F. E. MARCY.

COPPER CONVERTER.

APPLICATION FILED MAY 18, 1908.

**919,199.**

Patented Apr. 20, 1909.

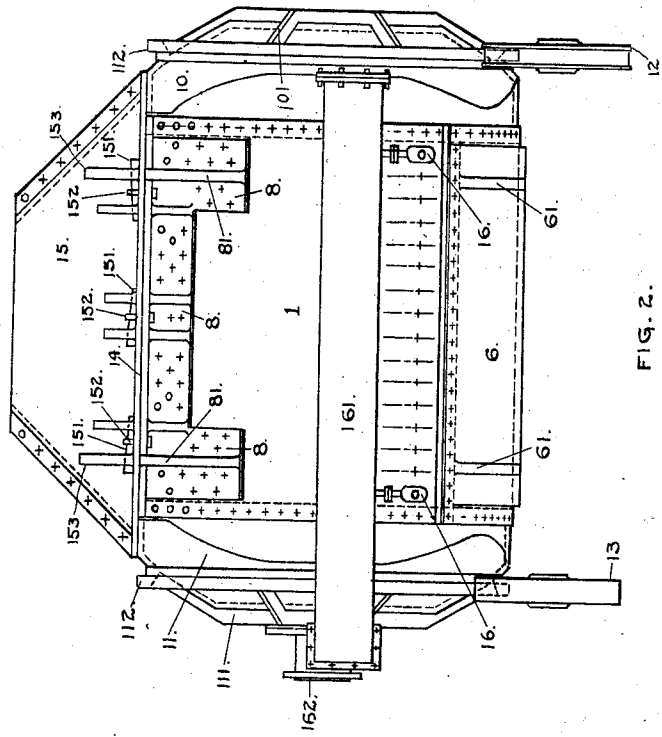



FIG. 2.

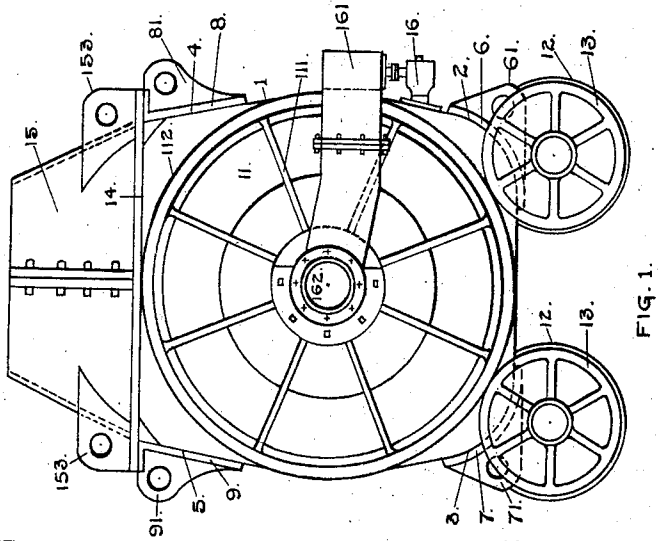



FIG. 1.

WITNESSES=

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# UNITED STATES PATENT OFFICE.

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## COPPER-CONVERTER.

No. 919,199. Specification of Letters Patent. Patented April 20, 1909.

Application filed May 18, 1908. Serial No. 433,383.

*To all whom it may concern:*

Be it known that I, FRANK E. MARCY, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented a certain new and useful Improvement in Copper-Converters, of which the following is a specification.

This invention relates to a converter such as may be used for the converting of copper matter into pure copper by a chemical union of the impurities as iron with the silicious lining or other material in the converter.

The object is to provide a converter which has peculiar advantages resulting from the manner of articulating its several parts and in the peculiar shape of some of these parts so as to locate the articulation of the top peculiarly with reference to the supporting means.

A further object is to provide a converter which for all practical purposes unites the advantages of both the vertical and horizontal types of converter heretofore known.

Referring to the drawings,—Figure 1 is an end elevation; and Fig. 2 is a side elevation of the converter.

The shell 1 is irregularly cylindrical in cross section, that is, all its longitudinal elements are parallel to each other and do not intersect a right angularly transverse plane in a circle. To be more specific, the irregularly cylindrical shape is brought about by bulging the shell into ridges 2, 3, at its lower front and back edges. At its upper front and back portions the shell extends upwardly into tangential converging planes 4, 5. These ridges are made of cast steel sections 6, 7, and the tangential edges of the shell 1 are reinforced by steel castings 8, 9. To this irregularly cylindrical shell 1 is secured cast steel heads 10, 11, of frusto conical shape, for the most part reinforced by ribs 101, 111. The inner edges of the heads 10, 11, are shaped irregularly cylindrical to correspond with the edges of the shell 1 to which they are riveted. Treads 112, 112, are formed upon the heads 10, 11, for coaction with supporting wheels 12, 13, mounted in some suitable way not shown. One set of these wheels 12, is suitably grooved to prevent displacement in coacting with one of the treads 112.

