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 DEVICE FOR STIRRING MELTS

2,390,052

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FIG. 1

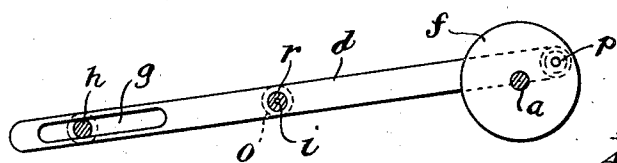
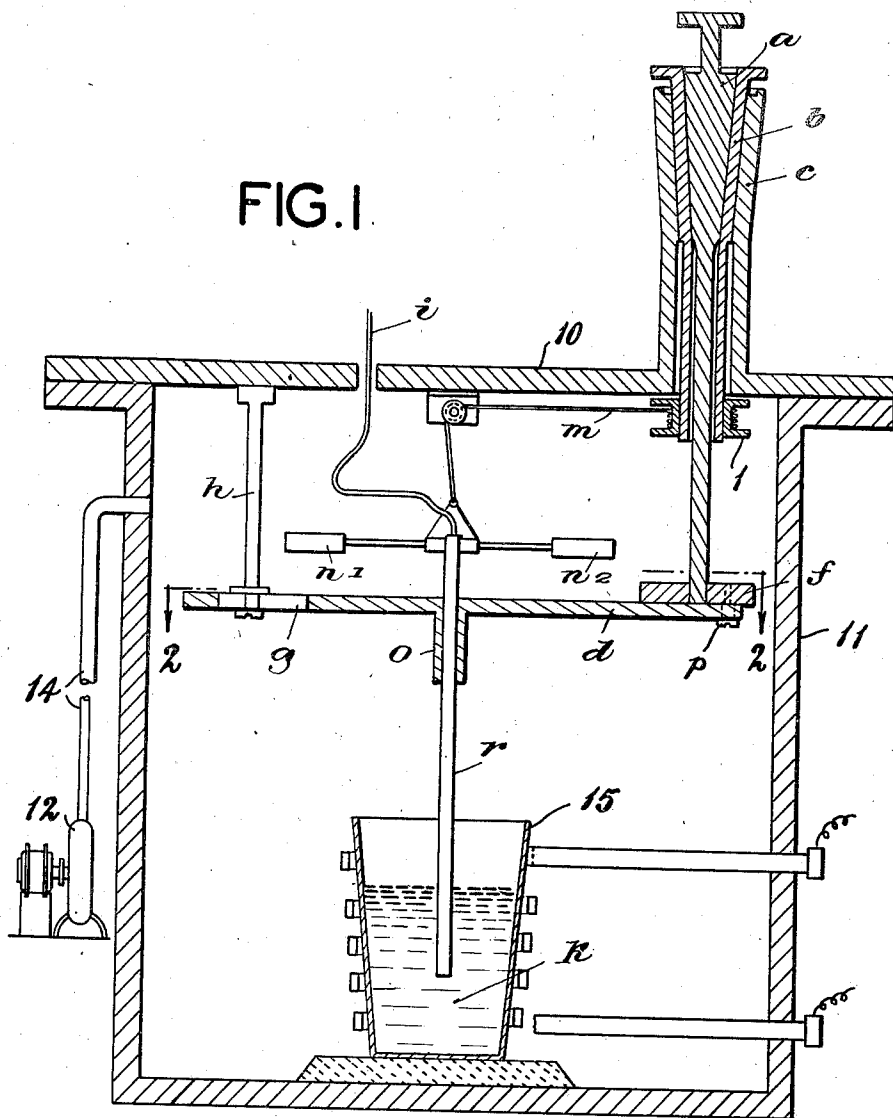


FIG. 2

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## UNITED STATES PATENT OFFICE

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## DEVICE FOR STIRRING MELTS

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vested in the Alien Property Custodian

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In Germany January 2, 1940

4 Claims. (Cl. 266-34)

Our invention relates to a new device for stirring melts, especially metallic melts, which at the same time serves to control the temperature of the melt. A further object of our invention is the use of the new device in the vacuum casting of metals.

In melting or casting metals, mixtures of metals or other substances, it is often necessary to stir the molten mass, for instance, in order to break through the oxide film formed on the surface before the melt is cast, or in order to attain a quicker homogenization. In all these cases it is necessary to control the temperature of the melt. If the melt consists of substances which in molten condition are very susceptible against gases because of their strong reactivity at elevated temperatures, it has proved advantageous to work in vacuo. In this case, however, the stirring of the melt and measuring of the temperatures entails some difficulties as the stirring and measuring device must be removed before the melt is cast or solidifies.

