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(71) Applicants:
- **David, Graziano**
  25062 Concesio (Brescia) (IT)
- **Bianchi, Carlo**
  13011 Borgosesia (Vercelli) (IT)

(72) Inventor: **The designation of the inventor has not yet been filed**

(74) Representative: **Manzoni, Alessandro**
MANZONI & MANZONI,
UFFICIO INTERNAZIONALE BREVETTI,
P.le Arnaldo 2
25121 Brescia (IT)

(54) Method and equipment for removing and/or cutting off bobs when die-casting

(57) The invention concerns equipment for removing the bobs (runners, gates)(16,17) from die-cast pieces (11).

It is made up of hubs (18,19) mounted crossways in the parts or half dies (12a,12b) of the die, facing the bobs at the height of the attachment zones (16',17') of the latter to the piece. The hubs are moved to push away and detach the feedheads after the piece has been moulded and before the die is opened to lift off the said piece.

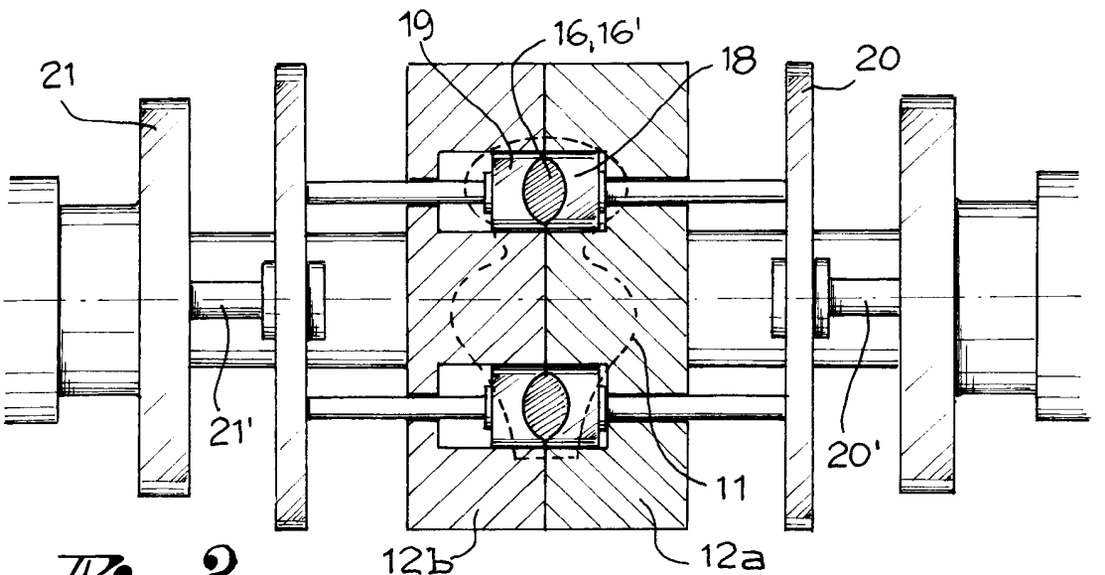

Fig. 3

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Description

[0001] This invention concerns a method and the equipment necessary for removing the bobs from cast pieces.

[0002] Metal objects, when produced by fusion in dies or moulds for foundries, inevitably have appendixes, called bobs and/or casting heads, due to the presence of at least one casting channel and a riser or gas vent. The bobs are subsequently removed after the lifting off and cooling down to leave the pieces completely free. At present, the removal of the bobs is carried out by cutting or trimming, which requires the availability of suitable equipment and, in particular, means picking up the pieces, with the labour and extra costs that this implies.

[0003] However, the aim of this invention is to propose both a method and the necessary equipment for the removal of the bobs from a cast piece, with an operation carried out directly in the die, synchronised with the piece moulding machine, while the latter is still hot and before the lifting off.

[0004] The advantages that this implies are obvious: the piece is freed from the bobs when it is still in the die or fusion mould; therefore, it is not necessary to pick the piece up again after cooling in order to cut off or trim the bobs; it is no longer necessary to use extra machinery, which means significant savings in time, labour and costs.

[0005] These aims and advantages are represented by the equipment described in revendication 1 and the application method described in revendication 5.

[0006] Further details of the invention will become clear from the following description, made with reference to the enclosed designs, which are indicative but not restrictive, where:

Fig. 1 shows a machine for die fusion, complete with equipment as described in the invention and where the die is closed;

Fig. 2 shows the same machine as Fig. 1, but with the die open;

Figs 3 and 4 show in cross-section two diagrams that illustrate the layout and functioning of the equipment; and

Fig. 5 shows an example of a cast piece after lifting off, where the broken lines indicate the bobs that have been removed.

[0007] Fig. 1 shows a machine 10 for the die fusion of metal pieces 11, a purely illustrative example of which is shown in Fig. 5.

