April 9, 1929. L. C. LOSHBOUGH 1,708,509

HEATING DEVICE

Filed Feb. 9, 1924 2 Sheets-Sheet 1

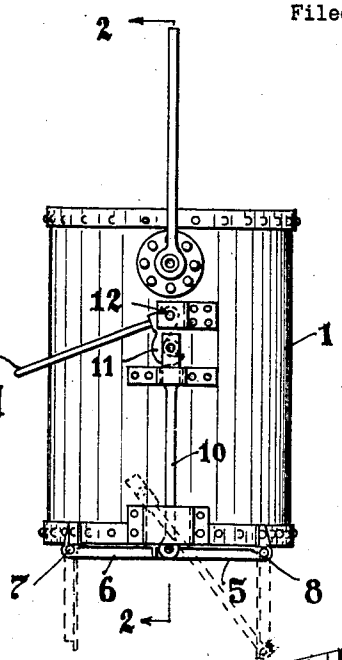


Fig. 1

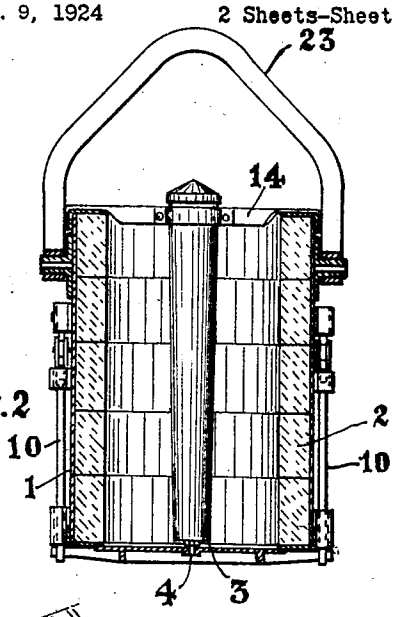


Fig. 2

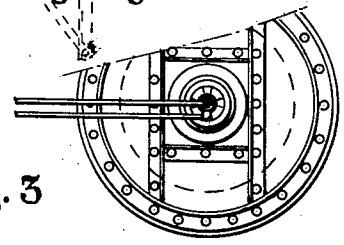


Fig. 3

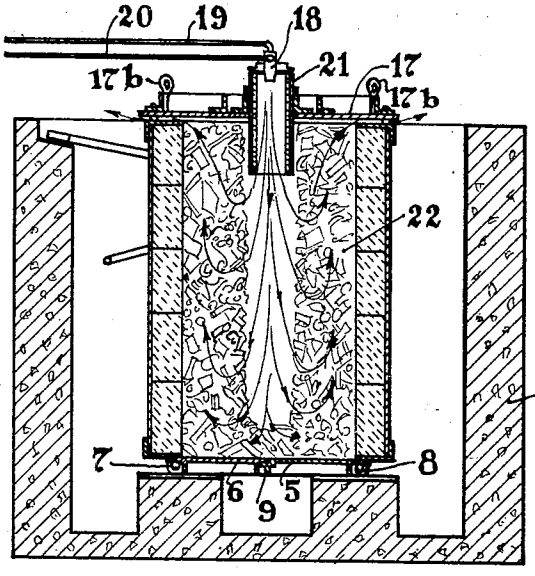


Fig. 4

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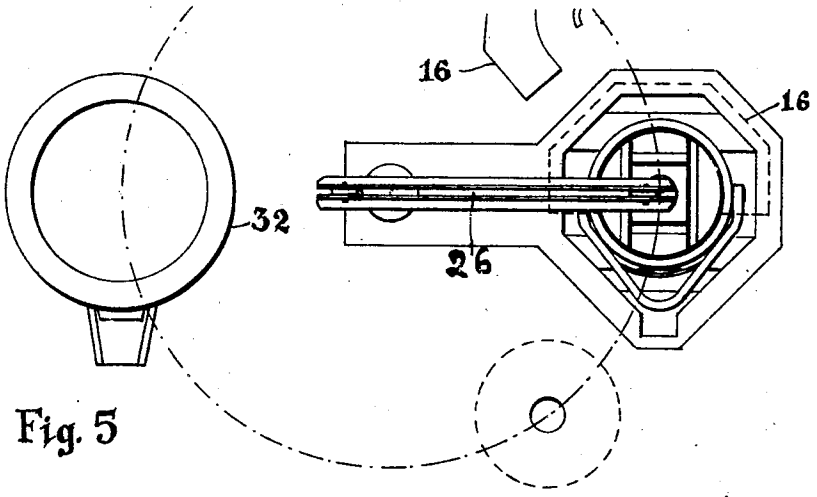


