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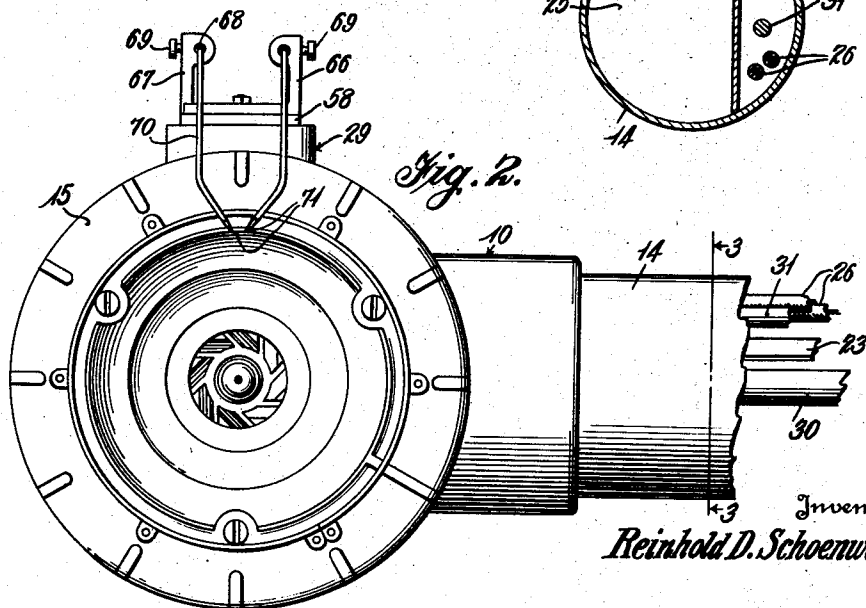
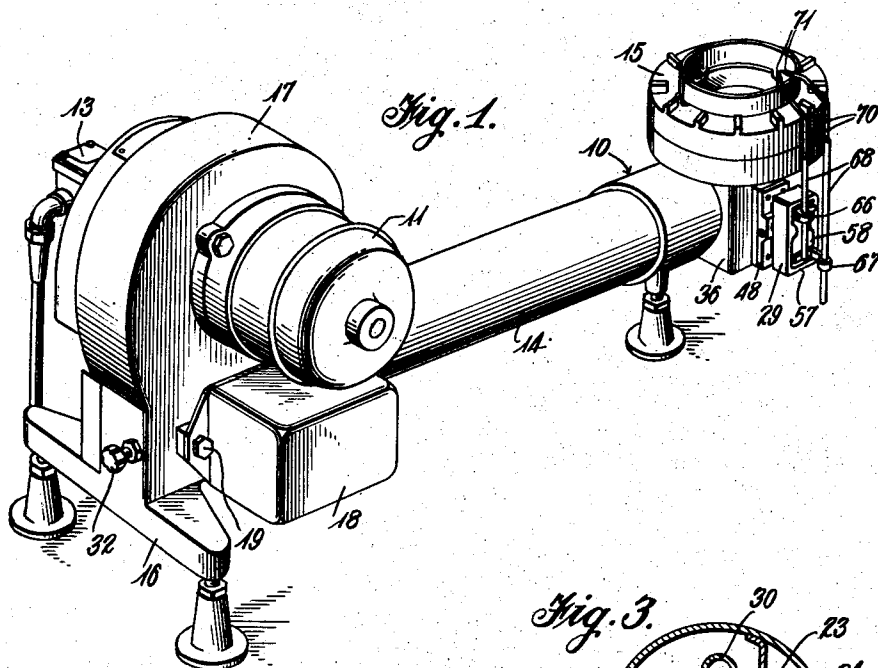
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IGNITION MEANS FOR OIL BURNERS

