Oct. 1, 1968 W. BRILL 3,403,898

OXYGEN CONVERTER APPARATUS

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FIG. 1

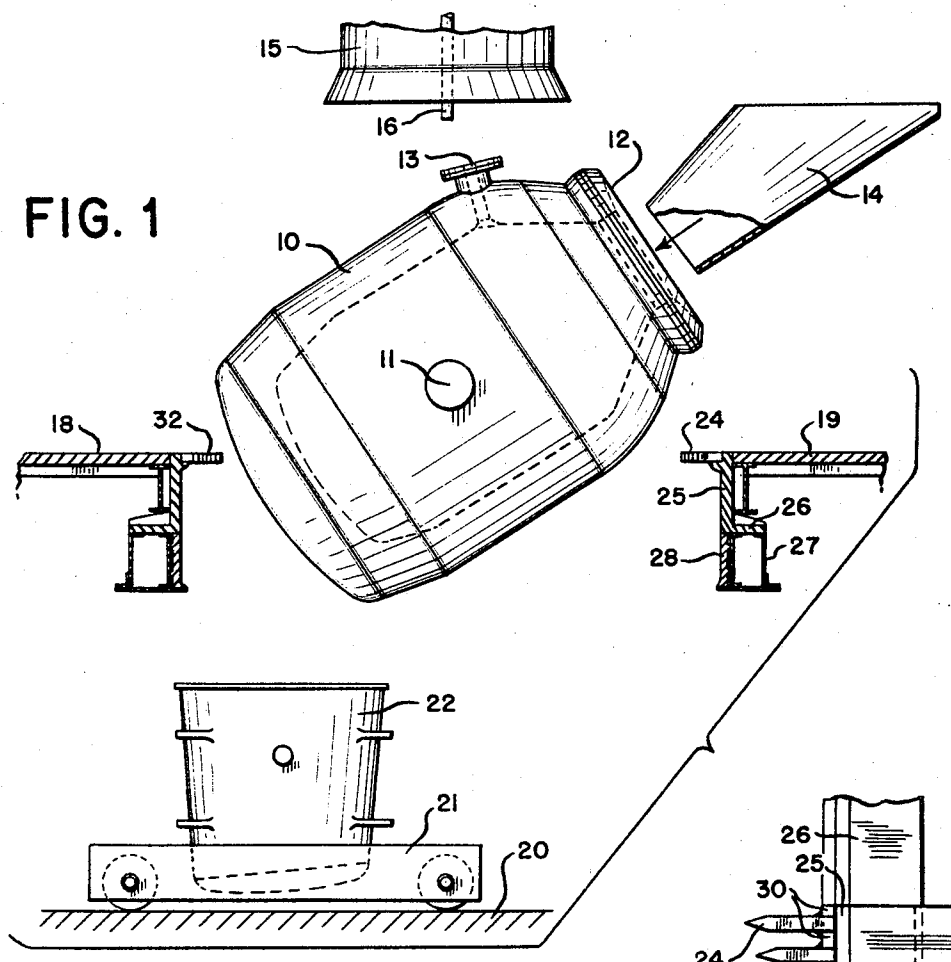


FIG. 4

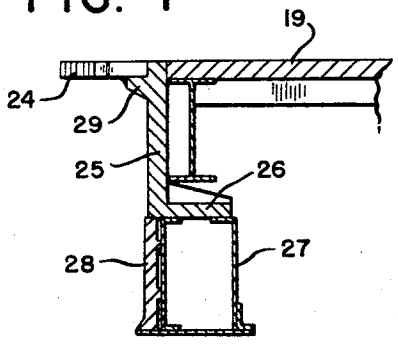
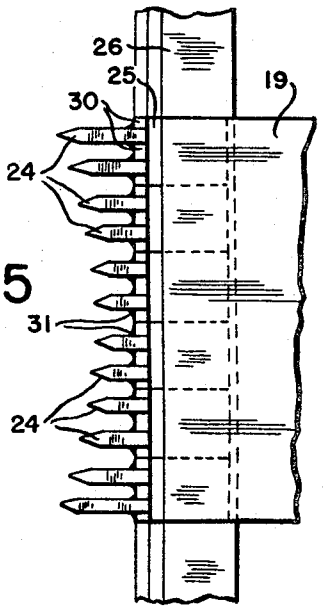


