

April 15, 1930.

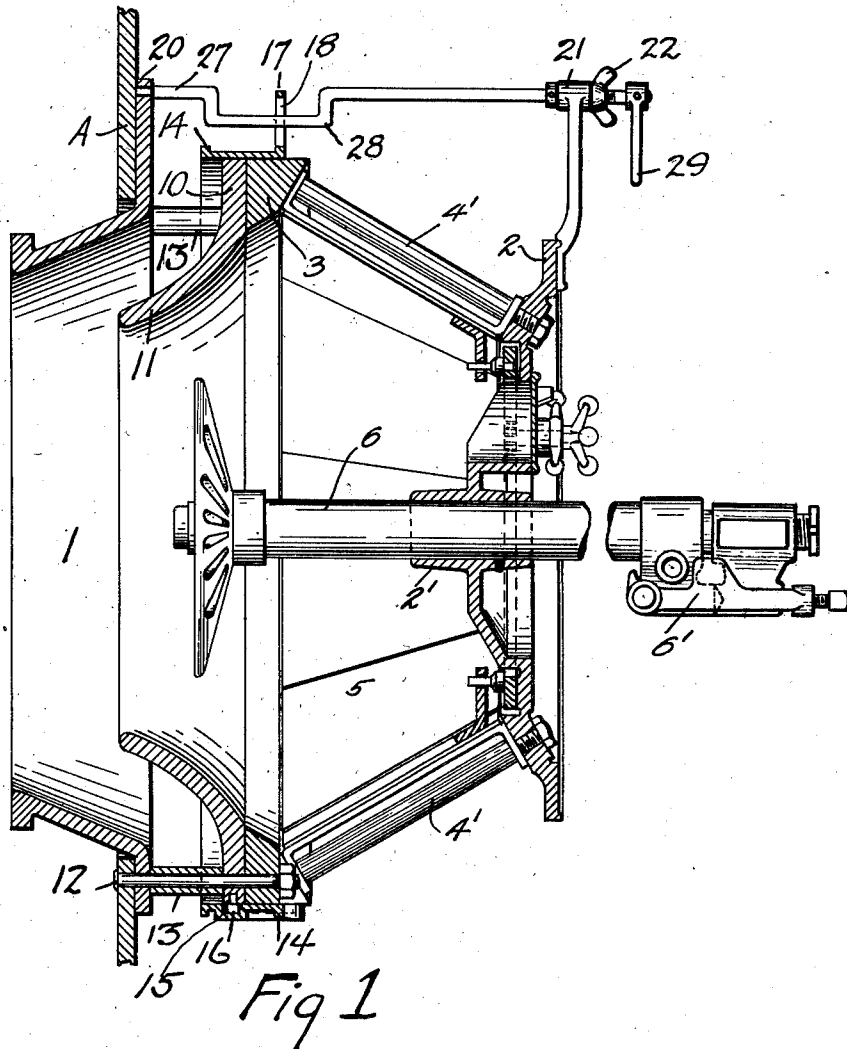
E. H. PEABODY

1,754,433

DOUBLE PORTED REGISTER FOR FUEL BURNERS

Filed Jan. 8, 1923

2 Sheets-Sheet 1



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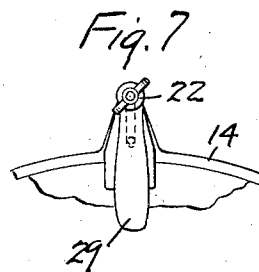
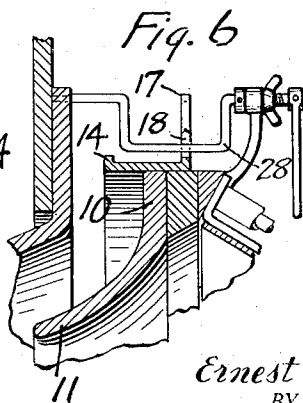
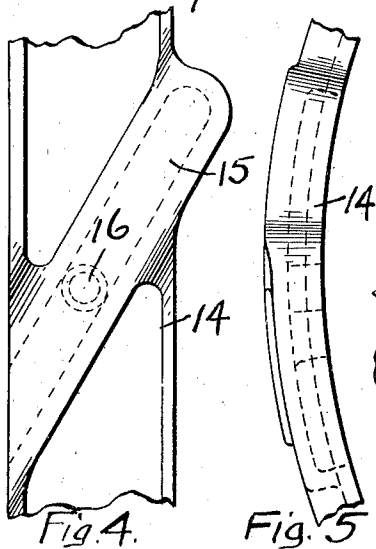
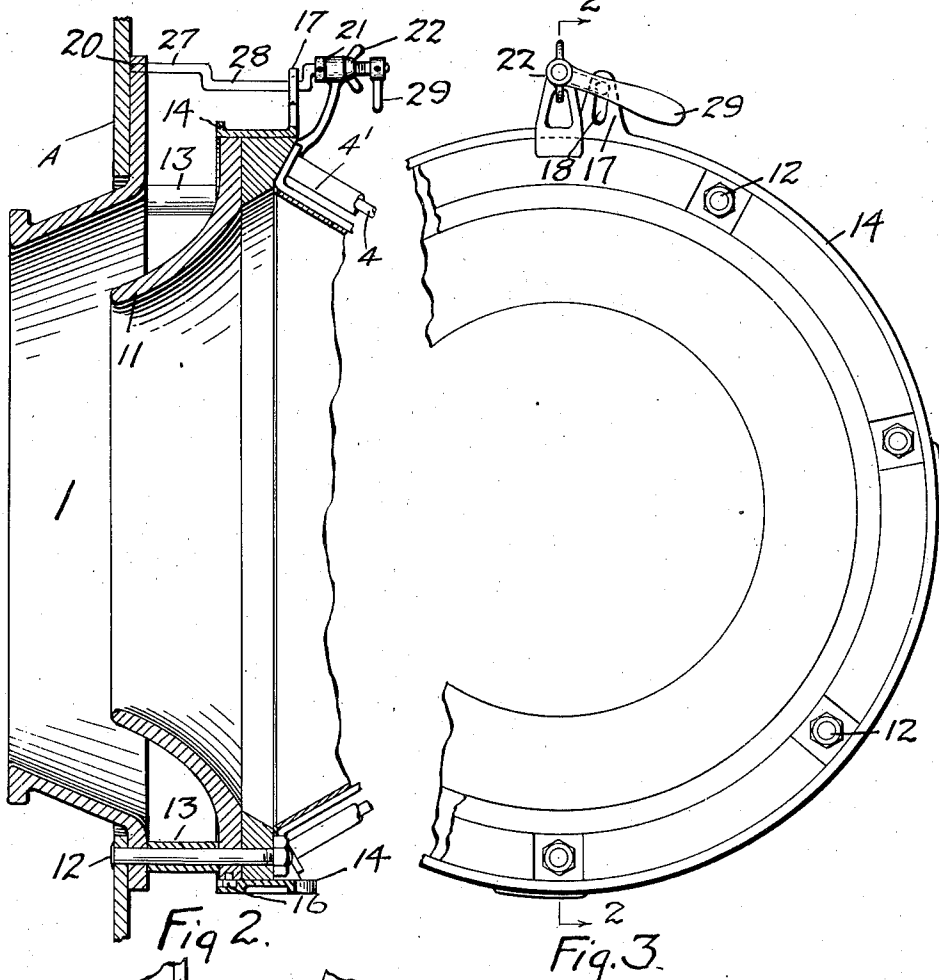
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DOUBLE PORTED REGISTER FOR FUEL BURNERS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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DOUBLE-PORTED REGISTER FOR FUEL BURNERS

Application filed January 8, 1923. Serial No. 611,410.

This invention relates to oil burning equipment, particularly of the type where air is admitted to, and around a conical spray of liquid; and has for its object to provide a device by which the maximum efficiency may be obtained over a very wide range in capacity, that is, from very low loads to very high loads.