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3 Sheets-Sheet 1



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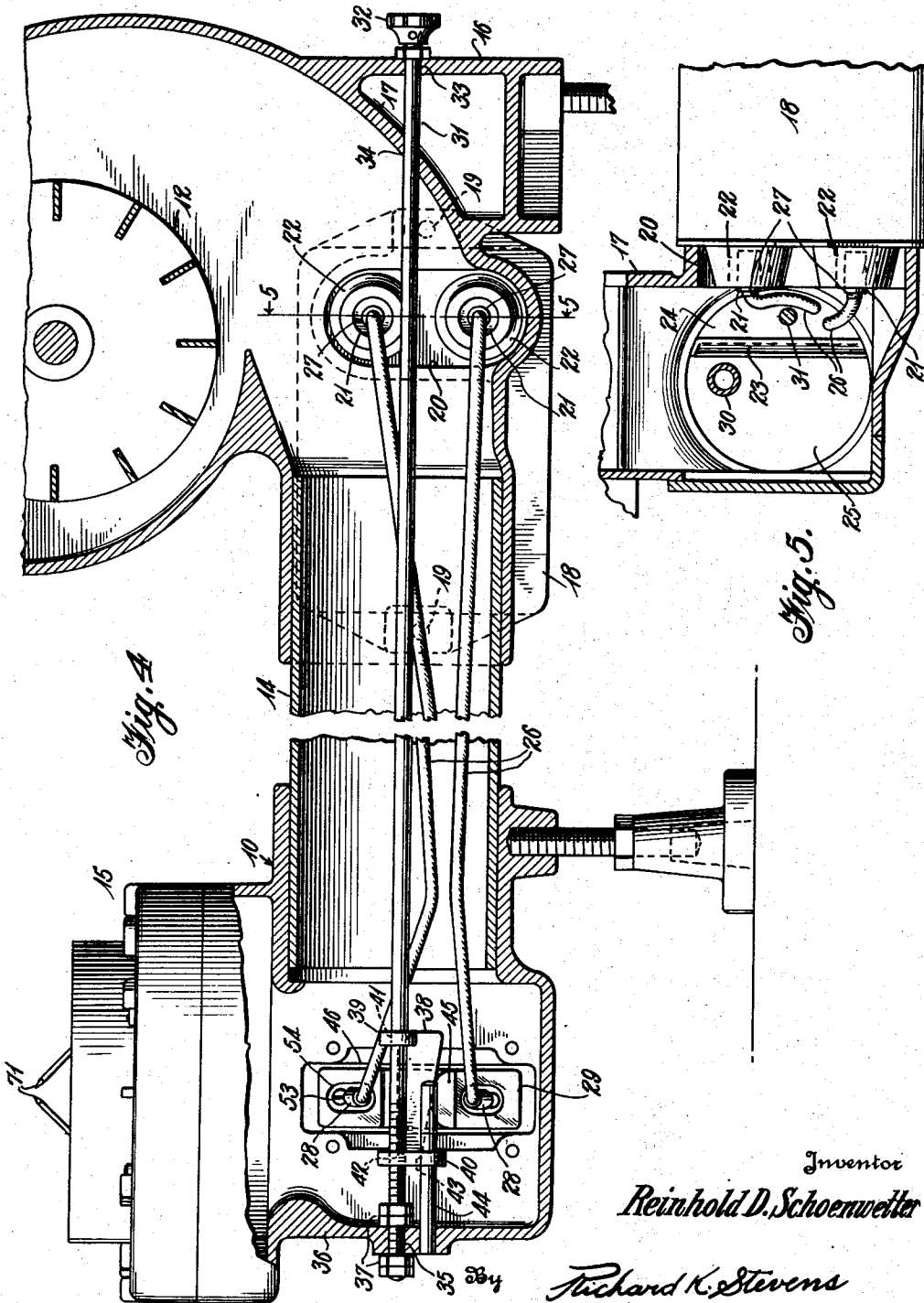
