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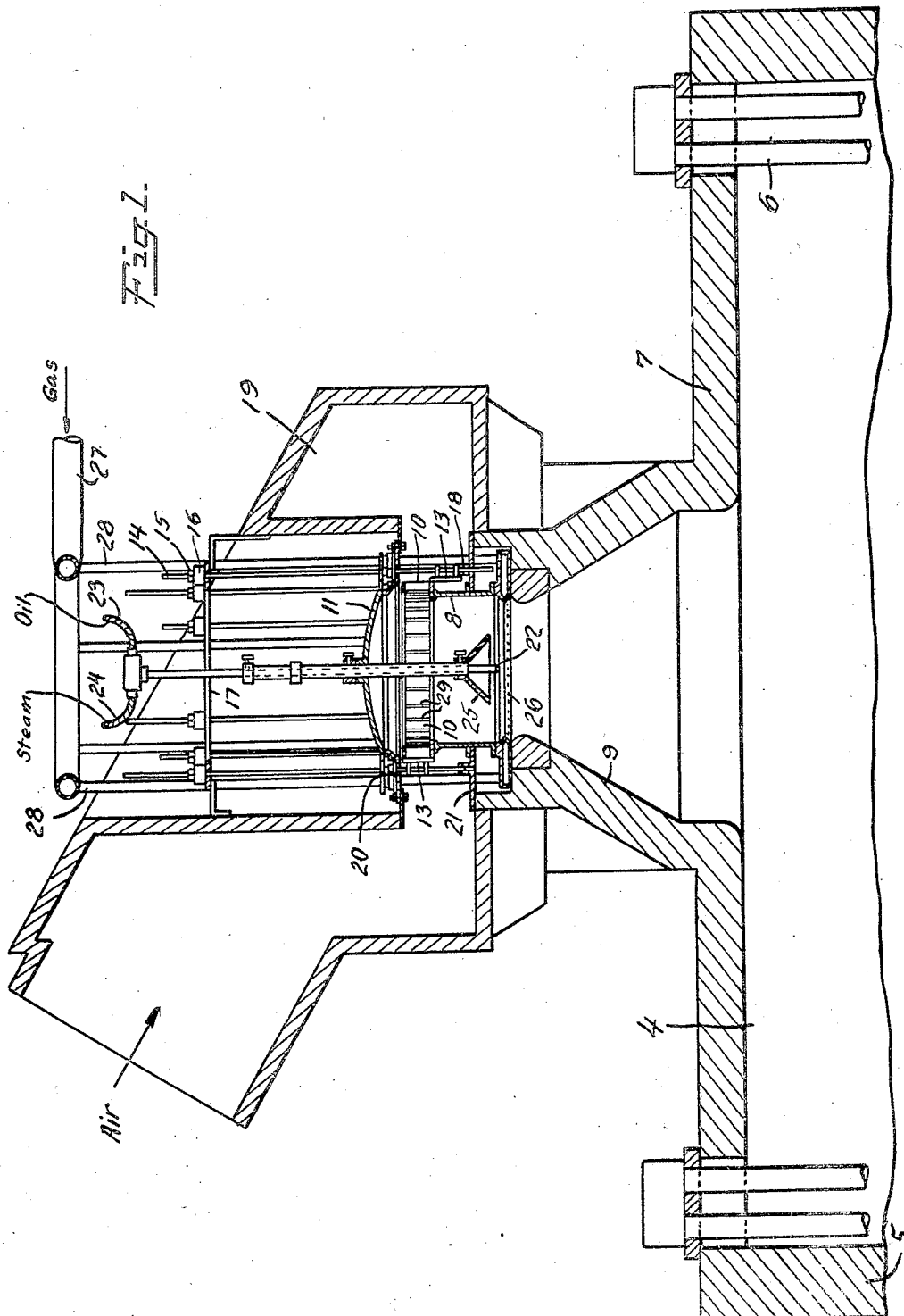
W. R. ARGYLE ET AL

1,914,355

ART OF HEATING HYDROCARBONS

Filed June 2, 1932

2 Sheets-Sheet 1



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Fig. 2.

