July 12, 1938. M. J. ROBERTS 2,123,204

BURNER

Filed Nov. 17, 1933 2 Sheets-Sheet 1

Fig. 1.

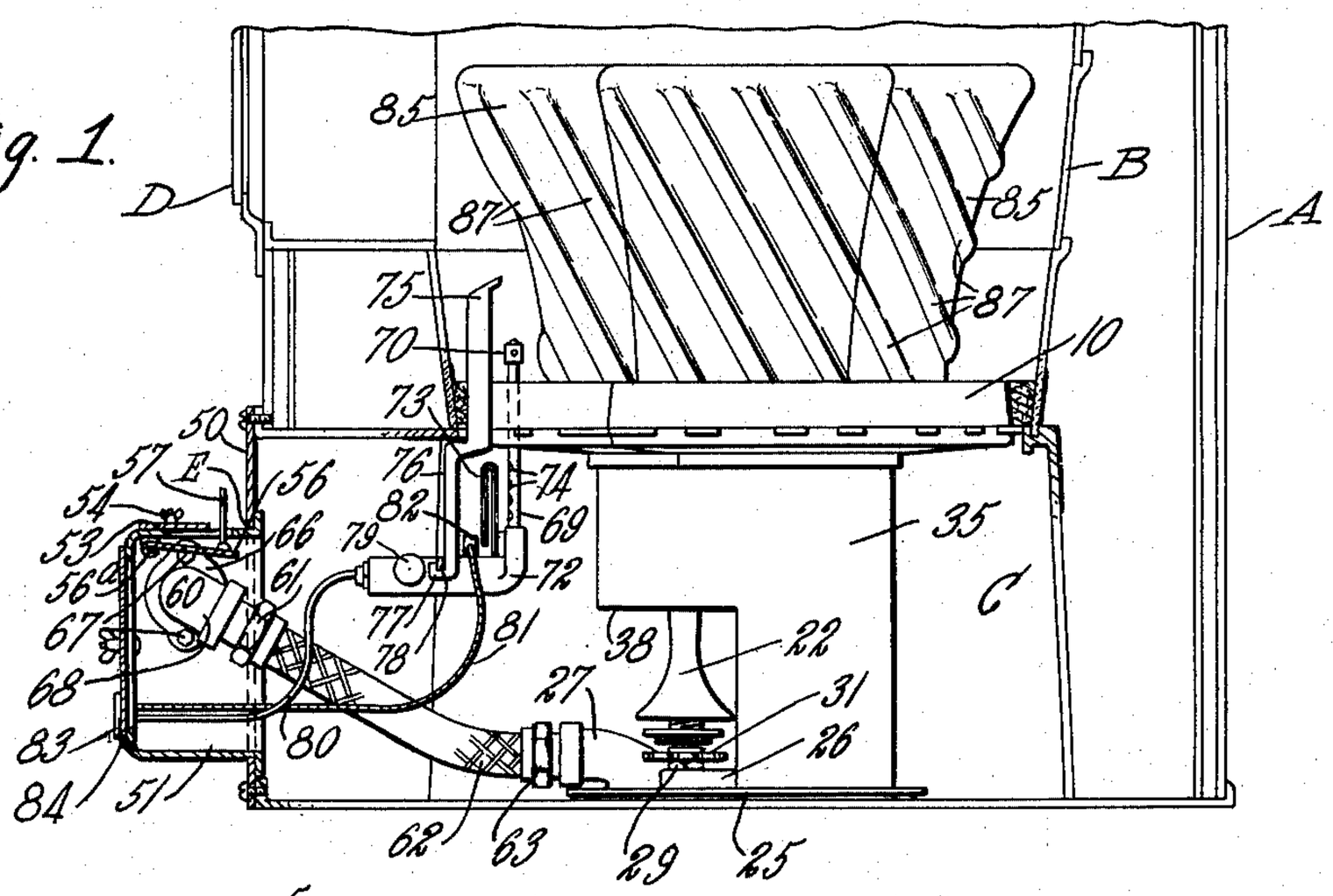
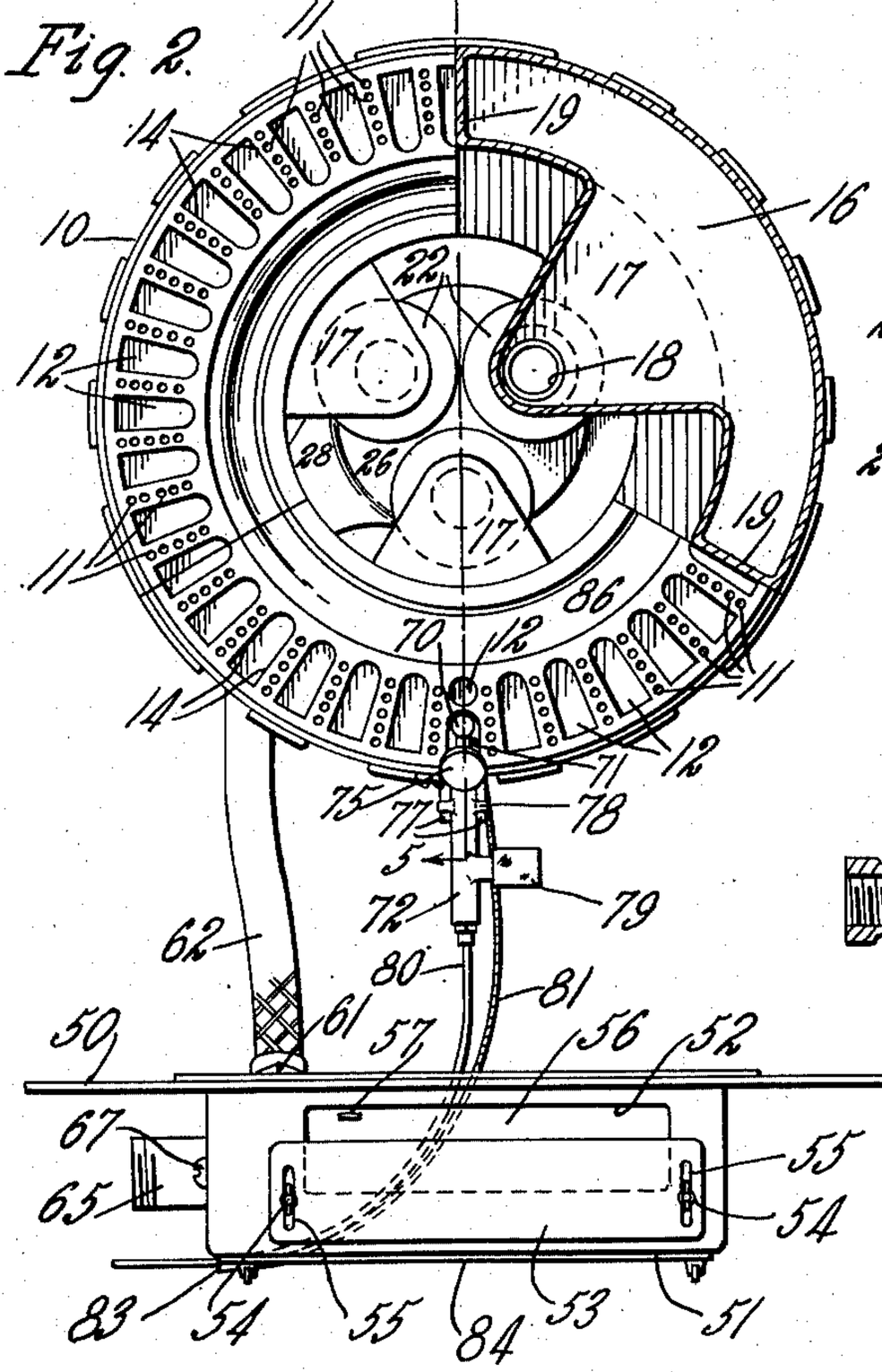