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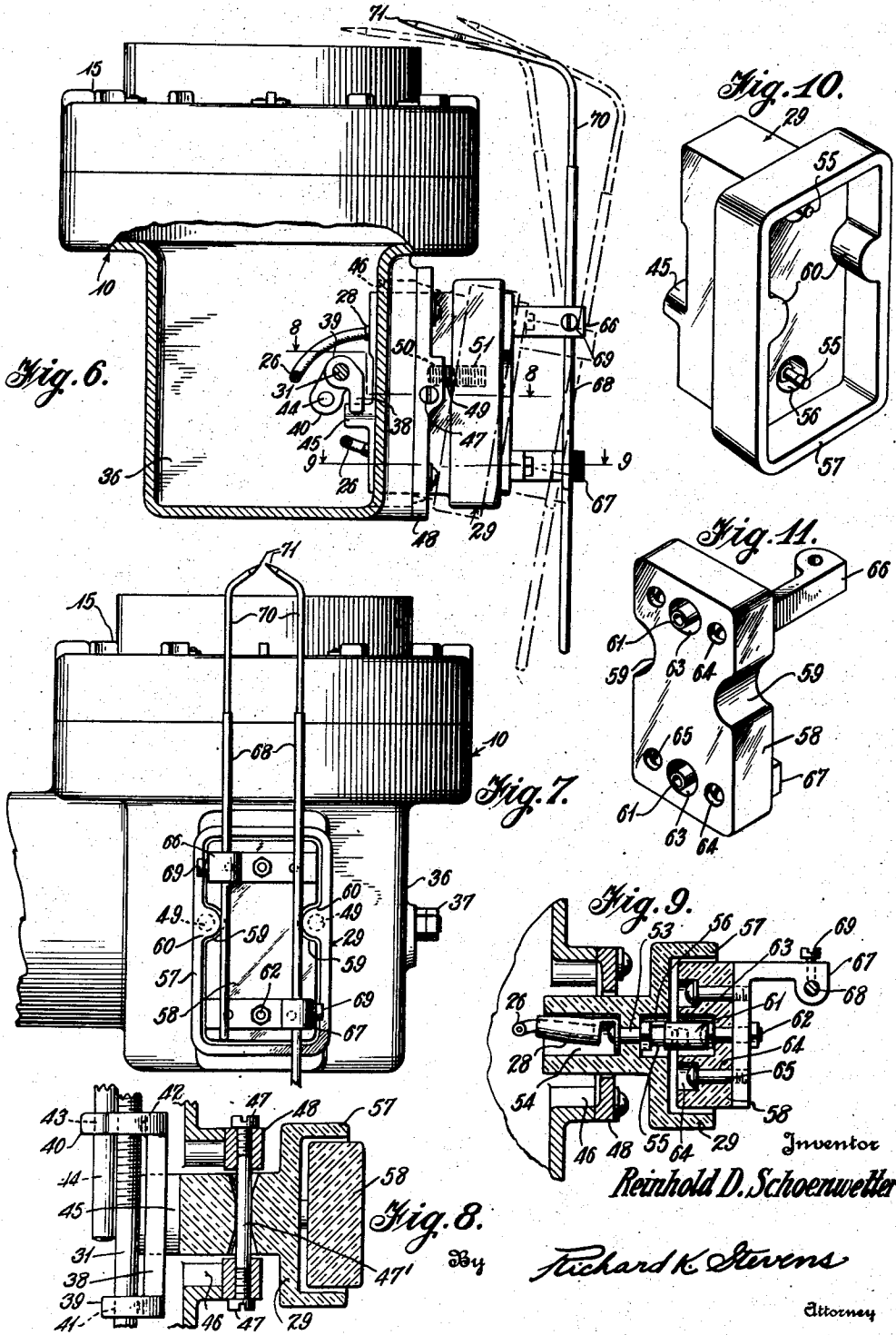
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IGNITION MEANS FOR OIL BURNERS

