Sept. 2, 1930. R. H. WAGER 1,774,859

COMBUSTION BAFFLE

Filed April 12, 1928 2 Sheets-Sheet 1

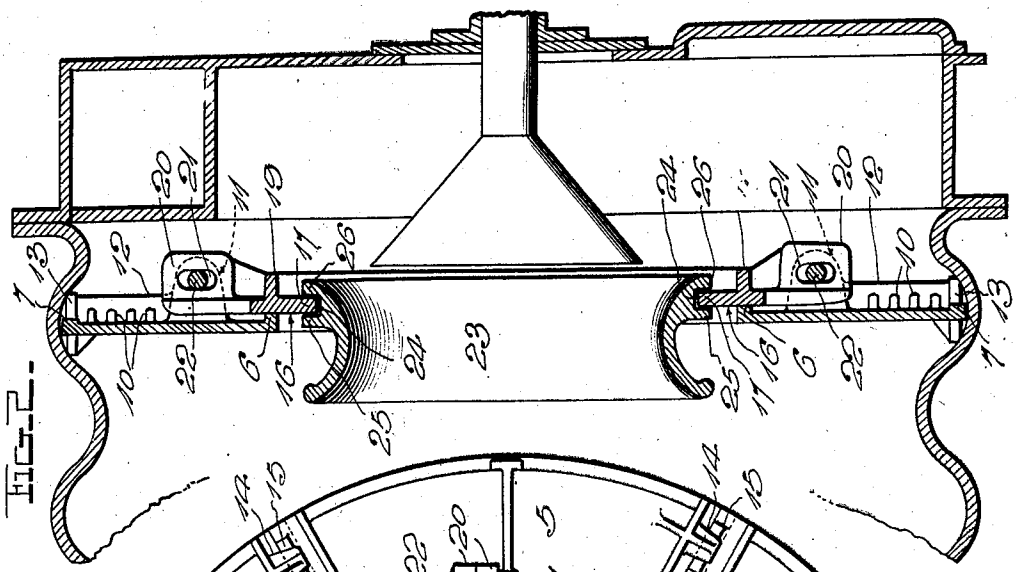


Fig. 2.

