A. F. S. BLACKWOOD.

CONVERTER.

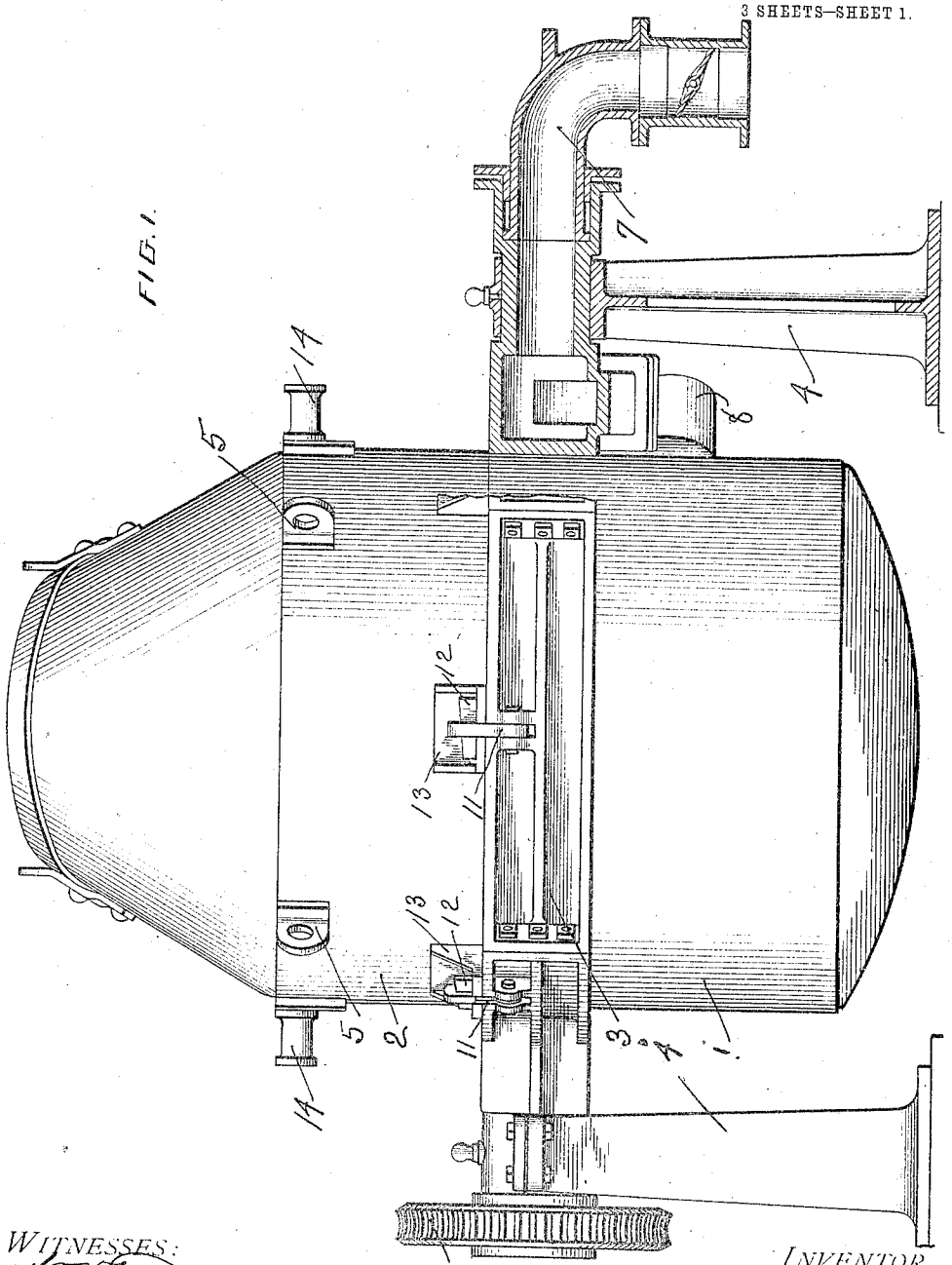
APPLICATION FILED JULY 28, 1910.

1,042,876.

Patented Oct. 29, 1912.

3 SHEETS—SHEET 1.

FIG. 1.



