July 2, 1940. R. F. ANDLER 2,206,070

INTERNAL SLEEVE OIL BURNER

Filed July 15, 1937 2 Sheets-Sheet 1

FIG. 1

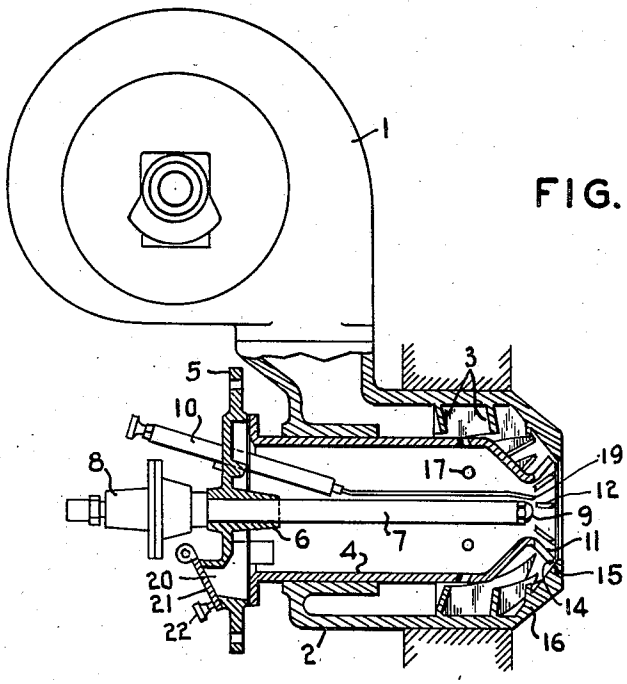
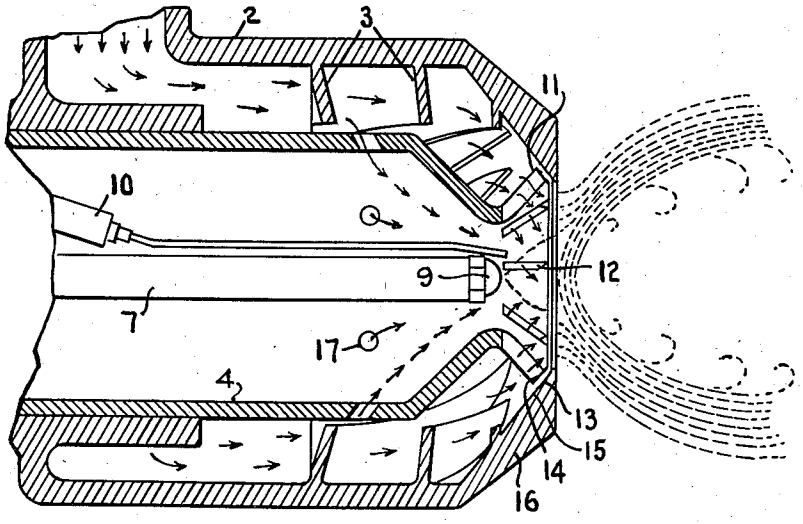


FIG. 2



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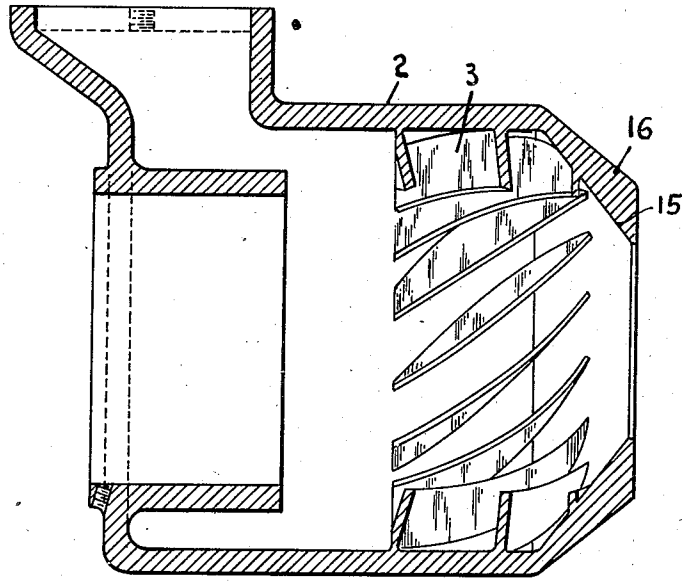