Fig. 2.



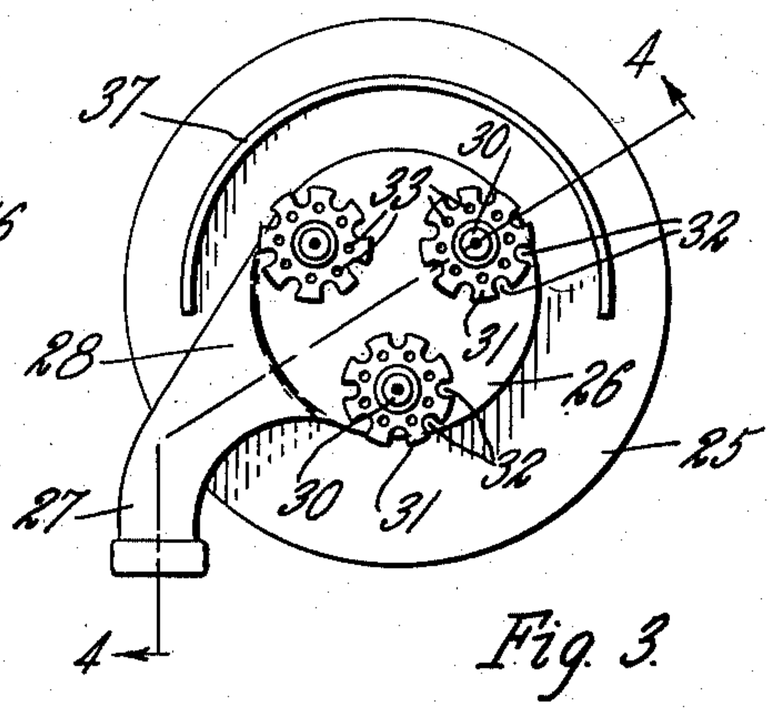


Fig. 3.

Fig. 4

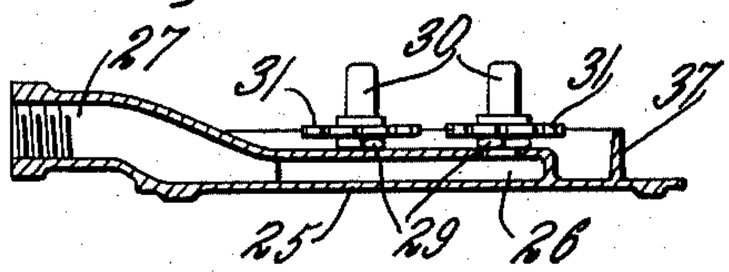


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Fig. 5.

