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ATTACHMENT FOR GAS-BURNING APPARATUS

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FIG.1

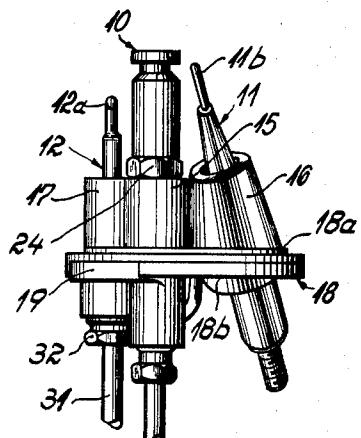


FIG. 3

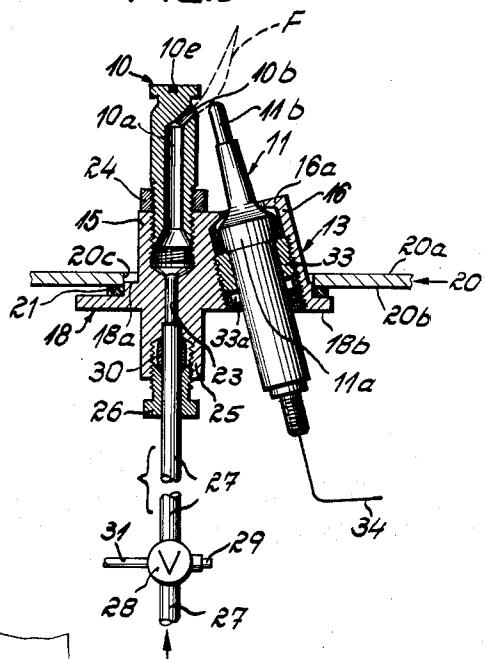
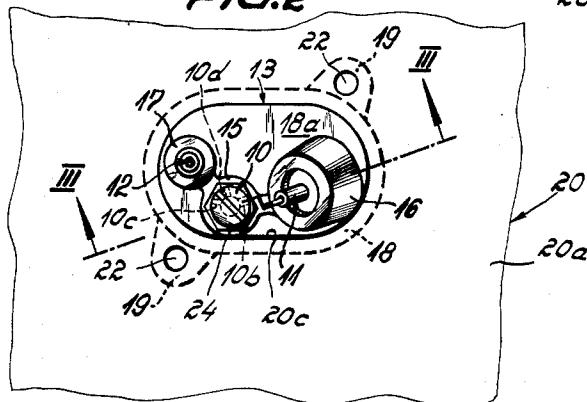


FIG. 2



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**ATTACHMENT FOR GAS-BURNING APPARATUS**

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J 10,885

5 Claims. (Cl. 158—123)

The present invention relates to gas-burning apparatus in general, and more particularly to an attachment which may be put to use in gas ranges, in gas-burning furnaces, in gas-burning heaters, in gas-heated boilers and in many other types of gas-heated or gas-burning appliances and apparatus. Still more particularly, the invention relates to an attachment which delivers, ignites and controls the flow of gaseous fuel to such apparatus.

It is an important object of my invention to provide a very simple, exceptionally compact, lightweight and low-cost attachment which may be used in all or nearly all types of gas-burning or gas-heated apparatus and whose components are readily accessible for the purpose of inspection, cleaning, replacement and/or repair.

Another object of the invention is to provide an attachment of the just outlined characteristics wherein the escape of gaseous fuel is prevented in a fully automatic way as soon as the flame on the burner nozzle is extinguished, either accidentally or on purpose, wherein the position of the igniter with respect to the burner nozzle is fixed in such a way that the gas-igniting portion of the igniter is in optimum position with reference to the gas-discharging portion of the burner nozzle, and wherein the heat-sensitive portion of a customary thermoelectric current generator which automatically prevents escape of non-ignited gases is mounted in such a way that it assumes an optimum position with reference to the gas-discharging portion of the burner nozzle.

An additional object of the invention is to provide an improved supporting member for the burner nozzle, igniter and thermoelectric current generator of an attachment which exhibits the above outlined characteristics.

A further object of the invention is to provide a supporting member which affords access to all or nearly all of the parts supported thereby without necessitating separation of the supporting member from the wall or another element of the apparatus in which the attachment is put to use.

A concomitant object of the invention is to provide a supporting member which may be detached from the apparatus without necessitating even partial dismantling of the apparatus.

Still another object of the invention is to provide a supporting member which is constructed in such a way that it automatically holds the burner nozzle, the igniter and the generator in requisite position as soon as these parts are properly received therein but which nevertheless allows for adjustments of at least one such part in the event that the ignition of gases or heating of the generator is not satisfactory when the apparatus is in actual use.

