invention, what is taught with reference to a machine press is thought to be transferred to another kind of machine, such as a pipe bender, taking the same solution with the purpose of obtaining either reduced sizes or, alternatively, an improved performance of the pipe bending machine.

[0005] In this context, the technical problem at the basis of the present invention is to provide a pipe bending machine having an improved movement transmission to a bending die in order to overcome above cited drawbacks relating to the encumbrance and low transmitted power in the state of art.

[0006] In particular, an object of the present invention is to provide a pipe bending machine having an improved movement transmission to a bending die, the pipe bending machine having reduced-size gear wheels maintaining the same power transmitted from the driving gear wheel to the driven gear wheel.

[0007] The object is generally achieved by a pipe bending machine having an improved movement transmission to a bending die, the machine comprising a body and a head, a motor being housed in the machine body and having an output shaft supporting a driving gear wheel, which is located in the machine head, and a driven gear wheel, which is connected to a pipe bending die, being located in the same machine head, wherein a couple of intermediate gear wheels engage both the driving gear wheel and the driven gear wheel.

[0008] As one can see, the Applicant developed a so called translation invention, transposing a device from a technical field, where said device is already known, to another one in which the device is not yet employed.

5 **[0009]** Further features and advantages of the present invention will be more evident by a schematic and therefore not limiting description of an embodiment of a pipe bending machine having an improved movement transmission to a bending die as shown in the accompanying drawings in which:

10 figure 1 is a cut axonometric view, with some parts being removed, of a pipe bending machine according to the invention;

15 figure 2 is a partially cut top plan view of the pipe bending machine in figure 1, with the bending die being removed; and

20 figure 3 is a general axonometric view of the pipe bending machine according to the invention, with a pipe ready to be bent.

25 **[0010]** First referring to the axonometric view in figure 1, therein a machine body is indicated as 1 and a machine head as 2. Conventionally, situated inside the machine body is a motor 3, generally an electric motor. A driving gear wheel 5 is keyed to the output shaft 4 of the motor 3. Located on the machine head 2 is also a bending die 6 (only partially shown) that allows pipes to be bent in a known way. The bending die 6 is rotated by a shaft 7 to which a driven gear wheel 8 is keyed. According to the present invention, as best shown in the top plan view of the pipe bending machine in figure 2 (with the bending die being removed), intermediate gear wheels 9 and 10 are interposed between the driving gear wheel 5 and the driven gear wheel 8. The intermediate gear wheels 9 and 10 engage at the same time both the driving gear wheel 5 and the driven gear wheel 8. In such a way the intermediate gear wheels 9 and 10 both transmit a movement of rotation from the driving gear wheel 5. If the driving gear wheel rotates in a direction, also the driven gear wheel 8 rotates in the same direction.

35 **[0011]** Thanks to the present invention, the power transmitted from the motor 3 to the bending die 6 being equal, the size of the gear wheels of the transmission and then of the machine head 2, and generally of all pipe bending machine, can be reduced.

40 **[0012]** With reference to figure 3 shown therein is a general axonometric view of the pipe bending machine in which the present invention is embodied. A pipe T that is positioned between the bending die 6 and the counter bending die 11, ready to be bent, is therein shown.

45 **[0013]** Thanks to the present invention, the sizes of the machine being equal to those of the precedent machines having a reduced performance, to develop improved bending performance, up to the double of the present one, is made easier.

Claims

1. A pipe bending machine having an improved movement transmission to a bending die, said machine comprising a body (1) and a head (2), a motor (3) being housed in the machine body (1) and having an output shaft (4) supporting a driving gear wheel (5), which is located in the machine head (2), and a driven gear wheel (8), which is connected to a pipe bending die (6), being located in the same machine head (2), **characterised in that** a couple of intermediate gear wheels (9, 10) engage both the driving gear wheel (5) and the driven gear wheel (8).

