

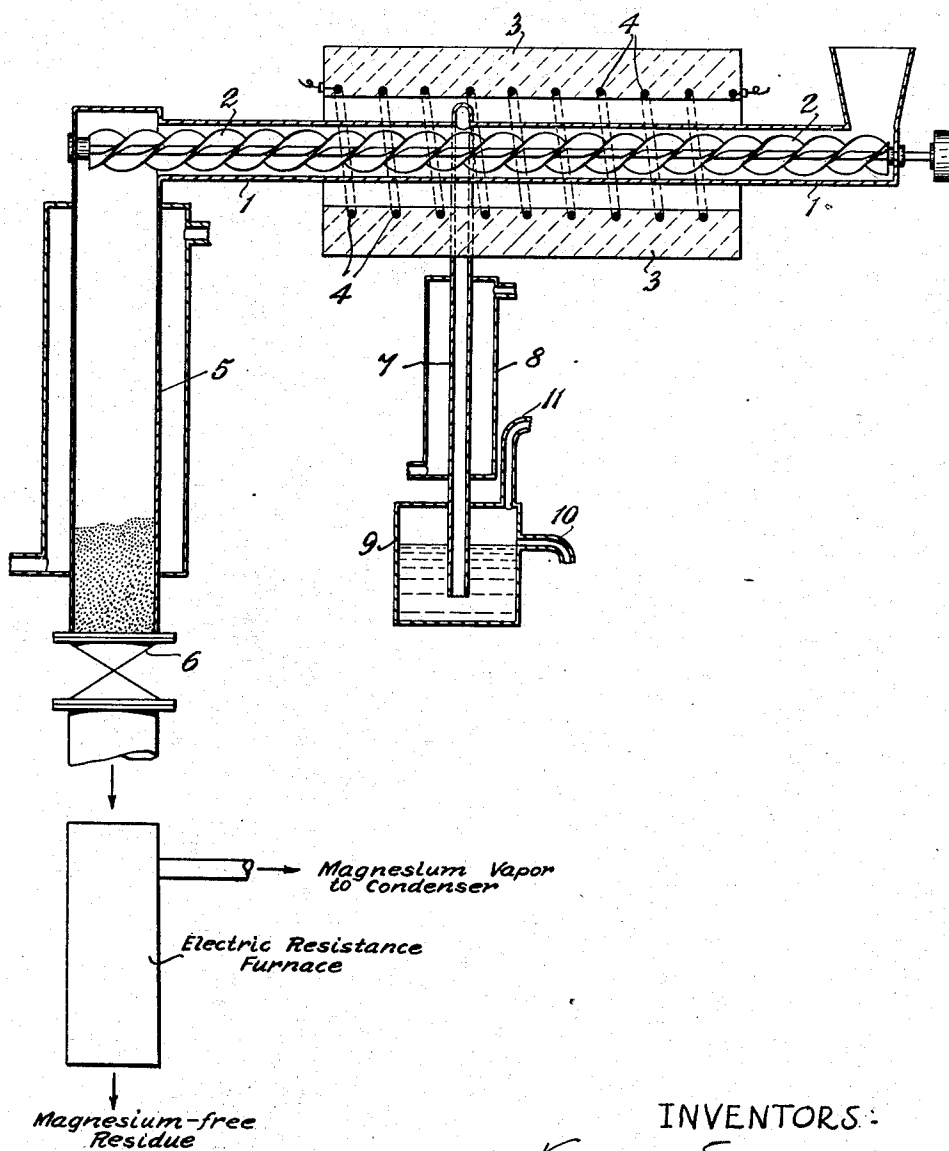
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CONVERSION OF MAGNESIUM DUST INTO COMPACT METALLIC MAGNESIUM

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CONVERSION OF MAGNESIUM DUST INTO
COMPACT METALLIC MAGNESIUM

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4 Claims. (Cl. 75-10)

This invention relates to a process for the conversion of magnesium dust into compact magnesium metal.

The object of the present invention is to provide a simple and economical method for recovering compact metal from magnesium dust by vaporization of the magnesium and re-condensation of the vapors.

According to the present invention the vaporization of the magnesium is effected by interposing the material to be treated in the form of pieces or granules as resistor between the poles in an electric furnace, while regulating the conductivity of the charge made up into the form of pieces or granules in such a manner that it becomes possible to drive off the magnesium completely, by vaporization, without wastage of electric energy. This is attained in accordance with the invention by working up the magnesium dust, into porous shaped pieces, with the admixture of suitably large quantities of current conducting additions which are inert to magnesium metal, which are still unmelted at temperatures at which magnesium vaporizes vigorously, and which have very low vapor tension at these temperatures. There are preferably employed concurrently further additions acting as carriers capable of preventing the pieces from crumbling during the distillation operation. Preferred examples of substances of the one type are carbon and iron, and a preferred example of a substance of the other kind is magnesium oxide.