A further object of the invention is to provide an attachment wherein the igniter, the burner nozzle and/or the generator may be detached and reinserted as often as desired without affecting the accuracy of their positioning with reference to each other and wherein each of these parts may be detached and reconnected either by hand or with the help of very simple and readily available tools.

With the above objects in view, one feature of my invention resides in the provision of a gas-burning or

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gas-heated apparatus comprising a wall one side of which is more readily accessible than the other side thereof and which is provided with an opening, an attachment including a one-piece supporting member having a substantially plate-like base adjacent to the one side of the wall so as to extend across the opening and having a readily accessible outer side, and fastener means detachably securing the base to the one side of the wall. The supporting member comprises a series of holders in the form of nipples which are integral with the base and which extend through the opening and beyond the other side of the wall, and the attachment further comprises a burner nozzle which is preferably detachably received in one of the nipples, an igniter which is preferably detachably received in a second nipple and whose gas-igniting portion is closely adjacent to the gas-discharging portion of the burner nozzle, and a thermoelectric current generator which is preferably detachably received in a third nipple and a heat-sensitive portion of which is closely adjacent to the gas-discharging portion of the burner nozzle. At least the igniter and the current generator will be normally arranged in such a way that each thereof is accessible through the outer side of the base and the arrangement is such that, when properly received in their respective nipples, the igniter and the generator will automatically assume optimum positions with reference to the gas-discharging portion of the burner nozzle to make sure that the gas discharged by the burner nozzle will be ignited as soon as the igniter is operated and that the generator will send an electric current as soon and as long as the gas is burning.

The nipples may be provided with internal threads but, if desired, the respective parts may be retained therein in bayonet lock fashion or in another suitable way.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved attachment itself, however, both as to its construction and the mode of assembling and mounting the same, together with additional features and advantages thereof, will be best understood from the following detailed description of a specific embodiment with reference to the accompanying drawings, in which:

FIG. 1 is a side elevational view of the attachment;

FIG. 2 is a top plan view of the attachment as seen from the hard-to-reach inner side of a supporting wall which constitutes a component part of the gas-burning apparatus wherein the attachment is put to use; and

FIG. 3 is a section as seen in the direction of arrows from the line III—III of FIG. 2.

Referring to the drawings, and first to FIG. 1, there is shown an attachment which is especially suited for use in a gas-burning or gas-heated apparatus such as a gas range, a gas-heated boiler, a continuously heating gas furnace or the like. It is assumed that the attachment is used in a gas range or a similar appliance and that it is secured to the readily accessible outer side 20b of a wall 20 which is the rear wall of the range. This attachment includes a burner here shown as a nozzle 10, an igniter here shown as a spark plug 11, a conventional thermoelectric current generator 12, and a one-piece supporting member 13 which comprises specially configurated tubular holders or nipples provided with sockets for reception of the parts 10, 11 and 12. The arrangement is such that the burner 10 is accessible from the inner side 20a of the wall 20 and that the igniter 11 and generator 12 may be reached from the outer side 20b of this wall. The outer side 20b is more readily accessible than the inner side 20a.

The supporting member 13 further comprising a carrier in the form of a plate-like base 18 having at its inner side

a slightly raised oval platform 18a which fits into a complementary opening 20c of the wall 20. The base 18 extends across the opening 20c and the platform 18a is surrounded by an annular sealing element 21 of elastic material which abuts against the outer side 20b of the wall 20 around the opening 20c. The base 18 is provided with two laterally extending projections or lugs 19 which are detachably secured to the outer side 20b of the wall 20 by screws 22 or by similar fasteners. The heads (not shown) of the screws 22 are located at the outer side 18b of the base 18 so that an operator may rapidly detach the supporting member 13 merely by withdrawing the screws 22 and by thereupon withdrawing the platform 18a from the opening 20c.