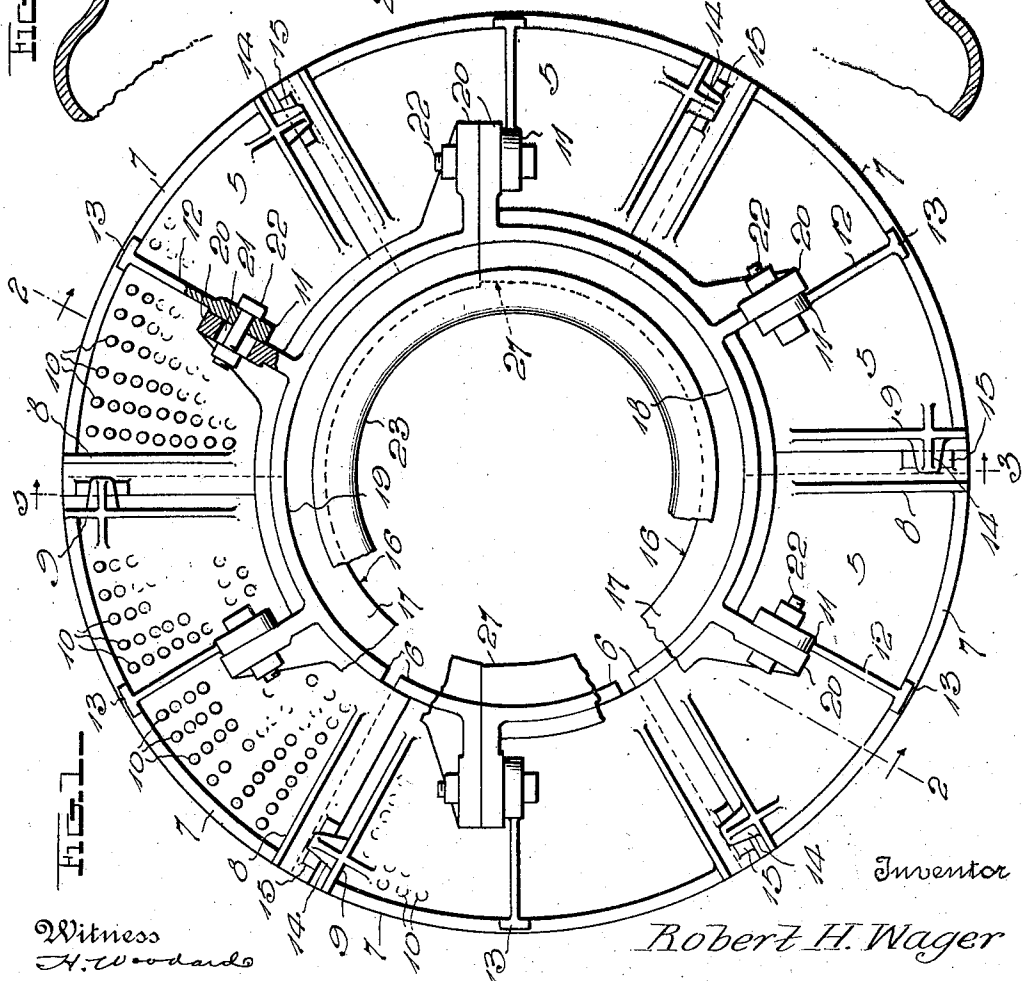


Fig. 1.

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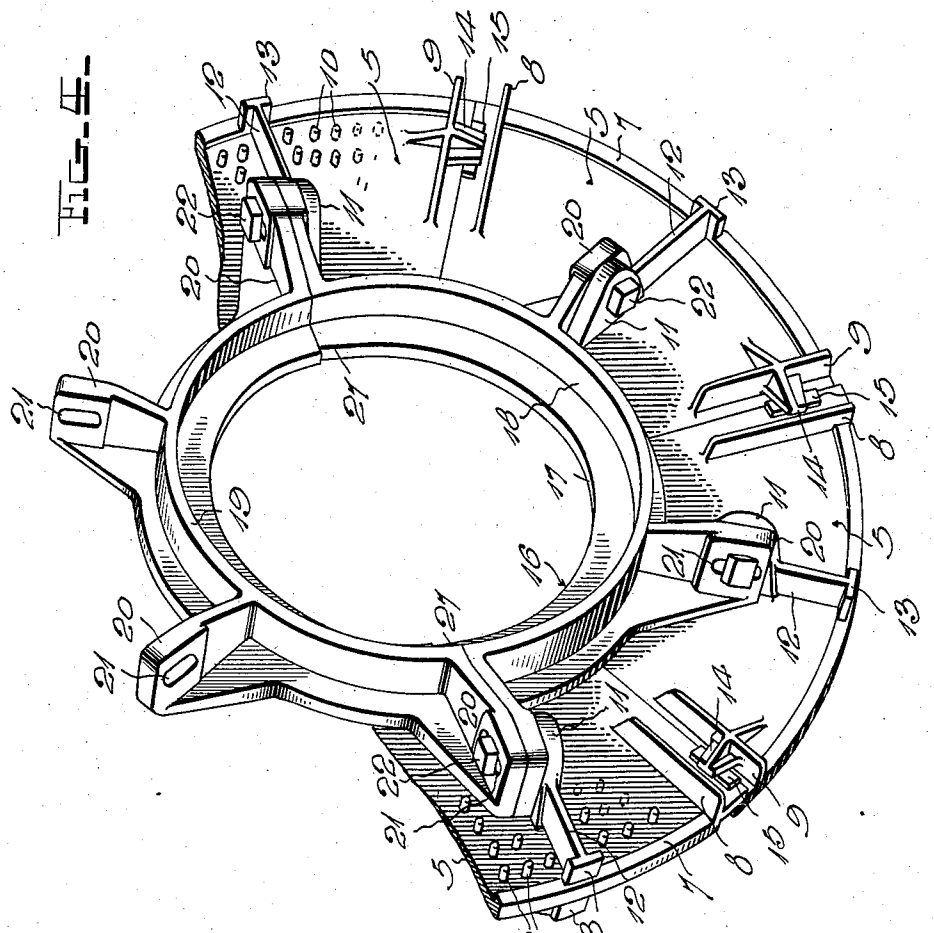


Fig. 5.

