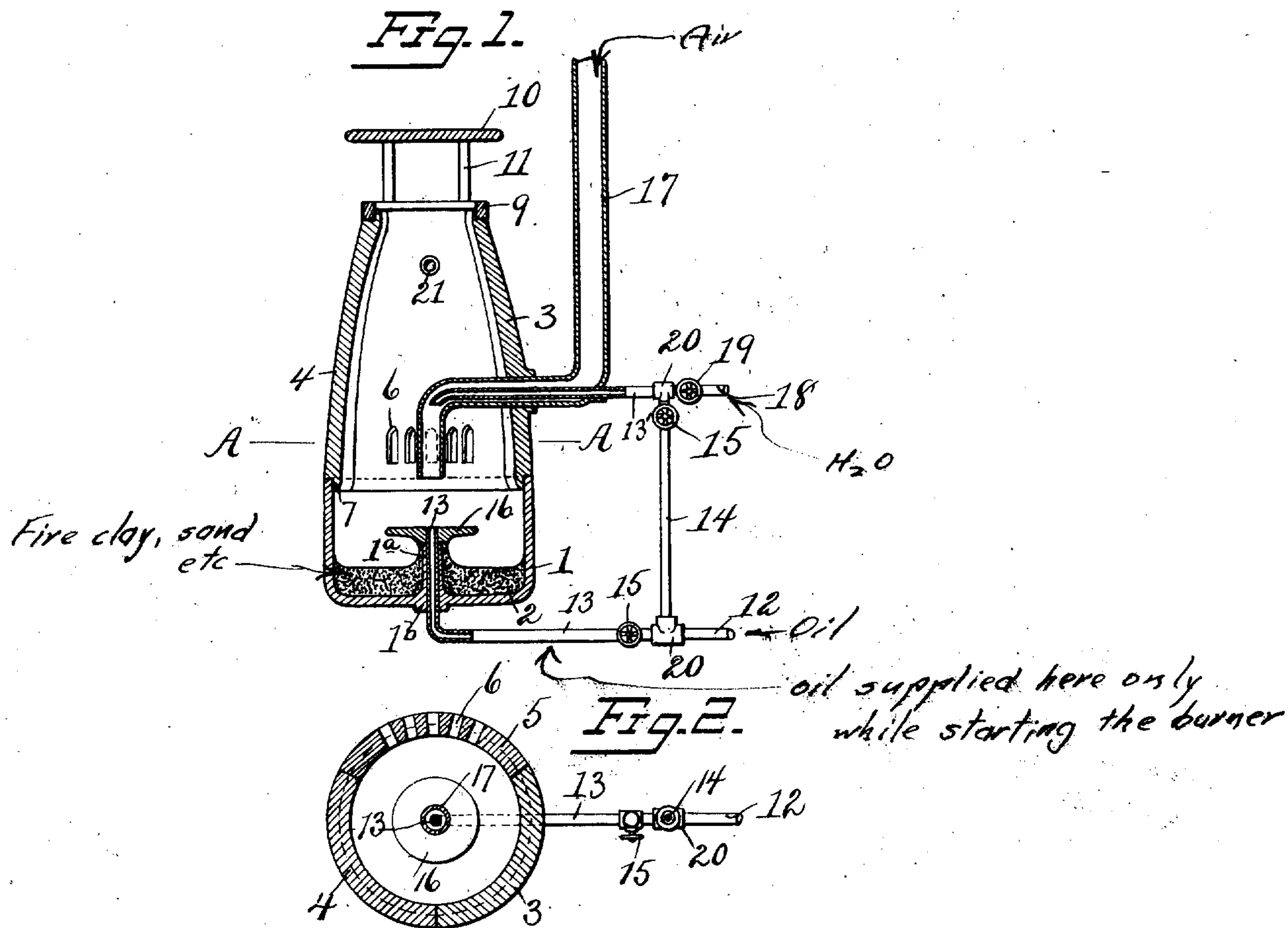


No. 897,506.

PATENTED SEPT. 1, 1908.

J. N. YOUNG.  
HEATING APPARATUS.  
APPLICATION FILED FEB. 8, 1904.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## HEATING APPARATUS.

No. 897,506.

Specification of Letters Patent.

Patented Sept. 1, 1908.

Application filed February 8, 1904. Serial No. 192,615.

*To all whom it may concern:*

Be it known that I, JOHN NELLES YOUNG, a citizen of the United States, residing at No. 2128 Alameda avenue, Alameda city, county of Alameda, State of California, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification.