It is readily understood that the amount of air admitted around the oil spray, depends upon the area of air opening, or the resistance of the so called air register, and also the pressure or draft, under which the air is forced into the oil spray. I have found that in order to secure the continuous and even mixture of the necessary amount of air for consuming the fuel, that certain velocities of air are required which cannot be reduced below a certain minimum. In other words, the air supply must be directed into, and around the oil spray with sufficient velocity to insure the mixture. The air cannot be allowed to merely drift into the furnace through a large opening, for the reason that if this is done, a certain proportion of the air will not be mixed with the oil spray, and the mixture will be uneven and irregular and may result in setting up pulsation in the fire. Therefore, it is not possible to secure good results by making the air ports of the register too great in area. On the other hand it is very desirable to be able to burn as large a quantity of oil as possible with a minimum draft pressure, and therefore it is desirable to make the air ports large, and in this way cut down the resistance to the flow of the air. I have found that the area of the opening, through which the oil spray and the air pass into the furnace at low loads, has a definite limitation.

This same area may be employed at the higher capacity also, and it is obvious that if the area of the air port and air passage into the furnace be limited, a very considerable increase of the air pressure is necessary at the higher loads.

In order to meet this condition, I have devised an apparatus whereby the maximum opening may be maintained for the low loads, and in which a secondary air opening may be provided for, supplementing or increasing

the area of the opening into the furnace at the high load, and thus realize a very much higher rate of combustion, while at the same time keeping the air pressure at a lower point than would be possible otherwise.

In my device, I use an air register of standard type for controlling the admission of air into the passage adjacent to the atomizer. This air register is used for the lower loads and as soon as it is desired to increase the capacity, the secondary air port is opened, admitting an additional air supply which flows in around the smaller opening into the passage way which leads to a larger opening. The two sizes of openings further enable the operator to burn a very large quantity of oil at the maximum rates, with a moderate air pressure, while by closing the secondary air port the smaller opening is available at the low loads.

The foregoing and other features of my invention will now be described in connection with the accompanying drawings forming part of the specification in which I have represented my double ported air register in one of its applications, after which I will point out in the claims those features which I believe to be new and of my own invention.

In the drawings:

Figure 1 is a sectional elevation of a mixing chamber and air register with my supplementary port interposed therebetween.

Figure 2 is a similar section with the supplemental air port entirely open, the section taken along the line 2—2 of Figure 3.

Figure 3 is a front view of my supplemental port ring with the air register removed.

Figures 4 and 5 are details of the closing ring I employ.

Figures 6 and 7 are details of apparatus for actuating the closing ring.

Referring to the drawings, the letter "A" designates a portion of a furnace wall to which is secured a frusto conical member 1 constituting the throat of the furnace and providing a mixing chamber for the fuel and air. This member has a flange which is adapted to bear against the front wall. Supported in axial alinement with the throat is an air

register preferably of the type described in my Patent No. 1,527,214 granted February 24, 1925. As here shown, the register comprises a front plate 2 and a back plate 3 held together by bolts 4, so that they are spaced apart a definite distance and held firmly in alinement. Upon the bolts are mounted pipe spacers 4' serving as supports for doors 5 which are hinged thereon. These doors are provided with means for moving them simultaneously from an open to a closed position or vice versa. The object of the air register is to deliver the air for combustion to the burner in proper amount with the desired velocity and with a whirling motion, as fully described in my said patent to which reference may be made.

The front plate is formed with a bearing 2' in which is supported a fuel burner 6. This burner, and detachable coupling 6', may be of the type described in my Patents No. 1,523,079 granted January 13, 1925, and No. 1,628,424 granted May 16, 1927, to which reference may be made for a more complete description.

Secured to the back plate 3 is an annular ring 10 having a frusto conical extension 11 projecting into the furnace throat as shown in Figs. 1 and 2. The back plate 3, ring 10 and member 1 are secured together and to the furnace front plate "A" by bolts 12. Pipe spacers 13 surrounding the bolts 12 hold the ring 10 and its extension 11 in spaced relation to the furnace throat.