In accordance with the present invention, we have constructed a new device which combines both aims and may be introduced into and removed from the melt without any difficulty.

Fig. 1 of the accompanying drawing shows a vertical section of the device in accordance with the invention.

Fig. 2 is a sectional detail view taken along line 2-2 in Fig. 1.

The device consists of two concentric rotatable conically shaped members *a* and *b*, arranged in a suitable casing *c* which, for instance, is fixed on the lid 10 of a vacuum furnace 11. A partial vacuum may be created within furnace 11 by means of a motor driven vacuum pump 12, said pump communicating with the interior of the furnace by means of a pipe 14. A crucible 15 is disposed within the furnace, which crucible may be electrically or otherwise heated in a well known manner. The inner member *a* serves to actuate the stirring mechanism, where as the outer member *b* serves to effect the introduction and withdrawal of the measuring device from the melt *k* disposed within the crucible 15.

The member *a* in the apparatus in accordance with the invention fits in member *b* and is fat sealed with respect thereto. The lower end of the member *a* is connected with a disc *f* which is connected to one end of holder or support *d* through an eccentric pin *p*. The other end of holder *d* is supported from the lid 10 of the furnace 11 by a rod *h*, which rod engages in a slot *g* in the holder to permit reciprocation of the holder

with respect thereto upon rotation of the member *a*. The stirring member *r*, which may be a tube of refractory material ("Pythagoras mass") also carries the temperature measuring device in the form of a thermocouple *i*. The stirring member *r* is slidably mounted in holder *d* and in tubular collar *o* so as to permit vertical movement. The member *r* furthermore is suspended by a cable *m*, the end of said cable being wound around a spool *l* which spool is attached to the lower end of member *b*, which end is disposed within the furnace. The stirring member *r* is also provided with weights *n*<sup>1</sup> and *n*<sup>2</sup> so that upon unwinding the cable *m* from the spool *l* the stirring member will slide down through the tube *o* more easily.

In order to effect stirring of the melt with the apparatus in accordance with the invention, the stirring member *r* is lowered into the melt by rotating the member *b* in the casing *c* so that a sufficient amount of the cable *m* will be unwound from the spool *l*. The member *a* is then rotated, which causes reciprocation of the holder or support *d* which, in turn, causes the reciprocation of the stirring member *r* transversely of its longitudinal axis within the melt. In order to remove the member *r* from the melt before the melt is poured out, or before it solidifies it is merely necessary to rotate the member *b* so that the cable *m* is wound upon the spool *l* whereby the member *r* is raised out of the melt.

What we claim is:

1. A device for stirring and measuring temperatures of melts, which comprises a horizontally reciprocable support, rotatable eccentric means for reciprocating said support, stirring means including a temperature measuring means mounted on said support for reciprocation together with said support, said stirring means being capable of being raised and lowered with respect to said support, suspension means for said stirring means, and means concentric with the axis of rotation of said rotatable eccentric means for actuating said suspension means whereby the stirring means may be lowered into and raised out of the melt to be stirred.

2. A device for stirring and measuring temperatures of melts, which comprises a horizontally reciprocable support, rotatable eccentric means for reciprocating said support, stirring means including a temperature measuring means mounted on said support for reciprocation together with said support, said stirring means being capable of being raised and lowered with respect to said support, and means operable independently of said rotatable eccentric means for raising and

lowering said stirring means, said raising and lowering means including a rotatable spool coaxial with said rotatable means and a cable, one end of which suspends the stirring means and the other of which is wound on the spool, whereby the stirring means may be lowered into and raised out of the melt to be stirred.

3. A device for stirring melts in vacuum furnaces, which comprises a horizontally reciprocable support mounted within the furnace, rotatable eccentric means for reciprocating such support, a stirring means mounted on such support for reciprocation together with such support, said stirring means being capable of being raised and lowered with respect to such support, means operable independently of said rotatable eccentric means for raising and lowering said stirring means, said raising and lowering means including a rotatable spool and a cable one end of which suspends the stirring means and the

5 other end of which is wound on the spool, whereby winding of the spool will raise and lower the stirring means into and out of the melt to be stirred and a pair of concentric relatively rotatable members extending from the inside to the outside of the furnace, one of said concentric means serving to actuate the eccentric means and the other serving to wind the spool of the raising and lowering means.

10 4. A device for stirring melts comprising, a container for the melt, a support, rotatable means for horizontally reciprocating said support, a vertically movable stirring element eccentric of the axis of rotation of said rotatable means and carried by said support, and means operable independently of said rotatable means for raising and lowering said element relative to the support.

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