This invention relates to heating apparatus for stoves, ranges, grates, ovens, furnaces, fire boxes, boilers and for any and all other heating purposes where liquid fuel may be employed.

A further object of the invention is to provide an apparatus in which the lowest grades of crude oil may be successfully employed as fuel, without danger of choking or clogging the apparatus from carbonaceous residuents such as ordinarily form in retort vaporizers and like apparatus where heavy oils are used for fuel.

A further object of the invention is to provide an apparatus of this type in which the liquid fuel is subjected to intense heat within a chamber of suitable shape, said chamber having free entrance and exit openings and a discharge of the heated fuel in either liquid or gaseous form being accelerated by the pressure generated within the chamber by the expansion of the fuel.

A still further object of the invention is to provide a heating apparatus in which a volume of heated liquid fuel is directed forcibly against a highly heated surface, either of metal or of a refractory material, such material being kept at an intense heat so that all parts of the fuel will be consumed.

A still further object of the invention is to provide a liquid fuel burner in which the fuel is fed under gentle pressure to the inner walls of a chamber and allowed to trickle down the walls in the form of a film, which being contacted by the heat is quickly consumed, the flame in passing heating the walls to a high temperature and consuming any carbon or other material which may tend to cling thereto.

A still further object of the invention is to provide an apparatus of this type in which a downwardly directed current of air is induced within the heated chamber and is mingled to some extent with the liquid fuel, the air and fuel being then directed against a heated surface of any suitable material and consumed.

A still further object of the invention is to provide an apparatus of this type in which a

quantity of light hydrocarbon may be fed upward through the base of the apparatus and discharged in the form of a film over the lower deflecting plate, the lighter hydrocarbon, being readily ignited, serving to effect the preliminary heating of the apparatus before the heavy oil is fed thereto.

With these and other objects in view, my invention consists in the construction and combination of elements hereinafter described, illustrated in the accompanying drawings and particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a sectional elevation of an oil burner embodying the invention; Fig. 2 is a sectional plan view of the same on the line A—A of Fig. 1.

In the drawings—The base of the burner is in a form of a cup 1, in the lower portion of which is placed a refractory or other material 2, in the form of fire clay, sand, or the like. On top of the base is mounted the upper portion 39 of the casing, this being preferably formed of a number of sections 3, 4 and 5 for convenience in handling. The lower edges of these sections are provided with depending ribs, which when together form a continuous annulus 7, that fits within the upper portion of the cup shaped disk. The casing is of greatly reduced diameter toward the upper end and the top of each of the sections is provided with a rib 8, the ribs being arranged to fit within a ring 9 which in a measure serves to hold the sections in proper relative positions. Above the open top of the casing is a spreader plate 10 that is supported by a number of vertical standards 11 formed integral with the ring 9. One of the sections of the casing is provided with a number of draft openings 6, for the admission of air to the interior of the casing.

Within the lower portion of the cup 1 is a metallic disk 16 that preferably is supported by a pipe 1<sup>a</sup>, the pipe passing upward to an opening 1<sup>b</sup> at the lower portion of the cup and being connected by a pipe 13 and coupling 20 to an oil supply pipe 12, a suitable valve 15 being placed in the pipe 13 in order to control the flow of oil to said pipe. This portion of the apparatus may be employed for the purpose of introducing gasoline or any light hydrocarbon or burning fluid into the lower portion of the casing for the initial heating of the apparatus, the oil flowing from the plate 16 and passing down into the bed of refractory or other material 2, and when ig-



nited by a match or the like the flame will quickly heat the interior of the casing and the plate 16, and after all of the parts have reached the proper temperature the heavier oil may be fed in at the top of the apparatus or at any point above the plate 16. In some cases, however, this lower fuel inlet pipe may be employed for the purpose of admitting a liquid fuel of any character and it will be understood that the supply of fuel through this fuel pipe may be kept up during the introduction of fuel through other means above the plate or disk 16.

A branch pipe 14 connects the oil pipe 13 to a pipe 13<sup>1</sup>. This pipe 13<sup>1</sup> is connected to a water pipe 18. The pipes 13 and 14 are provided with suitable valves so that the oil passing to the burner may be delivered entirely through the pipe 13<sup>1</sup>. In practice, however, a small portion of the oil is allowed to pass through the pipe 13. The water pipe may be closed by a suitable valve 19.