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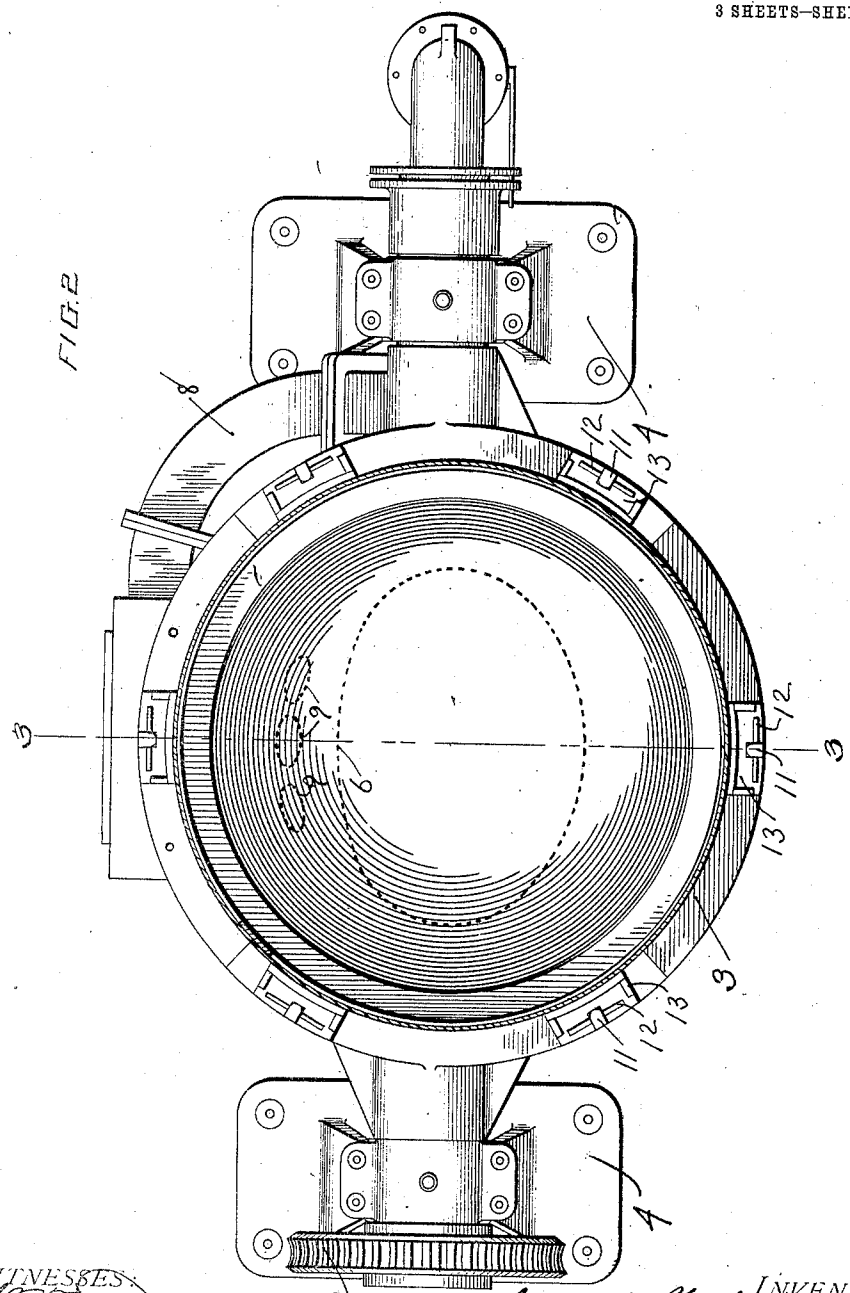
3 SHEETS—SHEET 2.

