Dec. 8, 1925. 1,565,084

H. G. FRERICHS

ARTICLE FOR LINING TAP HOLES OF FURNACES

Filed Oct. 16, 1924

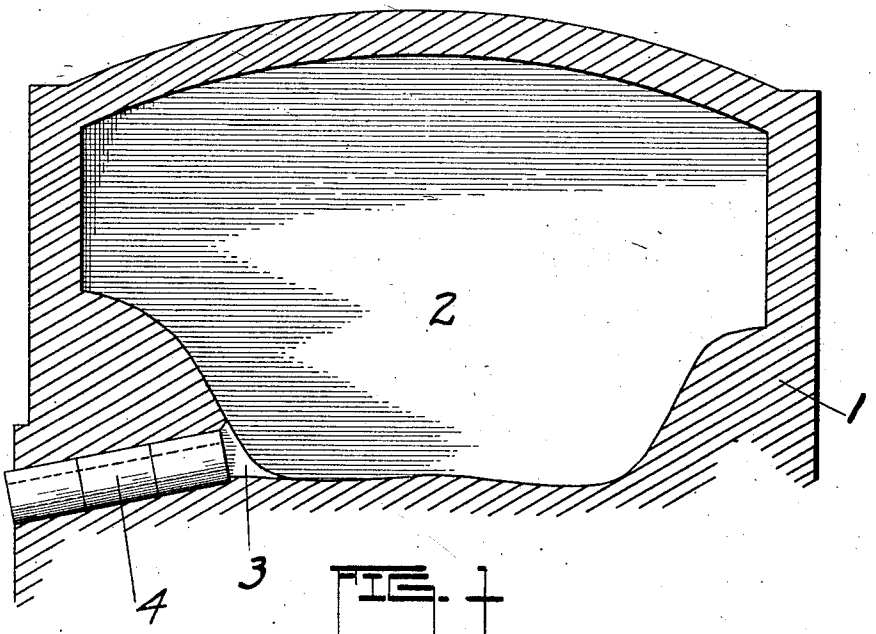
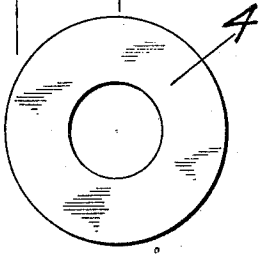


FIG. 1

FIG. 3



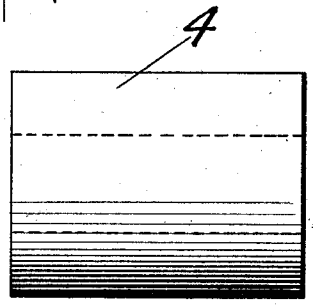


FIG. 2

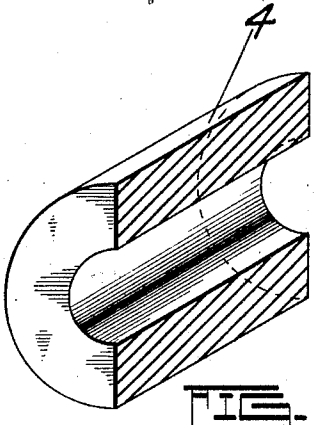


FIG. 4

INVENTOR.

Henry G. Frerichs

Chas. H. La Porte.

Atty

Patented Dec. 8, 1925. 1,565,084

UNITED STATES PATENT OFFICE.

HENRY G. FRERICHS, OF BARTONVILLE, ILLINOIS.

ARTICLE FOR LINING TAP HOLES OF FURNACES.

Application filed October 16, 1924. Serial No. 744,053.

To all whom it may concern:

Be it known that I, HENRY G. FRERICHS, a citizen of the United States, residing at Bartonville, in the county of Peoria, State of Illinois, have invented a new and Improved Article for Lining Tap Holes of Furnaces.

Figure 1 is a cross-section in outline showing an open hearth furnace with a tap-hole and my invention applied thereto;

Figure 2 is a side elevation of the article for lining the tap-hole;

Figure 3 is an end view of Figure 2 and,

Figure 4 is a perspective view in section of the article shown in Figure 2.

This invention relates more particularly to furnaces containing molten metal, preferably of the open hearth type, such as are used for the manufacture of steel.

The invention has for its principal object a new and improved lining for the tap-hole of a furnace by the application of a one piece or monolithic construction which constitutes the article of the invention.

A further object of the invention is to provide a means for quick replacement of tap-holes after they have been burned away or destroyed in some other manner.

Still another object of the invention is to provide for making the refractories used for tap-holes last much longer and so obviate frequent replacement.

A further object of the invention is to make a tap-hole refractory in such a manner that the molten metal which chills or freezes in the tap-hole, may be easily and quickly removed.

I attain the foregoing objects by building a monolithic or one piece tap-hole block of suitable refractory material, depending on the purpose for which it is to be used. For basic open hearth furnaces, I prefer to use a block made of dead burned magnesite in much the same manner as a magnesite brick would be made.

At the present time tap-holes are built up of arch brick, the composition of the brick depending on the type of furnace and the character of the metal or slag formed therein.

For the purposes of this description I will refer to a basic open hearth furnace, although it is to be understood that I do not limit the use of my invention to this type of furnace.

Referring to the drawings, 1 designates a furnace having a molten metal chamber 2 with which communicates a tap-hole 3. The tap-hole refractory is designated 4 being of suitable length and diameter and tubular in cross-section, as shown. While such a refractory may be made of suitable length to correspond to the length of the tap-hole in the furnace, I prefer that they be of a length less than the length of the tap-hole and aligned in series using a plurality thereof, as shown in Figure 1.

According to the well known practice, when tap-hole blocks are built up of several arch brick (a five inch diameter circle may require nineteen (19) brick), they are built around a form, usually a steel pipe. If this is being done, as is usually the case, while the furnace is hot, the work is very disagreeable and it is almost impossible to do a good job without shutting down the furnace for a couple of hours, more or less. Furthermore, the joints between the bricks allow steel to pass through them and this destroys the refractory in a relatively short time. Sometimes, too, a piece of steel will freeze in the hole and part of it will have to run down between the joints of the bricks making it exceedingly hard to remove and all of these things delay the operation of the furnace.

I have discovered that if these say, nineteen (19) brick, are replaced with one block, or two or three aligned is shown in Figure 1, each block made and formed in one solid piece, then I obviate all of the aforementioned difficulties which occur with a non-monolithic construction. The hole does not cut out at anywhere near the rate of speed. steel does not stick therein, because there is no means of attaching itself, and the replacement is a matter of an exceedingly short time.

I prefer to construct a block having a five inch hole and a four inch wall, but it is obvious that I need not be limited to such dimensions and, therefore, do not wish to be limited otherwise than expressed in the appended claims.

What I claim is:

1. A monolithic tap-hole refractory for furnaces and of tubular cross-section.

2. A monolithic magnesite tap-hole refractory for furnaces and of tubular cross-section.

3. A lining for tap-holes of open hearth furnaces, comprising a series of aligned monolithic refractory units of tubular cross-section.

4. In combination with an open hearth furnace, a wall of which is provided with a tap-hole, of a lining for said tap-hole, comprising a monolithic refractory unit of tubular cross-section.

HENRY G. FRERICHS.