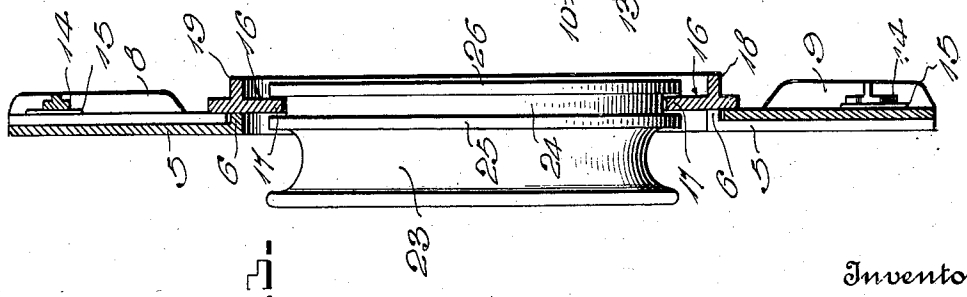


Fig. 7.

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UNITED STATES PATENT OFFICE

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COMBUSTION BAFFLE

Application filed April 12, 1928. Serial No. 269,472.

In converting boiler furnaces, particularly those of marine boilers, for burning oil, it is customary to mount a brick or a metal combustion baffle in the front portion of the furnace to form one side of the air chamber containing the ingoing air for mixing with the oil sprayed from the burner. In recent years, one particular sectional metal baffle has gained well deserved prominence, for such reasons as the speed and ease with which it is applicable and removable, its general efficiency, and its comparatively low cost. This baffle comprises segmental baffle plates overlapped in an annular series, and a one-piece throat ring having projecting lugs bolted to lateral lugs on said baffle plates, and while this construction is of advantage for numerous reasons, the throat ring cracks badly after a short period of use under the various degrees of expansion and contraction to which it is subjected. It has been my object to overcome this difficulty, and in so doing, I have devised a novel construction hereinafter described and claimed and shown in the accompanying drawings. This construction has been continuously used simultaneously in as many as eighteen boiler furnaces for a period of eight months, with no signs of cracking, whereas the baffles to which I have previously referred, often have a life of no more than two or three weeks, before cracking of the throat rings.

Fig. 1 of the accompanying drawings, is a front elevation partly broken away and in section of a combustion baffle constructed in accordance with my invention.

Fig. 2 is a sectional view substantially on line 2—2 of Fig. 1, showing the baffle installed in a Scotch marine boiler.

Fig. 3 is a vertical sectional view substantially on line 3—3 of Fig. 1.

Fig. 4 is a perspective view partly broken away and in section.

In the drawings above briefly described, illustrating the preferred form of construction, the numerals 5 denote a plurality of segmental baffle plates disposed in an annular series and preferably provided at their inner and outer edge portions with reinforcing ribs 6—7 respectively, both disposed at one side of said plates. Then too, the ends of the plates 5, which ends overlap each other, are provided with radial ribs 8—9 which both reinforce said plates and serve somewhat as heat radiating and hence cooling means. To additionally radiate heat and cool the plates, they are preferably provided with projecting studs 10. The intermediate portions of these plates are provided with laterally projecting lugs 11 disposed substantially in radial planes, and extending outwardly from these lugs, additional ribs or webs 12 are provided, having the same functions as the parts 8—9. At the outer ends of the ribs or webs 12, oppositely projecting feet 13 have been shown on the plates 5. Ordinarily, the outer peripheral edges of these plates are seated in one of the corrugations of a boiler furnace as shown in Fig. 2. In such case these plates are liable to slant from the perpendicular position that they should retain, the feet 13 are then instrumental in properly centering and holding the baffle in the desired position.

One end of each plate 5 is provided with an intergral projecting finger 14 which, in the present showing, is integral with the rib 9. The adjacent end of the next plate is slidably received between this finger and the plate end by which said finger is carried, and the plate portion with which the finger contacts, is preferably thickened somewhat as at 15, for reinforcing purposes. This relation of parts prevents relative warping of the plates 5 and the consequent existence of spaces between them which would conduct air where not wanted.