[0008] The die 12 generally consists of two half-dies 12a, 12b which together form one or more impressions 13 of the piece 11 to be produced. Each impression 13 communicates with at least one casting channel 14 and with a riser conduct or gas vent 15 which, once the piece is cast, give way to the creation of appendixes or bobs 16, 17 which are attached to the piece 11 in one or more places 16', 17'.

[0009] The two half-dies 12a, 12b can be brought together or separated by the appropriate means, which are already well-known, and which bring about the opening and closing of the dies in the course of the moulding process of the piece.

[0010] On each half-die 12a, 12b, at the height of the attachment zone 16', 17' of the bobs 16, 17 to the piece, there are some hubs 18, 19 for removing the bobs from the piece. The hubs 18 on a half-die 12a are opposite to and aligned with the hubs 19 on the other half-die 12b; all the hubs have a frontal hollow to prevent blocking the channel 14, 15 towards which they are facing.

[0011] More precisely, the hubs 18 on the half-die 12a are fixed and movable simultaneously with at least one corresponding plate 20, located and guided behind the said half-die and connected to a linear actuator 20'. Likewise, the hubs 19 on the half-die 12b are fixed and movable according to a corresponding plate 21 located and guided behind this half-die and also connected to a linear actuator 21'. The actuators 20', 21' of the plates 20, 21 and, by means of these, of the hubs 18, 19 may be pneumatic, hydraulic, mechanical or electromechanical. They are activated to move the hubs 18, 19 either jointly in the same direction or independently in opposite directions.

[0012] During the casting of the molten metal in the closed die — Fig. 1, the hubs 18, 19 on the two half-dies 12a, 12b are brought together in the closure plane as shown in Fig. 3, with the respective frontal hollows along the line of the casting channels in such a way as not to obstruct them and hinder the flow of the metal. In the same Fig. 3, as in Fig. 4, the cast piece is shown with broken lines, while the bobs are shown in cross-section.

[0013] Once the piece has been formed, while the mould is still closed and the piece is hot semi-liquid, the hubs 18 on one half-die, indicated as the right-hand half-die 12a in the drawings, are commanded to advance while the hubs 19 on the other half-die 12b retreat simultaneously, as shown in Fig. 4.

[0014] As a result, the bobs are pushed away and, thereby, removed from the piece, which remains steady where it is. Then the hubs 18 retreat as the hubs 19 advance back to their original respective positions. Now the die is opened for the lifting of the piece, freed of its bobs. At the same time, the hubs 19 briefly advance again to expel the bobs.

[0015] In such a way, at the end of each fusion cycle inside the die, the piece will be lifted off free of bobs and the latter will be off-loaded separately from the piece, in accordance with the aims of this invention.

Claims

1. Equipment for removing bobs from die-cast metal pieces for foundries, where each die consists of two

parts or half-dies (12a, 12b), controlled by means of command for their opening and closure, and where said two parts or half-dies together mould the shape of at least one impression of the piece and the casting and vent channels which cause the formation of bobs attached to the piece, equipment characterised by the presence of hubs (18, 19) mounted on the parts or half-dies of the die, facing the bobs at the height of the attachment zone of the latter to the piece, and by the fact that these same hubs are moved to push away and detach the bobs after the moulding of the piece and before opening the die for the lifting off of the said piece.

2. Equipment according to revendication 1, in which the hubs (18) associated with one part or half-die (12a) are aligned with and opposite to those (19) associated with the other part or half-die (12b), and in which the opposing hubs have a frontal hollow in correspondence with the section of the respective zones of the bobs to be detached, said hollows fitting into the closure plane of the die along the line of the channels in which the bobs form during the casting.

3. Equipment according to revendications 1 and 2, in which the hubs (18,19) on each part or half-die of the die are fixed and movable with at least one plate (20, 21) located and guided behind the respective part or half-die and commanded by at least one corresponding linear actuator (20',21').

4. Equipment according to revendication 3, in which each linear actuator (20', 21') is of a pneumatic, hydraulic, mechanical or electromechanical type and operated in synchronisation with the opening and closing means of the die.

5. Method for detaching bobs and/or casting heads from die-cast metal pieces, which foresees:

- the closure of the die with the insertion of at least one movable device at the height of each casting channel or vent, where the bob and/or casting head is formed;
- a delivery of molten metal in the die for the moulding of the piece, without the said device interfering with the respective casting channel or vent;
- the movement by said device of the respective bob and/or casting head in order to detach the latter while the piece is still hot and semiliquid;
- the opening of the die for the lifting off of the piece, once it has solidified;
- a movement by said device in order to expel the bob and/or casting head that has been separated from the piece.

