are ground to an impalpable powder. This is then fed into a furnace, kiln or shaft, heated to a temperature high enough to ignite the sulfur, preferably being fed by an air blast or drawn into the furnace by a fan or blower suction. The pulverulent ore is at once ignited, with formation of sulfurous anhydrid and metallic oxids. The finely divided metallic oxids are carried along in the furnace with the mixture of sulfurous anhydrid and air, and being in such a fine state of division, act at once as a catalyzer, converting 30-40 per cent. of the sulfurous anhydrid into sulfuric anhydrid, and at the same time the gases are purified by the removal of arsenic and the like by their intimate contact with the fine non-volatile oxids. The spent metallic oxids are then separated from the gas. The resulting sulfuric anhydrid is absorbed in strong sulfuric acid in the well-known absorption towers, and the remaining sulfurous anhydrid converted into sulfuric anhydrid by the continuance of the contact process or into hydrated sulfuric acid by the well-known chamber process.

The accompanying illustration shows the apparatus in which the process is carried out.

The inventor is Jos. McFetridge, of Vandergrift, Pa.

988,724. Cement Treating Process.

This invention is a process for treating Portland cement clinker, by running the intensely heated clinker from a rotary kiln into a receiver and treating the same for the desired time with steam at high pressure generated by spraying water upon the heated material in a closed receiver or otherwise, so that the

clinker is disintegrated or made friable so as to facilitate grinding and its ageing or hydration to the desired extent is effected, that is, the free or objectionably loosely combined or lime magnesia in the clinker is hydrated or reduced to other forms.

The accompanying illustration shows apparatus for carrying out this process.

The inventors are Robert W. Lesley, of Haverford, and Henry S. Spackman, of Ardmore, Pennsylvania.

988,936. Electric Furnace Process and Electric Furnace.

This invention resides in an electric furnace wherein the resistor comprises a column or columns of molten material, electrodes furnishing communication with the columns, the

heat in the column resistor being communicated to the main body or mass of molten or other material under treatment by conduction from such resistor and chiefly by convection and rapid circulation; and it is a further feature of the invention that the patentee so constructs and proportions the column

resistor that the "pinch effect" in such column is availed of for causing more or less violent circulation and movement of the heated material from the columns into the mass of molten material under treatment.

The accompanying illustration is a vertical sectional view of an electric furnace in which the resistor is in the form of a column or columns of molten material contacting with the electrodes and communicating with the main mass of molten material above it.

The inventor is Carl Hering, of Philadelphia, Pa.

988,963. Manufacture of Lead Oxid and White Lead.

In the manufacture of white lead from oxid by dissolving the latter in acetate of lead solution, nearly half the lead remains behind as sludge. This is owing to the oxid of lead having been fused in its manufacture, and no matter how finely it is ground afterward, this fused oxid is in large part insoluble in the acetate of lead solution.

It is the purpose of this invention to avoid the fusing of the oxid altogether by making it as a highly soluble massicot at a temperature a long way below the fusing point, and thus the difficulty hitherto experienced in working commercial litharge is avoided. Further, in the manufacture of red lead it is also very desirable to have the lead oxid in as fine a state of division as possible to avoid the fusing of the oxid, and to have every particle of the charge at the same degree of oxidation, and especially to avoid powdered lead in the charge, as the lead takes much longer to oxidize to red lead than the fused oxid, and the fused oxid much longer than the finely divided unfused oxid. It is thus impossible to bring all the lead oxid at the same time to the right color, and individual parts are too much oxidized, and others too little.

The process is defined in the patent as consisting in subjecting metallic lead to a blast of air and steam, discharging the mixed

dust and gases in an upward direction, and at the same time heating said dust and gases to a degree slightly below that

necessary to fuse the oxid until the entire lead contents are converted into oxid.

The accompanying illustration shows apparatus in which the process may be carried out.

The inventor is George Vincent, of Liverpool, England.

990,266. Manufacture of Steel.

This invention relates to the conversion of iron into steel by a process analogous to the Bessemer method and has more particular reference to improvements in what may be termed the continuous conversion process. In this last-named method the converter is of a stationary type, erected adjacent to or even as part of the cupola, whereby molten cast iron, the product of the cupola, is allowed to pass directly from the cupola hearth continuously into the converter through a conduit or connecting passage. The metal accumulates in the converter, to which blast, under suitable pressure is applied, causing the carbon, and other metalloids to be oxidized and the heated products of combustion to pass up into the cupola and assist in the reduction and melting of the metal. Thus the process of smelting and converting are carried on simultaneously, the bath of molten steel being constantly fuel enriched by passing over of highly carbonized iron from the cupola, and a sufficiently high temperature maintained to insure the combination of the oxygen in the blast with the carbon of the metal, the converter hearth being tapped intermittently for steel, as the molten metal accumulates and gets deprived of its carbon and other metalloids by the action of the air blast. Hitherto in this method of manufacturing steel, there has been excessive slagging, from the converter and the too free passage of molten metal intermingled with slag from the converter resulting in abnormal losses of metal that pass out with the slag while the

converter is in blast. Further, owing to the fact that an ordinary charge such as may be used for this process frequently consists of pig iron, steel scrap, and wrought iron, there is a lack of uniformity in the metal passing into the converter, and the steel is difficult to grade.

Now the object of the present invention is to obtain a purer and more uniform quality of steel. For this purpose there is formed a bath or well at the bottom of the cupola in which the molten metal accumulates and from which it overflows into the converter attached. This bath is supplied with twyers similar to those in the converter in order to thoroughly agitate and mix the molten metal, and remove by oxidation any excess of

silicon, manganese or other impurities in the metal before it overflows into the said converter. The presence of the coke in the cupola bath prevents any appreciable reduction in the quantity of carbon in the metal, so that the metal overflowing into the converter does not contain more silicon and manganese than is required to be removed before the carbon is reduced to the desired percentage, but if found necessary carbon may be added in any convenient way to the converter or the bath to make up any deficiency.

The accompanying illustration shows apparatus in which the process is carried out.

The inventor is Thomas James Heskett, of Westminster, London, England.