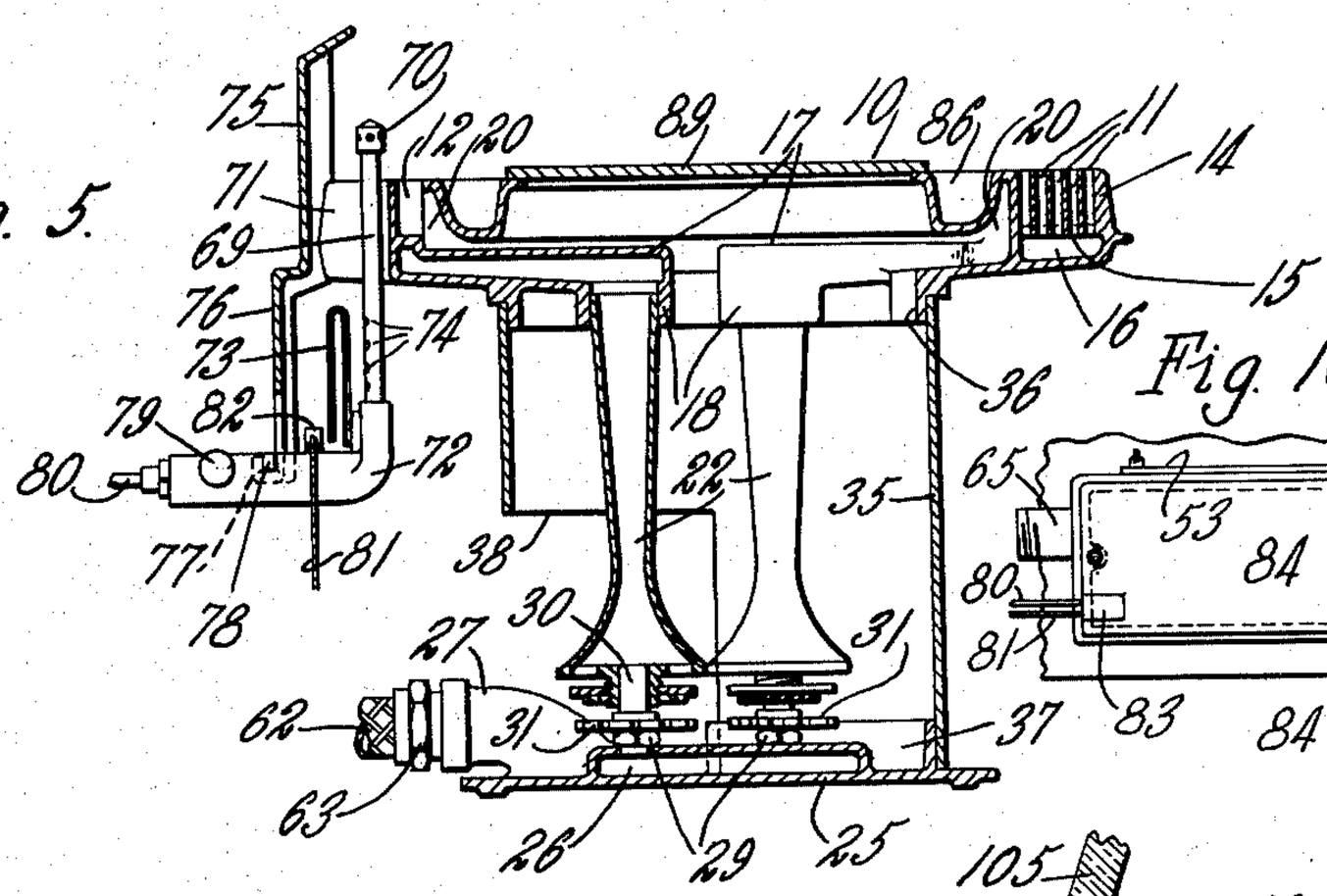
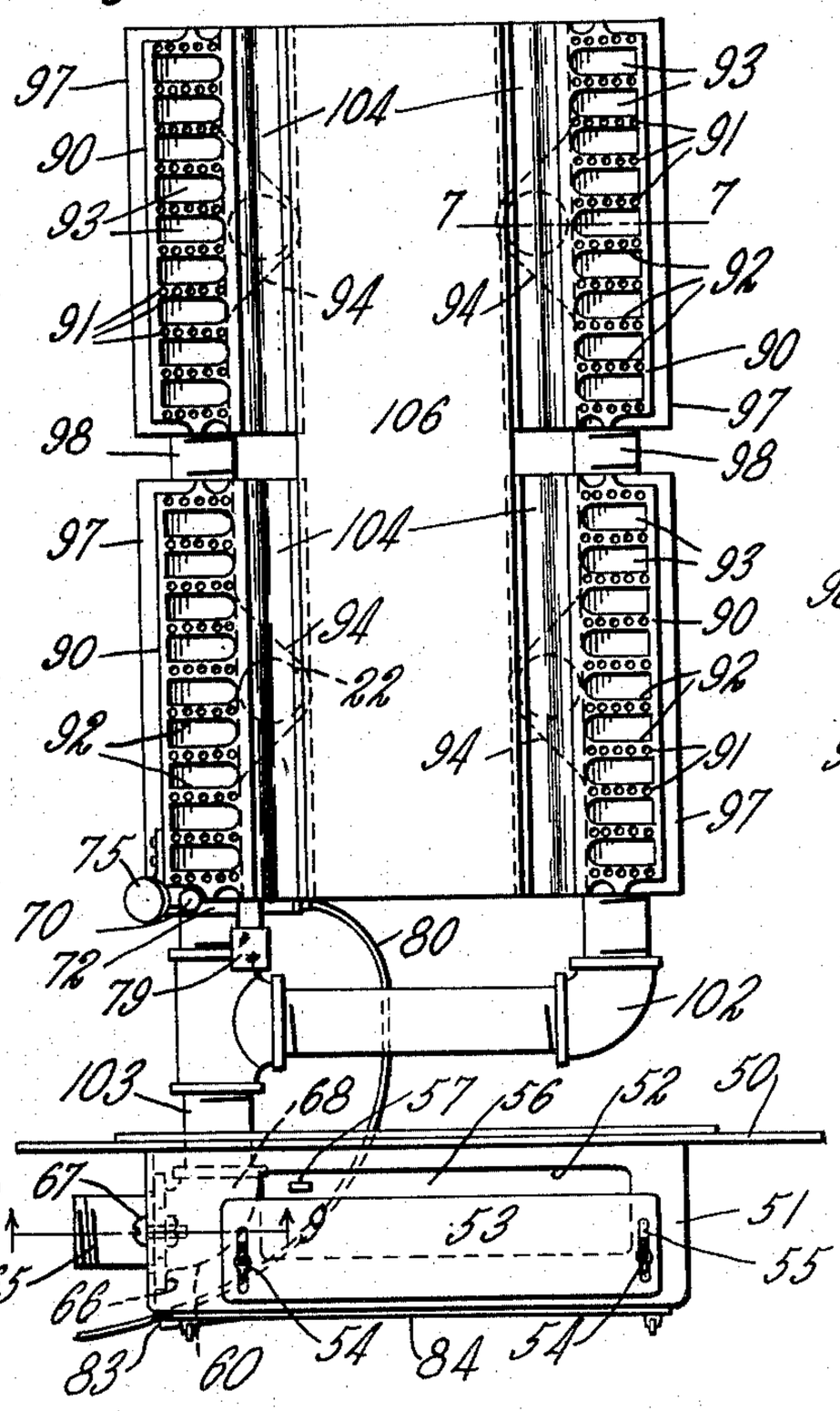


Fig. 10.

