

July 5, 1960

J. W. MOSELEY

2,943,850

GAS FIRED TOBACCO CURERS

Filed March 26, 1956

2 Sheets-Sheet 1

FIG. 1.

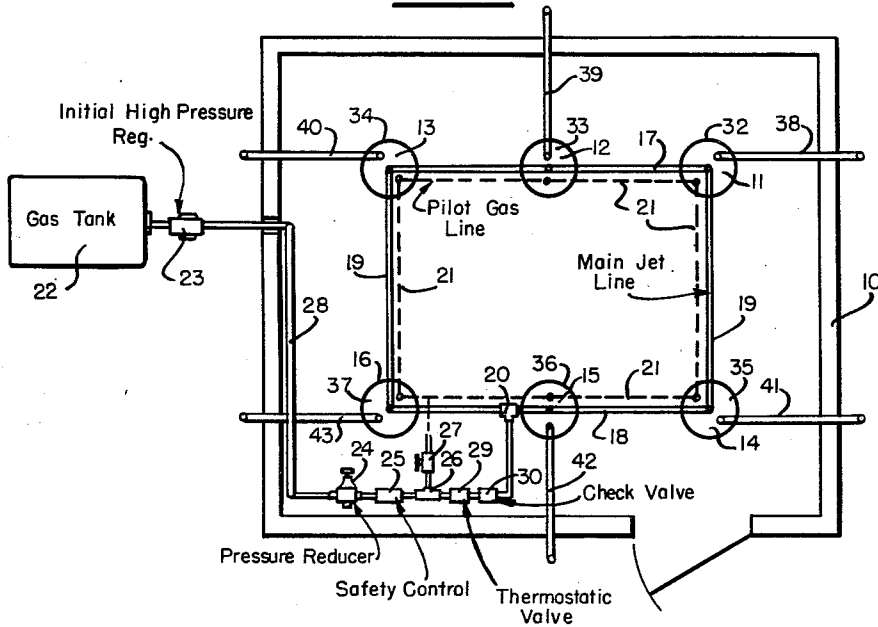
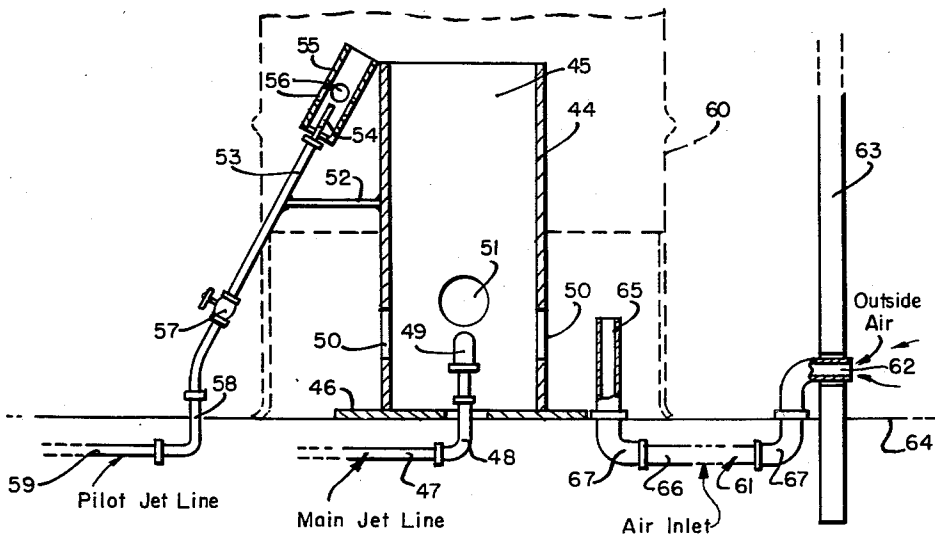


FIG. 2.

