H. O'NEILL AND E. FANDRICH.

FUEL BURNER.

APPLICATION FILED JUNE 1, 1918.

1,429,090. Patented Sept. 12, 1922.

Fig. 1.

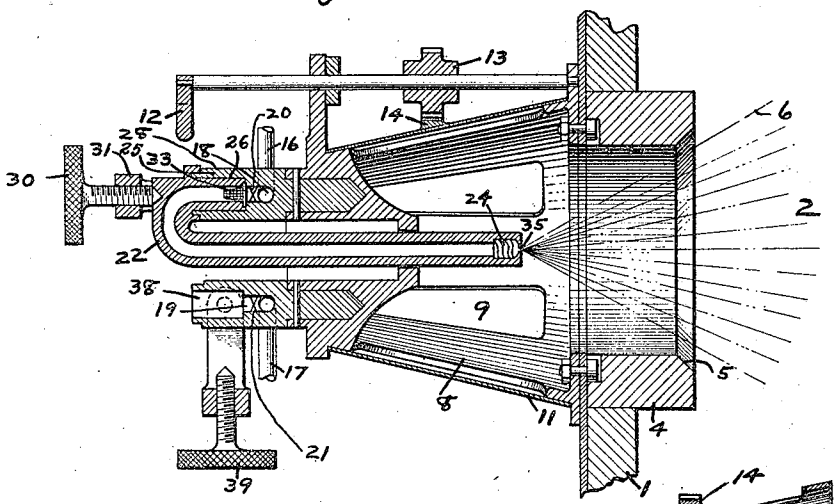
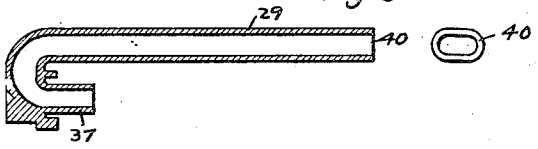


Fig. 3.



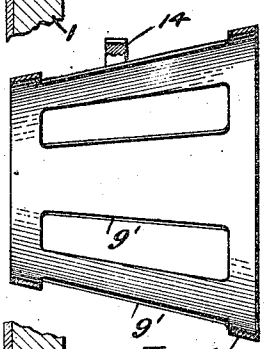
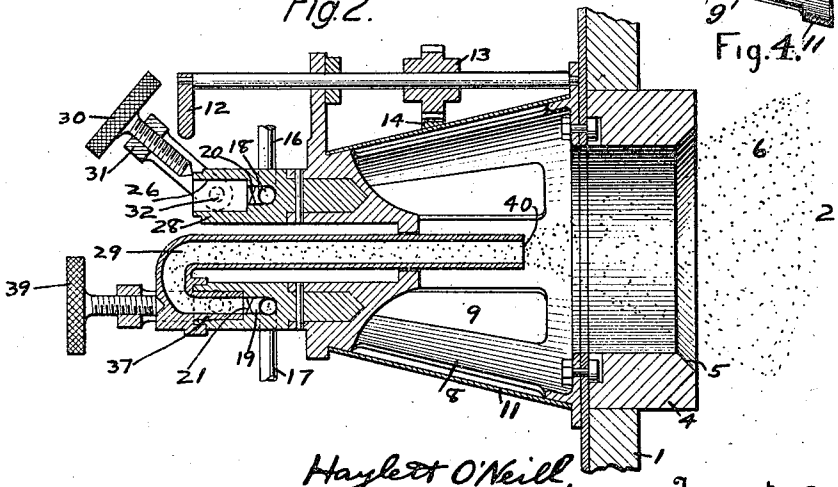


Fig. 4.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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FUEL BURNER.

Application filed June 1, 1918. Serial No. 237,707.

To all whom it may concern:

Be it known that we, HAYLETT O'NEILL and ERNEST FANDRICH, both citizens of the United States, and residents of Larchmont, Westchester County, New York, and Schenectady, Schenectady County, New York, respectively, have invented an Improvement in Fuel Burners, of which the following is a specification.

This invention relates to fuel burners, and with regard to certain more specific features, to an apparatus for utilizing more than one fuel in a single furnace.

Among the several objects of the invention may be noted the provision of devices for delivering more than one kind of fuel to a single combustion chamber, and in certain cases to substantially the same portion of the combustion chamber; the provision of quickly detachable and readily interchangeable parts permitting the delivery to a single combustion chamber of one or another fuel at will, without shutting down the furnace to make the change, and without appreciable loss of time; and the provision of apparatus of this type permitting the effective combustion, throughout an entire furnace, of one or another fuel whereby the fuel most readily available may be burned and economies effected thereby, without loss of time in effecting the transfer from one fuel to another and without material reduction of the furnace capacity during the burning of any of the fuels. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, steps and sequence of steps, and arrangement of parts which will be exemplified in the structure hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which is shown one of various possible embodiments of this invention,

Figure 1 is a sectional elevation of a portion of a furnace, showing part of the combustion chamber and one form of our invention applied thereto. In this figure the furnace is shown arranged for the delivery of fuel such as oil.