Fig. 6.



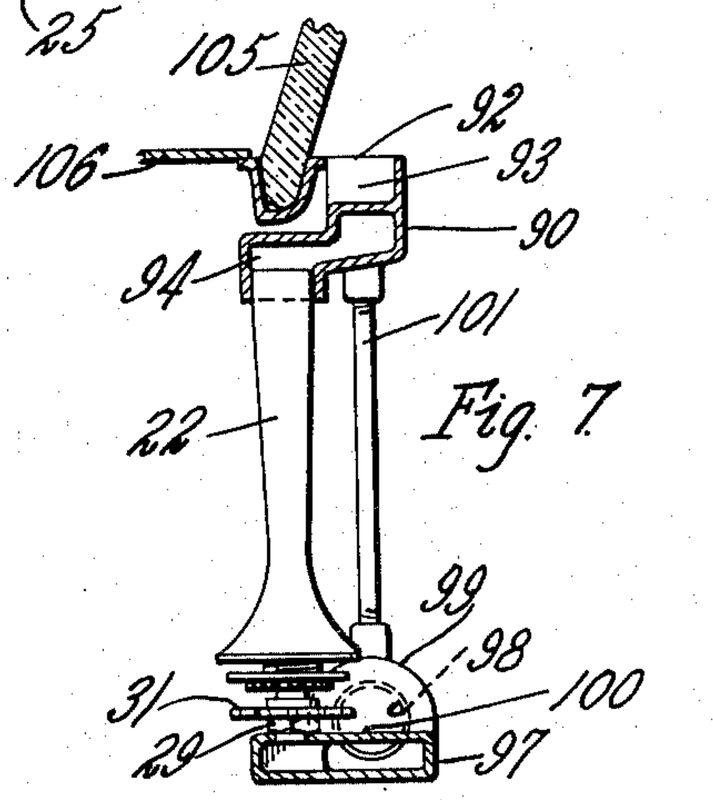


Fig. 7.

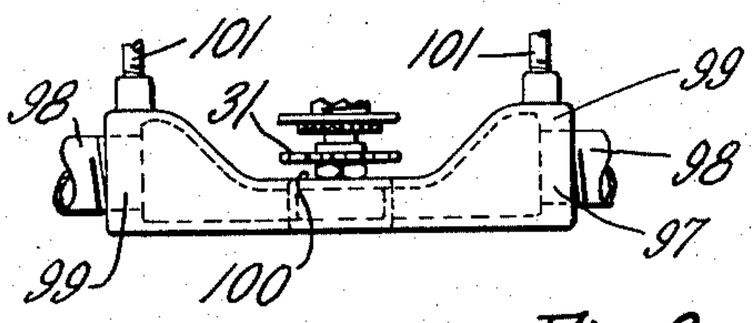


Fig. 8.

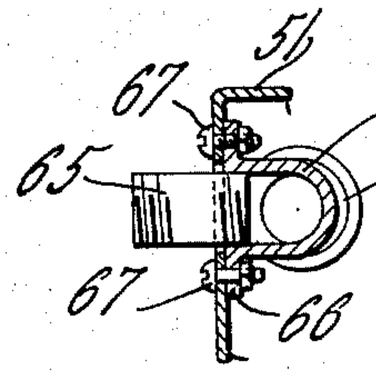


Fig. 9.

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2,123,204

BURNER

Millard J. Roberts, N. Tonawanda, N. Y.

Application November 17, 1933, Serial No. 698,510

9 Claims. (Cl. 158—104)

This invention relates to improvements in burners for use in connection with gaseous fuels.

The objects of this invention are to provide burners of this kind which are constructed to be readily adaptable for installation in furnaces or heaters constructed to operate on solid fuel, and with this main object in mind, the burner includes a burner head of improved construction, in which the air and gas discharge apertures are arranged in such a manner that the burner can operate at a greater capacity than has heretofore been possible with similar burners, and also noiselessly on any type of gaseous fuel. Other objects of the invention are to provide a more compact burner unit, which requires less space beyond the furnace or heater itself; also to provide a burner of this kind with mixing tubes which are arranged in upright or vertical positions to conserve space and improve the operation and increase the capacity of the burner; also to provide means of improved construction for supporting the burner head from a base; also to provide a burner of this kind with radiants or baffles which are provided with ribs extending in a helical or spiral direction about the axis of the burner so as to cause the flame and hot gases to travel a greater distance within the combustion space of the furnace and to produce more complete combustion; also to provide a burner of this kind with improved means for attaching a portion thereof to the ash pit door frame or other part of the furnace; also to provide improved means for regulating the supply of air used in the burner; also to provide a flexible connection between the burner and the air and gas control means to facilitate installation of the burner; also to provide a burner of this kind with improved means for adjusting the supply of fuel to the mixing tubes; also to provide a burner of this kind with means of improved construction for mounting the pilot burner assembly so that this assembly can be readily removed to permit repairs or inspection; also to improve the construction of burners of this kind in other respects hereinafter specified.

In the accompanying drawings:

Fig. 1 is a vertical section of a furnace showing an elevation of a burner embodying my invention.

Fig. 2 is a top plan view on an enlarged scale of the burner head removed from the furnace and having the baffles removed therefrom, the burner being shown partly in section.

Fig. 3 is a top plan view of the bottom part or base of the burner.

Fig. 4 is a sectional view thereof, on line 4—4, Fig. 3.

