March 19, 1968 P. PUXKANDL 3,373,985

ANNULAR SUPPORT RING FOR CONVERTERS

Filed Jan. 29, 1964

FIG. 1

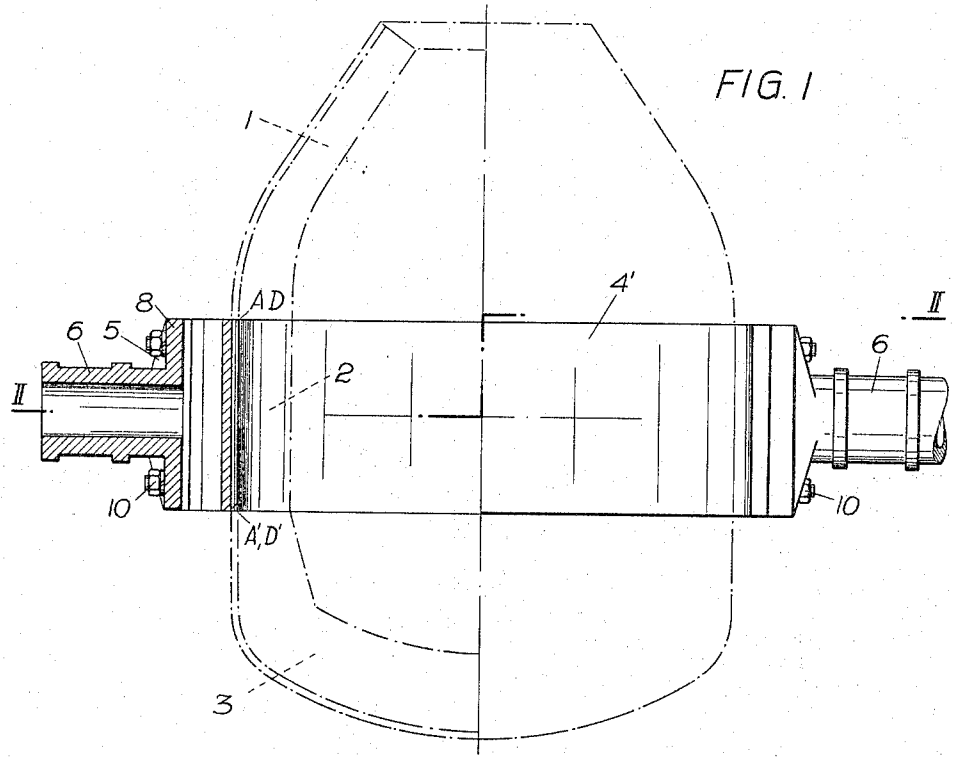
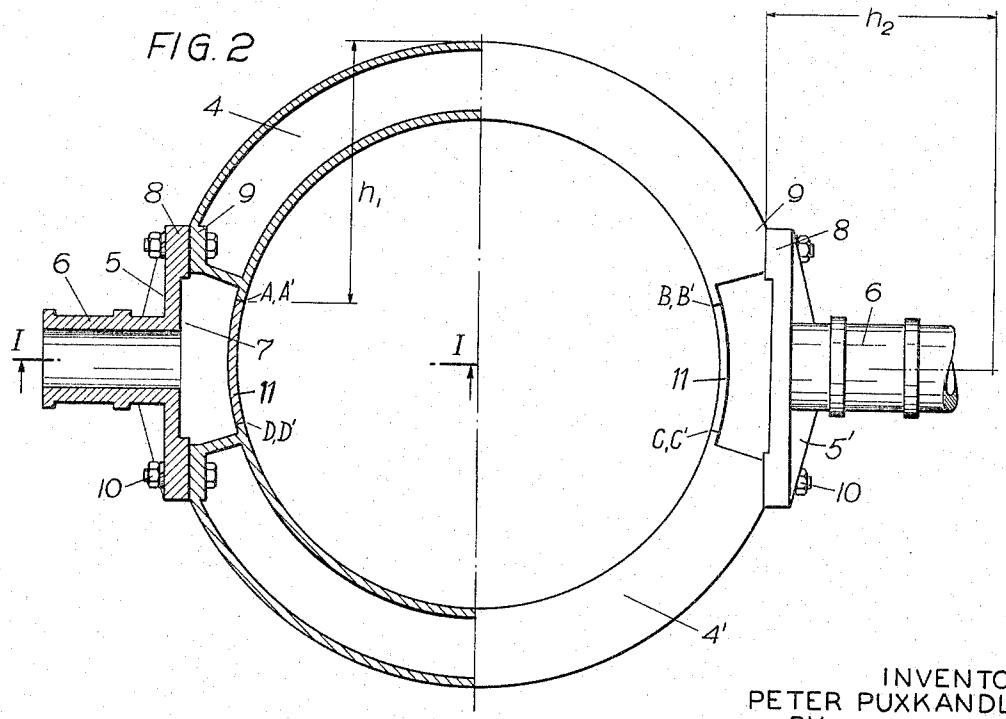


FIG. 2



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ANNULAR SUPPORT RING FOR CONVERTERS

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3 Claims. (Cl. 266—36)

This invention relates to a crucible or converter for carrying out metallurgical processes, particularly top-blowing processes in which oxygen or a high-oxygen refining gas is supplied to the molten charge from above.

In the course of development of such plants there has been a trend towards the highest possible capacity of the refining vessels. The constructions predominantly used up to now consisted of a cylindrical or pear-shaped refractory-lined vessel inserted in a tiltable trunnion ring, the support in the trunnion ring being effected by means of brackets projecting from the wall of the vessel and resting against the trunnion ring. In extending the refining vessels, as desired, to tonnages of more than 100 metric tons, it has proved necessary, to manufacture the trunnion rings in several parts, because trunnion rings made of one piece for large vessels involve unsolvable problems as to weight and in respect of their transportability.