J. WOOTEN MOSELEY

BY

More of Hall

ATTORNEYS

July 5, 1960

J. W. MOSELEY
GAS FIRED TOBACCO CURERS

2,943,850

Filed March 26, 1956

2 Sheets-Sheet 2

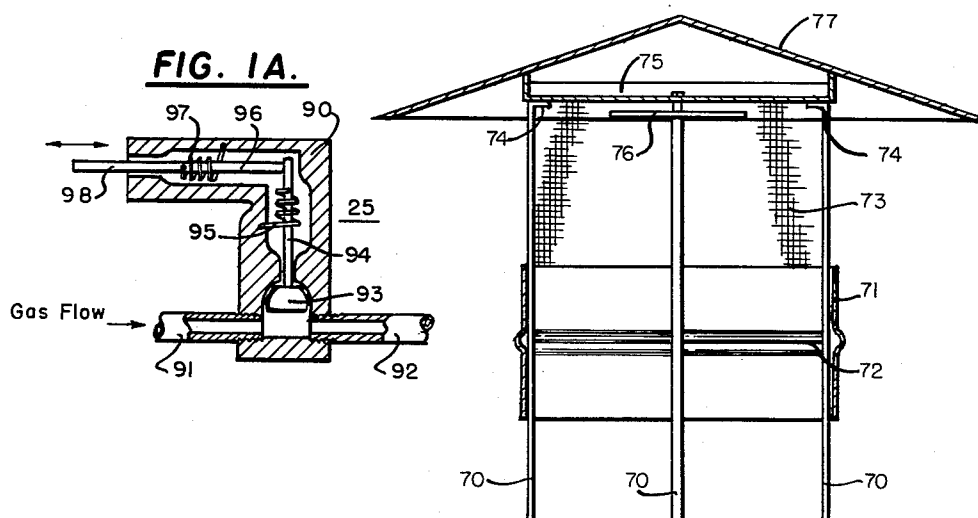
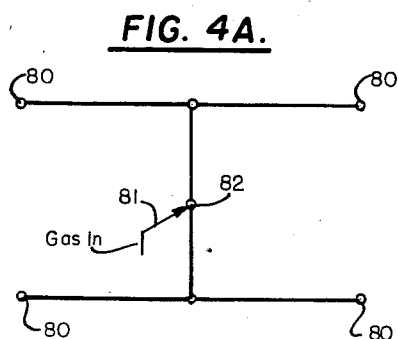
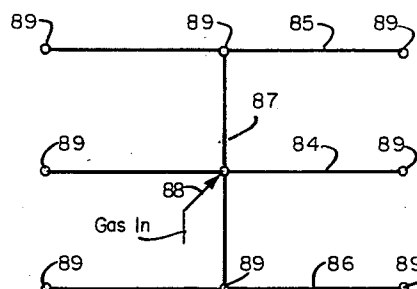
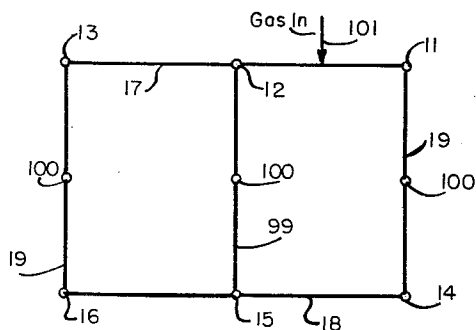


FIG. 4B.

INVENTOR

J. WOOTEN MOSELEY

BY

Moore & Hall

ATTORNEYS

2,943,850

GAS FIRED TOBACCO CURERS

John Wooten Moseley, 610 N. College St., Kinston, N.C.

Filed Mar. 26, 1956, Ser. No. 573,808

6 Claims. (Cl. 263-19)

The present invention relates to tobacco curing arrangements, and is primarily concerned with an improved gas burner, and with curing systems employing such burners, whereby tobacco may be cured more efficiently than has been the case in the past.

As is well known, it is normally the practice to cure tobacco leaves in curing barns, and such barns ordinarily include a plurality of heat sources disposed adjacent the floor thereof for effecting the desired cure. In the case of Bright Leaf tobaccos, for instance, the curing process normally comprises three successive phases, which phases are often termed the "yellowing period," the "drying period," and the period for "killing the stem." In providing the differing temperatures characteristic of these different curing phases, various forms of heat sources have been employed heretofore in known curing barns, and these heat sources have taken the form of coal-stoker arrangements, oil burner arrangements, and more recently gas burner arrangements employing bottled or liquidified gas sources.

In the particular case of gas burners, the gas is normally supplied to the said burners at what is termed a "low" pressure, which is of the order of one-third p.s.i., and when such low pressure gas burner systems are employed, the yellowing period for tobacco curing requires in the order of 24 hours, at a heat of 90° to 100° F. Subsequent to this yellowing period, under known systems of cure, the tobacco is subjected to a heat of between 100° and 155° F., for a period of approximately 48 hours and the barn temperature is periodically raised, within the specified range, during this 48-hour period to drive the moisture from the tobacco leaf. The time required to complete this drying period is ordinarily variable, and varies upwards with the humidity of the outside air. Subsequent to completion of the period required for drying the leaf, the temperature within the barn is further raised to a range of 165° to 180° F. for a period of 18 to 30 hours, thereby to drive moisture from the stem or to "kill" the stem.