FIG. 2



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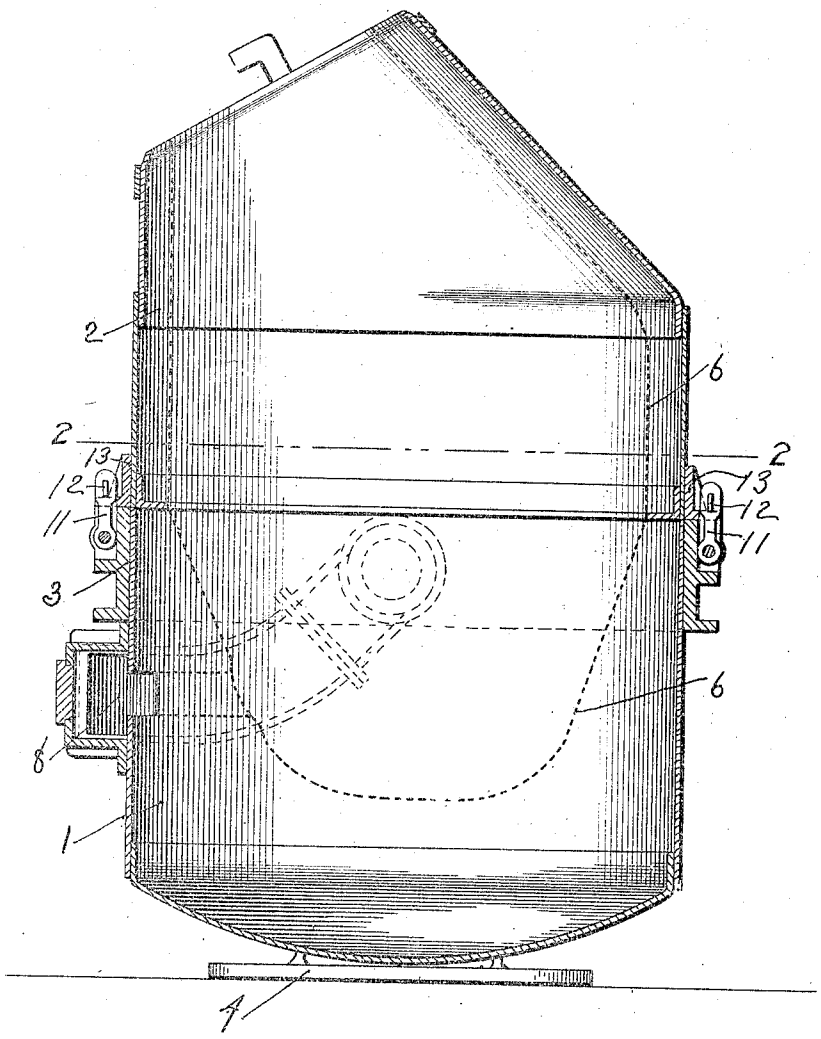
3 SHEETS—SHEET 3.

FIG. 3.



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CONVERTER.

1,042,876. Specification of Letters Patent. Patented Oct. 29, 1912.

Application filed July 28, 1910. Serial No. 574,404.

To all whom it may concern:

Be it known that I, ALEXANDER F. S. BLACKWOOD, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Converters, of which the following is a description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to Bessemer converters of the type in which provision is made for readily separating the converter to afford convenient access to the interior thereof for the purpose of repairing the lining with which such converters are provided; and the objects of my invention are to provide a separable converter which may be readily separated and which requires no mechanism for effecting the separation of the parts thereof other than such as ordinarily forms a part of foundry equipment; to provide a separable converter in which the plane upon which the parts are separated passes through the locality at which the maximum wear upon the lining of the converter occurs, so that the portions of the lining the more likely to need repairs will be close to the ends of the parts after they have been separated; and to provide such further improvements in and relating to separable converters as will be hereinafter disclosed and claimed.

With the above enumerated objects in view my invention consists in the improved separable Bessemer converter illustrated in the accompanying drawings, described in the following specification, and particularly claimed in the clauses of the concluding claim; and in such obvious modifications of the converter illustrated and described as will be obvious to one skilled in the art to which the invention relates.

In the drawings comprising three sheets: Figure 1 is a view showing a side elevation of my improved converter, one of the trunnions however being sectioned to show the air supply passage extending therethrough; Fig. 2 is a plan view of the lower part of the converter, the upper part being removed. Fig. 3 is a view showing a section taken upon a vertical plane indicated by the line 3—3 Fig. 2.

My improved converter is made up of two parts, the lower part 1 being supported by a trunnion ring 3 rotatable in bearings at the upper ends of the pedestals 4, while the upper part 2 is separable from the lower part so that it may be readily lifted therefrom by means of a crane, to which end it is provided with a plurality of lugs 5 to be engaged by lifting chains, it being thus obvious that no mechanism other than a crane, which is a common and necessary part of foundry equipment, is necessary to effect the separation of the parts. The feature of ready separation of the parts by means of a crane results from the fact that the plane upon which the parts are separable passes above the trunnion ring, thus dispensing with such special apparatus as is commonly provided for manipulating the lower part of such separable converters as are separable upon a plane located below the trunnion ring; and the location of the plane of separation above the trunnion ring furthermore secures a separation of the parts at the annular belt or zone at which the converter lining is subjected to the maximum amount of wear and at the place where it is the more likely to have become damaged and to need repairs— that is, in side blown converters, the zone above the plane of the twyers which is in line with or slightly above the direction which the blast from the twyers takes as it passes through the molten metal and in which the heat of combustion is highest; from which it will be obvious that after the parts have been separated the portions of the lining more likely to need repairs will be at or near the ends of the parts and will consequently be readily accessible for the purpose of repair. The plane upon which the two parts are separated being above the trunnion ring as stated, also coincides approximately with the upper limit of the trunnion ring, as when the several parts are designed and proportioned as contemplated by me a plane so located will divide the converter at just about the place where the maximum amount of wear is found to occur. This is found to be about seventeen inches above the center line of the twyers in a one ton converter.