Fig. 5

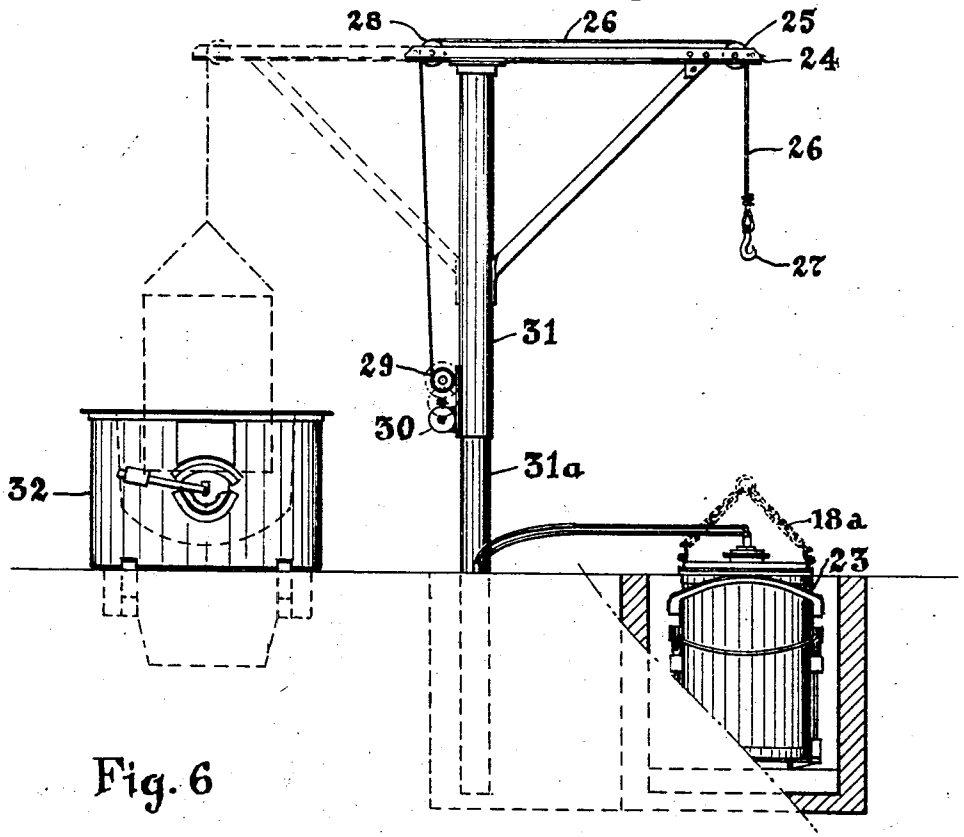


Fig. 6

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UNITED STATES PATENT OFFICE.

LYLE C. LOSHBOUGH, OF CHICAGO, ILLINOIS.

HEATING DEVICE.

Application filed February 9, 1924. Serial No. 691,562.

This invention relates to a process and apparatus for heating metal such as steel scrap before delivering it to the main furnace such as an electric furnace, or for other purposes, and has for its object to provide a new and improved process and apparatus of this description.

There are many advantages in melting steel by electricity, one of which is to prevent impurities from becoming incorporated therewith. When the metal is put directly into the electric furnace without preheating a very large percent of the cost of melting the material is required to raise the temperature during the early part of the heating of the metal. When my process and device is used this expense is saved for the metal can be first heated by a cheap heat such as that produced by oil or gas.

This invention has as a further object to provide a simple, cheap, easily handled process and apparatus for pre-heating metal by means of which the cost is greatly reduced, and the efficiency of the electric furnace is greatly increased, this pre-heating process being accomplished by a cheap fuel.

This heating device may be used for heating metal for any other purpose where such use may be desirable.

The invention has other objects which are more particularly pointed out in the accompanying description.

Referring now to the drawings:

Figure 1 is a side view of one form of heating device for carrying out my process.

Figure 2 is a sectional view taken on line 2—2 of Figure 1 showing the device ready to be filled with material to be heated.

Figure 3 is a plan view with parts broken away, of the device shown in Figure 1.

Figure 4 is a vertical sectional view through the heating device after it is charged and while the material is being heated.

Figure 5 is a plan view of the device shown in Figure 4, showing also the crane for handling the heating device.

Figure 6 is a sectional view through the floor showing the heating device and the handling device in elevation.

Like numerals refer to like parts throughout the several figures.