Figure 2 is a similar view of the same furnace, showing the parts arranged for the delivery of another fuel, such as powdered coal, thereto.

Figure 3 is a sectional elevation and fragmentary end view of the detachable part shown in Figure 2 for delivering coal to the combustion chamber.

Fig. 4 shows a frusto-conical member having ports therein for regulating the admission of air to the burner.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

In considering this invention in its relation to the prior art, it may be noted that for some time past there has been great loss of efficiency and availability of furnaces, particularly those on ships, because of the scarcity of one or another kind of fuel at various places and the impracticability of converting the furnaces to the use of a cheaper fuel without rendering them substantially useless for subsequent burning of the fuel for which they were originally designed without further reconstruction of the furnace, expense and delay. Oil, for example, is shipped many thousand of miles to serve oil-burning ships, although other fuels less expensive and more easily obtainable cannot be utilized because the oil-burning furnaces are not adaptable to other fuels without such reconstruction as would make them expensive to convert and likewise expensive to reconvert to oil later, not to mention the disadvantages of the delay incident to such changes. Again, ships that burn oil while at sea likewise burn oil while at dock because their furnaces can burn nothing else, whereas powdered coal or other fuel that might be less advantageous at sea is more advantageous at dock but cannot be used because the furnaces cannot readily be adapted to it and later changed back for the burning of oil. As the description progresses, it will be seen that with the apparatus of the present invention, the disadvantages of burning a single fuel at all times in a furnace are avoided, and that the desiderata of maximum utility and economy under widely varying conditions of service of a furnace are attained.

Referring now to the accompanying drawings, and more particularly to Figures 1, 2 and 3 thereof, there is illustrated at 1 a portion of the wall of a furnace, of which the combustion chamber is indicated at 2. Extending into the combustion chamber is

a wall 4, preferably cylindrical and having its inner edge beveled as at 5 to permit the desired divergence of the inducted fuel. This fuel enters the combustion chamber 2 in the general form of a cone, indicated at 6; for convenience, this is referred to herein as the fuel cone.

Attached to the outer wall of the furnace at a point substantially coaxial with the wall 4 leading to the combustion chamber, is a frame 8 shown in the present instance as of frusto-conical shape with apertures 9 to permit air to be drawn into the combustion chamber along with the fuel, the draft head, or injector action of the fuel cone, or both, serving to draw in the requisite amount of air. The size of the apertures 9 may be adjusted by suitable means such as the frusto-conical cover plate 11 having apertures 9′ which may or may not register with the apertures 9, according to the angular position of the cover plate together with a device such as the handle 12 operating the pinion 13 meshing with the gear 14 on the cover plate 11, for rotating the latter about the frame 8 to regulate the size of the apertures 9. In the drawings the cover plate 11 is shown in that position in which the apertures 9′ are out of registry with the apertures 9 for the admission of air to the combustion chamber along with the fuel.

Mounted in the outer end of the frame 8 are two supply pipes 16, 17, connected respectively to reservoirs or other sources of fuel (not shown) and adapted to deliver fuel into the passages 18, 19 respectively, from which further travel of the fuels is permitted or prevented, by valves indicated diagrammatically at 20, 21. By this means the supply of fuel from the two sources may be individually controlled.

For purposes of illustration, the burners in the accompanying drawings are shown as designed for two fuels such as oil and powdered coal respectively. The oil may be of any suitable grade, with or without the addition of such combustible substances as powdered coal in suspension therein. The sources or reservoirs for the fuels, and the specific means for conveying them to and through the supply pipes 16, 17, respectively, are not illustrated, and may be of any suitable form.

When the furnace is to be used with oil as fuel, the pipe 22 provided with suitable nozzle 24, is placed in position by having its receiving end 25 inserted in the socket or recess 26 in the member 28 that carries the oil supply pipe 16 and its associated parts. The oil pipe 22 is shown in Figure 1 as being in position for burning, while in Figure 2 the socket 26 is shown empty, the oil pipe having been removed therefrom in order that coal might be fed to the furnace through the coal pipe 29. When the oil pipe 22 is in operating position, as in Figure 1, it is held there by means such as the screw 30 mounted in a bracket 31 pivotally mounted at 32 upon the member 28, so that the screw can be swung from its horizontal pipe-locking position shown in Figure 1 to its upper position illustrated at Figure 2, where it is out of alignment with the socket 26 to permit insertion and removal of the pipe 22. The screw 30 thus locks the pipe 22 in position, and can be readily backed off and swung upwardly at any time to permit removal of said pipe. A strainer 33 may be provided in the receiving end of the pipe 22 to prevent foreign matter from reaching the nozzle 24. The valve 20 is of course shut when the pipe 22 is not in operating position; if desired, an interlock may be provided to prevent opening of the valve when the screw is not in operating position and to prevent backing off of the screw when the valve is open. It will be seen from Figure 1 that the tuyere 35 for oil burning is so located with respect to the combustion chamber 2 that maximum burning efficiency is attained; in fact, the efficiency and operation of the device are substantially the same as if there were no possibility of converting the apparatus to the use of other fuel and readily reconverting it to the burning of oil.

