UNITED STATES PATENT OFFICE.

ADDISON H. BEALE AND ELWOOD F. McDOWELL, OF POTTSVILLE, PENNSYLVANIA.

COMPOUND FOR FACING THE PORTS OF OPEN-HEARTH STEEL-FURNACES.

No. 850,723. Specification of Letters Patent. Patented April 16, 1907.

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To all whom it may concern:

Be it known that we, ADDISON H. BEALE and ELWOOD F. McDOWELL, both citizens of the United States, residing in Pottsville, Pennsylvania, have invented a certain Compound for Facing the Ports of Open-Hearth Steel-Furnaces, of which the following is a specification.

The object of our invention is to prevent the rapid destruction of the port ends of open-hearth furnaces by the action thereupon of the products of combustion in their escape from the working chamber of the furnace.

In the manufacture of steel in the Siemens or open-hearth furnace by what is known as the "basic process" much difficulty has been experienced in maintaining the port ends of the furnace through which the products of combustion pass on their way to the regenerators. These products of combustion, being principally basic, cause rapid fusion and destruction of those portions of the furnace in which the ports are formed, these portions of the furnace being usually composed of silica compounds, which are therefore violently attacked by said basic products of combustion. In carrying out our invention we face said ports with a basic compound combined with a binding ingredient which will serve not only to render the compound itself properly cohesive, but will insure its proper retention upon that portion of the furnace-lining in which the ports are formed. By thus facing the ports with a properly-prepared basic material we enable them to resist the destructive action otherwise due to the impact of the basic products of combustion entering and passing through said ports, while yet permitting that portion of the furnace above the slag-line to be provided with a silica lining.

The compound which we prefer to use consists of seventy parts, by bulk, of chrome ore, thirty parts, by bulk, of magnesite, and twenty parts, by bulk, of the binding agent employed. This binding agent should be of an anhydrous character, the agent which we prefer to employ being a hydrocarbon, such as anhydrous pitch or tar.

The chrome ore and magnesite are ground or otherwise reduced to a powdered or granular condition and are then mixed with the anhydrous pitch or tar, the latter being in a fluid state, and heated, if necessary, so that it will form, with the powdered or granular chrome ore and magnesite, a plastic mass of a cohesive character, which when applied to the port end of the furnace-lining above the slag-line can be readily shaped to accord with the desired form of the port and will retain this shape and adhere to that portion of the lining to which it is applied, sufficient material being used to face all parts of the port with which the products of combustion are liable to come into destructive contact when the furnace is in operation.

When subjected to the heat of the furnace, the volatile portions of the pitch or tar are driven off, leaving a carbon residue which unites the particles of basic material and insures their retention in place.

The compound can be used for facing the ports when the furnace is being lined in the first instance or is being relined or for repairing the ports after the furnace has been in use, the employment of said compound materially increasing the life of the ports, and thereby insuring a much larger yield in tonnage from the furnace before repairs become necessary.

We claim—

1. A compound for facing the ports of open-hearth furnaces, said compound consisting of chrome ore, magnesite and a binding agent, substantially as specified.

2. A compound for facing the ports of open-hearth furnaces, said compound consisting of chrome ore, magnesite and an anhydrous binding agent, substantially as specified.

3. A compound for facing the ports of open-hearth furnaces, said compound consisting of chrome ore, magnesite and a hydrocarbon such as anhydrous pitch or tar, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ADDISON H. BEALE.
ELWOOD F. McDOWELL.

Witnesses:
W. I. McCLURE,
LOUIS HOLSTEIN.