The dotted lines 6, Figs. 2 and 3, indicate approximately the outline of the lining of the converter.

7 is the air supply passage extending through one of the trunnions after which the air passes through a conduit 8 and into the converter through one or more passages or twyers 9.

10 is a gear designed to be engaged by a

worm whereby the converter may be rotated upon its trunnions as is common in Bessemer converters.

The trunnion ring 3 is preferably formed in sections as shown, and means are provided for securing the upper and lower parts of the converter together; the same being shown as comprising a plurality of shackles 11 pivotally secured to the trunnion ring at their lower ends, while the upper ends thereof are slotted to receive transverse tapering wedges or keys 12 which coöperate with brackets 13 secured to and carried by the upper part 2 of the converter and located adjacent the lower end thereof.

14 are trunnions carried by the upper part 2 of the converter, the purpose of which is to support the upper part of the converter as upon suitable trestles after it has been lifted off and moved away from the lower part and in such a way that said upper part may be tipped into a convenient angle to permit its lining to be repaired as will be understood.

Such being the construction of my improved converter, it will be obvious that after removing the keys 12 and swinging the shackles 11 free from the brackets 13 the upper part 2 of the converter may be lifted from the lower part 1 by means of a crane and chains engaging the lugs 5 and the same placed upon suitable supports, the trunnions 14 of the upper part serving as supports for the same and permitting it to be moved into such a position, angularly, as to enable the lining thereof to be readily repaired. The lower part 1 may obviously be likewise rotated upon its trunnions to bring it in proper position to enable repairs to be made to the lining. When thus separated the portions of the lining of the two parts the more likely to need repairs are readily accessible as above explained; and the fact that the workman who is to make the repairs does not have to enter the converter to reach the locality where repairs are to be made, nor to reach far thereinto, enables repairs to be made upon a converter, when constructed in accordance with my invention, so hot as to positively preclude the entry of a person into the interior thereof as would be necessary if the portion of the lining to be repaired was removed from the open end of the part to be repaired, it being possible to make repairs upon the lining of my improved converter after the same has been given but a few hours in which to cool, whereas from fifteen to eighteen hours are commonly required for a converter to become cool enough for a workman to enter into it to repair the lining.

With a converter constructed in accordance with my invention as above disclosed I am able to operate with a single converter where two or more have heretofore been required for the reason that repairs to the converter lining may be made without waiting for the converter to become cool; whereas in plants using converters in which it is necessary to enter into the interior thereof in order to repair the lining, the converters have to be given many times as long to cool, and a second converter will be necessary in order to maintain a continuous operation of the plant, before the first will have had time to cool and be repaired. In such plants it has heretofore been necessary to have at best two, and often more converters, the individual converters being used in succession.

Having thus disclosed my invention and explained the advantages thereof, I claim and desire to secure by Letters Patent:—

1. A converter comprising a lower lined portion having twyers arranged to deliver air through the side, means for supporting and swinging the said lower portion; an upper lined portion detachably secured to the lower portion, the plane of juncture between the upper and lower portion coinciding with the plane of greatest wear of the lining of the converter which in a one ton converter is about seventeen inches above the center of the twyers.

2. A converter comprising a lower lined portion having twyers arranged to deliver air through its side, means for supporting and swinging the said lower portion, an upper portion, detachably secured to lower portion, the plane of juncture between the upper and lower portion coinciding with the plane of greatest wear of the lining of the converter, which in a one ton converter is about seventeen inches above the center of the twyers, means whereby the upper portion may be gripped to be removed, and trunnions secured to the upper portion whereby the same may be suitably mounted after being detached and removed from the lower portion.

This specification signed and witnessed this twenty seventh day of July A. D. 1910.

ALEXANDER F. STIRLING BLACKWOOD.

In the presence of—

R. F. HINTERMANN,

JESSE F. MONFILS.