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Application October 5, 1936, Serial No. 104,068

14 Claims. (Cl. 158—28)

This invention relates to oil burners of the type generally employed for purpose of heating household furnaces and particularly to ignition means for such a burner.

The majority of the oil burners now sold on the market depend almost entirely upon electrical means for their ignition and in many instances the so-called electric spark system is used. In order to employ the electric spark ignition system, it is necessary to provide electrodes mounted in the proximity of the burner head in such a position that the sparking ends thereof are in the best zone of ignition. Due to the use of various designs of deflector plates for directing the flow of air which intermingles with the atomized fuel to support combustion, the zone of best ignition has become critical and necessitates such a fineness of positioning of the electrodes that numerous adjustments are necessary before proper setting is obtained. As far as I am aware, no means have heretofore been devised whereby one could effect this adjustment from a point outside of the furnace. The customary methods utilized heretofore have been, for example, the grasping of the electrodes and bending them to properly position them relative to the zone of best ignition which for obvious reasons is impracticable since it is very difficult to see whether or not the proper spacing of the electrodes to give the best igniting spark has been retained while making the adjustment. Attempts have been made to overcome this difficulty by providing mirrors within the furnace so disposed that the operator can by looking in the furnace door inspect the relative positions of the electrodes.

Therefore an object of this invention is the provision of means whereby, without altering the relative adjustment of the electrodes, the electrodes may be positioned in the zone of best ignition from a point outside the furnace.

This invention further contemplates the provision of an electrode assembly such that the electrodes and their mount may be readily detached as a unit for inspection and relative adjustment without the necessity of loosening any screws or bolts.

This invention further contemplates the provision of an electrode assembly such that the electrodes and their mount may be readily detached as a unit for inspection and relative adjustment and when replaced will be in the same relative position to the zone of combustion.

Other features and advantages will appear

from the following description when considered with the drawings, in which;

Figure 1 is a perspective view of an oil burner showing the ignition electrodes mounted on the burner head in assembled relationship;

Figure 2 is a plan view of an oil burner head showing the ignition electrodes in an operative position;

Figure 3 is a cross-section through line 3—3 of Figure 2 of the burner tube showing the disposition of the ignition current conductors therein;

Figure 4 is a fragmentary vertical section of an oil burner showing in detail the adjusting means for the ignition electrodes;

Figure 5 is a fragmentary cross-sectional view taken along the line 5—5 of Figure 4 showing the ignition current transformer mounted on the burner casing;

Figure 6 is a fragmentary sectional view of a burner head showing the ignition electrode assembly in detailed elevation;

Figure 7 is a side view of a burner head showing the electrode assembly mounted thereon;

Figure 8 is a horizontal section of the burner assembly taken along the line 8—8 of Figure 6 showing the adjusting cam;

Figure 9 is a horizontal sectional view of the electrode assembly taken along the line 9—9 of Figure 6;

Figure 10 is a perspective view of the inner section of the insulating electrode mount; and

Figure 11 is a perspective view of the outer section of the insulating electrode mount.

Referring to the drawings in detail, particularly Figure 1, an oil burner indicated generally as 10 having a prime mover 11, a fan 12, a fuel pump 13, an air blast tube 14, and a burner head 15, is shown operatively assembled on a supporting frame 16 made integrally with the fan casing 17. A transformer 18, the primary circuit of which is adapted to be supplied with an electric current from a source, not shown, is secured to the frame by bolts 19, and forms a closure for an opening 20, at a point directly under the prime mover 11. Leads 21 from the secondary winding of the transformer 18 are brought out of the transformer case and project through insulating bushings 22 into the bottom portion of the fan casing 17 which forms an air passage from the fan 12 and communicates at its outer end with the air blast tube 14. Air blast tube 14 is longitudinally divided by a vertical partition 23, preferably of sheet metal, into two independent passages 24 and 25. Disposed within the