FIG. 3

FIG. 4

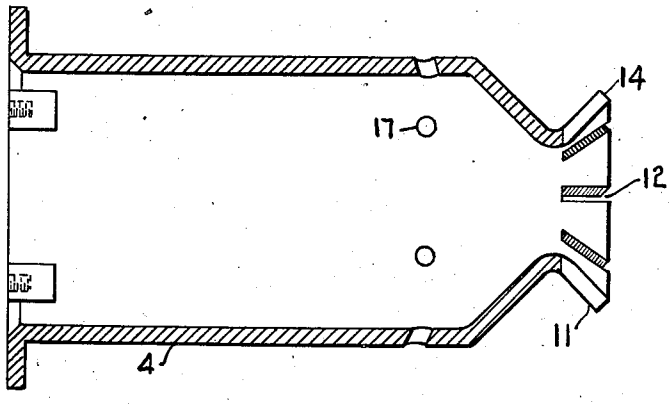
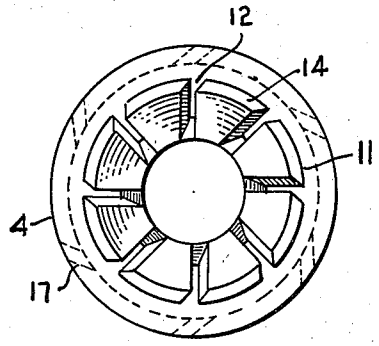


FIG. 5



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UNITED STATES PATENT OFFICE

2,206,070

INTERNAL SLEEVE OIL BURNER

Robert F. Andler, Rutherford, N. J., assignor to Electrol Incorporated, Clifton, N. J., a corporation of Delaware

Application July 15, 1937, Serial No. 153,714

6 Claims. (Cl. 158—76)

My invention relates to oil burners for producing the well known ball type of flame.

The principal object of my invention is to improve the construction of the sleeve or air cone through which the air is conducted and from which it emerges as in a gyrating form to mix with the oil as it is ejected from the nozzle.

A further object is to provide a construction which will divert a portion of the air, which travels in a gyrating annulus around the air cone, to the interior of said air cone which has an oil tube therein. The oil tube is provided with a nozzle which is located adjacent the outlet of said inner air tube. The nozzle should be formed to emit a substantially conoidal oil spray. The end of the inner tube is contracted to more intimately mix the sprayed oil with the whirling air currents, thereby obtaining a much more efficient burner by securing better combustion.

My means of accomplishing the foregoing objects may be more fully comprehended by having reference to the accompanying drawings, which are hereunto annexed and are a part of this specification in which:

Fig. 1 is a side elevation of my improved oil burner a part of the device being shown in section;

Fig. 2 is an enlarged detail view showing a fragmentary portion in section;

Fig. 3 is an enlarged detail view in section of the outer air tube;

Fig. 4 is an enlarged detail view of the inner air tube;

Fig. 5 is an end view of the outlet of the same.

Similar reference numerals refer to similar parts throughout the entire specification.

As shown in the drawings: The burner consists of a fan or blower 1 which has its discharge connected to the air receiver 2 so that the air enters said receiver 2 directly on the diameter at right angles. The air receiver 2 is cylindrical in cross section and its discharge end tapers inwardly, forming an inwardly extending truncated conoidal wall 16 through which the air passes to the combustion chamber (not shown). This air receiver is formed with an axially extending cylindrical portion 2' in which in mounted an inner tubular member 4 which is termed in the trade the air cone. This inner tubular member is mounted in the cylindrical portion 2' of the air receiver 2. Its outer wall is spaced from the inner wall of the air receiver so as to provide an annular space between the two. A plurality of fins or vanes 3 are mounted in the space between the air receiver 2 and the inner cylindrical member or air cone 4. A plate 5 is attached in any suitable manner to this inner cylindrical member 4. The plate 5 has a support 6 at its center for the oil conductor 7 which is provided with a standard cut off valve 8 the construction on which is too well known to require description. The outer end of the oil conductor 7 constitutes a nozzle 9 which is formed to emit the oil in a spray of substantially conoidal form. The plate also supports the electrodes 10 which are properly located to ignite the sprayed oil at the desired time. Oil is supplied to the cut off valve 8 and in turn to the oil conductor by means of a suitable pump (not shown). The inner cylindrical member or air cone 4 may in some cases be provided with an inwardly and outwardly flaring conoidal portion 11 although this is not essential to the operation of the burner, when it is so supplied I provide in the outwardly flaring portion of the air cone a plurality of slots 12 which are formed as shown in Fig. 5. When the outwardly flaring cone 11 is used there should be an annular space 13 between its periphery 14 and the inner edge 15 of the inwardly extending truncated conoidal portion 16 of the air receiver 2. A plurality of holes 17, preferably at an angle with respect both to a plane lying at right angles and one lying parallel to the axis of the cylinder, are drilled or formed in the wall of the inner cylindrical member 4, through which the air enters as indicated by the arrows. Although I have shown the fins 3 and the outwardly flaring conoidal portion 11, these parts while desirable can be omitted. The principal feature of my invention is in providing spaced whirling or gyrating air streams to contact the conoidal spray of oil emitted by the nozzle 9. The operation of the burner is as follows: The cut off valve is connected to a source of oil (not shown) which is under pressure so that the oil will be emitted from the nozzle in an outwardly flaring conoidal spray or mist formed of minute particles of oil. The electrodes 10 are connected to a source of high tension electric current (not shown) to produce a spark at 19. The air from the blower 1 enters the air chamber as indicated by the arrows where it forms a gyrating current which enters the fins 3 in an annular form until it reaches the annular space 13 through which it passes to the combustion chamber. Another portion of this air stream expands inwardly through the slots 12 of the conoidal portion 11 making contact with the outer portion of the conoidal spray of oil emitted by the nozzle 9. Another portion of the annular gyrating air stream in the space