When the furnace is to be used with some other fuel, such as powdered coal, the oil pipe 22 is removed in the manner indicated above, and the pipe 29 (Figures 2 and 3) above referred to is placed in position by having its receiving end 37 inserted in the socket 38 in the member 28, after which the screw 39, which may be similar to the screw 30, is swung up from its Figure 1 position into its horizontal operating position indicated in Figure 2 and is then screwed into the recess in the pipe 29 to secure the pipe in position with respect to the combustion chamber 2. When the pipe 29 is thus in operating position, powdered coal from the supply pipe 17 may be admitted thereto through the valve 21, means being provided if desired to prevent the opening of the valve when the screw is not in operating position, and conversely, to prevent backing off of the screw when the valve is open. A comparison of Figures 1 and 2 shows that the tuyere or point of delivery 40 of the coal is in substantially the same location as the tuyere or point of delivery 35 for the oil, and that the two fuels are thus delivered to the combustion chamber in the manner most efficient for combustion. In fact, the furnace when adapted for coal burning as in Figure 2, is substantially as efficient as if it were not convertible to the burning of any other kind of fuel and reconvertible to the burning of coal.

In view of the above, it will be seen that

the several objects of the invention are achieved and other advantageous results attained.

As various possible embodiments might be made of the above invention and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim:

1. Apparatus of the class described comprising a combustion chamber with an opening therein, a member arranged coaxially with respect to the opening and provided with air ports, means for regulating the size of the air ports, a tuyere-bearing pipe arranged coaxially with said member and said opening, a plurality of fuel supply conduits to one of which said tuyere-bearing pipe is detachably connected, said other fuel supply conduit being adapted upon removal of said tuyere-bearing pipe to be detachably connected with a tuyere-bearing pipe for the discharge of another kind of fuel.

2. Apparatus for supplying fuel to a combustion chamber comprising a plurality of fuel supply conduits each terminating in a coupling member, a tuyere-bearing pipe detachably coupled with one of said conduits, the other conduit being adapted upon removal of said tuyere-bearing pipe to be detachably coupled with a tuyere-bearing pipe for the discharge of a different kind of fuel.

3. Apparatus for supplying fuel to a combustion chamber comprising a plurality of fuel supply conduits each having means for detachably connecting it with a tuyere-bearing pipe, and tuyere-bearing pipe detachably connected with one of said conduits, the other conduit being adapted upon removal of said tuyere-bearing pipe to be detachably connected with a tuyere-bearing pipe for the discharge of a different kind of fuel.

4. Apparatus for supplying fuel to a combustion chamber through an opening therein, comprising a plurality of fuel supply conduits for supplying different kinds of fuels, a coupling member at the end of each conduit to one of which a tuyere-bearing pipe may be connected for discharging the desired kind of fuel, and means for supporting said coupling members in proximity to said opening.

5. Apparatus for supplying fuel to a combustion chamber comprising a fuel conduit, a tuyere-bearing pipe, a quick detachable connection between said fuel conduit and said tuyere-bearing pipe, a second fuel supply conduit, and means whereby the second fuel supply conduit may be connected to a tuyere-bearing pipe so that the latter may be quickly detached when desired.

6. Apparatus for supplying fuel to a combustion chamber through an opening therein comprising a plurality of fuel supply conduits, a coupling member associated with the end of each conduit, a tuyere-bearing pipe detachably connected with one of said coupling devices for delivering fuel at a point adjacent said opening in the combustion chamber, said other coupling member being adapted upon removal of said tuyere-bearing pipe to be connected with a similar tuyere-bearing pipe for delivering fuel at substantially the same point as the first-mentioned tuyere-bearing pipe.

7. Apparatus for supplying fuel to a combustion chamber comprising a plurality of fuel supply conduits, a coupling member at the end of each conduit adapted to be coupled with a corresponding member on the end of a tuyere-bearing pipe, and clamping means associated with each coupling member whereby when a tuyere-bearing pipe is connected to one coupling member it may be clamped in place by the corresponding clamping means.

In witness whereof, we have signed our names to this specification this 30th day of May, 1918, and 31 day of May, 1918, respectively.

HAYLETT O'NEILL.
ERNEST FANDRICH.