By the use of such additions the result is achieved that the process can be practised with the voltages of 50-300 volts usually employed in the art of electric heating, without appreciable amounts of magnesium being left behind in the residue of the charge. Furthermore, the preparation of the charge in this manner offers the advantage that after the vaporization of the magnesium content the shaped pieces of the charge are still of such inherent strength that these granules, or the like, substantially retain their shape, so that the material is not reduced to dust, and the disengaged metal vapors are consequently practically free from dusty impurities. These vapors become readily condensed to a liquid deposit which sets to compact metallic magnesium.

The spent residue can be comminuted and used again as an addition to fresh magnesium dust.

For the carrying out of the process the magnesium dust is commixed for example with carbon in a powdered form and with pulverized

magnesium oxide, the proportion of carbon to magnesium oxide being between 1:2 and 1:3, and the sum of these additions amounting to up to 50 parts by weight of the magnesium dust to be dealt with. The mixture is then worked up to a paste with the addition of hydrocarbon oils, after which this paste is heated to distil off the hydrocarbon oils. If this be effected at higher temperatures (for example above 650° C.) a small proportion of the oils will be cracked with the result that the initially pasty mass assumes the form of solid granules. At the same time parts of the fine magnesium dust become agglomerated to larger granules of a metallic nature; the fractured surface of the granulated material shows silky lustre and under the microscope minute metal droplets are detectable.

Apparatus well suited for the production of granular material in accordance with the present invention is illustrated diagrammatically in the accompanying drawing. The casing 1 of a horizontally disposed conveyor helix 2 passes through a furnace 3 which is heated by an embedded resistance 4, and works into a cooling shaft 5 equipped with a discharge device 6. About mid-way of the casing 1 of the helix there is branched off a pipe 7 for carrying off the vapors evolved, which pipe passes through a cooler 8 and discharges into a condensing trap 9 provided with overflow 10 and gas outlet pipe 11.

The magnesium dust is admixed with the selected additional substances in a mixing machine, for example in a kneading machine, and kneaded with hydrocarbon oils until a doughy paste results. This paste is fed to the helix 2 through a hopper. In traversing the casing 1, which is heated by radiation for example to 700° C., the hydrocarbon oils become volatilized. The vapors are condensed in the cooler 8 and flow into the receiver 9 where they are separated from the uncondensable gases which escape at 11. The charge passes in a granular state into the cooling shaft 5 and is intermittently or continuously removed through the discharging device 6.

Through this treatment the magnesium dust also loses its pyrophorous properties, so that the granulated charge can be exposed to the air without the slightest danger.

According to the provisions of the patent statutes, we have explained the principle and construction of our invention and have illustrated and described what we now consider to represent its best embodiment. However, we desire

to have it understood that, within the scope of the appended claims, the invention may be practised otherwise than as specifically illustrated and described.

5 We claim:

1. A process of converting magnesium dust into compact metallic magnesium, which comprises mixing magnesium dust with current conducting substance indifferent to magnesium metal, which
10 at temperatures at which lively vaporization of magnesium takes place is still unmelted and which has low vapor tension at such temperatures, while concurrently further adding magnesium oxide, impasting the mixture thus obtained with the addition of hydrocarbon oil, after
15 which this paste is heated to distil off the hydrocarbon oil, and agglomerated to compacted bodies; then interposing the pieces thus obtained as resistor between the poles in an electric furnace to drive out the magnesium in the form of
20 vapor, and condensing the vapor evolved to a liquid deposit.

2. A process of converting magnesium dust into compact metallic magnesium, which comprises
25 mixing magnesium dust with comminuted carbon, while concurrently further adding magnesium oxide, impasting the mixture thus obtained with the addition of hydrocarbon oil, after which this paste is heated to distil off the hydrocarbon
30 oil, and agglomerated to compacted bodies; then interposing the pieces thus obtained as resistor between the poles in an electric furnace to drive out the magnesium in the form of vapor, and

condensing the vapor evolved to a liquid deposit.

3. A process of converting magnesium dust into compact metallic magnesium, which comprises mixing magnesium dust with comminuted iron, while concurrently further adding magnesium oxide, impasting the mixture thus obtained with the addition of hydrocarbon oil, after which this paste is heated to distil off the hydrocarbon oil, and agglomerated to compacted
5 bodies; then interposing the pieces thus obtained as resistor between the poles in an electric furnace to drive out the magnesium in the form of vapor, and condensing the vapor evolved to a liquid deposit.
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4. A process of converting magnesium dust into compacted metallic magnesium, which comprises mixing magnesium dust with a mixture of comminuted carbon and magnesium oxide, the proportion of carbon to magnesium oxide being between 1:2 and 1:3, and the sum of these additions amounting to up to 50 parts by weight of the magnesium dust, impasting the mixture thus obtained with the addition of hydrocarbon oil, after which this paste is heated to distil off the hydrocarbon oil, and agglomerated to compacted
15 bodies; then interposing the pieces thus obtained as resistor between the poles in an electric furnace to drive out the magnesium in the form of vapor, and condensing the vapor evolved to a liquid deposit.
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