The supporting member 13 further comprises a first tubular holder or nipple 15 which extends through the opening 20c and beyond the inner side 20a of the wall 20 and which is provided with internal threads to mate with external threads provided on the burner 10. It will be noted that the axis of the nipple 15 is substantially perpendicular to the general plane of the base 18. The burner 10 is formed with a central bore 10a which communicates with three inclined discharge orifices 10b, 10c, 10d and with a bore 23 provided in the base 18. The orifices 10b-10d are provided in the gas-discharging end portion of the burner 10 which extends beyond the open end of the nipple 15. It will be noted that the burner 10 is held against rotation by a lock nut 24 which bears against the end face of the nipple 15. The axial position of the burner 10 may be adjusted upon loosening of the nut 24. The nipple 15 is aligned with a second tubular holder or nipple 25 which extends beyond the outer side 18b of the base 18 and which is provided with internal threads to take an externally threaded annular plug 26 connected to the discharge end of a gas supply conduit 27 which contains a safety valve 28. The valve 28 is of known design and is operated either manually by a pushbutton 29 or automatically by the thermoelectric current generator 12 in a manner which will be described later. There is a packing 30 which is accommodated in the socket of the nipple 25 and which is compressed by the plug 26 to prevent escape of gas at the outer side of the supporting member 13. The operative connection between the safety valve 28 and the thermoelectric current generator 12 comprises a conductor 31 one terminal portion of which is electrically connected with the generator 12 by means of a nut 32.

A third tubular holder or nipple 16 of the supporting member 13 extends through the opening 20c and beyond the inner side 20a of the wall 20 and is provided with internal threads to take an externally threaded annular plug 33 which causes a boss 11a on the central portion of the igniter 11 to abut against the inwardly bent annular edge portion 16a at the open end of the nipple 16 and to thereby provide a fluidtight seal between the socket of the nipple 16 and the space at the inner side 20a of the wall 20. The socket of the nipple 16 is open at the outer side 18b of the base 18 so that an operator may engage the rear end of the plug 33 by means of a suitable tool in order to remove the igniter 11 for the purpose of inspection or replacement. The plug 33 is formed with slots 33a which may receive the tip of a suitable tool. A similar slot 10e is provided in the gas-discharging portion of the burner 10 so that it may take the tip of a screwdriver which serves to unscrew the burner from the socket of the nipple 15.

A fourth tubular holder or nipple 17 of the supporting member 13 is similar to the nipple 16 and serves to receive the externally threaded central portion of the thermoelectric current generator 12 so that the heat-sensitive tip 12a of the generator is located between the orifices 10c, 10d, see FIG. 2. Thus, the tip 12a extends beyond the open end of the nipple 17 and is closely adjacent to the gas-discharging portion of the burner 10.

The generator 12 may be reached from the outer side 18b of the base 18 because the outer end of the socket defined by the nipple 17 is open and because a portion of this generator extends beyond the outer side 18a. It will be noted that the axis of the nipple 16 is inclined with reference to the nipple 15 so that the gas-igniting electrode 11b of the igniter 11 extends beyond the open end of the nipple 16 and into close proximity of the orifice 10b in the gas-discharging portion of the burner 10. The arrangement is such that, when the attachment is fully assembled, the electrode 11b automatically assumes an optimum position with reference to the orifices 10c, 10d whereby any likelihood of improper operation is avoided at all times. A conductor 34 connects the igniter 11 with a suitable source of electrical energy, not shown. The outer end portion of the igniter 11 extends beyond the outer side 18a of the base 18.

When the operator desires to use the gas range, the pushbutton 29 is depressed so that a stream of gas flows toward the orifices 10b-10d, and the operator simultaneously completes the circuit of the igniter 11 whereby the electrode 11b ignites the gas stream which escapes through the orifice 10b. The resulting flame F ignites the gas streams which flow through the orifices 10c, 10d so that the tip 12a is heated and the generator 12 sends a weak current to a suitable electromagnet which is accommodated in the safety valve 28 and which is thus energized to automatically retain the valve 28 in open position as long as the flames at the orifices 10c, 10d heat the tip 12a. The operator is now free to release the pushbutton 29 because the energized electromagnet continues to maintain the safety valve 28 in open position as long as the gas escaping from the burner 10 is ignited. When the flames are extinguished, either accidentally or on purpose, the tip 12a is cooled and the generator 12 ceases to send a current through the conductor 31 so that the safety valve 28 closes in a fully automatic way and prevents uncontrolled escape of gas. The construction of the safety valve 28 is described in full detail in a co-pending application Serial No. 311,062 of Josef Schmid and Andreas Pritzkow (entitled "Electromagnet for safety valves and the like") which is assigned to the same assignee.

The one-piece supporting member 13 may be made of metallic or synthetic plastic material and one of its important advantages is found to reside in that the co-operating parts 10, 11, 12 of the improved attachment are automatically located in requisite position with reference to each other so that there is no danger of uncontrolled escape of gas once the attachment is secured to the wall 20. Another important advantage of the attachment is seen in that the member 13 may be rapidly attached to or disconnected from the outer side 20b of the wall 20 and that nearly all of its parts may be detached even if the supporting member 13 remains secured to the wall. It goes without saying that the attachment of my invention may be modified in such a way that the burner 10 is accessible from the outer side 18b of the base 18 and that the igniter 11 (which is shown in the form of a spark plug) may be replaced by a different igniter (for example, one wherein the gas-igniting electrode 11b is replaced by a hot wire) without in any way departing from the spirit of this invention.