Fig. 5 is a sectional elevation of the burner, on line 5—5, Fig. 2.

Fig. 6 is a top plan view of a burner of modified construction for use in a rectangular combustion chamber.

Fig. 7 is a fragmentary sectional elevation, on line 7—7, Fig. 6.

Fig. 8 is a side elevation of a section of the base of the burner shown in Figs. 6 and 7.

Fig. 9 is a fragmentary sectional view on line 9—9, Fig. 6.

Fig. 10 is a front elevation of the inlet box used with the burner illustrating the detachable cover provided therefor, said cover being partly broken away.

In Fig. 1, my improved burner is shown as installed in a hot air furnace or heater A having a fire pot B for solid fuel. The usual grates in such furnace or heater are removed and the flame projecting portion or head of the burner is located in the lower portion of the fire pot, the parts of the burner extending downwardly into the ash pit C. D represents the usual fuel door of the furnace and E the ash pit opening. It will be understood that my improved burner may be installed in a boiler or any other furnace or heater.

My improved burner includes a burner head 10, which may be in the form of a casting, as shown, or of other construction, and is provided with passages for air and gas and orifices or openings through which the combustible mixture and secondary air are discharged from the top surface of the burner head 10. I have found that a burner of materially increased capacity can be produced by arranging the gas discharge ports or orifices 11 in a series of rows extending inwardly from the periphery, instead of arranging these orifices in circles concentric with the wall B of the combustion chamber. In order to supply the necessary secondary air to the gaseous mixture discharged through the ports 11, I also provide, between adjacent rows of orifices, discharge openings 12 for secondary air. By means of this arrangement, a much greater number of fuel ports or orifices can be provided in the limited space adjacent to the wall B of the combustion chamber, so that a large amount of fuel can be burned and at the same time sufficient secondary air can be supplied to the flame. Any suitable structure may be employed to produce these results and by way of example, I have shown a burner head in which the fuel discharge ports 11 are arranged in relatively deep substantially upright radially extending webs 14 which extend from the top surface of the burner head 10 to a web 15 extending continuously around the edge portion of the burner head and with which the lower ends of the upright webs or ribs 14 may, as shown, be integrally formed. The horizontal circular web 15 also forms the top wall of one or more passages 16 for the mixture of primary air and fuel. The ports 11 may

be drilled or otherwise formed in the ribs 14 and extend from the top surface of the burner plate 10 into the passage 16, so that each port will be of a length at least several times greater than its diameter. The structure described results in relatively long holes through which the primary mixture passes, which results in a practically noiseless operation of the burner, whether operating on natural, artificial, or mixed gas, probably due to the fact that the surface friction of these orifices prevents lifting of the flames above the outlets of the ports. Furthermore, the arrangement of these holes in more or less radially extending rows results in greater capacity of the burner without any loss in efficiency, since the necessary amount of secondary air for complete combustion is supplied to the flame issuing from these jets through the secondary air passages 12 arranged at opposite sides of the rows of ports 11.

In the construction shown in Figs. 1 to 5, the burner head is formed in three sections to facilitate installation of the same in a furnace or heater and the passage 16 of each section is provided with an inwardly extending flaring or V-shaped portion 17, having an inlet duct 18 for the mixture of fuel and primary air arranged in the part thereof near the center of the burner head. By means of this flaring or fan-shaped construction of the passage 17, the mixture of fuel and primary air will be supplied to the passage 16 in such a manner that all of the burner ports 11 will receive the primary mixture at substantially the same pressure. When a burner is built in sections as shown in Figs. 1 to 5, each chamber 16 is, of course, provided with end walls 19, so that each section may receive its own supply of gaseous mixture independently of other sections. If the burner is constructed in a single piece, the passage 16 may continue to form a complete ring. It will, of course, be understood that burners of this type may be built in one or more sections or parts.

The burner head is also provided with passages 20 for the secondary air, which passages terminate in the air ducts 12 arranged between rows of ports 11 and the passages 20 receive air from the lower face of the burner head 10 from the spaces between the inwardly extending ducts 17 carrying the mixture of fuel and primary air. As may be seen by referring to Figs. 2 and 5, ample space is provided for the admission of secondary air from beneath the burner head 10 to the secondary air passages 20.

22 represents the usual mixing tubes for supplying a mixture of primary air and fuel to the inlet ducts 18 of the burner head. In my improved burner, I have arranged these mixing tubes in upright positions, and when so arranged a more compact burner structure is produced and furthermore, since gaseous fuel is lighter than air, the flow of combustible mixture upwardly through the mixing tubes 22 because of the pressure at which the jets of fuel are discharged into the lower ends of the mixing tubes, will be accelerated by the tendency of the lighter mixture to rise. By means of the vertical arrangement of the mixing tubes, the primary mixture can be discharged from the mixing tubes directly into the burner head, so that the resistance to flow of the primary mixture to the burner head is correspondingly reduced. Consequently, each burner tube can operate at a greater capacity.

The burner also includes a lower member or base 25 which is formed with a chamber or manifold 26 for fuel. This base or lower member may also, if desired, be in the form of a casting, and as shown is provided with an integrally formed tube or duct 27, the outer end of which may be connected with a gas supply pipe or duct and the inner end of which is flared out as shown at 28, Fig. 3, and terminates in the fuel manifold or chamber 26 which may be substantially circular in form and shallow or flat so as to occupy very little vertical space. The top surface of this fuel chamber 26 may be drilled or otherwise provided with apertures through which gas may be discharged and the number of apertures formed in the top wall of the manifold 26 will, of course, correspond to the number of sections in which the burner is constructed, one aperture being provided for each mixing tube.

