A. W. DIACK.
PROCESS FOR RECOVERING METAL.
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Inventor

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Witnesses

Elizabeth M. Brown.

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To all whom it may concern:

Be it known that I, ARCHIBALD W. DIACK, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Process for Recovering Metal, of which the following is a specification.

This invention comprises a process for recovering metals from skimmings, and other dress, and for melting down borings and other small particles and pieces of such metals as readily oxidize when heated.

While this process is not necessarily carried out by any particular type of mechanism, and any other construction may be employed, that shown in the drawing embodies features necessary to the carrying out of this process. An oil, gas, or solid fuel furnace of well-known construction, contains the crucible 2 and is closed by the cover 3 having an opening closed by the lid 4. A top 5 partly covers the crucible and has an opening 6 through which access is had to the contents. A refractory tube 7, unacted upon at the temperature employed, preferably of carbon, extends down into the crucible below the line of the molten contents.

Above the furnace may be mounted a hopper 10 having a spout 11 connecting with the pipe 12, which pipe connects to the tube 7 in any desirable manner, a connecting sleeve 13 being shown. At the upper end of the pipe 12 may be mounted a frame 9, in which are revoluble the shaft 14 and a tube 15. On the shaft 14 may be secured a pulley 16 and a pinion 17, which latter meshes with the gear 18 on the tube 15. A screw-conveyor 19 is secured to the tube 15 and will be turned by the shaft 14. The parts above the furnace top 3 may all be of cast iron, and any other mechanism may be employed to force the material down the tube 7. Arrangements may also be made for preheating the material in its passage from the hopper to the molten metal in the crucible.

Dross such as skimmings from melted aluminum and of light-weight alloys contain large amounts of metal. When such dross is packed into a crucible and heated to the melting point of the metal or alloy, the oxides and other impurities do not separate readily, as their specific gravity is so nearly that of the metal or alloy. In view of the fact that these metals readily oxidize at the melting point, much not already an oxid becomes so during this heating.

By thrusting the mingled metal, oxid, and other impurities below the surface of a heavier metal with which it readily forms an alloy, the oxid is released, and, because of the great difference in specific gravity, immediately rises to the surface, covering the same and retarding further oxidation.

When the apparatus used in the drawing is employed, the mixed oxid and metal are thrown into the hopper 10, and slip down to the pipe 12 through the spout 11. The screw 19 slowly feeds down this material at a constant speed, forcing it down into the molten mass which fills the lower end of the tube 7. By the time the material is forced out of the lower end of the tube, the metal will have been melted and absorbed by the molten mass in the crucible and the oxid will float to the surface 21 of the mass. As more metal is added to the amount already in the crucible, and the surface rises, the oxid will come near to the opening 6 where it can be skimmed off.

In order to insure easy movement the tube 7 may be formed slightly tapering, the smaller end being upward. A metal rod can be thrust down through the bore 20 of the tube 15, should the material bridge or cake in the tube 7.

This process may be modified to recover the metal of borings and scraps of such metals as readily oxidize near the melting point. A quantity of the metal is first melted, after which the borings and scraps are forced down into the molten mass through the tube 7. This tube prevents the oxidizing flame from reaching the finely divided metal, which really does not melt until under the surface of the main mass. The tube 7 or its equivalent can be filled with an oxidizing or neutral atmosphere so as to further protect the metal.

It is sometimes desirable to mix a proper flux such as ammonium chloride with the mixed metal and oxides and with the metal borings before submerging the same in the molten metal.

Having now explained my process, what I claim as my invention and desire to secure by Letters Patent is:

1. The process of recovering light metals, which consists in mechanically feeding par-
articles of the same down through a conveying tube whose lower end is submerged in a mass of molten metal.

2. The process of recovering metals from a mixture of metals and oxides of the same, which consists in mechanically feeding the mixture down through a tube whose lower end is submerged in a mass of molten metals of a higher specific gravity than the metals recovered.

3. The process of separating metals from a mixture of the same and impurities, which consists in mechanically feeding the mixture down a tube having its lower end submerged in molten metals and permitting the impurities to rise to the surface.

4. The process of recovering metals, which consist in mechanically feeding particles of the same down into a mass of molten metals while protecting the same from oxidation by the flame which keeps up the temperature of the mass of the molten metals.

5. The process of recovering easily-oxidized metal from impurities which consists in feeding particles of the same into a mass of molten metal through a conveyer which is filled with a non-oxidizing gas.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ARCHIBALD W. DIACK.

Witnesses:

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