The foregoing temperatures and time periods are characteristic of substantially all curing systems utilized heretofore, whether coal, oil, or low pressure gas burners are used, and it will be appreciated that under such known systems of tobacco curing, a period of four and a half to five days is usually required to complete each curing process. The relatively long curing time thus required heretofore has a definite and appreciable effect upon tobacco harvesting and curing operations as they are presently practiced. In this respect it should be noted that the harvesting of tobacco, at the present time, normally comprises several independent harvesting runs over the same tobacco field, and during each of these separated runs ripe leaves are picked from the tobacco plants being harvested. Inasmuch as the ripening of leaves may occur sooner than the four and a half to five day period required heretofore for curing a given run of tobacco, it has often been necessary in the past to store or otherwise delay the

curing of a given run of leaves until the curing barn completes the cure of a previous run. The long period of time necessary heretofore for curing a run of leaves is therefore highly undesirable and quite costly.

- 5 The present invention, through the use of an improved gas burner arrangement adapted to operate with high pressure gas, completely obviates these disadvantages. In this respect, "high" pressure gas is defined as a gas pressure in excess of one p.s.i., in distinction to the low pressure gases described heretofore wherein pressures of approximately one-third p.s.i. have been employed.

10 It is accordingly an object of the present invention to provide an improved tobacco curing arrangement.

- 15 Another object of the present invention resides in the provision of a curing barn for tobacco which includes heat sources more efficient in their operation than those utilized heretofore.

- 20 Another object of the present invention resides in the provision of gas fired tobacco curers which use less total fuel for a given curing operation than has been the case heretofore.

- 25 Still another object of the present invention resides in the provision of a gas burner arrangement for use in tobacco curing barns which reduces substantially the total time required for completing the cure of a given run of tobacco leaves.

- 30 A still further object of the present invention resides in the provision of a tobacco curer arrangement which is adapted to cure a greater quantity of tobacco over a given period of time than has been possible with prior curing systems.

- 35 A still further object of the present invention resides in the provision of improved gas fired burners for use in tobacco curing barns, which burners include a pilot flame system, whereby safer operation of curing barns may be effected.

- 40 Still another object of the present invention resides in the provision of a tobacco curing arrangement which is less expensive and more efficient to operate than has been the case in the past.

- 45 In providing for the foregoing objects and advantages, the present invention contemplates the provision of a curing barn having a plurality of gas burners disposed at spaced locations adjacent the floor of said barn. The several burners so disposed each include a main gas orifice and a pilot gas orifice, and gas lines are distributed throughout the barn, preferably below the floor or the ground comprising the floor of the barn, to interconnect respectively the main gas and pilot gas orifices of the several burners. As will become apparent from the subsequent description, the several burners are designed to operate efficiently with "high" pressure gas supplies; and in practice, gas from an external source, such as a tank, is supplied via pressure regulating means to the gas lines within the barn at a pressure in excess of one p.s.i. and preferably in the region of five p.s.i. It has been found in actual practice that by using high pressure gas systems, with the resultant hotter flames achieved thereby, a forced circulation of hot air is effected within the barn whereby the drying period for tobacco curing is cut by 25 to 35% of the time required heretofore when oil, coal stoker or low pressure gas burners were utilized. Similarly, the time period for killing the stem is cut by one-third of the usual time, as compared to the time required for curing with prior art systems; and in actual practice it has been determined that two complete curings can be run through a tobacco barn in approximately seven days with the high pressure system of the present invention, as compared to the four and a half to five days required heretofore for a single cure.

In addition to the decreased time required for curing

3

a run of tobacco, with the resultant more efficient operation, it has been found that use of my invention results in less total fuel being required to complete each cure than has been the case in the past, whereby a significant saving is achieved in the cost of effecting each cure.

The foregoing objects, advantages, construction and operation of the present invention will become more readily apparent from the following description and accompanying drawings, in which:

Figure 1 is a schematic representation of a tobacco curing barn and gas fired burner arrangement constructed in accordance with the present invention.

Figure 1A illustrates an improved safety valve such as may be employed in the practice of the present invention.

Figure 2 is a cross-sectional view of a preferred gas burner constructed in accordance with the present invention.

Figure 3 is a representation of a preferred metal jacket or heat spreader which may be employed in conjunction with the burners shown in Figure 2; and

Figures 4A, 4B and 4C illustrate schematically possible dispositions of gas burners alternative to that shown in Figure 1.