All of the structural features 6—7—8—9—10—11—12—14, are disposed at the front sides of the plates 5 and are hence subjected to the comparatively cool air entering from the usual furnace front. Hence, the plates are kept comparatively cool with obvious advantages.

A plate-connecting ring 16, preferably of T-shape in transverse section, is disposed at and contacts with the front sides of the plates 5, and this ring projects inwardly at 17, beyond the inner peripheral edges of said plates 5. This ring 16 is formed of two arcuate sections 18—19, the former being preferably

somewhat greater than a semi-circle while the latter is correspondingly less than a semi-circle. These ring sections 18—19, are provided with peripheral lugs 20 having longitudinal slots 21 and adapted for connection with the lugs 11 of the plates 5, bolts 22 being provided for securing the two sets of lugs together. Certain of the lugs 20 are disposed at the ends of the ring sections 18—19 and hence certain of the bolts 22 not only secure these lugs to the adjacent lugs 11, but secure said ring sections together.

The parts so far described, or their equivalents, constitute a sectional, annular combustion baffle, and with this baffle, I make use of a throat ring 23 which is preferably of one-piece formation and may be of metal, fire clay, brick or other desired material, whereas the plates 5 and the plate-connecting means 16, etc., are in all instances of metal construction. The throat ring 23 may well be defined as a floating ring, in that it is only loosely connected with the annular baffle and is structurally independent of all parts of this baffle. The ring 23 and the annular baffle are provided with co-acting portions, which while holding the throat ring 23 against displacement, permit unhampered expansion and contraction of this ring without exerting any force against the ring 16 or other portion of the baffle, tending to produce cracking or other injurious strain. In the present disclosure, the periphery of the throat ring 23 is provided with a continuous groove 24 between two annular ribs 25—26, said groove loosely receiving the inner edge portion 17 of the plate-connecting ring 16. The clearance between the ring 16 and the throat ring 23, is such that said throat ring may move in numerous directions under expansion and contraction and may even move in a circumferential direction should it have any tendency to do, and these free floating movements of the ring 23, are one of the most essential features of my invention. In the devices which I have successfully used for long periods of time and under very trying conditions, it is the free floating movements of this throat ring 23 and the construction of this ring independently of the plate-connecting ring 16, to which I attribute the success of the improved construction. However, the floating throat ring is also advantageous in connection with annular baffles whose details of construction are other than those herein disclosed.

In mounting the device in a furnace, the four lowermost plates 5 are placed in position and the lower section 18 of the ring 16 is bolted to them. Then, the throat ring 23 is set in place and the remainder of the plates are placed, there being sufficient sliding of these plates with regard to each other, to allow easy insertion of the last one. When now the upper section 19 of the ring 16 is properly positioned and bolted to the upper plates and to the uppermost of the first applied plates, the structure is in readiness for use. It will hence be seen that it may be installed quickly and easily, and may be removed with equal ease. I have hereinbefore stated that the section 19 is preferably less than a semi-circle, whereas section 18 is greater than a semi-circle. This is done in order that the upper section may be more readily inserted and removed than would otherwise be possible. Because of the fact that the lower section 18 is more than semi-circular, it is usually necessary to cut away portions of its ends as indicated at 27, to prevent them from striking diametrically opposite parts of the throat ring 23, when inserting and removing the latter.

Obviously, the slots 21 and the slidable connections between the plates 5, not only permit easy assembly and disassembly of parts, but allow slight variance in the diameter of the baffle to permit of its use with furnaces of slightly different diameters.

The details herein disclosed are those which I have found to be successful in all respects, and while these details are preferably followed, I again direct attention to the fact that within the scope of the invention as claimed, variations may be made.

I claim:

1. A combustion baffle comprising baffle plates, means connecting said baffle plates to jointly form an annular baffle, and a floating throat ring structurally independent of said plates and said plate-connecting means, and loosely supported by said annular baffle.

2. A combustion baffle comprising baffle plates, a plate-connecting ring connected to said plates to provide an annular baffle, and a floating throat ring structurally independent of said plates and said plate-connecting ring, and loosely supported by said plate-connecting ring.