between the wall of the air receiver 2 and the wall of cylinder 4 expands inwardly through the holes 17 into the annular space between the oil conductor 7 and the cylinder 4. By slanting the holes 17 the whirling or rotating movement of the air is not interfered with. Indeed practice has shown that slanting them will of itself impart a rotating motion to the air currents. I have found that this inner air stream is essential, otherwise the nozzle 9 will become so hot that it will cause the oil to carbonize. Also this air tends to keep the oil spray away from the electrodes and keeps them in a clean condition thereby securing an improved result. An opening 20 which is closed by a shutter 21 held tightly shut by a screw 22 may be provided. Preferably the amout of air is controlled by a shutter at the inlet of the fan 1.

Having described my invention, what I regard as new and desire to secure by Letters Patent is:

1. In an oil burner, a tube through which air is supplied and having a contracted outlet end, a nozzle for emitting a substantially conical spray of oil, said nozzle located in said tube near the outlet end thereof, an inner tubular member surrounding said nozzle in spaced relation, forming with said tube an annular passage through which air flows and from which it is directed into the sprayed oil in a zone near the nozzle, a plurality of vanes which extend inwardly from the air supply tube, said vanes, adjacent the outlet end of said tube, being radially spaced from said inner tubular member sufficiently to define a substantially annular space between said tube and said tubular member into which the inner part of the annular air stream may expand and form an inner annular air stream of less velocity than the outer part of the annular air stream.

2. In an oil burner, a tube through which air is supplied and having a contracted outlet end, a nozzle for emitting a substantially conical spray of oil, said nozzle located in said tube near the outlet end thereof, an inner tubular member surrounding said nozzle in spaced relation and forming with said tube an annular passage through which air flows and from which it is directed into the sprayed oil in a zone near the nozzle, said tubular member tapering inwardly near said nozzle and then flaring outwardly and having a plurality of slots in said outwardly flaring portion, a plurality of vanes which extend inwardly from the air supply tube, said vanes, adjacent the outlet end of said tube, being radially spaced from said inner tubular member sufficiently to define a substantially annular space between said tube and said tubular member into which the inner part of the annular air stream may expand and form an inner annular air stream of less velocity than the outer part of the annular air stream.

3. In an oil burner, an air supply tube having a contracted outlet at its forward end, a spray nozzle located in said tube near the outlet end thereof, and an inner tubular member surrounding said nozzle in spaced relation and forming with said air supply tube an annular passage through which air flows and from which it is directed into the sprayed oil in a zone near the nozzle, said tubular member tapering inwardly near said nozzle and then flaring outwardly substantially to the diameter of the contracted outlet end of the air supply tube, and having a plurality of slots in said outwardly flaring portion through which air flows in leaving said annular passage.

4. In an oil burner, an air supply tube having a contracted outlet at its forward end, a spray nozzle located in said tube near the outlet end thereof, an inner cylindrical tubular member, closed at its rearward end, surrounding said nozzle in spaced relation and forming with said air supply tube an annular passage through which air flows and from which it is directed into the sprayed oil in a zone near the nozzle, the cylindrical wall of said tubular member being provided, immediately rearwardly of said nozzle, with a plurality of apertures through which jets of air are admitted from said annular passage to the interior space about said nozzle defined by said tubular member and are directed against said nozzle to cool the same, and means positioned in said annular passage adapted to impart a whirling motion to the air stream passing therethrough.

5. In an oil burner, an air supply tube having a contracted outlet at its forward end, a spray nozzle located in said tube near the outlet end thereof, an inner tubular member, closed at its rearward end, surrounding said nozzle in spaced relation and forming with said air supply tube an annular passage through which air flows and from which it is directed into the sprayed oil in a zone near the nozzle, the wall of said tubular member being provided, rearwardly of said nozzle, with a plurality of apertures, directed at an angle with respect both to a plane lying at right angles and one lying parallel to the axis of said tubular member, for the admission of air from said annular passage to the interior space about said nozzle defined by said tubular member, and means positioned in said annular passage adapted to impart a whirling motion to the air stream passing therethrough.

6. In an oil burner, an air supply tube immediately beyond the forward end of which combustion takes place, said tube having a contracted outlet at its forward end, a spray nozzle located in said tube near the outlet end thereof, and an inner tubular member surrounding said nozzle in spaced relation and forming with said air supply tube an annular passage through which air flows and from which it is directed into the sprayed oil in a zone near the nozzle, said tubular member flaring outwardly adjacent said nozzle substantially to the diameter of the contracted outlet end of the air supply tube, and having a plurality of slots in said outwardly flaring portion through which air flows in leaving said annular passage, whereby the said slots function to give direction to the air for combustion as it leaves the forward end of said tube and enters the zone of combustion.

ROBERT F. ANDLER.