Referring now to Figure 1, it will be seen that, in accordance with the present invention, a tobacco curing barn 10 may have a plurality of high pressure gas burners 11 through 16 inclusive distributed adjacent the floor thereof. The several gas burners each have a main gas orifice and a pilot gas orifice, such as will be described with greater particularity in conjunction with Figure 2; and the main gas orifices and pilot gas orifices of the burners 11 through 16 are respectively interconnected, preferably by closed loop configurations of gas lines disposed within the barn.

Thus, referring to Figure 1, it will be seen that burners 11 and 13 are disposed at opposing ends of a gas line 17, while burners 14 and 16 are preferably disposed at opposing ends of a gas line 18. Burners 12 and 15 are disposed adjacent the mid-points of lines 17 and 18 and the opposing ends of the lines 17 and 18 are in turn connected by cross gas lines 19. Gas pressure for the main orifices of the several burners 11 through 16 inclusive is supplied at a point 20 in line 18; and this particular closed loop or frame disposition of gas lines 17, 18 and 19 is chosen to avoid gas lines having dead ends which might effect back pressures, thereby to assure that substantially equal pressures appear at each of the several burners 11 through 16. A further closed loop configuration of gas lines, illustrated primarily in dotted line in Figure 1 and designated as 21, interconnects the several pilot orifices of the gas burners 11 through 16 and these pilot orifices are again preferably supplied with gas at a relatively high pressure.

In practice, the gas supply comprises a tank 22 disposed external of the barn and containing gas at a relatively high pressure, the said tanked gas being ordinarily liquefied. The gas from tank 22 is coupled to the barn 10 via an initial high pressure regulator 33 which ordinarily acts to reduce the gas pressure to approximately 15 p.s.i., and the gas at this initially reduced pressure is thereafter coupled to a further pressure reducer 24, preferably located within barn 10 by elongated gas line 28. In practice, line 28 enters the barn adjacent the foundation thereof, extends upwards adjacent the barn wall near its point of entry, and then extends for a substantial length thereof (see Figure 1) along the barn wall until it is dropped to the location of further pressure reducer 24. The elongated run of gas line 28 thus provided permits preheating of the gas in said line, whereby the efficiency of the several burners to be described is improved.

Pressure reducer 24 serves to further reduce the gas pressure to a pressure still in excess of one p.s.i., and

4

preferably to a pressure of approximately five p.s.i. This final reduced pressure gas, which is still at a "high" pressure as the term is understood in the art, then flows via a safety control 25 to a T-junction 26, and is then coupled to the main and pilot orifices of the burners, as will be described.

The elements 23 and 24 are conventional in nature and many possible alternative constructions will be suggested to those skilled in the art. The safety control 25, however, must be designed to operate safely and surely at high pressures, and I therefore prefer to use a construction of the type illustrated in Figure 1A. Before proceeding with a detailed description of the particular safety control valve shown in Figure 1A and corresponding to element 25, however, it should be appreciated that the function of this valve is to disconnect the gas tank 22 from the several gas lines feeding the main and pilot orifices of the burners in the event that the gas supply should fail for any reason, or in the event that the pressure output from pressure reducer 24 should fall below some predetermined minimum value.

Safety control valves of the type normally employed in the past ordinarily comprise bimetallic elements associated with a valve element; and the position of the said bimetallic element is usually controlled by a small burner flame fed by the gas supply, whereby failure of the gas supply extinguishes the burner thereby to effect an appropriate flexing of the bimetallic element and a closure of the safety control valve. Such bimetallic control valves are subject to the disadvantage that the controlling flame may be blown out accidentally, thereby causing closure of the gas lines at an improper time; and these known control valves are subject to the further disadvantage that they tend to break down at the high gas pressures employed in the present systems. It is therefore preferable, in practicing my invention, to use a mechanical safety control valve which is responsive to gas failure thereby to close the gas lines, and the improved valve now to be described is so designed that it must be manually reset before gas may pass once more to the main and pilot orifices of my improved burners.

Referring now to Figure 1A, it will be seen that the improved manual safety control valve 25 may comprise a casting 90 adapted to receive gas lines 91 and 92 whereby gas may selectively pass via the said gas lines and via the said casting 90 in the direction indicated. The casting 90 includes a movable diaphragm 93 adapted to selectively close the flow path between gas lines 91 and 92; and it will be appreciated that the particular representation of diaphragm 93, as illustrated in Figure 1A, is diagrammatic only. In practice, the casting 90 may include a tortuous flow path between gas line 91 and gas line 92, and this flow path may include a valve seat, in which event the element 93 may take the form of a small valve element which can be selectively seated in the said seat to isolate gas line 91 from gas line 92. Casting 90 includes a first slidable rod 94 positioned above diaphragm 93 and in contact therewith; and the said rod 94 is biased in a downward direction by a spring 95. The casting 90 further includes a second rod 96 disposed transverse to the rod 94 and biased (for the particular representation of Figure 1A) to the right by a spring 97.