3. A combustion baffle comprising baffle plates, means connecting said plates to provide an annular baffle, and a floating throat ring structurally independent of said annular baffle and said plate-connecting means, and loosely surrounded by said annular baffle, said throat ring and said annular baffle having co-acting portions for loosely holding the ring against dislocation.

4. A combustion baffle comprising baffle plates, a plate-connecting ring connected to said plates and extending inwardly beyond the inner peripheral edges thereof, and a floating throat ring structurally independent of said plates and said plate-connecting ring, and loosely surrounded by said plate-connecting ring, said throat ring and said plate-connecting ring having co-acting portions for loosely holding said throat ring against displacement.

5. A combustion baffle comprising baffle

plates, means connecting said baffle plates to provide an annular baffle, and a floating throat ring structurally independent of said plates and said plate-connecting means, said throat ring having a peripheral groove loosely receiving the inner peripheral edge of said annular baffle.

6. A combustion baffle comprising baffle plates, a plate-connecting ring connected to said plates to provide an annular baffle, said ring extending inwardly beyond the inner peripheral edges of said plates, and a floating throat ring structurally independent of said plates and said plate-connecting ring, and loosely surrounded by said plate-connecting ring, said throat ring having a pehipheral groove loosely receiving the inner peripheral edge of said plate-connecting ring.

7. A combustion baffle comprising an annular series of slidably overlapped segmental baffle plates, said plates having lateral lugs at one side, a plate-connecting ring disposed at said side of said plates and spaced inwardly from said lugs, said ring being divided into arcuate sections and having radial lugs overlapping the lugs of said plates, and bolts securing the lugs of the plates and ring together, certain of the lugs of said ring being disposed at the ends of the ring sections, whereby certain of said bolts secure said ring sections together.

8. A combustion baffle comprising an annular series of slidably overlapped segmental baffle plates, said plates having lateral lugs at one side, a plate-connecting ring disposed at said side of said plates and spaced inwardly from said lugs, said ring being divided into arcuate sections and having radial lugs overlapping the lugs of said plates, bolts securing the lugs of the plates and ring together, certain of the lugs of said ring being disposed at the ends of the ring sections, whereby certain of said bolts secure said ring sections together, and a floating throat ring loosely surrounded by said plate-connecting ring and having a peripheral groove loosely receiving the inner peripheral edge of said plate-connecting ring.

9. In a combustion baffle; a circular structure comprising plates which are segments of a circle, slidably interfitting means connecting the ends of said plates and of a length permitting temporary circumferential crowding of the plates so that the final plate can be inserted, and means for holding all plates in position when said temporary crowding is relieved and the plates disposed at their proper relative positions.

10. A combustion baffle comprising an annular series of slidably overlapped segmental baffle plates, said plates having lateral lugs at one side, a plate-connecting ring disposed at said side of said plates and spaced inwardly from said lugs, said ring being divided into arcuate sections and having radial lugs overlapping the lugs of said plates, bolts securing the lugs of the plates and ring together, certain of the lugs of said ring being disposed at the ends of the ring sections, whereby certain of said bolts secure said ring sections together, and a floating throat ring loosely surrounded by said plate-connecting ring and having means engaging opposite sides of said plate-connecting ring to hold said floating ring in assembled relation with said baffle plates and connecting ring.

11. In a furnace combustion baffle, a floating throat ring, a sectional supporting ring assembled around said floating throat ring and having only such connection with the latter as to permit floating thereof, and an annular baffle supporting said supporting ring.

12. In a furnace combustion baffle, a one-piece floating combustion ring, a sectional supporting ring for said combustion ring assembled around the latter and having only such connection therewith as to permit floating thereof, and an annular baffle supporting said supporting ring.

13. A structure as specified in claim 11; the connection between said supporting ring and said throat ring consisting of opposed circumferentially extending shoulders on the one ring between which a portion of the other ring is received.

14. A combustion baffle having an opening of circular outline and a throat ring loosely mounted within said opening and free to float circumferentially therein.

15. A combustion baffle having an opening, and a throat ring extending along the wall of said opening, said baffle and ring having co-acting portions loosely mounting said ring and allowing it to float circumferentially.

In testimony whereof I have hereunto affixed my signature.

ROBERT HUDSON WAGER.