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GAS RETORT

Filed Feb. 4, 1931

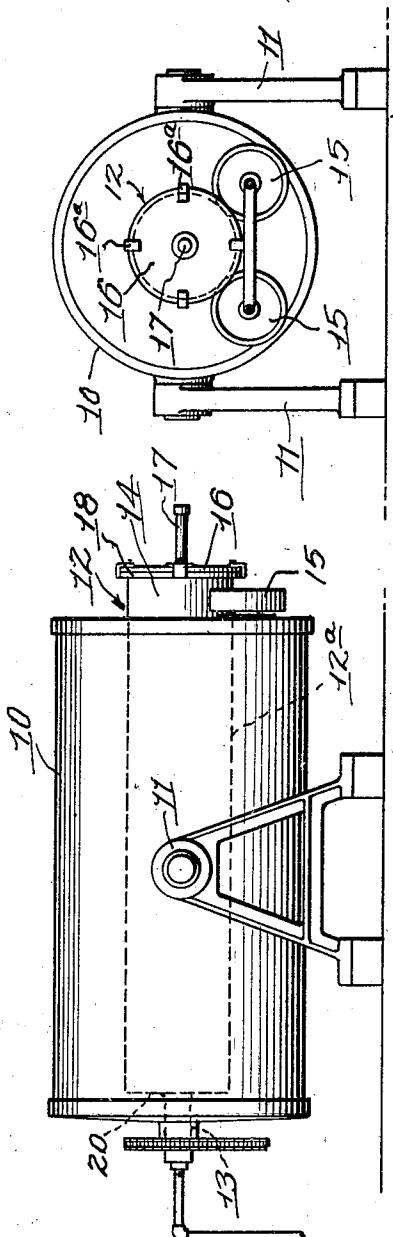


Fig. 1.

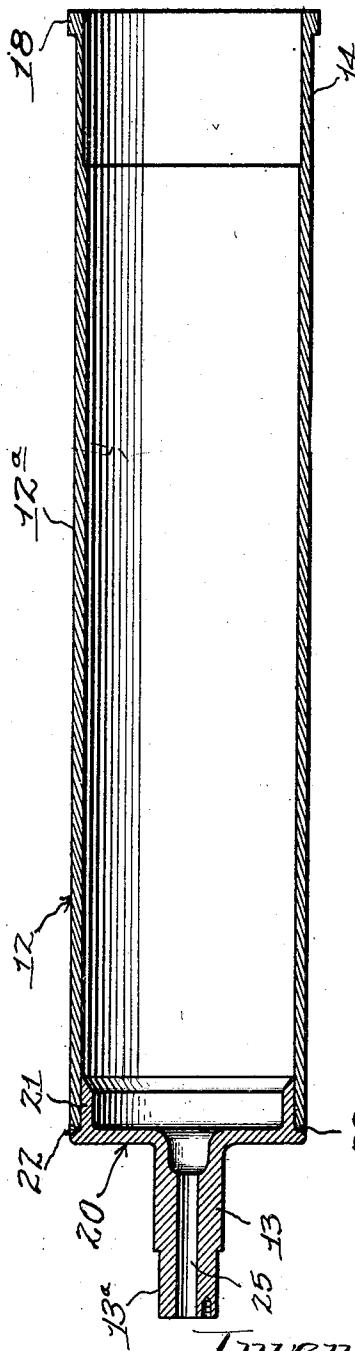


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE

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GAS RETORT

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This invention relates to improvements in rotary carburizing retorts, and more particularly to retorts of the character described, utilized in the gas carburizing process, and having an elongated cylindrical body and a longitudinally extending axially disposed bearing at one end.

Retorts of the type above described have heretofore been cast of a high heat-resisting alloy, and in their commercial form have presented considerable difficulties in manufacture. This is due largely to the fact that the castings must be impervious to the gases used in the gas carburizing process, as well as the gases of combustion used for heating the retort.

Heretofore the retorts have been cast in a single piece, including the cylindrical body portion and the end trunnion bearing extension. Such castings, however, present certain difficulties in that it is practically impossible to place and maintain the core so that the wall sections are of uniform section. Furthermore, there is a large loss of such castings due to shrinkage, cavities, cracks and imperfections, particularly at the relatively heavy sectional trunnion end.