The improved attachment is of particular advantage in such types of gas-burning appliances and apparatus wherein the interior of the apparatus is normally hard to reach without partial or complete dismantling of its parts. By providing the burner, the igniter and the generator on a common support which is accessible from the outer side of a wall or a similar element of the apparatus, I can reach, inspect, replace or clean the aforementioned parts without necessitating even partial dismantling of the apparatus. The igniter and/or the burner may be withdrawn while the supporting member remains attached to the apparatus and the burner may be reached

upon separation of the supporting member from the apparatus.

For example, and if the attachment is put to use in a gas-heated boiler, the boiler may be installed in a normally locked room and the attachment may be reached through an aperture or window provided in one wall of the boiler room so that the operator need not enter the boiler room when he desires to gain access to the burner, igniter and/or generator of the improved attachment. In such types of gas-heated apparatus, the positioning of the igniter and generator with reference to the burner is of utmost importance because the apparatus is normally locked and the operator must rely on the supporting member to hold these parts in requisite position. To my knowledge, presently used gas-heated or gas-burning apparatus are not provided with one-piece supporting members which can automatically retain the igniter and/or the thermoelectric current generator in optimum position with respect to the burner.

In many types of gas-burning or gas-heated apparatus, the burner 10 of my improved attachment serves as a means for igniting one or more main burners of the apparatus, i.e., this burner may perform the function of a pilot burner. The base 18 of the attachment may be mounted in a horizontal, vertical or otherwise inclined plane without affecting the operation of parts which are mounted on the supporting member. The feature that the wall 20 must be formed with a single opening 20c is of particular advantage when the improved attachment is to be installed in a conventional gas-burning or gas-heated apparatus. Also, this single opening 20c may be sealed by a single washer or similar sealing element.

In accordance with a slight modification of my invention which is so simple that it will be readily understood without necessitating a separate illustration, the supporting member 13 and the burner 10 may be provided with two or more gas-conveying bores of different diameters so that the attachment may be used in connection with different types of gaseous fuel. The operator merely seals one or more bores and permits the fuel to flow through such bores whose diameters are sufficient to convey requisite quantities of a given fuel. In such constructions, the burner is normally provided with two or more sets of gas-discharging orifices.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic and specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a gas-burning apparatus, in combination, a wall having a first side, a second side and an opening; an attachment comprising a one-piece supporting member having a base extending across said opening and adjacent to the first side of said wall, and three substantially tubular holders integral with said base and extending through said opening, a burner received in and having a portion extending beyond the first of said holders at the second side of said wall, an igniter received in the second of said holders and having a portion adjacent to said portion of the burner, said second tubular holder being inclined with respect to said first tubular holder, and a thermoelectric current generator received in the third of said holders and having a portion adjacent to said portion of the burner, whereby said igniter and said generator are removable from their respective holders at the side of said base which is spaced from the first side of said wall; and fastener means securing said base to said wall, said fastener means being accessible from that side of said base which is spaced from said wall whereby said

supporting member is removable from the wall at the first side thereof.

2. In a gas-burning apparatus, in combination, a wall having a first side, a second side and an opening; an attachment comprising a one-piece supporting member having a base extending across and covering said opening and adjacent to the first side of said wall and having a plurality of projections, and three substantially tubular holders integral with said base, a burner received in and having a portion extending beyond the first of said holders at the second side of said wall, an igniter received in the second of said holders and having a portion adjacent to said portion of the burner, said second tubular holder being inclined with respect to said first tubular holder, means accessible from said first side of said wall for detachably securing said igniter to said second holder, a thermoelectric current generator received in the third of said holders and having a portion adjacent to said portion of the burner, and means accessible from said first side of said wall for detachably securing said generator to said third holder, whereby said igniter and said generator are removable from the respective holders at that side of the base which is spaced from the first side of said wall; and fastener means detachably securing said projections to said wall and being accessible from that side of said base which is spaced from the first side of said wall.

