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(54) **Machine for continuous upward casting**

(57) This is a machine for hot drawing, in particular of gold or other precious materials and their alloys, of the kind which comprises a melting group, consisting of a crucible, of a substantially cylindrical shape, within which the materials to be melted down are placed and

a drawplate group. The machine is characterised in that the drawing of the molten material occurs upwards by providing the die, from which the product streams with continuity, in correspondence with the cover of the crucible itself.

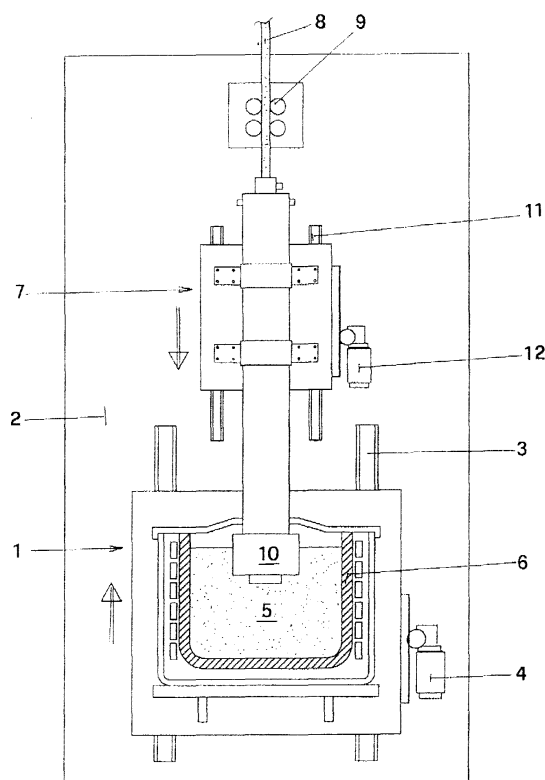


Fig.1

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Description

[0001] The present finding relates to a machine for hot drawing, specifically a continual meltdown oven equipped with a drawplate, according to the pre-characterising portion of claim 1.

[0002] According to the state of the art, it is well-known that for the fusion of gold or other precious metals and their alloys ovens are used, which essentially consist of a crucible, of a substantially cylindrical form, within which the materials to be melted down are placed; the crucible is heated in different ways, well-known in the state of the art, such as electrical induction, Joule effect or the use of gas burners.

[0003] When, besides melting, the immediate drawing of the product is also required, the lower base of the crucible is equipped with a die from which the product streams with continuity; suitable means to make sure that the material solidifies immediately are also provided for, taking on the shape of the hole to be found in the die itself.

[0004] In the ovens currently available the entire melting group and the subsequent drawing is integral with the supporting structure of the machine, therefore resulting in its positioning always at the same height with regards to the working surface, which usually corresponds with the floor.

[0005] As it is very often necessary to obtain drawn products of a greater length than the distance between the melting group and the working surface, it is necessary to fold the above-mentioned products, this operation obviously being rather difficult in the case of drawn tubes with a significant section, which are difficult to fold, and in the case of drawn tubes of a reduced section which tend to deform in an irregular manner when they are bent, this causing in both cases an obstruction in the area underneath the above-mentioned melting group.

[0006] Another problem is represented by the reduced drawing speed which is necessary to prevent the possible breakage of the drawn product, what would imply an escape of the molten liquid metal, with the well conceivable consequent safety problems to the operators in charge of the machine.

[0007] The objective of the present finding is that of creating a continual meltdown oven equipped with a drawplate which is capable of solving the previously described problems, the same oven being also capable of operating on particularly long continual drafts, guaranteeing, at the same time, a high drawing speed in conditions of safety.

[0008] All of this is achieved, according to the finding, by foreseeing that the crucible is fitted with means aimed at carrying out the drawing of the molten material to the upside, this being achieved by providing the die, from which the product streams with continuity, in correspondence with the cover of the crucible itself, instead of arranging it at the base thereof.

[0009] Such operating mode, besides solving the pre-

viously described problems, also enables the crucible to be placed in a lower position, all for the advantage of safety of the people working in the system.

[0010] With regards to construction, the system substantially consists of a structure which supports the melting group and the drawing group, said two groups being mutually independent, at least one of these being capable of sliding vertically so that the head of the drawplate may always remain soaked in the molten bath, as the level of said bath lowers upon gradual emptying of the crucible.

[0011] These and other features of the finding will now be illustrated in detail, with reference to one of its possible embodiments, provided as an illustrative and non-limiting example, with the help of the attached drawings, in which:

- Figure 1 is an elevation schematic view of the overall plant;
- Figure 2 is a detailed and section view of the die.

[0012] As can be seen in Figure 1, the melting group 1 is placed in front of the fixed structure 2 of the machine and is susceptible to sliding vertically along the guideways 3 through the transport device 4.

[0013] The molten material 5, contained in the crucible 6, passes through the drawing group 7, where it is cooled down, and takes on the shape of a draft 8, which will gradually increase in length.