passage 24 are electrical conductors 26 which connect by means of connectors 27 the leads 21 from the secondary winding of the transformer to connectors 28 carried by the inner insulating block 29 of the electrode assembly. Passage 25, having disposed therein the oil supply conduit 30, serves to connect the fan casing to the burner head. Partition 23 accordingly prevents any possibility of injury to conductors 26 by the insertion or removal of conduit 30. An electrode adjusting rod 31 having an operating knob 32 suitably secured to the outer end thereof, passes through the openings 33 and 34 in the frame 16 and the fan casing 17, respectively, and extends through the passage 24 and the opening 35 in the burner head casing 36 and is secured against endwise movement by locking nuts 37. Sufficient clearance is left between the nuts 37 and the casing wall 36 of the burner head to permit the rod 31 to turn freely in the opening 35. The inner end of the adjusting rod 31 is threaded back sufficiently far from the end thereof to permit the electrode assembly adjusting cam 38 which threadedly engages the adjusting rod 31 to move along the rod a distance at least equal to its own length. Cam 38, as shown in detail in Figures 4, 6 and 8 has formed on its opposite ends lugs 39 and 40. Lug 39 is provided with an opening 41 of sufficient diameter that it will slide freely on the adjusting rod 31 while lug 40 is provided with openings 42 and 43. Opening 42 is tapped to receive the threaded adjusting rod 31 and the opening 43 is of sufficient diameter to permit the guide rod 44 to slide freely therein. Guide rod 44, which cooperates with the lug 40 to prevent the cam 38 from being rotated by the adjusting rod 31, is rigidly secured to and projects from the burner head casing 36.

Cam 38 is adapted to slide on and actuate a shoulder 45 that is made integrally with the inner insulating block 29. Insulating block 29 extends through an opening 46 in the burner head casing 36 and by means of pivot pin 47' is pivotally mounted on a plate 48 that is secured to the burner casing and cooperates with the inner insulating plug 29 to form a closure for the opening 46. Pin 47' is held in operative position by short screws 47. Opposite ends of coil springs 49 are recessed in aligned openings 50 and 51 in the plate 48 and block 29, respectively, and exert a force on the upper half of block 29 which tends to cause the top of the block to pivot outwardly to its extreme position.

Conductor connectors 28 are secured by screws 53 within recesses 54 formed in the inner face of the insulating block 29. Screws 53 besides being current conductors also serve as securing means for the male section 55 of a set of snap-on connectors that are disposed in recesses 56 in the opposite face of block 29, as shown in Figures 9 and 10. A peripheral flange 57 made integrally with block 29 extends outwardly from the outer face thereof to form a recess for a second insulating block 58. Block 58 is substantially rectangular in shape and has transverse passages 59 formed in the longitudinal edges thereof adapted to receive bosses 60 formed on the inner face of the flange 57. Bosses 60 in addition to providing sufficient material to define the recesses 51 serve as means for aligning the two blocks when assembled in operative relationship and are disposed in such a manner that the blocks can only be assembled in one way.

As shown in detail in Figure 9, the female end 61 of snap-on connectors are secured by suitable

bolts 62 to the block 58 in recesses 63 formed in the inner face of the block. These connectors are in alignment with and adapted to be secured by snap-on engagement to the male sections 55 secured to the outer face of block 29. Block 58, as shown in Figures 9 and 11, is provided with openings 64 that are counterbored from their inner face to receive bolts 65 by which the respective electrode brackets 66 and 67 are secured in parallel spaced relationship to the outer face of block 58. The brackets are identical and may be used interchangeably. That arm of each bracket which projects laterally from the face of block 58 is drilled to provide a substantially vertical passageway for electrodes 68. The electrodes 68 are secured in the passageways by means of set screws 69. Each of the brackets is horizontally mounted but with their ends which carry the electrodes oppositely disposed so that when the electrodes are secured in the brackets in operative position, they are spaced and substantially parallel. The enlarged body portion of the electrodes 68 may be formed of any suitable electric current conducting material, such as iron, steel, copper, brass, etc. While that portion of the electrodes 70 of reduced diameter, preferably formed of an alloy of nickel and chromium commonly known by the trade-name "nichrome", is subjected to the heat of the burner flame and is in the form of wire which is bent so that the ends 71 thereof project over the burner head into the zone of ignition. The spacing of the points 71 of these electrodes is dependent upon the voltage supplied by the secondary of the transformer 18 and the intensity of the igniting spark desired. The "nichrome" wires 70 are secured to the body supports in any suitable manner such as by threaded engagement, shrinking or sweating.

