July 4, 1933. F. A. HAMILTON 1,917,031

COMBUSTION APPARATUS

Filed Aug. 26, 1931

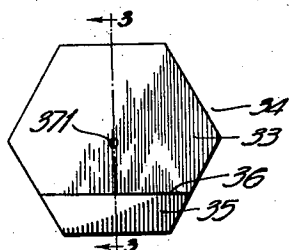


FIG. 2

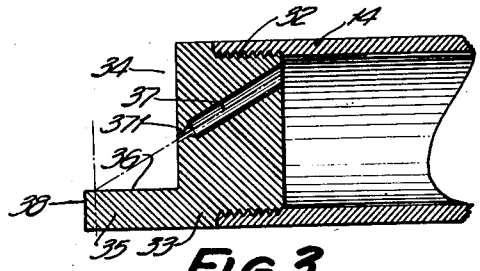


FIG. 3

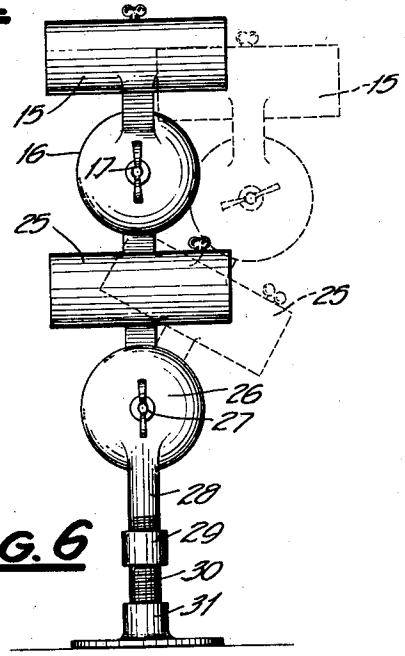


FIG. 6

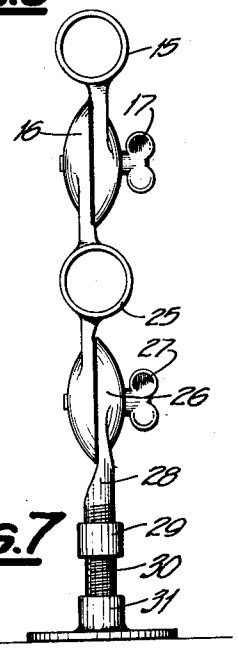


FIG. 7

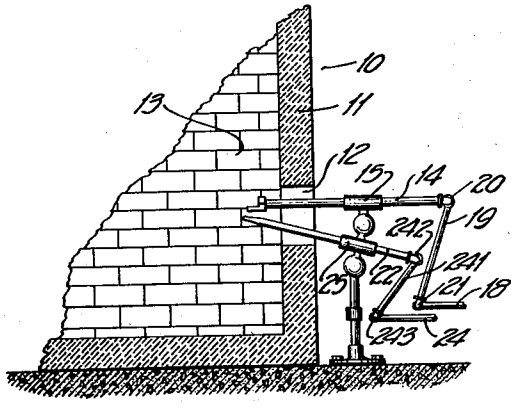


FIG. 1

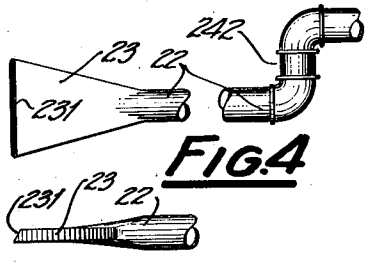


FIG. 4

FIG. 5

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UNITED STATES PATENT OFFICE

FRED A. HAMILTON, OF ALBANY, NEW YORK, ASSIGNOR OF ONE-HALF TO FITZSIMMONS & McALLISTER, INC., OF ALBANY, NEW YORK, A CORPORATION OF NEW YORK

COMBUSTION APPARATUS

Application filed August 26, 1931. Serial No. 559,509.

My invention more particularly relates to a fuel spraying apparatus comprising a nozzle which is simple and cheap to manufacture and which is at the same time highly efficient and satisfactory in operation. My invention also relates to a fuel spraying apparatus of the foregoing character combined with a device for delivering air to the spray in such a way as to promote combustion.

My invention will best be understood by reference to the accompanying drawing in which I have illustrated a preferred embodiment thereof and in which—

Fig. 1 is a section through a furnace wall and the oil burning apparatus embodying my invention associated therewith;

Fig. 2 is a front view of the spraying nozzle;

Fig. 3 is a section taken along the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary plan view of an air delivery pipe and the air nozzle attached thereto;

Fig. 5 is a side view of a portion of Fig. 4;

Fig. 6 is a side view of the support for the fuel delivery and air delivery pipes, and

Fig. 7 is a front view of Fig. 6.

Like reference characters indicate like parts throughout the drawing.