FIG. 5



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FIG. 3

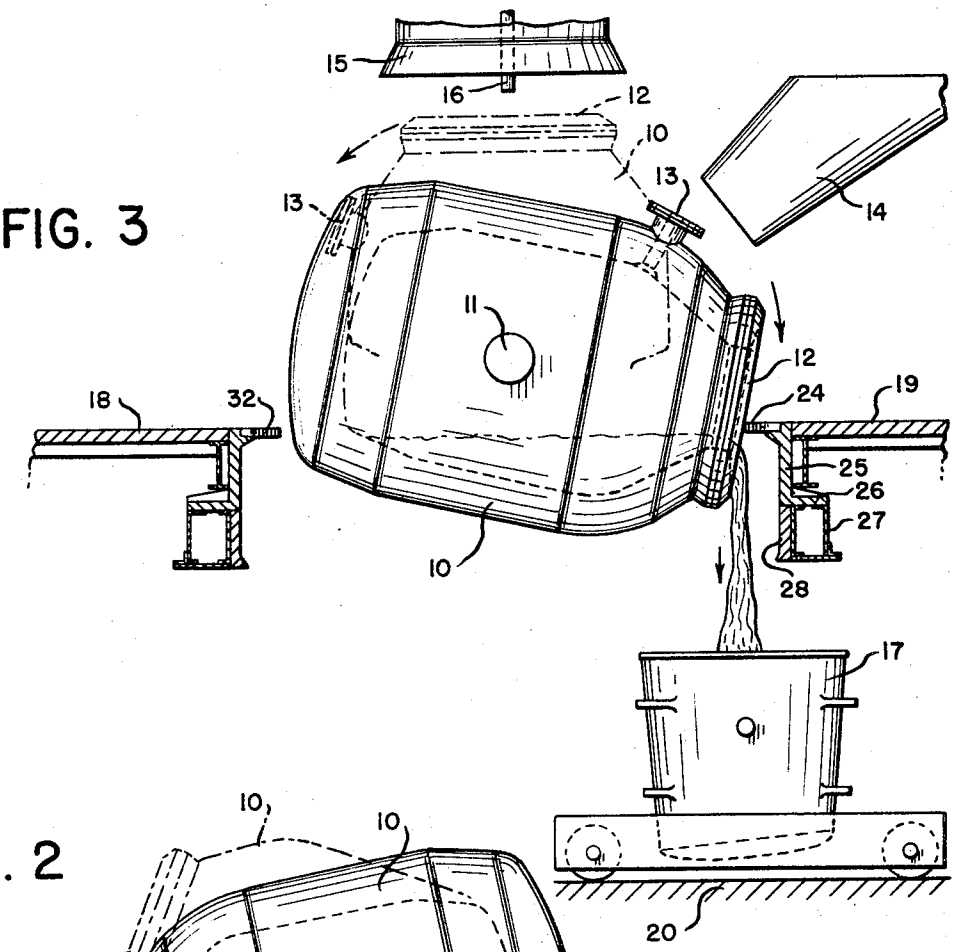
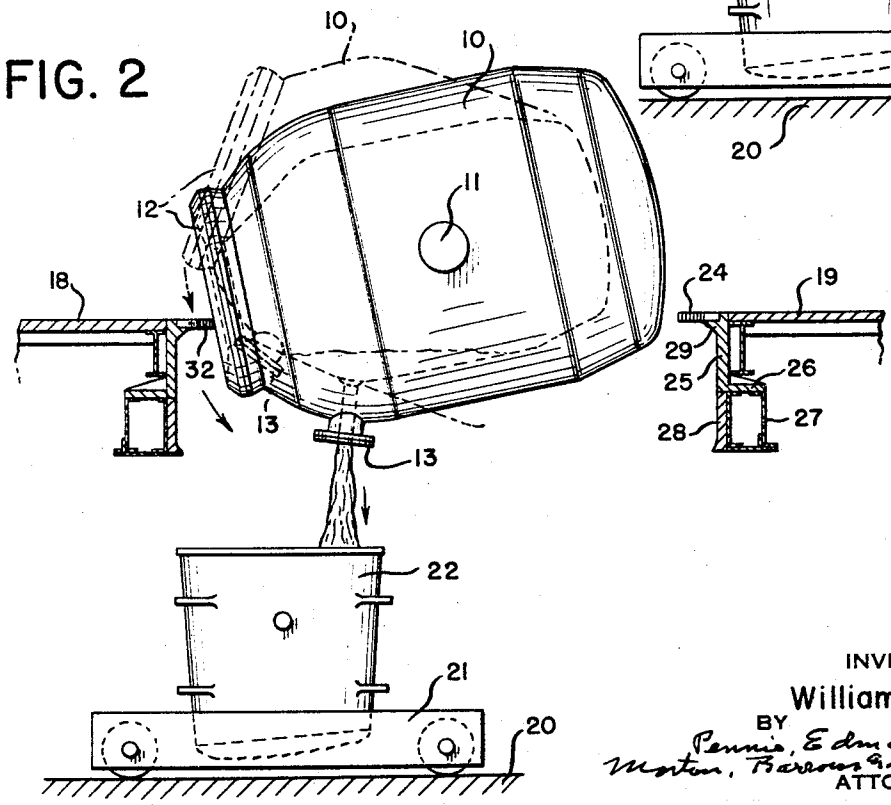