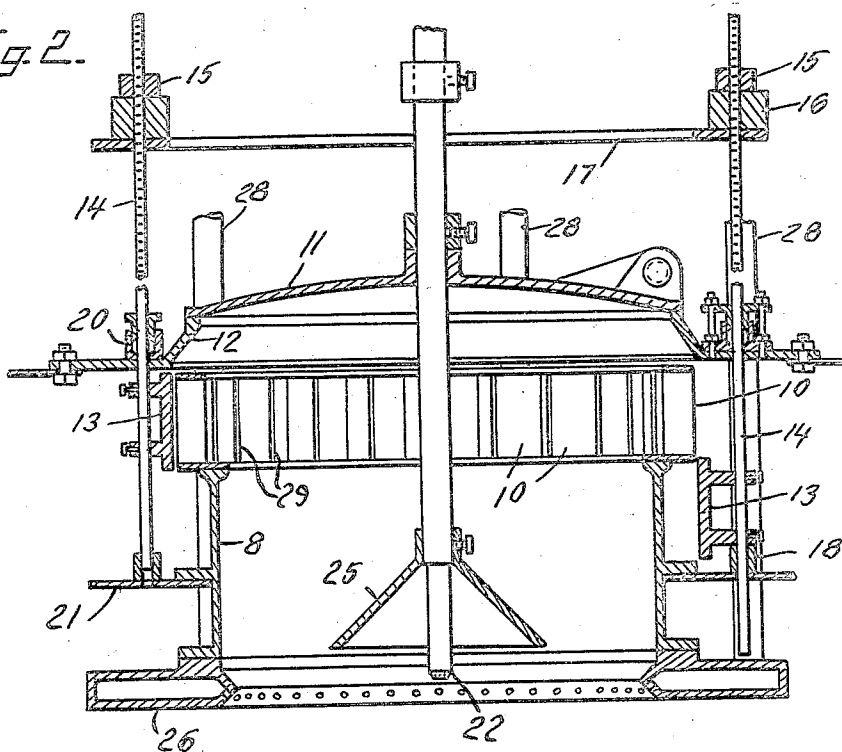
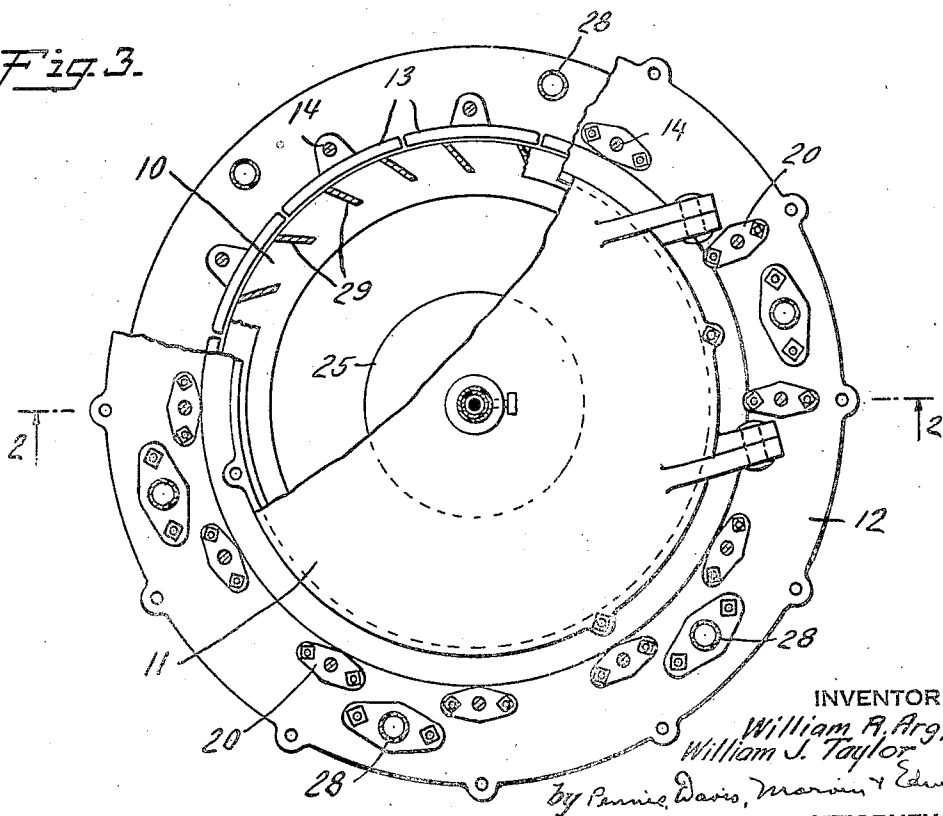


Fig. 3.



