Nov. 1, 1927. 1,647,381

F. THARALDSEN

PROCESS FOR MAKING LIQUID ZINC FROM BLUE POWDER

Filed Nov. 21, 1923

Fig. 1.

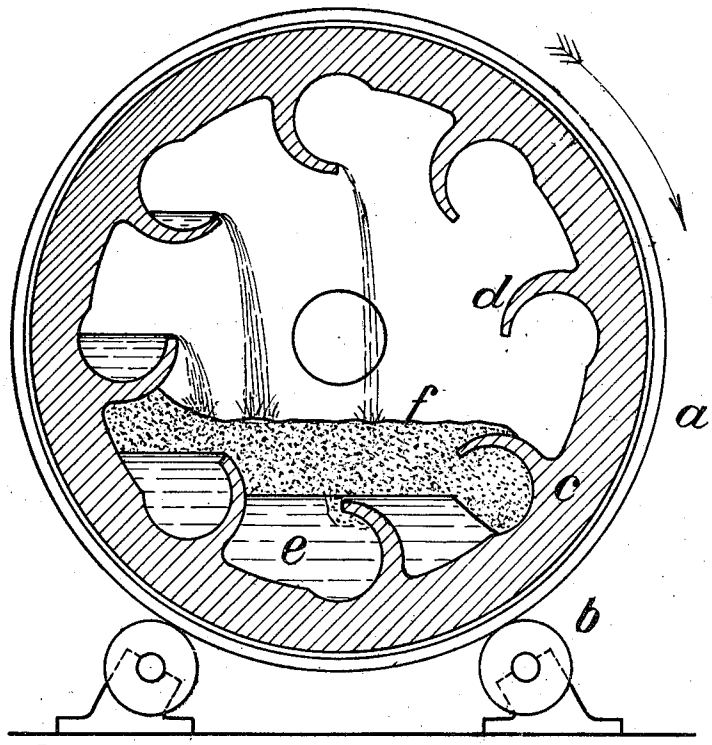
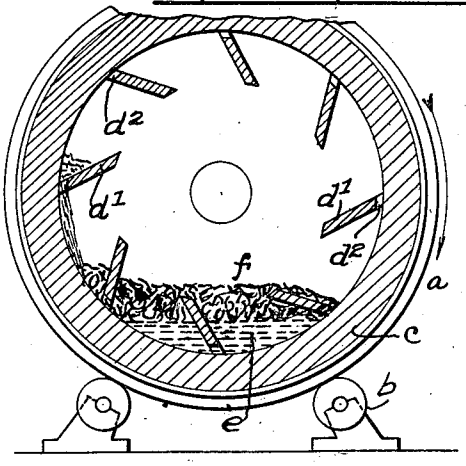


Fig. 2.



Inventor:

Filip Tharaldsen.

By Henry Orth & Co

Atty.

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UNITED STATES PATENT OFFICE.

FILIP THARALDSEN, OF OSLO, NORWAY.

PROCESS FOR MAKING LIQUID ZINC FROM BLUE POWDER.

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The processes hitherto described for treating pulverulent zinc, so-called blue powder, for making liquid zinc are unsatisfactory in so far as a rather considerable portion of the powder does not give off its liquid metal in spite of its presence in the metallic state. This occurs particularly in factory work, where the blue powder is treated in a rotating drum.

The poor result is most likely due to the fact that as soon as some, even very little, liquid zinc is formed, it descends to the bottom of the drum and from then on the powder only to a very limited extent comes into any intimate contact with the liquid zinc already formed. On the contrary the powder remains for the prevailing part as a layer upon the bottom bath of liquid zinc, that will thus carry the powder on its surface during the rotation of the drum.

According to my experience, based principally on investigations, the formation of zinc in the condenser and the conversion of blue powder into liquid metal is principally due to two causes: strong heating of the powder and thorough mixing of the powder with liquid zinc.

My invention therefore consists in bringing the blue powder into intimate contact with liquid zinc. Most conveniently this may be carried out by pouring molten zinc upon the mass of blue powder, so that the latter is thoroughly penetrated by the liquid metal and gives off its metal contents to the latter.

The molten zinc used for the purpose, or the liquid metal formed by the action of molten zinc on the blue powder under treatment may be continuously re-used in the operation.

A convenient device for carrying out my invention consists of a rotatable drum, into which the powder is conveyed, and in which molten zinc is supplied. The drum is provided with interior scoop-shaped projections. During the rotation of the drum these scoops will each time they pass down into the liquid zinc immerse a portion of the powder into the zinc bath, thus bringing about intimate contact between this powder and the liquid metal. And when the scoops leave the zinc bath they will lift a portion of liquid zinc above the layer of powder and pour it over the same.

The scoop-shaped projections may be subject to modifications as for instance have a perforated bottom. Or the projections may be so located that between the projections and the adjacent wall of the drum pockets are formed, that have one or more apertures, for instance a longitudinal slot, at their base. In this case the liquid metal, that is lifted above the layer of powder in the drum will run back through these apertures upon the mass of powder below.

It is understood, that the shape and arrangement of the drum may be modified in several respects. So it may have circular or polygonal section, it may be of cylindrical form or cone-shaped, it may be mounted horizontally or in inclined position and so on, such modifications being within the scope of my invention.

The arrangement above described is illustrated in the accompanying drawing in which

Fig. 1 is a transverse vertical section of an apparatus for carrying out my process and

Fig. 2 a like view of a modified form.

The apparatus comprises a drum —*a*— rotatably mounted on rollers —*b*—, —*c*— is the lining of the drum and —*d*— the scoop-shaped inside projections. —*e*— is the bath of liquid zinc, and —*f*— the mass of powder resting on the surface of the bath. The arrow indicates the direction of rotation. The drum may be operated intermittently so that certain quantities of powder and liquid zinc are supplied to the drum and this charge worked up, after which fresh quantities of powder and liquid metal are supplied. The drum may however also be operated continuously, with continuous supply of powder and continuous discharge of the residues.

In Fig. 2 the pockets formed by projections d' are provided with longitudinal slots d^2 near the wall of the drum to permit, as stated above, the liquid which is lifted above the layer of powder to run back through the slots onto the powder being raised by the pockets and back to the powder and zinc in the bottom of the drum.

The drum may work independently of the condenser from which the powder is taken. In many cases it is however very convenient to convey the powder to the drums immediately from the condenser, preferably without exposing powder and zinc to the air, in order to avoid oxidation.

I claim:

1. The process of making liquid zinc from

blue powder, which comprises superimposing a mass of blue powder upon a bath of liquid zinc and raising a portion of the liquid zinc above the powder and pouring it over the latter.

2. The process of making liquid zinc from blue powder, which comprises superimposing a mass of blue powder upon a bath of liquid zinc, immersing a portion of the powder into the latter, and raising a portion of the liquid zinc above the powder and pouring it over the latter.

3. The process of making liquid zinc from blue powder, which comprises providing a bath of liquid zinc with a superimposed layer of blue powder, successively immersing portions of the powder into the bath of liquid zinc, raising portions of the liquid zinc together with some of the previously immersed powder, and discharging the raised zinc and powder onto the bath and superimposed layer of powder.

In testimony that I claim the foregoing as my invention I have signed my name.

FILIP THARALDSEN.