In carrying out the invention I provide a container 1 which is lined with some heat resisting or insulating material 2 such as fire clay or brick. A removable displacing device 3 is provided and is arranged at the bottom to prevent lateral displacement. In the construction shown, the displacing device 3 is provided with a pin 4 which enters a recess in the bottom of the container. The container is provided with a bottom which opens to permit the discharge of the material. As herein shown this bottom consists of two hinged doors 5 and 6 which are hinged at 7 and 8 (see Fig. 4). The door 5 has a lip 9 which engages the door 6 and holds it in position. Connected with the door 5 are the rods 10 (see Figs. 1 and 2). Releasably connected with these rods are the hooks 11 pivoted to the container at 12 and provided with the controlling device 13. When the controlling device 13 is moved, the rods 10 are released and the doors 5 and 6 automatically open so as to discharge the material in the container. The displacing device 3 is centered by means of the centering piece 14 which extends across the casing but which does not close the top, thereby permitting the metal to be dumped into the casing. When the device is in operation, the container is preferably inserted in a concrete pit 15 (see Figs. 4, 5, 6) so as to be level with the floor. The pit has a removable cover piece 16 (see Fig. 5) which is placed over the top thereof so that the container can be easily charged by means of wheelbarrows or in any other suitable way. After the container is charged with the metal, the displacing device 3 is removed thereby leaving a central open space extending substantially to the bottom of the container as shown in Figure 4. The top 17 of the container is then placed in position and is provided with an oil burner 18 which is supplied with air and oil by the pipes 19 and 20. This burner projects the flame into a casing 21 lined with refractory material which acts as a combustion chamber and which directs it down into the center opening of the container. The heat is thus uniformly distributed throughout the mass of the material 22 in the container, and it is thus easily and quickly and cheaply brought to the desired temperature which will be below the melting temperature. The container is provided with the pivoted bail 23 and when the metal has been brought to the desired heat, the burner 18 is removed by means of the bail 18ª (see Fig. 6) which is detachably connected therewith and the container lifted out of the pit and moved over

the electric furnace. The doors 5 and 6 are then opened and the heated metal 22 discharged into the electric furnace. I have shown in Figures 5 and 6, a device for handling the container which consists of a crane construction having an arm 24 with a pulley 25 over which passes a cable 26 having a hook 27 which engages the bail 23 of the container. The cable 26 passes over the pulley 28 and down to the drum 29 which is operated by the electric motor 30. The arm 24 is connected with member 31 which is rotatably mounted upon the support 31a. When it is desired to lift the container, the hook 27 is lowered and connected with the bail 23, and the motor 30 operated to lift the container. The arm 24 is then rotated to bring the container over the electric furnace 32 (see Fig. 6) which is only indicated diagrammatically. The rods 10 are then released by moving the hook 11 and the doors 5 and 6 open and discharge the heated metal into the furnace 32. The container is then moved back into the pit 15 and the operation above described is repeated.

I claim:

1. A heating device for heating metal comprising a container, a displacing device extending therealong near the middle thereof about which the metal to be heated is placed, said displacing device removably held in position so that it may be removed after the metal is in place to leave a central opening through such metal.

2. A heating device for heating metal comprising a container, a displacing device extending therealong near the middle thereof about which the metal to be heated is placed, said displacing device removably held in position so that it may be removed after the metal is in place to leave a central opening through such metal, and means for injecting a flame into said opening to heat said metal.

3. A heating device for heating metal comprising a container, heat insulating material associated therewith and arranged to provide a receiving space for the metal, and means for providing a central opening through the metal when it is placed in the container.

4. A heating device for heating metal comprising a container, heat insulating material associated therewith and arranged to provide a receiving space for the metal, means for providing a central opening through the metal when it is placed in the container, and means for injecting a flame into said central opening to heat said metal.

5. A heating device for heating metal comprising a container, heat insulating material associated therewith and arranged to provide a receiving space for the metal, means for providing a central opening through the metal when it is placed in the container, and means for injecting a flame into said central opening to heat said metal, a door at the bottom of said container adapted to be opened when the metal is sufficiently heated so as to discharge the same.

6. A heating device for heating metal comprising a movable container, a receiving device into which it is received so that the top thereof is substantially level with the floor, a displacing device centrally located in said container, a holding device at the top of the container for holding said displacing device in position, but leaving a sufficient open space at the top for inserting the material, and a movable cover adapted to span the space between the floor and the container and affording a path for a vehicle containing a portion of the material to be discharged into the container.

Signed at Chicago, county of Cook and State of Illinois, this 22nd day of January, 1924.

LYLE C. LOSHBOUGH.