In operation, and when a normal supply of gas is coupled to line 91, the pressure of gas flowing from line 91 via casting 90 and thence to line 92, holds diaphragm 93 in an upward direction against the restraint of spring 95, whereby rod 94 is maintained in its upward position thereby assuring that rod 96 is maintained in its leftward position against the restraint of spring 97. If the gas supply should fail for some reason, the reduced pressure on the lower surface of diaphragm 93 causes spring 95 to urge rod 94 in a downward direction thereby moving diaphragm 93 into a position to close the flow path between lines 91 and 92. When such downward movement of rod 94 occurs, spring 97 urges rod 96 to the

5

right and the said rod 96 therefore snaps into a position above the uppermost end of rod 94 thereby to assure that diaphragm 93 is positively maintained in its downward or closed position. Even if the gas supply should thereafter be reapplied to line 91, diaphragm 93 will be inhibited from moving upward due to the positive lock-out function of rod 96 in its righthand position. No gas is therefore permitted to flow via casting 90 to the line 92 until rod 96 is manually pulled to the left, for instance by applying appropriate tension to extending end 98 thereof, in which event the said rod 96 will be moved out of contact with the upper end of rod 94 and the said diaphragm 93 and rod 94 can thereafter move upward into substantially the position shown in Figure 1A to maintain rod 96 in its lefthand position. By this arrangement, therefore, the safety control valve 25 permits gas to flow to the several main and pilot orifices of the gas burners so long as a normal supply of gas is provided; but if that supply should fail or the pressure thereof should fall below a predetermined minimum, the gas tank 22 will be effectively and positively isolated from the burners by safety control valve 25, and such isolation will be continued until the safety control valve 25 is manually reset.

It should be noted that the particular valve shown in Figure 1A is capable of operating at the high pressures utilized in my system, and will function properly to isolate the gas tank 22 from the burners even if, for some reason, the pressure reducers 23 and/or 24 should not operate properly whereby full tank pressure is impressed upon the safety control valve in its closed position. This particular consideration, which is not a characteristic of safety control valves known heretofore, is of considerable value in assuring safe operation of the over-all system.

The high pressure gas coupled to the aforementioned junction 26 is coupled via a manual cut-off valve 27, to the pilot gas lines 21, indicated by dotted line in Figure 1. The said high pressure gas is also coupled via T-junction 26 to a high pressure thermostat or thermostatic valve 29, which permits or prevents the flow of high pressure gas to the gas lines supplying the main orifices of the several high pressure burners 11 through 16 in dependence upon the temperature within barn 10.

It will be appreciated that, in operation, the high pressure thermostatic valve 29 tends to open when the temperature within the barn 10 falls below that desired, as determined by the setting of the thermostat 29; or in the alternative, the said thermostatic valve 29 prevents the flow of gas to the high pressure burners when the temperature within the barn is at or above a desired level. In actual operation, the thermostatic valve 29 may assume a number of positions between completely open and completely closed, and when the said valve is at some position intermediate its completely open or completely closed position, the pressure of gas passing therethrough tends to be throttled, with a resultant loss in gas pressure. In order to assure efficient operation of the several burners 11 through 16, therefore, a check valve 30 is preferably disposed in the gas line between high pressure thermostatic valve 29 and the feeding junction 26. This check valve 30 is pressure responsive in nature whereby no gas passes via thermostatic valve 29 to the orifices of the high pressure burners until a predetermined minimum pressure of gas is imposed upon the check valve 30, i.e. until the thermostatic valve 29 is substantially completely and fully opened.

It will be appreciated therefore that the over-all arrangement is such that the extremely high pressure of gas appearing in tank 22 is reduced to a desired high pressure, preferably in the order of five p.s.i. and preheated; and this reduced high pressure preheated gas is then coupled via a first network of gas lines to the pilot orifices of the several gas burners and is also coupled, via a thermostatic valve, and preferably via a check valve, to a second network of gas lines feeding the main orifices

6

of the gas burners. It will further be appreciated that the feeder networks, due to their preferably closed loop configurations, supply the aforementioned high pressure gas to both the pilot orifices and main orifices of the several burners at substantially the same pressure, thereby further assuring the efficient operation of the over-all system.

As is illustrated in Figure 1, the several high pressure gas burners 11 through 16 are each enclosed in a metal jacket or heat spreader such as 32 through 37, which heat spreaders or jackets are adapted to provide a more uniform distribution of heat within the barn and which further serve to prevent possible falling, of leaves being cured, into the burners themselves. The particular heat spreader or jacket employed will be described more fully in connection with Figure 3.