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ART OF HEATING HYDROCARBONS

Application filed June 2, 1932. Serial No. 614,936.

This invention relates to improvements in burners for supplying heat to heat absorbing surfaces arranged in a heating chamber radially spaced from the common axis of the burner and the heating chamber. The invention provides, particularly, improved control of the peripheral distribution, about the axis of the burner and the heating chamber, of the heat produced by operation of the burner.

The peripheral distribution of heat in heating chambers so arranged is important in several respects, including the maintenance of conditions requisite for high combustion efficiency, the full utilization of the capacity of the heating apparatus and the elimination of maladjustments of heat absorption by different parts of the heat absorbing surfaces. In heating apparatus in which petroleum oils are heated to temperatures upwards of about 700° F., the peripheral distribution of heat becomes doubly important as the elimination of local overheating is peculiarly essential in such apparatus. The improved burner of the invention is of general application, but it is of special value and application in heating apparatus in which petroleum oils are heated to such temperatures.

With the improved burner of the present invention, the peripheral distribution of heat is controlled by controlling the peripheral distribution of air supplied for combustion. The improved burner of the invention comprises a burner throat communicating with the heating chamber, the axis of the throat being the axis of the burner and the heating chamber, an annular opening in this throat for admitting air thereto, the boundary planes of this opening being normal to the axis of the burner and the heating chamber, a plurality of annular segments arranged about and adapted collectively to cover this opening, and means for independently positioning these segments with respect to this opening to control the peripheral distribution of air entering the burner throat through this opening.

The invention will be further described in connection with the accompanying drawings

which illustrate, in some detail, one embodiment of the improved burner of the invention. It will be understood that the invention is not limited to the particular burner illustrated in the accompanying drawings. In the accompanying drawings, Fig. 1 illustrates, in elevation and in section, a burner embodying the invention as arranged in conjunction with heating apparatus in which the heat absorbing surfaces are arranged radially spaced from a vertical axis, the burner being arranged for down-draft firing, the heating apparatus other than the burner being illustrated conventionally, in fragmentary section, Fig. 2 is a section on line 2—2 of Fig. 3, and Fig. 3 is an enlarged detail, in plan and with parts broken away, of the burner illustrated in Fig. 1.

The heating apparatus illustrated in the drawings comprises a heating chamber 4 laterally bounded by a cylindrical wall 5 and a series of tubes or pipes 6, through which the material to be heated is circulated, arranged radially spaced from the axis of the cylinder and adjacent the cylindrical wall 5. The burner, positioned above the heating chamber 4, communicates therewith through the roof 7 of the heating chamber.

The burner illustrated comprises a burner throat communicating with the heating chamber 4, this burner throat including a ring member 8 and a refractory passage 9 connecting the passage through this ring member with the heating chamber, the burner throat enlarging in section as it approaches the heating chamber, an annular opening 10 between the upper end of the ring member 8 and the cover and cover support members 11 and 12, twelve dampers 13 in the form of annular segments arranged about and adapted collectively to cover the opening 10, a plurality of slides 14 supporting the dampers 13, a separate slide being provided for each damper, and nuts 15 cooperating with a threaded portion of each of the slides 14 and a collar 16 carried by a support member 17 for independently positioning each of the dampers 13 with respect to the opening 10 to admit air for com-

bustion at a proportionately greater or lesser rate through that part of the annular opening 10 which each of the dampers 13 is adapted severally to close or partly close.