3. In a gas-burning apparatus, in combination, a wall having a readily accessible first side, a less readily accessible second side, and an opening, an attachment comprising a one-piece supporting member having a base adjacent to the first side of said wall and extending across and covering said opening, said base having a readily accessible outer side facing away from the first side of said wall, a first substantially tubular holder which is integral with said base and which extends through said opening and is provided with an open end at the second side of said wall, a burner received in and having a gas-discharging portion extending beyond the open end of said first holder, a pair of additional tubular holders each extending through said opening and having an open end adjacent to the second side of said wall, each of said additional holders being integral with said base and each defining a socket which is open at the outer side of said base, an igniter received in the socket of one said additional holder and having a gas igniting portion extending beyond the open end of said one additional holder and into close proximity of said gas-discharging portion, means for detachably securing said igniter to said one holder, the last said socket being inclined with respect to the other sockets, a thermoelectric current generator received in the other additional holder and having a heat-sensitive portion extending beyond the open end of said other additional holder and into close proximity of said gas-discharging portion, and means for detachably securing said generator to said other additional holder, said igniter and said generator being removable from the respective sockets at the outer side of said base; and fastener means detachably securing said base to said wall.

4. In a gas-burning apparatus, such as a gas range, in combination, a wall having a readily accessible outer side, a less readily accessible inner side and an opening; a one-piece supporting member comprising a base having a readily accessible outer side facing away from said first mentioned outer side, a platform integral with said base and extending into said opening, a first internally threaded tubular nipple integral with and extending from the outer side of said base, said first nipple having an open end distant from said base, a second internally threaded nipple integral with said platform and extending through said opening and beyond the inner side of said wall, said second nipple having an open end distant from said platform, a third internally threaded nipple inclined with reference to said second nipple and extending through said

opening and beyond the inner side of said wall, said third nipple having a first open end at the outer side of said base, and a second open end adjacent to the open end of said second nipple, a fourth internally threaded nipple integral with said platform and extending through said opening and beyond the inner side of said wall in parallelism with said second nipple, said fourth nipple having a first open end at the outer side of said base and a second open end adjacent to the open end of said second nipple, and two apertured lugs extending laterally from said base adjacent to the outer side of said wall; an annular sealing element surrounding said platform and abutting against the outer side of said wall; a fastener extending through each of said lugs and into said wall to secure said supporting member to said wall; an externally threaded burner nozzle screwed into and having a gas-discharging portion extending beyond the open end of said second nipple, locking means for preventing rotation of said burner nozzle; a gas supply conduit having an end portion extending into the open end of said first nipple and communicating with the bore of said burner nozzle via a bore provided in said supporting member; an igniter comprising a gas-igniting portion extending beyond the second open end of said third nipple and into close proximity of said gas discharging portion; a conductor connected with said igniter and arranged to conduct electric current necessary to ignite the gas discharged from said gas discharging portion when the circuit of the igniter is completed; an externally threaded thermoelectric current generator comprising a central portion received in and meshing with said fourth nipple, said generator further comprising a heat-sensitive portion extending beyond the second open end of said fourth nipple and into close proximity of said gas discharging portion of said burner nozzle, said generator being arranged to produce a weak electric current in response to heating of said heat-sensitive portion by flames developing upon ignition of gas escaping from said gas discharging portion; an electromagnetically operated safety valve provided in said conduit and arranged to control the flow of gas to said burner nozzle; manually operated means for opening said valve at the will of the operator; and an operative current-conducting connection between said generator and said valve arranged to automatically retain the valve in open position when the gas escaping from said gas discharging portion and heating said heat-sensitive portion is ignited and to automatically close said valve when said heat-sensitive portion thereof is not heated.

5. In a gas-burning apparatus, in combination, a wall having a readily accessible first side, a less readily accessible second side, and an opening, an attachment comprising a one-piece supporting member having a base adjacent to the first side of said wall and extending across and covering said opening, said base having a readily accessible outer side facing away from the first side of said wall, a first substantially tubular holder which is integral with said base and which extends through said opening and is provided with an open end at the second side of said wall, a burner received in and having a gas-discharging portion extending beyond the open end of said first holder, a pair of additional tubular holders each extending through said opening and having an open end adjacent to the second side of said wall, each of said additional holders being integral with said base and each defining a socket which is open at the outer side of said base, an igniter received in the socket of one of said additional holders and having a gas-igniting portion extending beyond the open end of said one additional holder and into close proximity of said gas-discharging portion, one of said portions being inclined with respect to the other portion, means for detachably securing said igniter to said one holder, a thermoelectric current generator received in the other additional holder and having a heat-sensitive portion extending beyond the open end of said other additional holder and into close proximity of said gas discharging portion, and means for detachably securing said generator to said other additional holder, said igniter and said generator being removable from the respective sockets at the outer side of said base; and fastener means detachably securing said base to said wall.

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