In addition, it will be noted from Figure 1 that the over-all curing arrangement preferably includes a plurality of air inlets or ducts, such as 38 through 43 inclusive; and these ducts, which are more clearly illustrated in Figure 2, communicate outside air to the interior of the barn. Such air inlets are of course necessary due to the greater quantities of air or oxygen consumed during the combustion of fuel within the barn; and in the past, curing barns have normally allowed for such air supply through the provision of apertures in the barn walls or foundation. In accordance with one particular improvement of the present invention, the air ducts 38 through 43 are supplied in place of such apertures provided heretofore, and these ducts are individually associated with the several high pressure burners 11 through 16 and include a terminus adjacent each of said burners and within the metal jacket or heat spreader associated with that burner. By this arrangement therefore air which is admitted to the barn is supplied directly adjacent the burner whereby more efficient mixing of air and gas is achieved than has been the case heretofore; and in addition the air, which is so supplied to the barn directly adjacent the several gas burners, is also preheated as was the case with the gas supply, thereby even further improving the efficiency of the curing operation.

The several gas burners 11 through 16 may assume a number of configurations provided they are designed to operate efficiently with the high pressure gas employed. One preferred construction in accordance with the present invention is illustrated in Figure 2, and it will be seen that a high pressure burner such as may be employed in the curing arrangement of the present invention, preferably comprises a main burner 44 which is of hollow, substantially tubular configuration. The tubular member 44 is open at its upper end 45 and is supported at its lower end on a base 46, through which base the supply of gas at high pressure may be communicated via a line 47, preferably disposed beneath the ground comprising the floor of the barn. It will be noted that gas line 47 is coupled to an elbow 48 extending into the tubular burner member 44; and a main jet orifice 49 is slidably placed into the elbow 48 adjacent the base 46 of the high pressure burner. This particular arrangement permits the tubular member 44, comprising the burner, to be lifted from the gas line whereby ready access to the gas orifice 49 may be had for cleaning purposes or the like.

Tubular burner member 44 includes a plurality of air inlets or holes in the side walls thereof adjacent the gas orifice 49, and these holes, which are designated for instance as 50 and 51, are spaced uniformly about the circumference of tubular member 44 in staggered relation to one another. This staggered disposition of air inlets 50 and 51 causes air passing into the interior of tubular burner member 44 to assume a swirling or whirlwind pattern, thereby greatly enhancing the mixing of air with gas emanating from orifice 49, and assuring that a hotter flame is produced by the burner than has been the case in burners utilized in curing barns heretofore.

In a preferred embodiment, the tubular member 44

preferably comprises a 3-inch round pipe substantially ten inches in over-all height. The several air holes, such as 50 and 51, are preferably 7/8-inch in diameter and are preferably spaced in alternate relation at two inches and two and a half inches from the base 46. In addition, the orifice 49 preferably has an opening of .053 inch, and this particular orifice has been found to operate very efficiently at gas pressures of substantially five p.s.i.

Tubular member 44 includes a transverse arm 52, welded thereto, and the said arm 52 in turn supports a gas line 53 terminating in a pilot orifice 54. A further burner member 55, which is also tubular in configuration and which includes air inlet apertures such as 56, is slidably placed over the orifice 54 whereby the said tubular member 55 can be slidably removed, once more to permit ready access to the pilot orifice 54. A gas line 53 is coupled via manual cut-off valve 57 to an elbow 58 which is in turn coupled to a line 59 comprising one line of the pilot gas system shown in Figure 1; and again the line 59 and other lines similar thereto, are preferably disposed beneath the floor or ground comprising the floor of the tobacco barn.

The over-all burner arrangement is covered by a metal jacket or heat spreader which is shown in dotted line in Figure 2 and which is designated as 60. A typical such heat spreader or jacket will be described more fully in connection with Figure 3, but the heat spreader 60 is illustrated in Figure 2 to clarify the disposition of the said heat spreader with respect to the other components of the burner. It should particularly be noted that, in accordance with a preferred embodiment of the present invention, the heat spreader or jacket 60, which encloses the high pressure burner including the aforementioned main and pilot orifices, further encloses an air inlet line 61 having one terminus 62 extending through the wall or foundation 63 of the barn above ground level 64, and having its other terminus 65 within jacket 60 and closely adjacent the air inlet holes 50 and 51 of tubular burner member 44.

