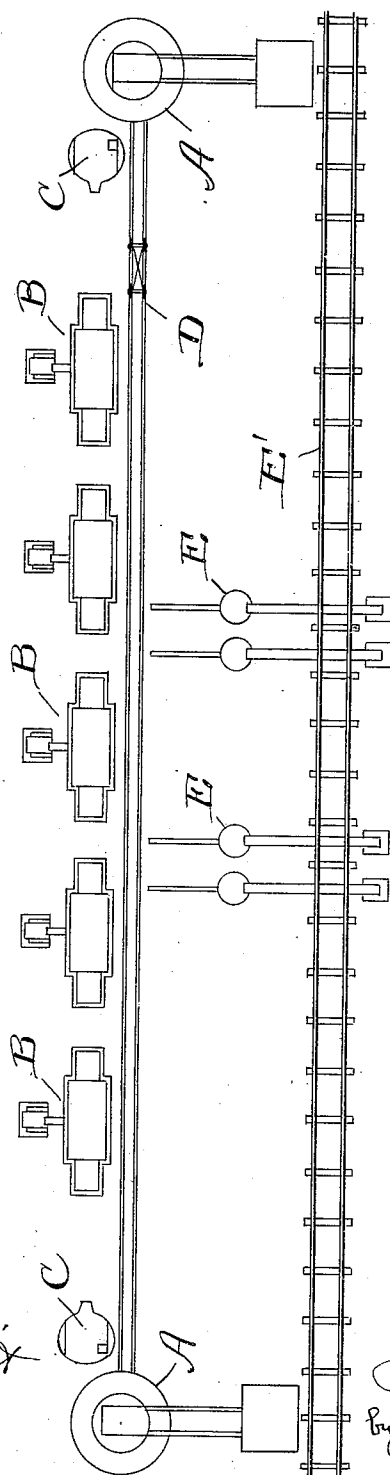


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STEEL PLANT.

APPLICATION FILED NOV. 22, 1905.

935,964.

Patented Oct. 5, 1909.



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UNITED STATES PATENT OFFICE.

JOHN C. CROMWELL AND HORACE W. LASH, OF CLEVELAND, OHIO, ASSIGNORS TO THE GARRETT-CROMWELL ENGINEERING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

STEEL PLANT.

935,964.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed November 22, 1905. Serial No. 288,539.

To all whom it may concern:

Be it known that we, JOHN C. CROMWELL and HORACE W. LASH, both citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Steel Plants, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of our invention is to so construct and correlate the various necessary elements of the modern steel plant that the various units may be thrown either in or out of operation without any inconvenience and without interference with the operation of the remaining units thus endowing the plant with an elasticity of operation not hitherto known.

A further object is to so dispose the necessary elements of the plants that the conveying system shall be reduced to a single continuous line and thus avoid the confusion and complexity of arrangement found in prior installations, which generally have a separate crane for each individual element or group of elements.

Referring to the accompanying drawing, it will be seen that we have constructed a plant in which the blast furnaces, mixers, cupolas and refining furnaces are so disposed relative to each other that a single crane may operate between them and serve for each individual element of the plant.

In the arrangement shown, the blast furnaces A A are two in number and disposed one at each end of a line of open hearth refining furnaces B B. Immediately adjacent to each blast furnace is a mixer C which is adapted to receive the pig metal as it is run directly from its associated blast furnace.

A conveying system, consisting in the preferred form of a crane-way D, runs between each blast furnace and the open hearth refining furnaces. The crane-way, the blast furnace and the mixer associated with the latter are, in each instance, so disposed that the ladle carried by the crane may receive metal from both the blast furnace and the mixer.

Along the crane-way, opposite to the refining furnaces B B, and likewise between the blast furnaces, are the cupolas E E designed to melt the cold pig or such other substances as it may be desired to add molten

to the hearth or ladle. The cold material for the cupolas is preferably brought from the stockyard on an ordinary railway E', running behind them, though it is obvious that the conveying system which handles the molten metal might also be adapted to bring in the cold material for the cupolas. It will be seen that with this arrangement but one conveying track is necessary to handle all of the molten metal from all of the blast furnaces, mixers and cupolas, and the elasticity of the system will be apparent. Either blast furnace may be thrown out of operation and the metal from the operating furnace still be conveyed directly to either mixer or to any one of the open hearths,—any or all of which latter may be in operation. If any one of the mixers is for any reason not in use, the metal from the blast furnace immediately adjacent thereto may be conveyed to the mixer at the other end of the system, or directly to the open hearths, as may be desired. It will be plain also, that the ladle, whether empty or partially filled with metal drawn from either of the mixers or blast furnaces, or any one cupola, may be run so as to receive metal from any second cupola and then convey the charge to any one of the various open hearths. It will further be plain that each and any of the open hearths may be thrown into or out of operation without in any way interfering with the handling of the molten metal by our carrying system. Further, it will be seen that this installation may be extended with the addition of more furnaces, mixers and cupolas along the line of the carrying system, and this line may be either curved or straight. The essential characteristic feature of our plant is that all of the sources of supply and all of the receivers for the molten material to be refined, shall be disposed along a single continuous conveying way in an operative and practical system.

In those cases where converters are used for refining the crude metal they would of course be disposed after the manner of the open hearth furnaces shown, with regard to the conveying system.

Having described our invention, we claim:

A steel plant comprising a plurality of blast furnaces, a plurality of refining furnaces disposed between the blast furnaces, a molten metal mixer disposed in such proximity to each blast furnace that metal may be run directly from each blast furnace to a

mixer, a conveying way extending between
the blast furnaces and by the refining fur-
naces, each blast furnace disposed so as to
be capable of discharging into a ladle car-
ried on the conveying way and each mixer
being disposed so as to be capable of dis-
charging metal into or receiving metal from
said ladle.

In testimony whereof, we hereunto affix
our signatures in the presence of two wit-
nesses.

JOHN C. CROMWELL.
HORACE W. LASH.

Witnesses:

H. D. SMITH,
H. B. SULLIVAN.