In operation to effect a positioning of the points 71 of the electrodes with respect to the ignition zone from a point outside the furnace, one grasps the operating knob 32 and rotates the rod 31 in a direction dependent upon the direction in which it is desired to move the points of the electrodes 71; that is, into or out of the combustion area. Rotation of rod 31 causes the cam 38, which is in threaded engagement therewith, to move along the shoulder 45 and cause block 29, which carries the electrode assembly, to be pivoted about its axis formed by the pin 47'. Cam 38 when moved toward the inner end of the operating rod 31 forces the top of the block 29 inwardly against the action of the coil springs 49 and on movement of the cam 38 in the opposite direction, these springs 49 tend to pivot the top of block 29 outwardly and thereby keep the shoulder 45 in contact with the cam 38 at all times. In this manner one is enabled to adjustably position the points 71 of the electrodes relative to the point of best ignition by means extending outside of the furnace. Insulating block 58 that carries the electrodes 68 being connected in operative position to block 29 by snap-on connectors may be readily detached without the necessity of loosening any screws or bolts to conveniently adjust the spacing of the points 71 of the electrodes.

I claim:

1. In an oil burner the combination of a burner head having an upper opening and a side opening, means for supplying fuel to said head, means for igniting said fuel, means for supporting said igniting means in a position adjacent said upper opening, said supporting means being movable

and positioned in said side opening, and means for adjusting the position of said igniting means with respect to said upper opening, said means extending from a point inside said burner head adjacent said supporting means to a point outside the oil burner.

2. In an oil burner the combination of a burner head having an upper opening and a side opening, means for supplying fuel and air to said head, means for igniting said fuel and air as it emerges from said upper opening, insulated means for supporting said igniting means in a position adjacent said upper opening, said supporting means being movable and positioned in said side opening, and means for adjusting the position of said igniting means with respect to said upper opening, said means being contiguous with said insulated supporting means and extending from a point inside said burner head to a point entirely outside the burner.

3. In an oil burner the combination of a burner head having an upper opening and a side opening, an atomizing nozzle disposed within the burner head below said upper opening, means for supplying fuel to said nozzle, means for supplying air to said head, means for igniting the mixture of fuel and air emerging from said upper opening, insulated means for supporting said igniting means in a position adjacent said upper opening, said supporting means being pivotally positioned in said side opening for movement about an horizontal axis, and means for adjusting the position of said igniting means with respect to said upper opening, said means being contiguous with said supporting means and extending from a point inside said head adjacent said supporting means to a point completely outside the oil burner.

4. In an oil burner the combination of a burner head having an upper opening and a side opening, a vertically disposed atomizing nozzle within said head below said upper opening, baffle means surrounding said nozzle, means for supplying fuel under pressure to said nozzle, means for supplying air under pressure to said baffle means, said air supply means comprising an air blast tube and an encased fan, means for igniting the mixture of fuel and air escaping through said upper opening, insulated means for supporting said igniting means in a position adjacent said upper opening, said supporting means being positioned in said side opening and being pivotally mounted for movement about an horizontal axis, and means for adjusting the position of said igniting means with respect to said upper opening, said means comprising a manually rotatable rod and a cam member capable of reciprocating movement along said rod only, said cam member being contiguous with said supporting means and said rod extending from a point inside said head adjacent said supporting means through said air blast tube and the casing of said fan to a point completely outside the oil burner.

5. In an oil burner the combination of a burner head having an upper opening, a vertically disposed atomizing nozzle within said head below said opening, baffle means surrounding said nozzle, means for supplying fuel to said nozzle, means for supplying air to said baffle means, means for igniting the mixture of fuel and air escaping from said opening, means for supporting said igniting means, said supporting means being pivotally mounted on the side wall of said head, and means for moving said supporting means from a remote point, whereby said igniting means is moved to-

ward and away from said head in an arcuate path.