A preferred arrangement comprising air inlet line 61 (corresponding to lines 38-43 inclusive, of Figure 1), includes an elongated pipe 66 disposed beneath the floor of the barn and cooperating with elbows such as 67 whereby the termini 62 and 65 are both above ground level. This arrangement, as well as the previously discussed arrangement of main gas lines 47 and pilot gas lines 59, permits all of the gas and air lines utilized in the curing barn to be disposed beneath the floor of the barn whereby to avoid obstructions; and further permits a wide facility in the disposition of burners while at the same time assuring the efficient burner operation and efficient mixing of air and gas discussed heretofore.

As has been mentioned previously, the several burners 11 through 16 (Figure 1) are each covered by a metal jacket or heat spreader, and a preferred form for such a heat spreader is illustrated in Figure 3. The burner jacket or heat spreader may comprise a plurality of spaced elongated legs 70 which may be, for instance, four in number. The said legs 70 support a metal drum 71 surrounding the legs 70 and including a reinforcing rib 72, whereby the drum 71-72 lends structural rigidity to the over-all jacket or heat spreader. Also attached to the legs 70 and disposed above the metal drum 71, is a screen mesh 73, for instance of 1-inch square welded wire, and this screen mesh 73 extends continuously about the heat spreader from the upper end of drum 71 to the upper termini 74 of the legs 70. Also supported by the upper ends 74 of the legs 70, is a pan 75 which is adapted to be filled with a quantity of sand for insulation purposes, and this sand may, if desired, be wetted for humidifying purposes during the yellowing period of the tobacco cure. The pan 75 supports from its lower surface a round metal plate 76 which is adapted to act as a heat baffle thereby enhancing the spreading of heat, and the said pan 75 further supports, in superposed relation

thereto, a substantially conical hood or roof 77 which further acts to spread the heat and which prevents tobacco leaves, which might for instance fall from curing racks, from coming into contact with the burner flames.

Preferred dimensions for the several components of the heat spreader illustrated in Figure 3, contemplate that the over-all length of legs 70 be of the order of 34 inches, and the metal drum 71 preferably has a height of approximately 14 inches with the lowermost portion of the said metal drum being spaced substantially 8 inches above ground whereby the height of the screen mesh 73 is substantially 12 inches.

While a preferred embodiment of the present invention has been described, many variations will be suggested to those skilled in the art and certain of these variations have already been discussed. Other variations will become apparent. Thus, it should be noted that in the arrangement of Figure 1 the several burners 11 through 16 are six in number and are distributed throughout the barn as illustrated in the said Figure 1. The arrangement may, in the alternative, comprise four burners, when the curing barn is somewhat smaller than that illustrated in Figure 1, and such a four-burner arrangement may be effected with the frame network of gas lines shown in Figure 1 by elimination, for instance, of burners 12 and 15.

Such a four-burner arrangement may also be effected, as shown in Figure 4A, by use of an H-shaped gas line configuration, with the four burners 80 being disposed at the opposing ends of the legs of said H, and with the gas inlet 81 being coupled to the mid-point 82 of the cross-member of said H-shaped configuration. This particular inlet position, at the symmetrical center of the H-shaped network, is chosen to assure, as in the closed loop arrangements, that equal pressure appears at the several burners. It will further be appreciated that the particular arrangement shown in Figure 4A, as well as that to be described in reference to Figures 4B and 4C, may be considered to represent the gas lines feeding the main gas orifices, and that a similar arrangement may be utilized to supply the pilot gas orifices.

Referring now to Figure 4B, it will be seen that, in addition to the four and six burner arrangements discussed previously, a total of nine burners, for instance, may be distributed in accordance with the gas line configuration of Figure 4A by adding a further gas line, such as 84, to the system with the said gas line 84 being disposed between and substantially parallel to the legs 85 and 86 of the previously discussed H-shaped gas line configuration. The cross line 87, which supplies gas to the spaced legs 85 and 86 of the H configuration, is further coupled to line 84 and the gas inlet 83 is again coupled to the symmetrical center of the over-all gas line arrangement for the purposes already discussed. The nine burners illustrated in Figure 4B have been designated respectively as 89.

The particular arrangements shown in Figures 4A and 4B do, of course, have the gas line dead-ends discussed previously; and therefore gas is fed to the symmetrical center of the system in order to assure equal pressures at the several burners insofar as this may be possible. In accordance with a preferred embodiment of the present invention, back pressure considerations may be obviated by utilizing closed loop configurations of gas lines, and such closed loops have already been discussed in respect to dispositions of four and six gas burners. Such a closed loop configuration may also be utilized in a nine burner arrangement; and one such arrangement is shown in Figure 4C.

