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2,804,133

LIGHTERS FOR GAS BURNERS

Original Filed Feb. 1, 1950

3 Sheets-Sheet 2

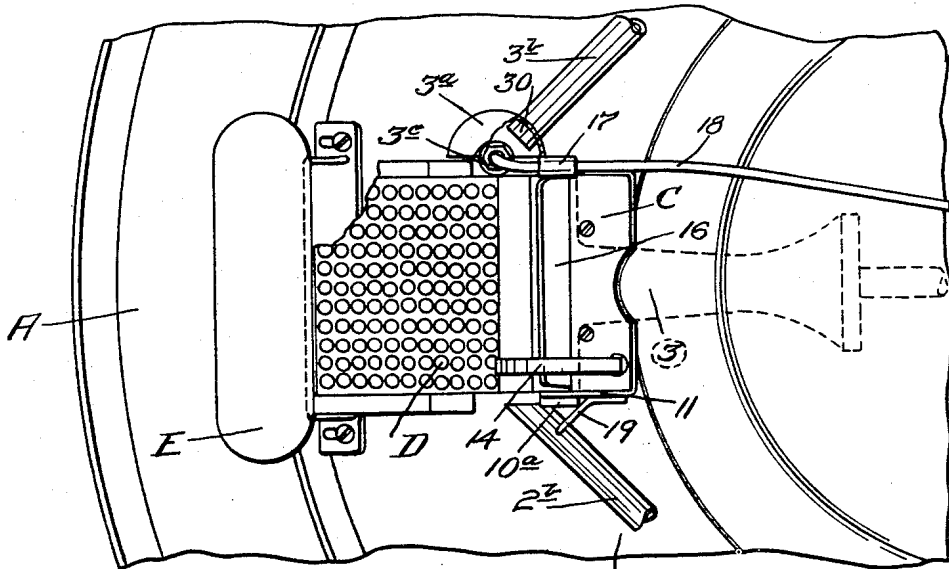


Fig. 3. R

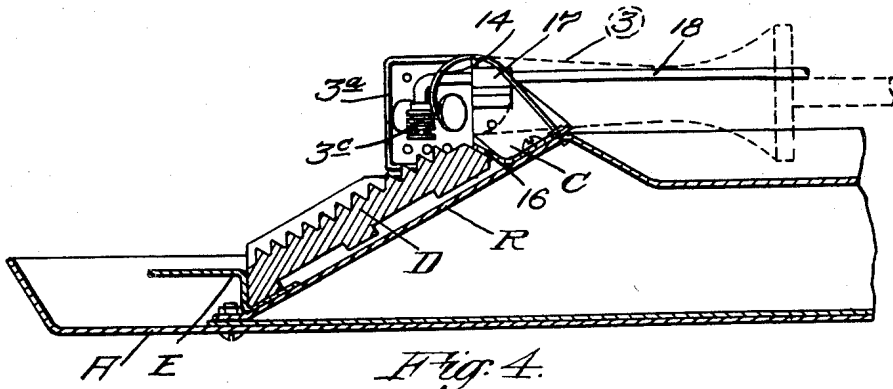


Fig. 4.

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Fig. 5.

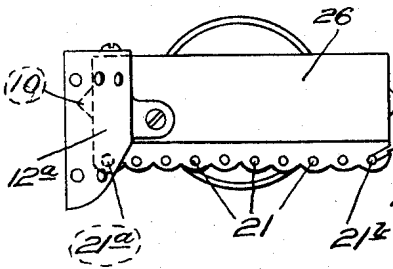


Fig. 6.

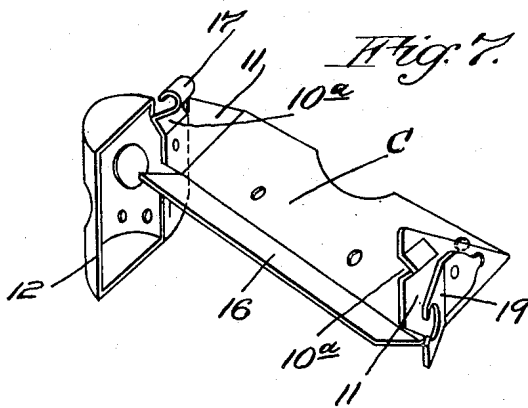
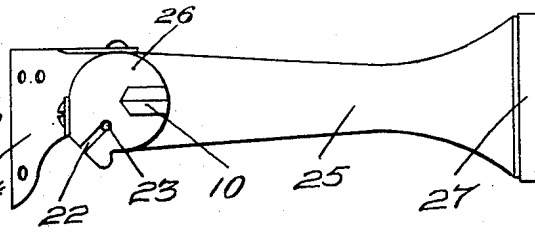


Fig. 8.