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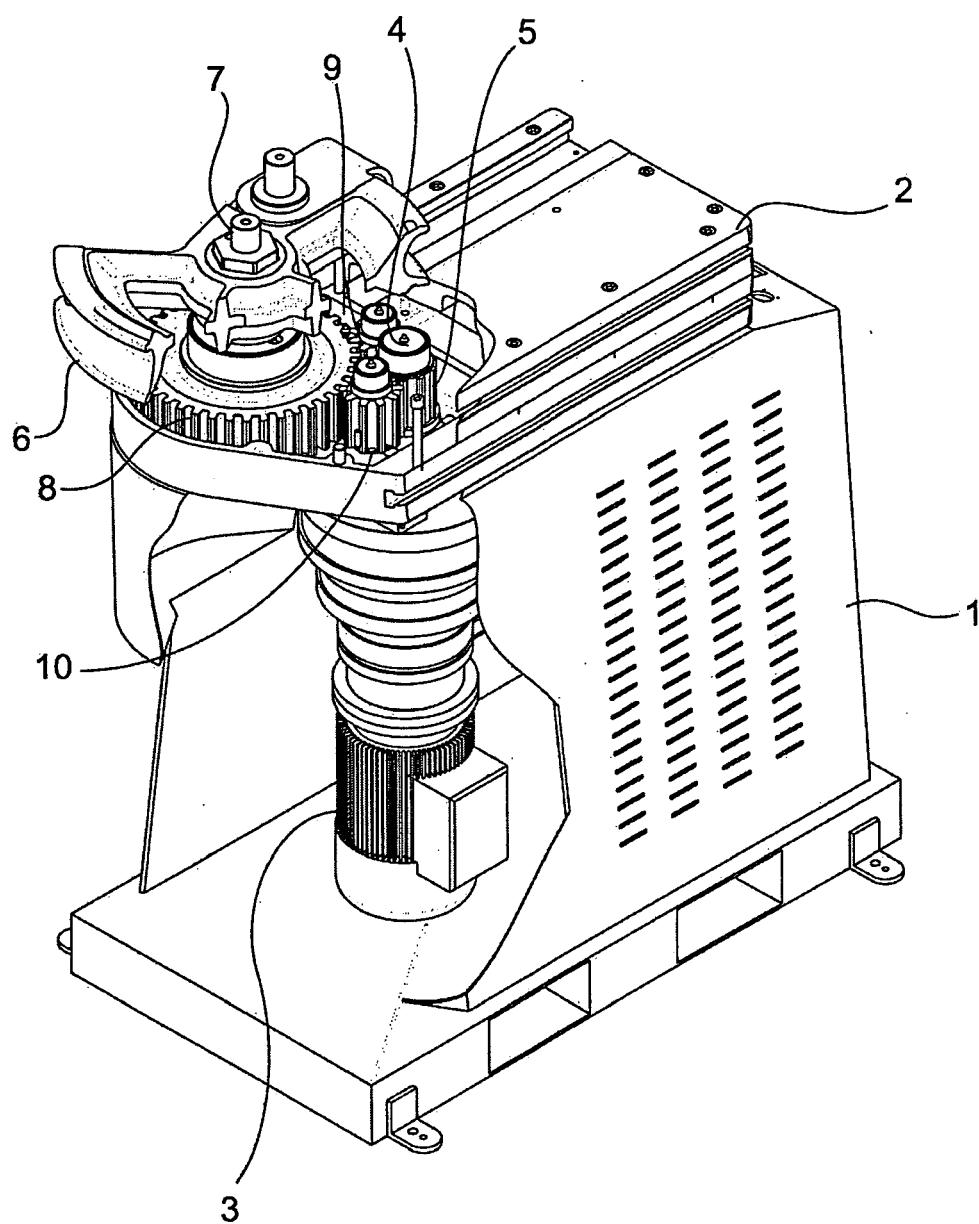