The shell 1 is open at the top and the treads 112, 112, are mounted upon the tapered portion of the heads 10, 11, and are of such diameters as not to extend beyond the extreme top edge of the shell 1. This top edge of the shell 1 is suitably flanged and coacts in such a way with the heads 10, 11, as to provide a plane surface 14 at the open top of the converter. This plane surface, as shown, is tangent to the periphery of the treads 112, 112, but does not intersect same. It may also lie entirely without the treads. A top 15, which converges upwardly upon all of its sides, is mounted upon the converter so as to coact at its lower plane surface with the plane surface 14 at the upper edge of the shell 1 and the heads 10 and 11. The top is suitably secured to the shell, the means shown being by wedges 151 passing through I-bolts 152 secured to the flanges of the shell 1.

Individual twyers 16, two of which are shown complete while the remainder are connected only by center lines in Fig. 2, connect with the shell 1 immediately above one of the lower ridges 2, and communicate with the twyer box 161, which is closed at one end and extends at the other end around one end of the converter and terminates in an inlet 162 coaxial with the converter.

Upon the cast steel portions 6, 7, 8, 9, are formed lugs 61, 71, 81, 91. These lugs are conveniently bored for the purpose of taking hold of the converter by means of a crane or other lifting device, either to rotate the same or bodily transport the converter from one place to another. The lower lugs, 61, 71, have their lower edges in a coincident plane for the purpose of providing means for stable resting on a flat foundation when the converter is off its support allowing the rotation thereof. The top 15 is ordinarily formed of cast steel and made in two pieces, as shown, or made in one or more pieces. It also has attaching lugs 153. Part of the body of the shell is formed of plate steel, while the upper edges and the ridged portions are formed of cast steel, as hereinbefore stated.

From the above description of the invention it will be apparent that when this converter is to be relined, which, as is well known, necessitates removal of the top 15, and upon such removal of the top 15 the converter will present a plane edge which is entirely free from intersection with the adjacent treads, and which lies in a plane which may be tangent to these treads, as shown, or which may lie entirely without

the treads. The essential feature is to present such a plane surface or edge which will be free from interference with the treads. This being the case, a platform may be built at the level of this plane edge and the lining material may be brought to the converter upon this platform without any interference with projecting treads, as was heretofore the case.

By extending the converter shell upwardly in the way described, to a plane tangent to or above the treads, the line of articulation of the top and remainder of the converter is sufficiently removed from the zone of intense heat of the converter so that burning out at this place of union is prevented. By bulging the converter shell at the lower front and rear sides, additional space is provided within the converter for lining material so that additional thickness of lining is possible at points immediately below the level of the twyer on either side of the converter, that is, both adjacent the twyers and directly opposite them and about in line with the blast. At these points the lining is especially subject to erosive and chemical action, and by so bulging the shell into ridges at these points, more lining material is possible for the necessary chemical reaction during the process of converting. This bulging of the shell also lowers the center of gravity and makes the turning moment less than in the converters of the prior art. It should be especially noted that the heads are integral or one-piece parts and have no joints except those with the shell 1 and the top 15.

It should be understood that it is not desired to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

It is claimed and desired to secure by Letters Patent,—

1. In a converter the combination of a cylindrical drum, an end on said drum provided with a continuous tread to permit complete inversion of the converter, the tread being of a diameter at least equal to the smallest diameter of said cylinder, friction wheels coacting with the tread for supporting the converter, and a top secured to the drum in a plane free from intersection with the tread.

2. In a converter the combination of a cylindrical drum having treads, wheels coacting with the treads, and a top secured to the drum at a joint lying wholly between the treads and in a single plane.

3. In a converter, a shell of irregular cylindrical section having projecting ridges at two portions of its curvature and a plurality of twyers adjacent one of said ridges and directing the blast into the converter toward the other of said ridges.

4. In a converter, a shell of irregular cylindrical section having projecting ridges at two portions of its curvature and lugs provided at the projecting ridges all combining to provide for stable resting on a plane foundation.

In testimony whereof, I affix my signature in the presence of two witnesses.

FRANK E. MARCY.

Witnesses:
H. I. GOODSPEED,
JOS. B. MOSSMAN.