Thus, referring to Figure 4C, it will be seen that the gas line configuration may take substantially the same form as that already discussed in reference to Figure 1 wherein gas lines 17, 18 and 19 are associated respectively with gas burners 11 through 16 inclusive. In order to provide for a nine-burner arrangement, a further gas line

99 may be disposed between lines 17 and 18 adjacent the burners 12 and 15; and the said line 99 is disposed substantially parallel to each of gas lines 19. When such an arrangement is employed, three further burners 100 may be placed adjacent the mid-points of lines 19 and 99, as illustrated in Figure 4C, thereby to effect a desired spaced disposition of nine gas burners. When the closed loop gas line configuration is employed, the gas inlet may be disposed adjacent a point 101, for instance, and it will be appreciated that the particular location of point 101, due to the closed loop configuration of lines utilized, may be at any convenient point in the closed loop gas line configuration without appreciably affecting the equal pressures present at each of the several burners.

Still other arrangements of gas burners will be suggested to those skilled in the art, and it must therefore be understood that the foregoing description is meant to be illustrative only. All such modifications, in respect to the form of components which are employed and in respect to the disposition of those components, which are in accord with the essence of my invention, namely the use of gas fired burners operating at high pressure as the term is understood in the art, are accordingly meant to fall within the scope of the appended claims.

Having thus described my invention, I claim:

1. A tobacco curer comprising a curing barn, a plurality of high pressure gas burners spaced from one another adjacent the floor of said barn, each of said burners comprising a substantially upright tubular member open at its upper end and having a main gas orifice therewithin adjacent its lower end, each of said tubular members having a plurality of staggered air holes in the walls thereof adjacent said main gas orifice, a pilot gas orifice in each of said burners adjacent the open upper end of said tubular member, a source of gas under pressure disposed external of said barn, a first gas line extending from said source into said barn, pressure regulator means in said first gas line for reducing the pressure of gas from said source to a pressure in excess of one p.s.i., second gas lines coupling the reduced pressure gas in said first line to the main gas orifices of said burners, third gas lines coupling the reduced pressure gas in said first line to the pilot gas orifices of said burners, and thermostatic valve means in said second gas lines whereby flow of gas to said main gas orifices is dependent upon the temperature within said barn.

2. The combination of claim 1 including pressure responsive check valve means in said second gas lines between said thermostatic valve means and said main gas orifices for preventing the flow of gas via said thermostatic valve means until said thermostatic valve means is substantially fully opened.

3. The combination of claim 2 including air lines extending from the exterior to the interior of said barn for supplying air to said barn, said air lines having termini adjacent the said air holes in each of said burners.

4. The combination of claim 3 including a plurality of metal enclosures covering the main and pilot orifices and the air line terminus of each of said burners respectively.

5. The combination of claim 1 including a plurality of heat deflecting metal jackets respectively disposed over said plurality of burners, each of said jackets comprising a roofed substantially cylindrical structure enclosing the main orifice and pilot orifice of its associated burner.

6. A tobacco curer comprising a curing barn having a plurality of gas burners spaced from one another on the interior of said barn, each of said gas burners comprising an elongated hollow tubular burner member disposed substantially upright adjacent the floor of said barn, said tubular burner member having a plurality of apertures adjacent the lower end thereof for the admission of air to said burner member, said apertures being disposed in the walls of said member and being spaced from one another in staggered disposition about said tubular burner member, a main jet orifice disposed within said tubular burner member adjacent said orifices, a pilot jet orifice disposed adjacent the upper end of said tubular member, and means for supplying both the main and pilot jet orifices of each of said burners with gas under pressure, the gas supplied to at least said main jet orifices being at a pressure in excess of one p.s.i.

References Cited in the file of this patent

UNITED STATES PATENTS

35	754,747	Clewell	Mar. 15, 1915
	1,164,058	Bayne	Dec. 14, 1915
	1,668,001	Bolling	May 1, 1928
	1,854,893	Farrer et al.	Apr. 19, 1932
40	1,920,186	Carter	Aug. 1, 1933
	2,183,855	Mansky	Dec. 19, 1939
	2,197,325	Spikes	Apr. 16, 1940
	2,216,075	Henderson	Sept. 24, 1940
	2,268,591	Holm	Jan. 6, 1942
45	2,279,097	Stark	Apr. 7, 1942
	2,357,575	Benz	Sept. 5, 1944
	2,472,534	Horne	June 7, 1949
	2,534,618	Moore	Dec. 19, 1950
	2,569,084	White	Sept. 25, 1951
50	2,783,988	Garner	Mar. 5, 1957