The gas discharge apertures in the top wall of the fuel chamber 26 preferably have nipples 29 secured therein, and any suitable or desired valve or flow regulating means may be provided on the nipples. These valves are not herein shown, but each includes a cylindrical apertured part or tube 30 which is adjustable relatively to the nipple 29, preferably by a threaded engagement with the nipple and the tube or part 30 has an adjusting disk wheel 31 secured thereto to facilitate such adjustment. Each wheel or disk 31 preferably has a knurled or recessed peripheral portion, recesses 32, Fig. 3, being shown in the construction illustrated and preferably the wheel also has holes 33 arranged therein. Adjusting wheels of this construction have the advantage that when the mixing tubes are located in a heater at such distance from the ash pit opening as to be out of reach, it is easy to adjust the wheels by means of a wire or rod having its end bent over and which may be inserted into the ash pit so that the bent end may engage in the recesses 32 or in the apertures 33 to turn the wheel.

The mixing tubes 22 rest on the adjustable tubes 30 and it is not desirable to support the weight of the burner head 10 upon these adjustable tubes 30 by means of the mixing tubes. I, consequently, provide a support 35 for the burner head 10 which support, with a round burner, is preferably in the form of a substantially cylindrical or tubular shell. The upper end of this tubular supporting member may engage with a suitable shoulder 36 formed on the lower ends of the sections of the upper part 10 of the burner and the lower end of the support 35 may be held in correct relation to the base member 25 of the burner by means of an upwardly extending flange 37 formed on this base. The lower front portion of the tubular support is cut away as shown at 38 to form an opening to permit air to flow into the interior of the base 35 and the fuel supply duct 27 also passes through this opening. The upper end of each mixing tube is of cylindrical form and has a sliding connection with the correspondingly formed inlet duct 18, see Figs. 5 and 7, and this sliding connection, as well as the sliding connection between the sleeves of the mixing tubes 22 and the gas discharge tubes 30, eliminates the need for accurate dimensions of the supporting member 35 and avoids the possibility of having the weight of the burner head supported by the mixing tubes.

When a burner of this kind is installed in a furnace or heater, the usual ash pit door or door frame is removed and the opening thus formed is closed by means of a sheet metal plate

50, to which an inlet box or enclosure 51 is suitably secured. In applying my burner to a furnace, I provide for variations in the sizes of the ash pit openings of different heaters by making the plate 50 of sheet metal and of sufficient size to fit the largest ash pit opening that may be encountered and when used on furnaces having smaller openings, the sheet metal plate 50 may be cut or trimmed to the desired size, by using merely ordinary tools which are readily available at the place of installation. The plate may then be provided with the necessary holes so that it may be secured by means of the screws or bolts which hold the door frame in place. The plate may also be trimmed in such a manner that the box 51 secured thereto may be located in the desired position with respect to the ash pit opening. The inner face of the box 51 is open to the ash pit space of the furnace and the admission of air to the burner may be controlled by any suitable means, which are preferably mounted on the box. In the particular construction shown, an elongated or rectangular opening 52 is provided in the top of the box 51, and a plate 53 is arranged on the top wall of the box so that the plate 53 may extend over the opening 52 to any desired extent to admit the correct amount of air to the burner. The plate 53 may be adjustably secured to the top of the box 51 in any suitable manner, for example, by means of clamping bolts or the like 54 passing through slots 55 in the plate and extending through apertures in the top wall of the box 51. I preferably also provide an air damper 56 for shutting off the admission of air to the burner when no fuel is supplied thereto, and in the construction shown, this damper is pivoted at 56*a* on the under surface of the top wall of the box 51 in such a manner that the damper 56 may be swung upwardly on its hinges 56*a* into a position to close the air opening 52. A link or arm 57 is provided on the damper 56 and extends upwardly through the air opening 52 into a position to be connected with any suitable mechanism for actuating this damper, preferably in such a manner that when the supply of fuel to the burner is interrupted, the damper will be closed, so as to avoid loss of heat from the interior of the furnace by cool air entering the air opening 52.

The box 51 is also provided with means for supporting a pipe or duct through which fuel may pass to the burner. In the construction shown for this purpose, a union or elbow 60 is provided, one end of which extends through an aperture in a side of the box 51 and the other end of which is connected by means of a suitable coupling 61 to a tube 62, the other end of which is connected by another coupling 63 to the gas inlet tube or duct 27. The tube 62 is preferably flexible and made of materials capable of withstanding the temperature to which it may be exposed in the ash pit of the furnace and is sufficiently flexible to allow for a considerable variation in the space between the box or enclosure 51 and the base plate or member 25 of the burner. Since the gas duct 27 of the base 25 extends tangentially with reference to this base, it will be obvious that by the use of a flexible tube 62 and by turning the base 25 about its vertical axis, considerable variation in the distance between the base and the box 51 can be compensated for without requiring any cutting or fitting of parts. A rigid tube of ordinary form may, of course, be used, if desired.

The union elbow 60 is preferably constructed with a straight tubular portion 65 which may extend through the hole in the side of the box 51 and which may be threaded or otherwise formed for connection with suitable pipes or conduits, and this straight tubular portion terminates in a flange 66 which is of such dimensions that it may be provided with holes for receiving bolts or screws 67 for securely clamping this flange to the side wall of the box 51. By means of this construction, a tight joint can be made between the elbow and the box 51, and furthermore, this elbow will be rigidly supported in correct location with reference to the box. Adjoining the flange 66 is the curved portion 68 of the elbow, which terminates in a suitable threaded or other connection for attachment of the coupling member 61 of the flexible tube 62.