The space between the wall of the throat and the frusto conical extension 11 provides an annular opening for the admission of additional air for combustion when desired or necessary. For the purpose of regulating or controlling the amount of such additional air I mount upon the back plate 3 and ring 10, and in slidable engagement therewith, a damper in the form of an annular ring 14 of such width as to completely close the supplemental air passage or to open such passage more or less.

To effect the desired movement of the damper 14 it is formed with a series of diagonally disposed slots 15, into which project studs 16 secured to the ring 10. The damper 14 is also provided with an extension 17 having a slot 18. Mounted in suitable bearings 20 and 21 is a shaft 27 having a thumb nut 22 to lock it in any adjusted position. A handle 29 enables the shaft 27 to be turned in either direction. The shaft 27 has an offset or crank section 28 which passes through and bears against the wall of slot 18 in the extension 17 so that a rotary movement, in one direction or the other, will be imparted to the damper 14 when the shaft is turned. At the same time a forward or rearward movement will be imparted to the damper due to the pressure of the walls of the slot 15 against the fixed studs 16.

I wish it distinctly understood that my double ported register herein described and illustrated is in the form in which I desire to construct it and that changes or variations may be made as may be convenient or desirable without departing from the salient features of my invention and I therefore intend the following claims to cover such modifications as naturally fall within the lines of invention.

I claim:

1. In a fuel burning apparatus the combination of an atomizer, a substantially frusto conical mixing chamber, an air register, a frusto-conical ring located between the air register and the mixing chamber, fastening means connecting the mixing chamber, ring, and air register, spacing means carried by said fastening means for maintaining the ring and mixing chamber in spaced relation, and means for controlling the entrance of air between the mixing chamber and the ring.

2. In a fuel burning apparatus the combination of an atomizer, a substantially frusto-conical mixing chamber, an air register, a frusto-conical ring located between the air register and the mixing chamber, fastening bolts connecting the mixing chamber, ring and air register, spacing sleeves carried by said bolts for maintaining the ring and mixing chamber in spaced relation, and a sliding cylindrical member for controlling the entrance of air between the mixing chamber and the ring.

3. In a fuel burning apparatus the combination of an atomizer, a substantially frusto-conical mixing chamber fitting into an opening in the furnace front plate, an air register, a frusto-conical ring located between the air register and mixing chamber and extending into the space bounded by the latter, means passing through the air register, ring, mixing chamber and furnace front plate for holding the parts in assembled relation, spacing means for maintaining a passage between the mixing chamber and the ring, and means for controlling the flow of air through said passage.

4. In an oil burning apparatus the combination of a furnace having a substantially frusto-conical mixing chamber with the small end adjacent the furnace, an air register, a conical annular ring interposed between the mixing chamber and the air register, and independently operable means for controlling the flow of air through the space between the annular ring and the mixing chamber and through the air register.

5. In an oil burning apparatus the combination of an atomizer, an air register adapted to control the flow of air adjacent the atomizer for ordinary loads, a furnace having a mixing chamber, a substantially frusto-conical annular ring in spaced relation to the wall of the mixing chamber and with the

smaller end projecting into the mixing chamber to provide a supplemental passage for additional air for high loads, and independent means for controlling each air supply.

5 6. In a fuel burning apparatus the combination of fuel admission means, a furnace having a substantially frusto conical mixing chamber, an air register adapted to deliver air adjacent to the fuel admission means, a substantially frusto conical flange extending
10 into the mixing chamber and forming with the wall of the mixing chamber a supplemental air port adapted to deliver air around and in front of the fuel admission means,
15 and rotatable and slidable means for controlling the passage of air through said port.

7. In combination with a furnace having a frusto conical throat, an air register and means for supporting the same in front of
20 said throat, a frusto conical member secured to said register and projecting into the furnace throat in spaced relation thereto to provide a supplemental air passage between the throat and said member, a damper mounted
25 on said register, and means for moving said damper to control the flow of air through said passage.

In testimony whereof I affix my signature.
ERNEST H. PEABODY.

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