Referring now to the drawing, 10 indicates generally a furnace comprising a wall 11 provided with an opening 12 and a furnace chamber 13. A fluid fuel delivery pipe 14 passes through the opening 12 and is mounted in a collar 15 secured to and preferably integral with one of the parts of the member 16, the two portions of which may be secured together in adjusted position by a suitable wing nut 17 and bolt, as indicated in Fig. 7. The fuel delivery pipe 14 is preferably connected to a fuel supply pipe 18 by means of an intermediate pipe 19 forming a joint as at 20 and 21 with the fuel delivery pipe and the fuel supply pipe respectively. An air delivery pipe 22 is preferably flattened at its free end to form a fan-shaped nozzle the front end of which is located in advance of the baffle and is bevelled upwardly and rearwardly as at 231 so that the air is directed upwardly in advance of the baffle against the spray of fluid fuel and in a form corresponding to that of the spray. The pipe 22 is preferably connected to an air supply pipe 24 by an intermediate pipe 241 connected to the delivery pipe and the supply pipe at 242 and 243, respectively. The air delivery pipe is preferably supported in a collar 25 which is in turn secured to one of the parts of the clamping member 16 and to one of the parts of a clamping member 26, the two parts of which may be secured together by a nut 27 and bolt. The clamping members 16 and 26 are carried by a standard 28 preferably screw-threaded at its lower end as indicated in Fig. 7, the screw-threaded end being received in an interiorly screw-threaded collar 29 which is in turn received on the upper end of a screw-threaded nipple 30, the lower end of which is received in a screw-threaded opening in a base member 31. The supporting members are assembled by screwing the nipple 30 into the base 31 and then screwing the collar or sleeve 29 on the nipple 30 and the standard 28 into the collar 29. It will be apparent that the fluid fuel delivery pipe and the air delivery pipe may be vertically adjusted by screwing the standard 28 into the collar 29 more or less, or in case a greater adjustment is desired, that the collar 29 and nipple 30 may be altogether omitted and the standard 28 screwed directly into the base member 31.

The fluid fuel delivery pipe 14 is preferably screw-threaded on its interior and at its free end as at 32 and is adapted to receive the screw-threaded end of the head 33 of a spraying nozzle indicated generally at 34. The spraying nozzle comprises an imperforate plate or baffle 35 provided with a flat surface 36. The head of the nozzle is also provided with a passage 37, preferably contracted at its outer end as at 371, leading from the delivery pipe 14 and arranged at such an angle as to direct the fluid fuel, which is under pressure, against the flat surface 36 and adjacent to the free edge 38 of the baffle. By directing the stream of fluid fuel against the flat surface in the manner indicated, it is converted

to a finely divided spray or fog which moves forwardly fan-shaped from the nozzle.

I have found that where the fluid fuel is directed against the baffle at a point somewhat remote, for example, a quarter of an inch from the free edge thereof, that the stream merely drips off from the front edge of the baffle without being converted into a spray. In practice, I have found that with a nozzle the head of which is hexagonal in form, as illustrated, and one and a quarter inches from one side to the other and one and seven-sixteenths inches in total length, that the best results are secured by directing the stream of fluid fuel against the surface 36 of the baffle approximately 0.15 of an inch or roughly one-seventh of an inch from the free edge thereof. I have also found that satisfactory results are secured when the passage 37 makes an angle of approximately 28 degrees with the center line of the nozzle.

The air delivery pipe 22 and nozzle 23 are preferably arranged at an angle to the fuel delivery pipe and the surface 36 of the baffle 35, as best shown in Fig. 1, and the angle may be varied by changing the angular positions of the fluid fuel delivery pipe 14 and the air delivery pipe 22 with respect to each other.

The fluid fuel is thoroughly atomized by its impingement against the flat surface of the baffle 35 near the free edge 38 thereof. The air nozzle is not intended to atomize the fuel but serves as a carrier for the spray and when it has been thoroughly mixed with the fluid fuel combustion takes place at a desired point in the furnace. It will be obvious that the character of combustion may be controlled by varying the angle between the fuel delivery pipe and the air delivery pipe, and by varying the extent to which the air delivery pipe and the fuel delivery pipe, and particularly the latter, are projected into the furnace.

While I have described my invention in its preferred embodiment it is to be understood that the words which I have used are words of description and not of limitation and that changes within the scope of the appended claims may be made without departing from the true scope and spirit of my invention in its broader aspects.

What I claim is:

1. In combustion apparatus, an imperforate baffle plate provided with a substantially flat surface having a free edge, means for directing liquid fuel under pressure at an angle against said surface and adjacent to the free edge thereof whereby a spray of fuel is produced, and a nozzle having its discharge end in advance of said baffle plate and positioned for projecting a jet of air against said spray.

2. In combustion apparatus, an imperforate baffle plate provided with a substantially flat surface having a free edge, means for directing liquid fuel under pressure at an angle against said surface immediately adjacent to the free edge thereof whereby a spray of liquid fuel is produced, and a nozzle having its discharge end in advance of said baffle plate and positioned for projecting a jet of air against said spray and at an angle to said surface.

3. In combustion apparatus, an imperforate baffle plate having a substantially flat surface provided with a free edge, a liquid fuel nozzle so disposed with respect to said baffle as to project a jet of fuel under pressure at an angle against said baffle adjacent the free edge thereof whereby a spray of liquid fuel is produced, and an air nozzle located on the side of the baffle opposite that against which the fuel impinges and so located with respect thereto as to direct a jet of air against said spray.

4. In combustion apparatus, an imperforate baffle plate having a substantially flat surface defining a free edge, a liquid fuel nozzle angularly disposed with respect to said baffle to project a jet of fuel under pressure against said baffle immediately adjacent the free edge whereby a spray of liquid fuel is produced beyond the end of the baffle, an air nozzle having its discharge end in advance of said baffle and positioned for projecting a jet of air against said spray, supply conduits for conveying liquid fuel and air respectively to the fuel and air nozzles, and a stand having relatively adjustable means for supporting the fuel and air supply conduits.

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