FIG. 2



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OXYGEN CONVERTER APPARATUS

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1 Claim. (Cl. 266—36)

This invention relates to oxygen converter apparatus for steel making, and especially to improvements in such apparatus for the purpose of protecting the floor on the sides of the converter from excessive heating and other deterioration caused by the falling of chunks of the hot incrustation or deposit of slag and steel which builds up on the charging mouth of the converter, and which separate therefrom and fall onto the floor during the turning of the converter towards the steel pouring position and towards the slag discharge position.

In accordance with the invention I provide two groups of heavy teeth mounted in stationary position and projecting close to the path of the rim of the charging mouth of the converter as it is turned on its horizontal trunnion bearings. The hot incrustations of slag and steel which form around the rim of the charging mouth are brought into engagement with these groups of teeth. One group is located on the right of the upright position of the converter which is the converting position. The other group of teeth is disposed on the left of the vertical position. By turning the converter in one direction a part of the deposit can be removed by one group of teeth, and the converter is then turned in the opposite direction, and more of the deposit is removed by the second group of teeth.

The invention will be described in greater detail in connection with the accompanying drawings in which,

FIG. 1 is a view partly in vertical section and partly in side elevation showing a converting apparatus including the improvements of the present invention;

FIG. 2 is a view similar to FIG. 1 showing the converter in a different position;

FIG. 3 is also similar to FIG. 1 and shows the converter in another position;

FIG. 4 is a vertical sectional view drawn to an enlarged scale, of the group of slag removing teeth at the right of the converter; and

FIG. 5 is a plan view of this same group of teeth.

The converter **10** is mounted to turn on a horizontal axis by means of conventional trunnions in bearings (not shown). The converter has a circular charging mouth having a conventional circular rim **12**. A steel pouring spout **13** is arranged at one side of mouth **12** and is shown at the left. Also at one side and shown at the right, is a charging chute **14** which is mounted on means (not shown) to move it into position to charge scrap iron or steel.

Converter **10** is in the upright position, shown in dotted lines in FIG. 3, during the converting process and in this position the charging mouth is directly beneath a stack **15** which carries away fumes and the products of combustion from the converting operation. Arranged at the center of this stack **15** there is a vertical pipe **16** called a lance from which oxygen is delivered under sufficient pressure to penetrate into the body of molten iron in the converter so as to convert the iron into steel.