The pipe 13<sup>1</sup> extends through an air pipe 17 the inner end of said air pipe being turned down in order to discharge a current of air against the plate or disk 16. The upper oil pipe terminates at a point in advance of the discharge end of the air pipe, so that the oil may mingle with the incoming stream of air in advance of the discharge of the latter against the plate 16.

In the operation of a burner of this type it being premised that the apparatus has been heated by the burning of a lighter hydrocarbon, a down draft of air will be induced by the volume of products of combustion passing upward towards the top of the casing and the oil fed through the pipe 13<sup>1</sup> will enter this stream of air and become slightly intermingled therewith before the air and oil are discharged against the plate 16. The incoming volume of oil is heated while passing through the pipe 13<sup>1</sup> and slightly expanded, so that it is in better condition to combine with the oil during the process of combustion. The volume of air and oil strikes the plate 16 with great force and portions will be deflected and will fall into the lower bed 2 of the refractory or other material, but will be instantly consumed by the intense heat contained in the oil. The major portion of the oil will be finely divided by the impact against the plate 16 and becoming thoroughly intermingled with the air will be consumed. Oil is also admitted to the upper portion of the casing through a number of pipes 21. This oil is introduced under comparatively gentle pressure and if undisturbed will spread in the form of a film and cling to the interior of the casing passing downward by gravity. As the wall of the casing is highly heated, however, the lighter portions of the oil will be instantly volatilized and will pass off at the top of the casing where the second combustion takes place, as the issuing volume of the gases and

products of combustion strikes the outer air. The heavier portions of the oil, such as asphalt and heavy carbons tend to cling to the side walls of the casing, but the current of out-flowing gas and flame is of such strength that these deposits, if any, are instantly carried off and consumed, the apparatus being wholly self-cleaning and all portions of the oil being consumed.

It will be here observed that that portion of the air pipe between its discharge end and the discharge end of the oil pipe 13<sup>1</sup> constitutes an expansion chamber in which the oil is allowed to expand while all portions of the oil are forcibly driven from the lower end of the air pipe by the pressure due to expansion.

The operation of the burner is very simple and it is easily installed. The fire grate of a stove, range, furnace or fire box, or so much thereof as may be necessary to admit the burner is first removed. The burner is lowered into the ash-pit sufficient to bring the upper part of the raised cover into the lower part of the fire box. The oil pipes having their valves in position are then connected with the burner and the oil supply. The air for the draft openings of the burner may be admitted through the usual air holes provided in the stove or other apparatus.

In practice, no more oil should be admitted to the burner than is consumed as fast as it enters the burner. As the heat increases the oil will be consumed more rapidly which will prevent it from accumulating in the base. The burner soon becomes hot and gives out a strong heat from itself and a further heating flame passing out below the spreader plate fills the fire box of the stove, range, furnace or other object to be heated. Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In combination in an oil burner, of a main casing having open top, means for feeding a volume of oil to the upper portion of the inner wall of said casing under gentle pressure to permit the oil to cling to said wall in the form of a film and oil and air supplies entering the lower portion of the casing whereby an upwardly directed volume of burning fluid will engage the descending film of oil.

2. In an oil burner, the combination with a casing including a base member, of a tube supported by the base, a disk resting on said tube, an air pipe arranged above the disk and adapted to direct the volume of air downward against the same, and an oil pipe extending within the air pipe, and having its discharge end above the discharge end of said air pipe.

3. The combination in an oil burner of a base, an upper casing member, the walls of which gradually converge toward the top, the top of said casing being open, a



spreader supported by the top of the casing, means for feeding oil into the upper portion of the casing under gentle pressure, so that the oil may be spread in the form of a film  
5 on the inner surface of the casing, a deflecting member secured above the base and means for directing a volume of burning fluid downward into contact with said deflecting member.  
10 4. In an oil burner, the combination with a cup shaped base having a layer of refractory or fire-resisting material therein, a casing mounted on the base, a fuel spreading or deflecting member arranged within and  
15 above the bottom of the base, a supply pipe leading upward through the base to said spreading member and serving to admit light hydrocarbon to the burner and means

for directing a volume of burning fluid downward against said spreading or deflecting 20 member.

5. The combination in an oil burner, of a main casing including a cup shaped base and a sectional upper portion having flanges seated within the top of the base, the upper edges 25 of said sections being also flanged, a ring encircling the flanges and combining the sections together, a spreader arranged above the open top of the casing, rods extending upward from the ring and supporting the 30 spreader, and means for introducing opposing volumes of burning fluid to said casing.

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