[0014] Above the drawing group 7, motorized rollers 9 are provided for, integral with the fixed structure 2, with the objective of making the drawing operation possible, generating a pull action on the draft 8 which is being formed.

[0015] The vertical displacement to the upside of the melting group 1 is placed in connection with the lowering of the level of molten material 5 contained within the crucible 6, so that the head of the drawing group 7 remains soaked in the above-mentioned molten bath.

[0016] Advantageously, also the drawing group 7 may slide vertically along said guideways 11, through a transport device 12, in such a way that, while moving vertically downwards, it allows the head 10 to remain soaked in the molten material 5, to follow the lowering of the level of the molten bath, during the drawing and with the crucible 6 in a fixed position.

[0017] Finally, it is foreseen that the melting group 1 as well as the drawing group 7 are mutually separated and removable so that they can be fitted onto existing machines.

[0018] Operatively, the speed of rotation of the motorized rollers 9 is controlled by an electronic device which balances the upward speed of the melting group 1 or the downward speed of the drawing group 7 with the outlet speed of the drawn material, in order to guarantee a uniform drawing and to prevent the possible breakage of the drawn product 8.

[0019] As can be seen from figure 2, the drawing group 7 includes a head 10, equipped with the die 13 and with the ceramic protection 14, from which the cooling chamber 15 extends, with a water double-circulation jacket, through the attachments 16' and 16" and with a vacuum chamber 17, equipped with the attachment 18, in correspondence with the portion of the draft being cooled down.

[0020] In the illustrated constructive solution, the heating is of an inductive type wherein the crucible is wound by coils made of copper or another kind of electrically conductive material which, once traversed by high frequency alternating current, induce into the charge of material placed in the crucible so intense currents as to cause the fusion of the charge itself.

[0021] Embodiments which are different from the one illustrated are obviously possible, in particular the heating of the load may take place by means of electrical resistances or gas burners which heat the crucible, without exiting for this reason from the scope of the claims of the patent, defined hereinbelow.

Claims

1. A MACHINE FOR HOT DRAWING, in particular of gold or other precious materials and their alloys, of the kind which comprises a melting group, consisting of a crucible, of a substantially cylindrical shape, within which the materials to be melted down are placed and a drawing group, said machine being characterised in that the drawing of the molten material occurs upwards by foreseeing the die, from which the product streams with continuity, in correspondence with the cover of the crucible.
2. A MACHINE, according to claim 1, characterised in that the melting group and the drawing group are mutually independent and at least one of them is susceptible to slide vertically so that the head of the draw-plate may always remain soaked in the molten bath, as the level of said bath lowers upon gradual emptying of the crucible.
3. A MACHINE, according to claims 1 and 2, characterised in that the melting group (1) is placed in front of the fixed structure (2) of the machine and is susceptible to slide vertically along the guideways (3) by means of the transport device (4), the molten material (5), contained in the crucible (6) being bound to pass through the drawing group (7), where also its simultaneous cooling occurs, taking on the shape of a draft (8) which will gradually increase in length.
4. A MACHINE, according to claims 1 - 3, characterised in that the vertical upwards movement of the

melting group (1) is placed in connection with the lowering of the level of the molten material (5) contained within the crucible (6), so that the head (10) of the drawing group (7) always remains soaked in the above-mentioned molten bath.

5. A MACHINE, according to claims 1 - 3, characterised in that the vertical downwards movement of the drawing group (7) is placed in connection with the lowering of the level of the molten material (5) contained within the crucible (6), so that the head (10) of the drawing group (7) always remains soaked in the above-mentioned molten bath.
6. A MACHINE, according to one or more of the previous claims, characterised in that the melting group (1) and the drawing group (7) are mutually independent.
7. A MACHINE, according to one or more of the previous claims, characterised in that the melting group (1) and the drawing group (7) are removable with regards to the fixed support structure (2).
8. A MACHINE, according to one or more of the previous claims, characterised in that the melting group (1) and the drawing group (7) are susceptible to be mounted together or individually onto machines which are already available on the market.
9. A MACHINE, according to claims 1 - 8, characterised in that motorized rollers (9) are provided for above the drawing group (7), integral with the fixed structure (2) with the objective of allowing for the drawing operation, generating a pull action on the draft (8) which is being formed.
10. A MACHINE, according to one or more of the previous claims, characterised by foreseeing that the speed of the vertical upward movement of the melting group (1) or the speed of downward movement of the drawing group (7), as well as the speed of rotation of the motorized rollers (9), is controlled by an electronic device which balances the upward/downward speed with the outlet speed of the drawn material (8).
11. A MACHINE, according to one or more of the previous claims, characterised by foreseeing that it is the drawing group that lowers, following the lowering of the level of the molten material contained in the crucible, with the objective of maintaining the head of the draw-plate always soaked in the molten bath.
12. A MACHINE, according to one or more of the previous claims, characterised in that the heating of the crucible (6) occurs by induction, as it is wound ex-

ternally by coils made of copper or another kind of electrically conductive material which, once the coils have been traversed by alternating current, induce such intense currents into the charge of material placed in the crucible that the melting of the charge itself is caused. 5