Fig. 1

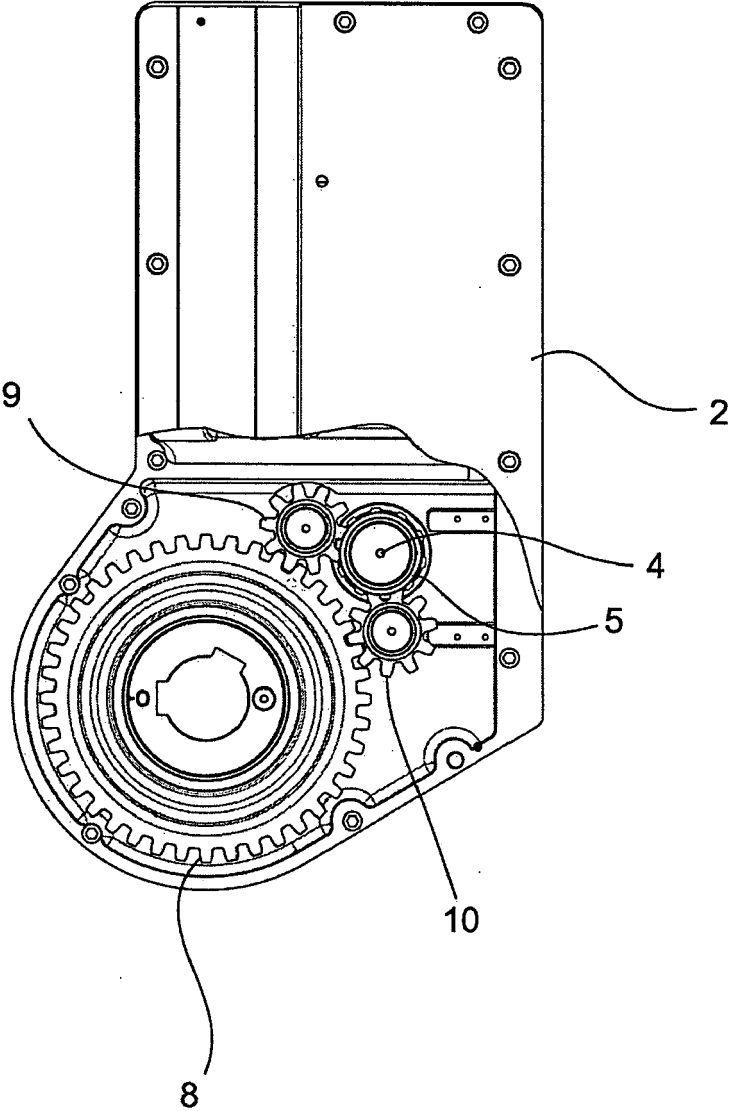


Fig. 2

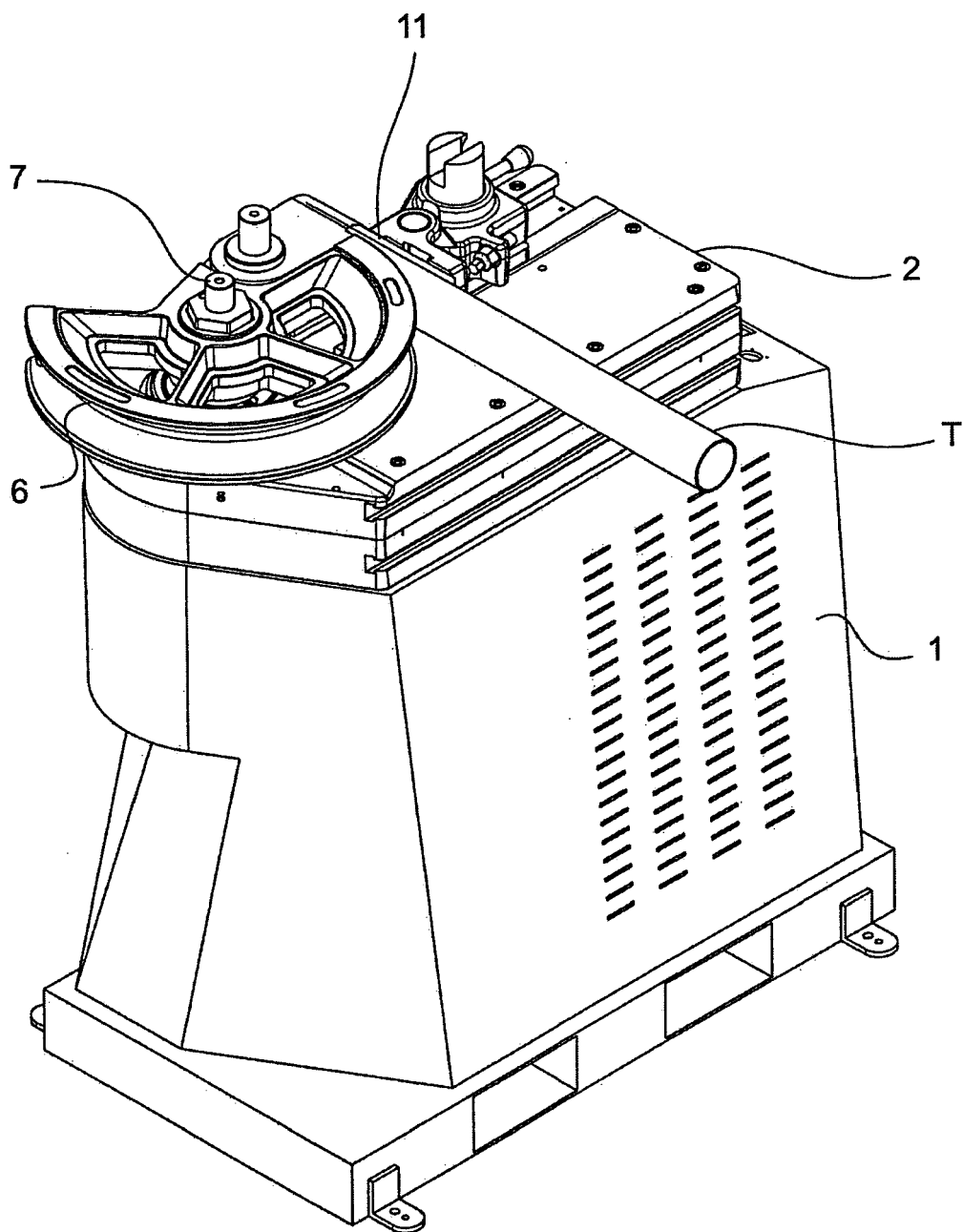


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5420

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 December 2009	Examiner Vinci, Vincenzo
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 09 42 5420

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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18-12-2009

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