The principal object of the present invention is to provide an improved construction for retorts of the form described above, wherein the cylindrical part and trunnion end piece are made separately, the first part by a centrifugal moulding process and the end piece by sand casting, and the two parts are welded together with a substantial joint at one end to form a retort which is much lighter in weight, making possible quicker penetration of heat which is applied to the outside of the retort, and requiring less power to drive the retort, than is possible with the older forms of integral sand-cast retorts.

The invention may best be understood by reference to the accompanying drawings, in which:

Figure 1 is a side view of a carburizing apparatus, illustrating the manner in which the retort is employed.

Figure 2 is an end view of the apparatus shown in Figure 1.

Figure 3 is an enlarged detail section of the improved form of retort embodying my invention, and with the end cover removed.

Referring now to details of the embodiment of my invention illustrated in the drawings, a carburizing furnace is indicated at 10, being mounted bodily on trunnions 11, 11, and having a retort 12 having its cylindrical body 12a extending longitudinally therethrough. Said retort is provided with a reduced trunnion bearing 13 at one end thereof, and having its opposite cylindrical end 14 projecting from the opposite end of the furnace and supported on a pair of bearing rollers 15, 15. A cover 16 is suitably engaged for detachable connection by clamps 16a, 16a to the projecting end 14 of the retort to permit entrance and removal of the material being carburized. A pipe 17 extends through the cover 16 for exhausting the gas from the retort.

Details of my improved retort are shown in Figure 3, in which it will be seen that the cylindrical body 12a is hollow throughout its length, and with its walls of substantially uniform thickness, excepting for a slightly reduced end portion 14 which extends beyond the furnace 10, and has a flange 18 to which the cover is clamped. The cylindrical body is made by a centrifugal casting process, which process permits the formation of relatively thin walls of uniform thickness, impervious to the escape of gases. The cylinder is cast with open ends, and is supported at one end on a trunnion piece 20 which has a cylindrical flange 21 fitting closely in the end of the cylinder, and a projecting shoulder 22 against which the end of the cylinder abuts. The parts are preferably secured together by welding in a continuous line around the joint between the end of the cylinder 12a and the shoulder 22 against which it abuts, as indicated at 23.

The trunnion piece 20 is preferably sand cast in the usual manner. It carries the trunnion bearing 13 integral therewith, and a reduced portion 13a which is adapted to carry a suitable drive pinion (not shown) by which the retort is rotated during operation in the usual manner. A passage 25 extends axially

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through the trunnion bearing as shown, to conduct the carburizing gas to the interior of the retort.

It will now be understood that by the two-part construction described, it is possible to obtain the benefits of the centrifugal casting process, which process, however, could not be utilized to produce the entire retort in a single piece. By the novel method of supporting port and jointure with the separate end bearing piece as described, a much lighter, more impervious and generally more satisfactory retort is obtained.

Although I have shown and described one particular embodiment of my invention, it will be understood that I do not wish to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of my invention.

I claim as my invention:

1. As an article of manufacture, a rotary retort made up of a cylindrical body section and a separately cast end section including an axially projecting trunnion bearing and a drive connection for rotating said retort, said end section having an annular flange fitting in supporting engagement within one end of said body section, and a contiguous upstanding shoulder against which the end surface of said body section abuts and is welded thereto in a continuous line around the periphery of said retort.
2. As an article of manufacture, a rotary retort made up of a cylindrical centrifugally cast body section having walls of substantially uniform thickness through its length, and a separately cast end section including an axially projecting trunnion bearing and a drive connection for rotating said retort, said end section having an annular flange fitting in supporting engagement within one end of said body section, and a contiguous upstanding shoulder against which the end surface of said body section abuts and is welded thereto in a continuous line around the periphery of said retort.
3. The method of making a rotary retort, which consists in forming separately a cylindrical centrifugally cast body section having walls of substantially uniform thickness throughout its length, and a cast end section having an axially projecting trunnion bearing and an annular supporting flange, and then fitting one end of said body section in supporting engagement upon said supporting flange and welding the parts together in a continuous line around the extreme end of said body section.

Signed at Springfield, Ohio, this 31st day of January, 1931.

FRANK K. ZIEGLER.