13. A MACHINE, according to one or more of the previous claims, characterised in that the heating of the crucible (6) occurs by means of electrical resistances located near the material to be melted. 10

14. A MACHINE, according to one or more of the previous claims, characterised in that the heating of the crucible (6) occurs through the use of gas burners. 15

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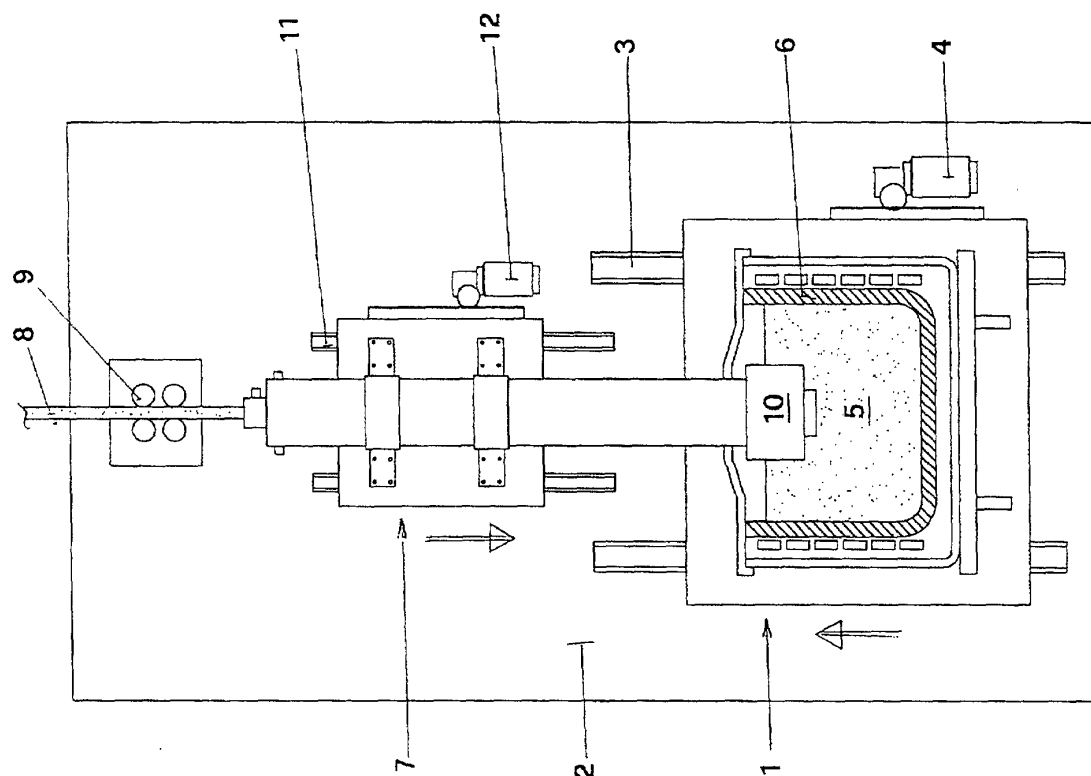


Fig. 1

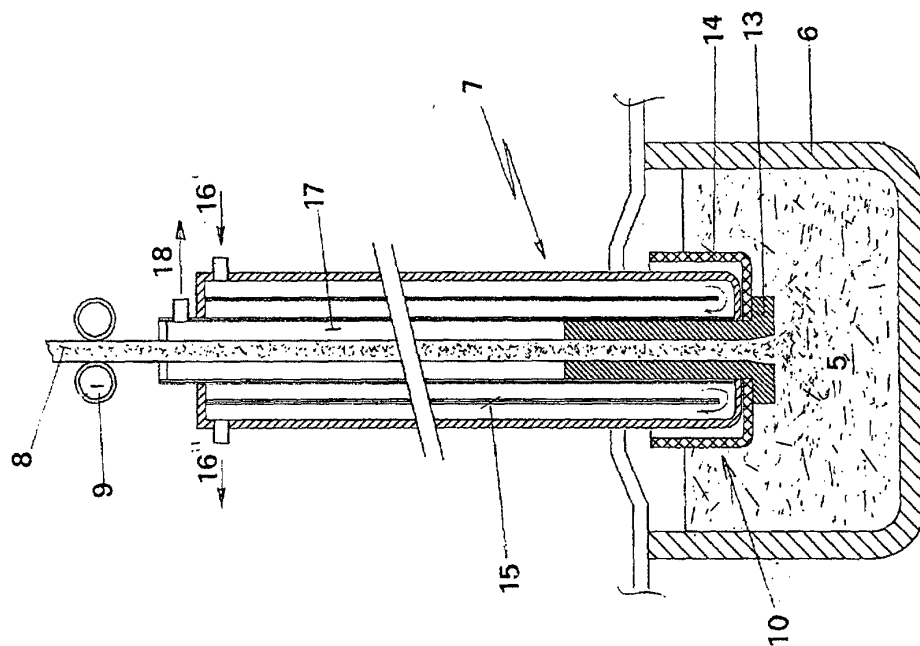


Fig. 2