6. In an oil burner the combination of a burner head, an ignition means therefor, said ignition means being pivotally mounted on the outside of said head for movement toward and away from said head and being normally spring-pressed away from said head, and means positioned on the inside of said head and extending to the outside of said oil burner for adjustably moving said ignition means toward said head.

7. In an oil burner the combination of a burner head, an ignition means therefor, said ignition means comprising a supporting member and a plurality of vertically extending ignition rods having substantially horizontal portions at their upper ends extending toward said head, said supporting member being pivotally mounted in the side wall of said head and said rods being movable in an arcuate path toward and away from said head and being normally yieldably held relatively away from said head, and means positioned on the inside of said head adjacent said supporting member for adjustably moving said ignition rods relatively nearer said head.

8. In an oil burner, the combination of a burner head ignition means for said burner positioned on the outside of said head and movable toward and away from said head, and means inside said head and extending outside said burner for actuating said ignition means, said ignition means being mounted on an insulated member pivotally positioned in the side wall of said head and having a cam surface thereon, and said actuating means comprising a rotatable rod and a cam member longitudinally movable along said rod and cooperating with said cam surface to move said ignition means.

9. In an oil burner the combination of a burner head, an ignition means therefor, and means for moving said ignition means toward said head, said last mentioned means comprising a rotatable rod extending from a point inside said head to a point outside said burner, a cam member positioned on said rod and threaded thereto for longitudinal movement therealong as said rod is rotated, and means for preventing said cam member from rotating, said cam member contacting a portion of said ignition means, whereby said ignition means is moved as said cam member is moved along said rod.

10. In an oil burner the combination of a burner head, means for supplying fuel to said head, means for supplying air to said head comprising an encased fan and an air blast tube extending from said fan casing to said head, ignition means for igniting the mixture of fuel and air supplied to said head, said ignition means being movably mounted in a side wall of said head, and means for moving said ignition means extending from a point inside said head adjacent said ignition means through said air blast tube and the casing of said fan to a point outside the burner.

11. In an oil burner the combination of a burner head, an ignition means, and means for supporting said ignition means in a position adjacent said head, said ignition means comprising a pair of vertically extending electrodes which are rotatable about their own vertical axes and have inclined upper end portions, and said supporting means being removably mounted in the side wall of said head, whereby said electrodes may be removed as a unit and rotated about said axes to vary the distance between said end portions.

12. In an oil burner the combination of a burn-

er head, an ignition means, and means for supporting said ignition means in a position adjacent said head, said ignition means comprising a pair of vertically extending electrodes which are rotatable about their own vertical axes and have inclined upper end portions, whereby said electrodes may be rotated about said axes to vary the distance between said end portions, and said supporting means being fastened to the side wall of said head by a snap-on means in a predetermined position in said wall, whereby said supporting and ignition means may be readily detached and reattached in exactly their original position with respect to said wall.

13. In an oil burner the combination of a burner head, an ignition means therefor, and means for moving said ignition means from a point outside the burner, said ignition means comprising a plurality of vertically extending rods which are rotatable about their own vertical axes and have inclined ignition points at their upper ends and being mounted on an insulated member having a plurality of separable portions, one portion supporting said igniting means and another portion

being pivotally mounted on the side of said head, whereby said ignition rods may be jointly moved toward and away from said burner head from a point outside said burner and may be removed entirely from said burner to adjust the distance of said points from each other.

14. In an oil burner, the combination of a burner head and an ignition means therefor, means for supporting said ignition means, means for moving said supporting means and said ignition means from a point outside the burner, said ignition means comprising a pair of rods extending from said support into the zone of ignition of said burner and each bent at the end thereof extending into said ignition zone, means for securing said rods in said supporting means permitting rotation of said rods about their own vertical axes for adjustment of the bent portions thereof relative to each other, and means for retaining said rods in adjusted relation, whereby said rods may be jointly moved with respect to said burner head and separately moved with respect to each other.

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