According to a prior proposal of the applicant, described in the Austrian Patent No. 220,644, a crucible having a load-bearing middle portion has already been known. As shown in the Austrian patent, the middle portion consists of a series of individual parts, which complement one another to form a trunnion ring and are connected by connecting means taking up tension forces to form a composite ring clamped about the crucible. Moreover, all of the individual parts of the composite ring comprising the load-bearing middle portion are welded about the entire periphery of the ring to the upper and lower parts of the crucible, which form a sheet metal shell. Whereas this construction eliminates the difficulties entailed by the requirement of transportability and by the weight of large trunnion rings, a disadvantage of this known construction is seen in that the trunnions cannot be removed after welding in the load-bearing middle part.

The present invention has as its object to avoid these difficulties by providing a metallurgical vessel comprising upper and lower sheet metal portions and a load-bearing middle portion wherein the middle portion includes two spaced symmetrical segment members rigidly connected to the upper and lower vessel portions with the ends of the segments facing each other, along with flat metal plates welded to the facing ends of the segments to complete the middle portion of the vessel and a pair of trunnion-carrying connecting members removably mounted by screws to the outer sides of the facing ends of the segment members so as to leave a cavity or open space between each flat metal plate and the corresponding trunnion-carrying member. In addition to the connecting members there suitably are also such members which are adapted to transmit transverse forces and the moment of torsion. For this purpose, e.g., stops or bolts may be used, as is known from an earlier proposal of the applicant (cf. Austrian Patent No. 209,924).

Suitably, the trunnion-carrying members are made of cast steel, whereas the remaining segment members consist of sheet metal of good welding properties.

By the provision of a cavity or gap between the connecting members and the plates, as described, the additional advantage is obtained that direct heat transfer from the vessel shell to the trunnions is largely prevented.

The invention is explained more fully in the drawing

by way of an exemplary embodiment. FIG. 1 is a lateral view of the crucible, FIG. 2 is a horizontal sectional view in the height of the plane of the trunnions.

The crucible comprises an upper part **1**, the load-bearing middle part **2**, which is provided on opposite sides with trunnions, and the bottom part **3**. As is shown in FIG. 2, the load-bearing middle part is formed according to the invention by four members which are equally designed in pairs, namely by the oppositely disposed segment members **4**, **4'** which carry no trunnions, and the connecting members **5**, **5'** carrying the trunnions.

The dimensions of these four parts may be correlated in such manner that the height h_1 of the ring segment members **4**, **4'** and the height h_2 of the members **5**, **5'** will always lie within the respective loading gauge. It has shown that in the largest converters built today, which have a capacity of 300 metric tons or even more, the division according to the invention into four members is still feasible. In this way a simple and economical manufacture is ensured and difficulties during transportation are avoided.

The facing ends of segment members **4**, **4'** are, on the one hand, connected through the welded-in plates **11** which complement the inner walls of the box-profile of the segment members to form the central shell portion; this is a non-releasable welded connection. On the other hand, the facing ends of the segment members **4**, **4'** are also screw-connected with their outer walls to the connecting members **5**, **5'** which carry the trunnions **6**, in such manner that the flange-like ends **8** of the connecting members are mounted on adequately beveled outer ends **9** of members **4**, **4'** by means of tension screws **10**; this thus is a releasable screw connection. Between the inner sides of connecting members **5**, **5'** and the plates **11**, a gap or cavity **7** is provided which hampers any heat transfer from the vessel shell to the trunnions.

The connection of the members **4**, **4'** with the upper and lower parts of the converter is performed by welding along the boundary lines A–B and C–D (seam to upper part) and A'–B' and C'–D' (seam to lower part). Thereby a perfectly rigid and inseparable connection between the members **4**, **4'** and the upper and lower parts of the vessel is achieved.

The trunnion-carrying members **5**, **5'** are in no immediate connection with the upper and lower parts of the vessel, but they are connected in the manner already described above only with the segment members **4** and **4'** by means of screws. Thereby it is possible to remove the trunnion-carrying members **5**, **5'** from the ready vessel at any time, if this is necessary for a repair or for some other reason.

Assembling of the crucible on site is effected in such manner that segment members **4**, **4'** are connected by the screws **10** with connecting members **5**, **5'** to form a closed, true-to-gauge ring. Then the ring is welded in the manner already described to the lower crucible part along lower seams A'–B', C'–D', and subsequently to the upper part along upper seams A–B, C–D. Finally, plates **11** are welded in along boundary lines A–A', D–D' on the one side, and B–B', C–C' on the other side.

What I claim is:

1. A metallurgical vessel comprising upper and lower sheet metal portions and a load-bearing middle portion wherein said middle portion comprises two spaced symmetrical segment members rigidly and undetachably connected to said upper and lower vessel portions with the respective ends of the segments facing each other, said segment members having a double-wall hollow structure, one wall thereof being rigidly and undetachably connected to the upper and lower vessel portions, two flat metal plates welded respectively to the facing ends of the two segment members to complete the middle portion of the

vessel, and a pair of trunnion-carrying connecting members removably mounted to the outer sides of said facing ends of said segment members by releasable screw connections, a cavity remaining between each trunnion-carrying connecting member and the corresponding flat metal plate.

2. A vessel as set forth in claim 1 wherein said segment members have a box-type profile and are welded with their inner walls to said upper and lower sheet metal vessel portion.

3. A vessel as set forth in claim 1 wherein said connecting members consist of cast steel members having flanges screw-mounted on the outer walls of said segment members.

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