70 represents a pilot burner arranged at the end of a pipe 69 and extending through a recess 71 formed in the burner head 10. The lower end of this pipe is secured to a housing 72 which also supports a thermostatic element 73 subjected to flames issuing from small orifices 74 in a side of the pilot burner tube 69. This thermostatic device is employed to prevent the admission of gas to the main burner in the event that the pilot flame becomes extinguished, and since this device does not constitute a part of this invention it is not therefore herein fully described. 75 represents a shield deflector bracket which is rigidly secured to the main burner head 10 adjacent to the pilot burner. In accordance with my invention, I provide the deflector 75 with a downwardly extending leg 76, the lower end of which is bifurcated. Both legs of the bifurcated portion are provided at their lower ends with hooks 77 adapted to receive lugs 78 formed on the sides of the pilot burner housing 72 for supporting this housing, as well as the pilot burner and other parts connected therewith in correct relation to the burner head 10. In case any repairs or adjustments are necessary on the pilot burner or the thermostatic control mechanism, it is merely necessary to lift the housing 72 and the parts connected therewith to disengage the lugs 78 from the hooks 77, whereupon this housing can be removed from the burner for inspection, adjustment or repairs. 79 represents an air inlet in the housing 72 through which air may be admitted for mixing with the fuel. A tube 80 which conducts gas to the pilot burner housing 72 is connected to the housing 72 so that it can be readily disconnected therefrom. 81 represents an electrical conductor leading to a terminal 82 with which the thermostatic member may contact when acted upon by the flames from the orifices in the tube of the pilot burner, to suitable connections located exterior to the furnace. The usual control devices for the burner are not shown, since they do not constitute a part of this invention, and if desired, the burner may be used without these devices.

In order to provide full accessibility to the various devices within the ash pit C and the inlet box 51, the latter is preferably provided with a removable front wall or cover 84. This cover may be attached in any suitable manner. For example, as shown in Fig. 10, the front of the box 51 may have a marginal flange 84*a*, leaving a relatively large opening 84*b* into which a pair of projections on said flange extend, for the reception of bolts or fastening devices which pass through holes in the cover 84 to secure it in place.

By simply detaching this cover, the described control of the gas flow may be effected through

the front opening by manipulating the adjusting disks 31, the pilot 70, thermostat 73, and pilot casing 72 may be adjusted or removed and the attachment of the tube 80 and electrical conductor 81 inspected. The cover 84 is preferably provided with a bulge or curved portion 83 for the entrance of the tube 80 and conductor 81 into the front opening of the inlet box.

The provision of the removable cover 84 for the inlet box 51 is of further advantage in that the aforesaid adjustments, inspection or removal of parts within the inlet box or ash pit may be made, without disturbing the adjustment of the air inlet control plate 53 or the adjustment of the connections between the air damper 56 and its actuating mechanism.

The burner head 10 is also employed to support a baffle which may be made of ceramic or refractory material, and against which the flames from the main burner are projected, and which in turn projects the flame and products of combustion against the wall B of the combustion chamber. This baffle in the construction shown may be made of a plurality of sections or segments 85, the lower ends of which extend into an annular channel 86, which may, for example, be formed integrally with the burner plate or casting 10 in such a manner as to grip the lower ends of the baffle sections and support the same in their upright or operative positions. Any other means for supporting the sections of the baffle may be provided, if desired. The outer surface of the baffle is preferably provided with a plurality of helical or spiral ribs 87 which tend to deflect the hot gases and flame impinging against the same in such manner as to give them a swirl-the same in such a manner as to give them a swirl-producing a thorough mixing of air and gas, insuring complete combustion, and also producing a longer path of travel of products of combustion from the gas orifices to their discharge beyond the upper edge of the baffle. This causes the hot gases to remain for a longer period of time in the space between the baffle and the furnace wall, thus causing the gases to give up a greater percentage of their heat to the walls of the furnace. This results in increased efficiency of the burner. It will be noted that the spiral ribs are preferably so formed that when the sections of the baffle are placed together in their operative positions, any ribs terminating at the sides of the sections will be in registration with the ribs of an adjacent secton so that the ribs will be continuous across the adjoining sides of adjacent sections.

The baffles, of course, confine the heat from the flames to a space adjacent to the furnace wall, and thus avoid the burning of fuel in the middle portion of the fire pot, where the heat from such combustion cannot be adequately transferred through the furnace walls. In order to further prevent the circulation of any air through the space within the baffle, a plate 89 may be placed on the inner portion of the burner head to prevent air from the ash pit from passing upwardly through the portion within the baffle. Other means for this purpose may, of course, be provided.

In Figs. 6 to 8, my invention is shown applied to a burner for use in connection with a furnace or heater having a rectangular fire pot or combustion chamber. In this construction, the burner head includes a plurality of sections 90. The sections 90 of the burner head have relatively deep ribs 92 provided with orifices 91 similar to the orifices 11 shown in Figs. 1 to 5, and air spaces 93 arranged between the ribs 92. The sections 90 of the burner head are provided with ducts or passages 94 for the primary mixture, the burner ports 91 terminating at their lower ends in passages 94. Mixing tubes 22 supply the combustible mixture to the passages 94.

This type of burner has a base which is formed in a plurality of sections 97 connected by threaded tubes 98 or in any other suitable manner. It will be understood, of course, that in the end sections of the base the threaded holes for the tubes 98 can be closed by means of threaded plugs, disks or the like. The base sections 97 have substantially tubular end portions 99 and the intermediate portions 100 which serve to support the mixing tubes 22 are flattened, so that there will be ample vertical space for the mixing tubes between the base sections and the burner head sections. As in the round burner construction which has already been described, it is desirable to support the burner head sections from the base by means independent of the mixing tubes 22, so as not to interfere with the adjustment of the fuel valve wheels 31, and in the construction shown in Figs. 6 to 8, a plurality of upright rods 101 are provided for this purpose, the upper and lower ends of which may have a threaded engagement with lugs formed on these sections. Pipes 102 and 103 supply fuel to the two rows of base sections 97, and these pipes, in the construction illustrated, are connected by a T. The pipe 103 connects with an elbow 60 similar to that which has already been described in connection with Figs. 1 to 5. The means for admitting air and gas to the ash pit of the furnace may be identical with that described in connection with Figs. 1 to 5, including a plate 50 to which a box 51 is secured, having means for controlling the admission of air to the ash pit.