5 Each of the slides 14 moves in a lower collar 18 and the upper collar 16 arranged to permit the damper 13 supported by that slide to be positioned either directly across the annular opening 10, or below the upper end

10 of the ring member 8, that is beyond the lower boundary of the annular opening 10, or at any intermediate position, by means of the nut 15 cooperating with that slide. The lower collars 18 are carried by a support

15 member 21. In Figs. 1 and 2, the damper 13 at the right is illustrated in the fully opened position and the damper 13 at the left is illustrated in the fully closed position. Each of the dampers 13 can thus be

20 positioned independently of any of the others and the peripheral distribution, within the burner throat, of air supplied for combustion through the annular opening 10 can thus be controlled to a degree limited

25 only by the number of dampers provided. More or less than the twelve dampers provided in the burner illustrated may be provided. The air for combustion may, with

30 advantage, be supplied from a windbox 19 surrounding the upper end of the burner throat and into which the annular opening for admitting air to the burner throat opens. The slides 14 may be extended through the

35 wall of this windbox to facilitate control, as through glands 20 in the burner illustrated. The cover support member 12 may be extended as part of the windbox and such glands may be supported, as in the burner

40 illustrated, by this extension. A plurality of vanes 29 may, with advantage, be provided in the annular opening 10 to assist in maintaining the peripheral distribution, of air supplied for combustion, established by the positioning of the dampers 13.

45 In the burner illustrated, a nozzle 22 for injecting liquid fuel, oil, is arranged axially within the burner throat. Oil, supplied through connection 23, atomized with steam supplied through connection 24, is injected

50 through this nozzle. An adjustable baffle 25 may be positioned between the nozzle and the annular opening for admitting air and provision may be made for independently positioning the nozzle and this baffle as described in an application filed May 25, 1932,

55 Serial Number 613,574, by Carlton L. Schmidt. A perforated hollow ring 26 is provided for introducing gaseous fuel supplied from connection 27 through branch

60 connections 28. Either or both gaseous fuel and liquid fuel may be used at one time in the burner illustrated.

It will be apparent that the invention provides for control of the peripheral distribution of air supplied for combustion through

the burner, and thus for control of the peripheral distribution of heat in the connected heating chamber, within substantially any chosen limits of precision. The control afforded is, moreover, susceptible of regulation at any time during operation. In this aspect the improved burner of the invention is particularly adapted to meet the requirements of operations in which conditions change during the operation.

We claim:

1. In a burner for supplying heat to heat absorbing surfaces arranged in a heating chamber radially spaced from the axis of the burner and the heating chamber, in combination, a burner throat communicating with said heating chamber, an annular opening in said throat for admitting air thereto, the boundary planes of said opening being normal to the axis of the burner and the heating chamber, a plurality of annular segments arranged about and adapted collectively to cover said opening, and means for independently positioning said segments with respect to said opening to control the peripheral distribution of air entering said burner throat through said opening.

2. In a burner for supplying heat to heat absorbing surfaces arranged in a heating chamber radially spaced from the axis of the burner and the heating chamber, in combination, a burner throat communicating with said heating chamber, an annular opening in said throat for admitting air thereto, the boundary planes of said opening being normal to the axis of the burner and the heating chamber, a plurality of annular segments arranged about and adapted collectively to cover said opening, a corresponding plurality of slides supporting said segments severally and permitting movement of said segments severally from a position between said boundary planes and across said opening to a position beyond one of said boundary planes, and means for independently positioning said segments with respect to said opening to control the peripheral distribution of air entering said burner throat through said opening.

3. In a burner for supplying heat to heat absorbing surfaces arranged in a heating chamber radially spaced from the axis of the burner and the heating chamber, in combination, a burner throat communicating with said heating chamber, a windbox surrounding said throat, an annular opening in said throat opening into said windbox for admitting air from said windbox to said throat, a plurality of annular segments arranged about and adapted collectively to cover said opening, and means for independently positioning said segments with respect to said opening to control the peripheral distribution of air entering said burner throat through said opening.

4. In a burner for supplying heat to heat
absorbing surfaces arranged in a heating
chamber radially spaced from the axis of
the burner and the heating chamber, in com-
5 bination, a burner throat communicating
with said heating chamber, an annular open-
ing in said throat for admitting air thereto,
the boundary planes of said opening being
normal to the axis of the burner and the
10 heating chamber, a plurality of annular seg-
ments arranged about and adapted collec-
tively to cover said opening, means for in-
dependently positioning said segments with
respect to said opening to control the pe-
15 ripheral distribution of air entering said
burner throat through said opening, and a
series of vanes in said opening for main-
taining the peripheral distribution of air
established by the positioning of said seg-
20 ments.

In testimony whereof we affix our signa-
tures.

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WILLIAM R. ARGYLE.

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