6. Method according to revendication 5, in which the devices are the hubs and where the hubs on one part of the die advance whilst the hubs opposite retreat in order to detach the bobs from the piece, then the hubs which have retreated advance to their original position whilst those that have advanced retreat just before the opening of the die, and the hubs which first retreated and then advanced, once more advance in order to expel the bobs once the die has been opened for the lifting off of the piece, which is now free of bobs.

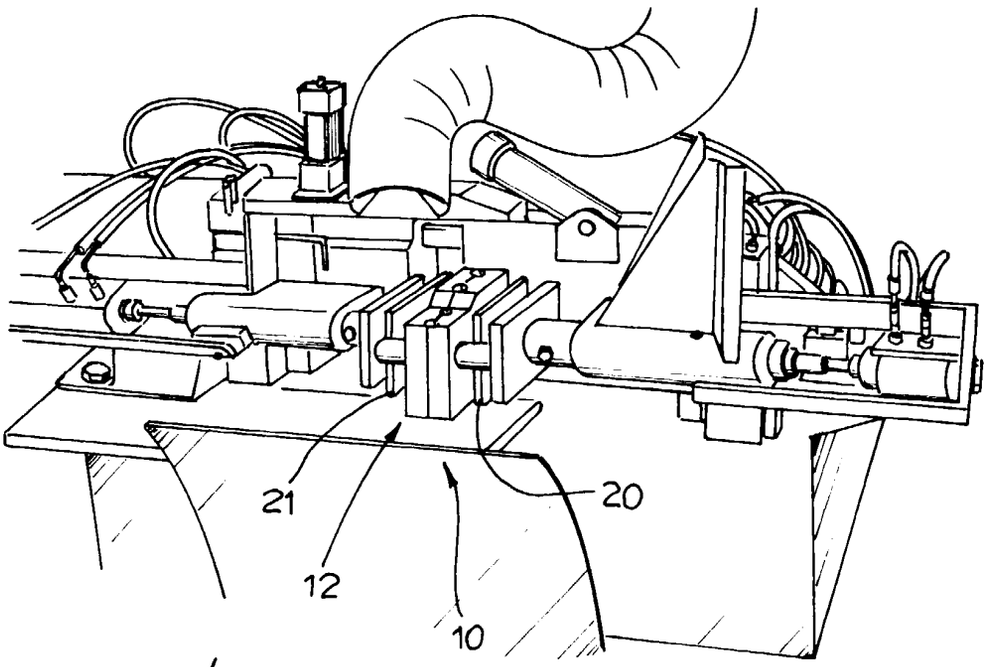

Fig.1

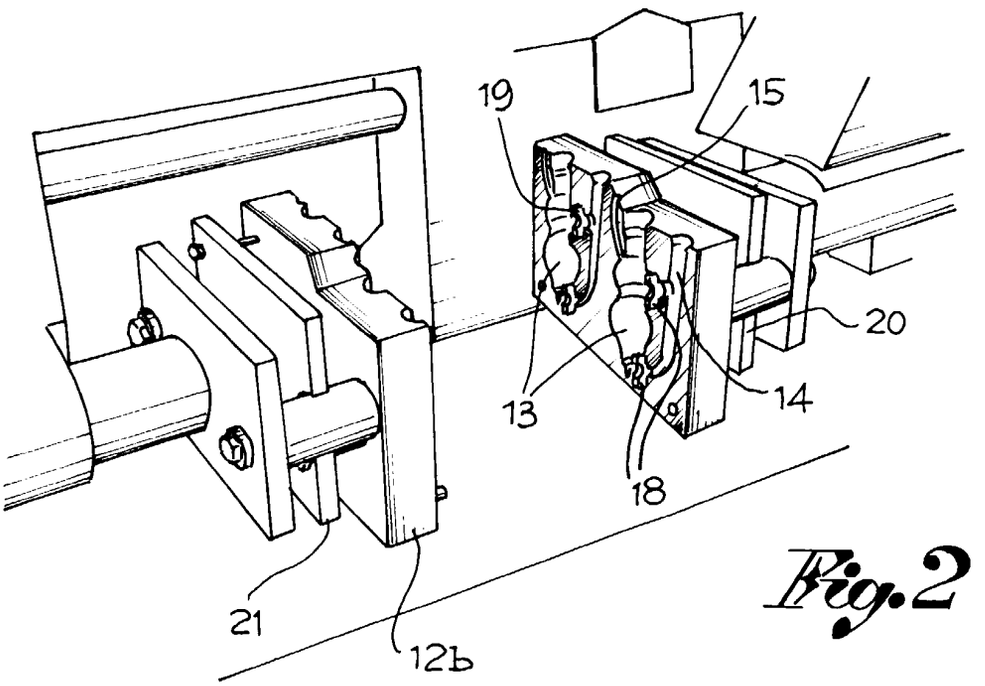

Fig.2

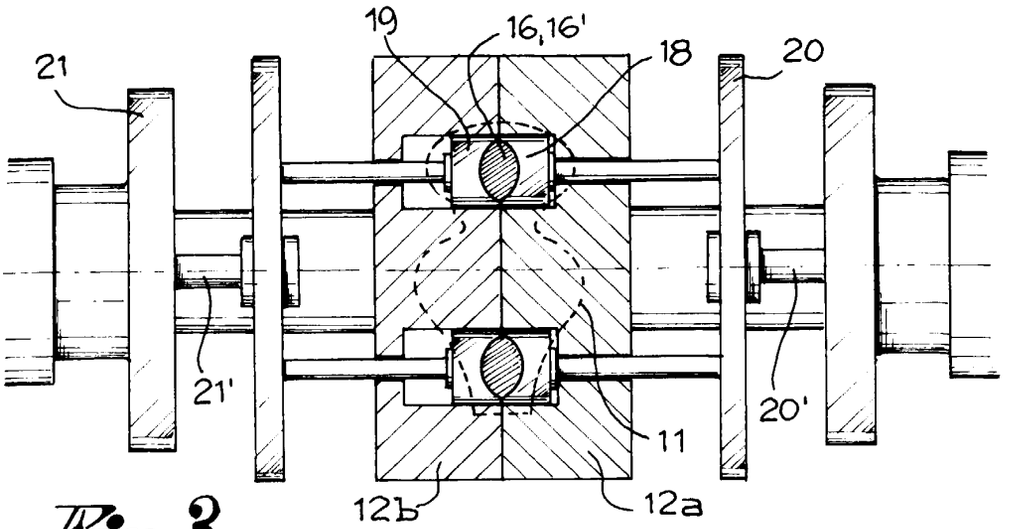

Fig.3

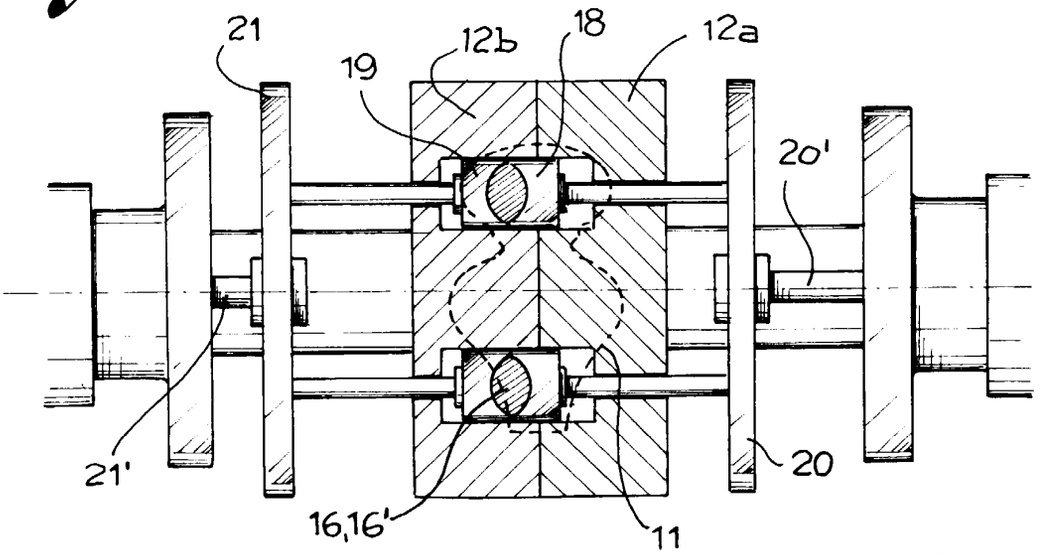

Fig.4

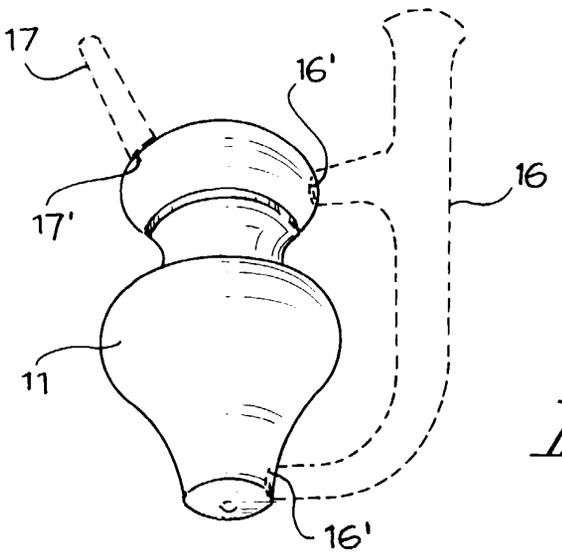

Fig.5

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EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0392

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 November 1999	Mailliard, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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