The rectangular burner may be made of any suitable or desired length by using as many burner head and base sections as the furnace can accommodate. The burner head is also provided with a groove 104 for supporting baffles 105 which are partly shown in Fig. 7, and a plate 106 prevents the escape of air from the ash pit into the space between the baffles. In other respects, the rectangular burner may be identical with the round burner described in connection with Figs. 1 to 5.

The burners described have the advantages that they operate at a greater capacity than similar burners heretofore on the market, and do so without noise. The greater capacity of the burners described is due to the vertical arrangement of the mixing tubes and also to the arrangement of ports in rows extending inwardly from the outer portion of the burner head, instead of being arranged in circular rows, as heretofore. The upright arrangement of mixing tubes results in a more rapid flow of gas and air through these tubes than through horizontal tubes, for reasons which have already been stated. This rapid flow results in greater capacity of the burner and makes it possible for each mixing tube to supply a greater number of ports. The long ports provide sufficient friction to retard the flow of gas through the ports to prevent lifting of the flames above the upper ends of the ports, which causes noisy operation of the burner. This arrangement enables the larger and more rapidly flowing quantities of combustible mixture from the mixing tubes to be used in the burner heads without noise. The vertical arrangement of the

mixing tubes, however, results in a further advantage, namely, that the burner requires less horizontal space in the ash pit, so that with the exception of the small box 51, all parts of the burner can be located in the ash pit of the heater. This burner, therefore, can be installed in a heater without the cumbersome projection beyond the ash pit door which has heretofore been necessary in burners of this type.

I claim as my invention:

1. In a burner for installation in heaters constructed for use with solid fuel, the combination of a burner head and fuel supply means constructed to be arranged in the ash pit space of a heater, a metal plate for closing the opening leading to the ash pit space, a box mounted in an opening in said plate and having an open side facing into said ash pit space, an air inlet opening in a wall of said box, a plate adjustably secured on said wall of said box to partly close said air opening to regulate the admission of air to said burner, and a damper also movably mounted to extend across said opening and which is adjustable for opening or closing that part of said opening which remains uncovered by said plate.

2. In a burner for installation in heaters constructed for use with solid fuel, the combination of a burner head and fuel supply means constructed to be arranged in the ash space of a heater, a metal plate for closing the opening leading to the ash pit space, a box mounted in an opening in said plate and having an open side facing into said ash pit space, an air inlet opening in a wall of said box, a plate adjustably mounted to the outer surface of said box so as to be secured in various relations to said air opening to control the amount of air admitted to the burner, and a damper for said air opening movably arranged on the inner side of said box for opening and closing that part of said opening which remains uncovered by said plate.

3. The combination of a burner head, a pilot burner arranged adjacent to said head, a shield for the pilot burner flame secured to said burner head and having a portion extending downwardly below said head, and an interfitting detachable connection between said portion and said pilot burner for removably supporting said pilot burner on said burner head.

4. A gas burner including a burner head comprising a plurality of sections, a base section for each burner head section, each base section forming a conduit for gas and having relatively high end portions and a low intermediate portion of greater width than said end portions to provide a substantially uniform cross sectional area in all parts of said base section for the flow of gas, the opposite end portions of said base section being threaded for connection with a gas supply conduit and a conduit leading to another base section respectively, a gas discharge orifice in the intermediate portion of said base section, a mixing tube arranged above said orifice, and means for supporting a burner head section from said base section.

5. In a burner for installation in heaters constructed for use with solid fuel, the combination of a burner head and fuel supply means constructed to be arranged in the ash space of a heater, a member for closing the opening to said ash space and having an entrance therein for the admission of air to said burner, manually adjustable means for varying the size of said air entrance, and a damper cooperating with said air entrance for opening and closing the remainder of said entrance.

6. In a burner for installation in heaters constructed for use with solid fuel, the combination of a burner head and fuel supply means constructed to be arranged in the ash space of a heater, a member for closing the opening to said ash space and having an entrance therein for the admission of air to said burner, a plate adjustably secured to said member to partly and variably close said air entrance to regulate the admission of air to said burner, and a movable damper mounted to cooperate with said entrance for opening and closing that part thereof which remains uncovered by said plate.

7. In a burner for installation in heaters constructed for use with solid fuel, the combination of a burner head and fuel supply means constructed to be arranged in the ash space of a heater, a member for closing the opening to said ash space and having an entrance therein for the admission of air to said burner, a plate adjustably mounted upon the outer side of said member to variably control the amount of air passing into said entrance to said burner, and a damper arranged at the inner side of said member for opening and closing that part of said entrance which remains uncovered by said plate.

8. The combination of a burner head, a pilot burner shield secured to said burner head, a pilot burner disposed behind said shield and between the same and said burner head, said shield having a part depending below said burner head and which part is bifurcated to provide a pair of spaced legs, a pilot control housing extending between said legs and having at the rear thereof a connection with said pilot burner for supporting it, said legs of said shield each having a hook thereon, and lugs at opposite sides of said housing which removably seat in said hooks to detachably support said housing and said pilot burner in operative relation to said burner head and said shield.

9. In a burner for installation in a heater for use with solid fuel, the combination of a burner head arranged in the combustion chamber of said heater, fuel supply means arranged in the ash pit of said heater below said burner head and comprising a substantially flat, hollow fuel receiving unit resting upon the bottom of said ash pit, fuel discharge means connecting said unit with said head, means independent of said fuel discharge extending upwardly from said unit and engaging with and supporting said burner head, a box closing the front of said ash pit and having means for admitting air to said ash pit, said fuel discharge means and said burner head, a flexible fuel supply conduit connected at one end to said box, a tangential inlet port on said fuel receiving unit to which the other end of said flexible conduit is attached, whereby by rotating said unit about its axis, said unit, said fuel discharge means, said burner head and said burner head supporting means may be rotated and adjusted to accommodate the length of said flexible conduit and whereby a burner including said box may have a conduit of a given length which enables installations to be made wherein said burner head and said fuel receiving unit may be positioned at different distances from said box.

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