The converter **10** is located in an opening in the floor which for convenience will be designated as parts **18** and **19**. At a lower level and extending beneath the converter is floor **20** on which a carriage **21** travels for moving the ladle **22** into position for receiving steel. When it is desired to discharge the converter **10** it is turned on the trunnions **11** in a counterclockwise direction, as

viewed in the drawings, to pour the steel out of spout **13** into the ladle **22**, as shown in FIG. 2.

After the pouring is finished, converter **10** is turned in the opposite or clockwise direction until the mouth is tilted to the position shown in FIG. 3 to discharge the slag which is formed on the surface of the steel during the conversion process into any suitable slag receiver, such as the ladle **17**.

In accordance with the invention a group of heavy teeth **24** is arranged at the approximate level of floor **19** and project towards the converter **10** close to the path of the rim **12** as the converter turns about its trunnions **11**. In order for the teeth **24** to have sufficient strength and ruggedness to withstand engagement with the incrustations of steel and slag on the rim **12** of the charging mouth, they are required to be of extremely heavy construction and advantageously can be made of steel or cast iron billets approximately 4″ x 4″ in cross-section and of conventional billet length.

The billet teeth **24** are secured in a support which is both rigid and rugged. This may comprise, for example, a vertical cast steel support **25** (FIG. 4) having a broad base section **26** which rests upon a box girder **27** made of suitable steel shapes. The forward portion of base **26** also rests upon a heavy steel plate **28** in front of girder **27** and vertically beneath the steel support **25**. A shelf **29** extends forward from the front surface of support **25** and is spaced from the upper edge of this casting by the thickness of the billet teeth **24**.

These teeth rest upon shelf **29**, being separated from one another by spacers **30**, and the teeth are welded, as shown for example, at **31** to both the shelf member **29** and the spacers **30**. The rear ends of teeth **24** are arranged in abutting relation to the extension of support **25** above shelf **29**. In plan view, the forward edges of teeth **24** are arranged, preferably, in a curved formation as shown in FIG. 5 to approximately correspond to the projected curvature of the charging mouth rim **12**.

A second group of heavy teeth **32** is arranged at the level of floor **18** at the left of converter **10**, these teeth being in all respects similar to the teeth **24** and supported in a similar way.

In the operation the converter **10** is first turned to the position shown in FIG. 1 to receive a charge of molten iron from a ladle and then the charging chute **14** is brought into position to charge the scrap iron or steel. This charge consists principally of molten cast iron and any desired percentage of steel scrap. After receiving the metal charge and slag-forming material the converter is turned to the upright or converting position with the mouth beneath stack **15** and oxygen is charged through lance **16** for an appropriate length of time.

After the conversion has been completed, the converter **10** is turned until its steel discharge spout **13** has reached the pouring position shown in FIG. 2 and the steel is poured into ladle **22**. The teeth **32** which are on the floor part **18** scrape off the incrustations on one side of the converter mouth rim as the converter is turned to and from the pouring position.

After the steel pouring is completed the converter is turned in the reverse direction through the upright position and to the slag pouring position of FIG. 3. The slag is discharged through the mouth of the converter, and some slag and steel are frozen on the rim **12** of the charging mouth and incrustations are also formed from the fumes and materials spewed out during conversion due to the violent reaction with the oxygen. The accumulated material is scraped off as the converter rim passes over the teeth **24**.

I claim:

1. In an oxygen converter apparatus, a converter having a discharging mouth and a discharge spout, the con-

verter being mounted to be turned about a horizontal axis from charging position to converting position and to steel discharging and slag discharging positions respectively, a floor having an opening therein in which the converter turns, groups of teeth mounted in stationary position at opposite sides of the floor opening and projecting close to the path of the charging mouth, and a horizontal support, below the floor level on which the teeth are mounted, the groups of teeth being disposed near the charging mouth to engage and dislodge material

deposited on the charging mouth when such charging mouth is moved to the latter two recited positions.

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