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R. KONDO.

SMELTING OF SULFID ORES.

APPLICATION FILED MAR. 2, 1906.

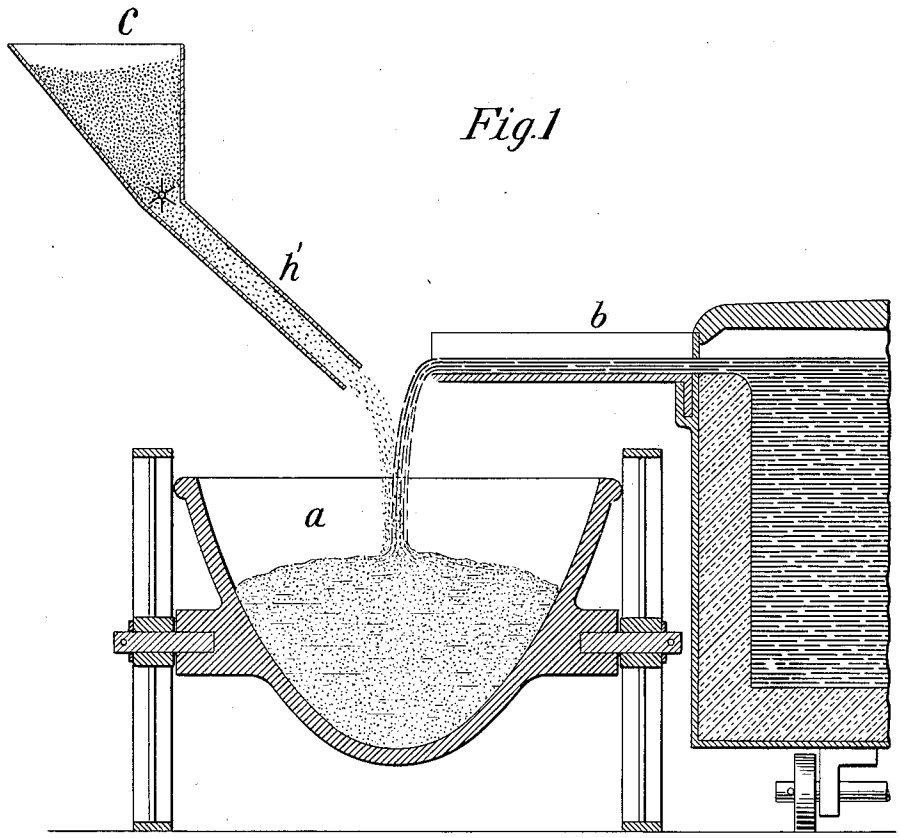
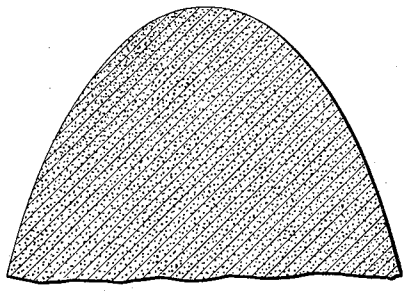


Fig.1

Fig.2



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UNITED STATES PATENT OFFICE.

ROKUSABURO KONDO, OF TOKYO, JAPAN.

SMELTING OF SULFID ORES.

No. 836,586. Specification of Letters Patent. Patented Nov. 20, 1906.

Application filed March 2, 1906. Serial No. 303,749.

To all whom it may concern:

Be it known that I, ROKUSABURO KONDO, a subject of the Emperor of Japan, and a resident of No. 55 Banbacho Honjo-ku, Tokyo, Japan, have invented a new and useful Improvement in Smelting of Sulfid Ores, of which the following is a specification.

In a smelting-works there are always more or less fine ore and fine dust to be smelted and smalls of coke produced by handling. These three materials I shall refer to in this specification specifically and collectively as "charging-material smalls." In smelting-works for sulfid ores, to charge such fine materials directly into the blast-furnace would cause much trouble by choking the furnace, causing irregularity, lessening capacity, requiring more blast-pressure and more coke and producing much flue-dust. To avoid these evils, it has been customary to mix these charging-material smalls with clay or with lime as a binding or cementing material, and mold the mixture into bricks, which after being dried were smelted in the blast-furnace; but the bricks made in this way cannot withstand breakage and are very largely broken again into fine particles by handling.

My invention consists in the process of preparing the aforesaid charging-material smalls of sulfid ores for smelting by combining the same with matte (either copper matte or iron matte) as the binding material, and my invention also includes the brick of said charging-material smalls bound or unitized by said matte as a new article of manufacture.

In the accompanying drawings I have shown an apparatus in which my process may be carried out and my new article of manufacture produced.

Figure 1 is a vertical section of said apparatus. Fig. 2 is a section of the brick removed from the apparatus.

a is a pot or mold, preferably of cast-steel, but which may also be made of cast-iron, and which may be two feet in diameter.

b is the matte-spout on the forehearth of a copper or iron matting-furnace of sulfid ores.

c is a hopper containing fine sulfid ore or flue-dust, and *h'* is the spout therefrom. The fine ore or flue-dust from the spout *h'* and the molten matte from the spout *b* are allowed to run into the mold *a* simultaneously, so as to be thoroughly mixed together therein. If desired, this mixing may be facilitated by stirring. When the mixed mass is chilled sufficiently, it is dumped out of the mold and crushed into suitable size for charging the furnace. The smalls produced by crushing may be returned to the mold again.

I use the word "matte" in its standard signification as meaning an impure metallic product containing sulfur, obtained in the smelting of the sulfids of different metals, especially copper.

It will be observed that by the use of the apparatus above described the stream of matte from the spout *b* and the stream of sulfid-ore charging-material smalls from the spout *h'* are directed substantially to the same point at the center of the pot *a*, so that they practically mingle together as they fall into the pot at this point, and spread outwardly in filling the pot. This mode of operation is very important to the proper formation of the brick, because it causes the inflowing smalls to mix with the inflowing matte at the time when the matte is at its maximum temperature, and therefore in its most liquid condition, and causes the cooling to take place after the two constituents of the brick have been mixed together. The comparative specific gravity of the smalls and the molten matte is such that the particles of the smalls will be floated by the stream of matte and carried by it until cooled, so as to form an approximately homogeneous mixture of the two in the completed brick.

I am aware of Patent No. 784,850, granted March 14, 1905, to Furukawa, covering a smelting-brick composed of a single core of charging-material smalls substantially surrounded by a shell of matte, and I do not wish to be understood as claiming a brick so constructed or the process of making the same. Instead of forming the charging-material smalls as a core and the matte as a surrounding shell, in my brick the charging-material smalls and the matte are combined as a conglomerate mass, in which condition I have found that the mass will be self-sustaining against ordinary handling and which I have found can be formed by the method which I have herein set forth.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. As an article of manufacture, a smelting-brick composed of a conglomerate mass of

matte and sulfid-ore charging-material smalls.

2. The improvement in the art of making smelting-bricks which consists in causing a stream of sulfid ore charging-material smalls to mingle with a stream of molten matte at approximately the center of a containing vessel whereby a conglomerate smelting-brick of said constituents is formed within said vessel.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ROKUSABURO KONDO.

Witnesses:
GENJI KURIBARA,
TATSUS OKI.