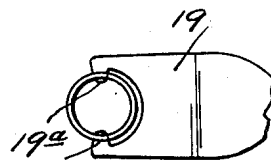
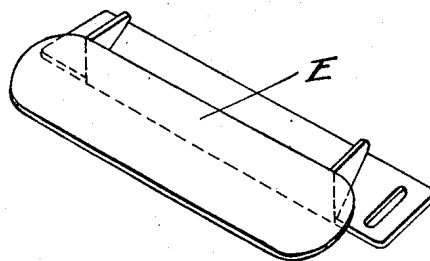


Fig. 9.

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LIGHTERS FOR GAS BURNERS

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Original application February 1, 1950, Serial No. 141,770, now Patent No. 2,758,641, dated August 14, 1956. Divided and this application January 19, 1953, Serial No. 332,021

3 Claims. (Cl. 158—115)

This invention relates to gas burners and more particularly to a lighter arrangement which has for its purpose the automatic relighting of one or more burners in the event that the flame becomes extinguished accidentally; the present application being a division of my application entitled Lighters for Gas Burners filed February 1, 1950, Serial No. 141,770, now Patent No. 2,758,641.

In the poultry raising industry it has become common practice to heat brooders by means of gas burners, usually four, six or more burners to a brooder depending upon the size of the same. Accidental extinguishment of one or more of the burners may be caused by a gust of wind or by air currents set up by the wings of the chicks under the brooder when they become frightened or excited. Means must accordingly be provided for automatically and immediately relighting the burners as there would otherwise be danger of asphyxiation or damage from explosion of accumulated gas.

Chicks in the brooder stage grow fast and are exceedingly active, they are constantly on the move, picking and scratching for feed. This activity creates a dusty atmosphere, and as the burners are supplied with air from under the hood of the brooder a certain proportion of the dust gathers in the venturi passages and heads of the burners and builds up to such extent as to materially interfere with the proper operation of the same. It is accordingly necessary to remove the burners from time to time and clean them as they would otherwise cease to function.

The object of the present invention is to provide a lighter arrangement which will automatically and immediately relight one or more of the burners if they become extinguished and further to provide a burner mounting which permits quick and ready removal and replacement of the burners for cleaning, inspection and otherwise.

The invention is shown by way of illustration in the accompanying drawings, in which,

Fig. 1 is a bottom plan view of the head which supports the main burners, the refractory plates, the pilot burners and the flash tubes.

Fig. 2 is a side elevation of the head partially broken away and partly in section.

Fig. 3 is an enlarged bottom view of a portion of the head, said view showing one main burner in dotted lines and also showing the pilot burner and connected flash tubes, a portion of the pilot burner housing is broken away and shown in section and a portion of the refractory plate is broken away.

Fig. 4 is a cross section taken on line IV—IV of Fig. 3.

Fig. 5 is a front view of one of the main burners.

Fig. 6 is a side elevation of Fig. 5.

Fig. 7 is a perspective view of the bracket which supports the head end of the main burner.

Fig. 8 is a perspective view of the bracket which supports and secures one end of a refractory plate, and

Fig. 9 is a side elevation of lug 19 showing the prongs whereby the flash tube is retained in the recess of the lug.

Referring to the drawings in detail and particularly

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Figs. 1 and 2, A indicates the head of the brooder to which is suitably secured a canopy or hood B under which the chicks gather for shelter and heat. The head and hood may have the shape of a frustum of a cone and may be supported on the floor of a brooder house by a series of legs or may be suspended above the floor by an overhead rope and pulley system not shown; the particular shape of the brooder and its size may vary considerable and is not important to the present invention, as this invention relates to the burners whereby heat is supplied and to means for relighting the burners when the flame becomes extinguished accidentally.

In the present instance, four main burners are shown and are indicated at 2, 3, 4 and 5. Each main burner is provided with a pilot burner and these in turn with flash tubes; the pilot burners being indicated at 2^a, 3^a, 4^a and 5^a and the flash tubes 2^b, 3^b, 4^b and 5^b. A gas supplying manifold having four tubes indicated at 6, 7, 8 and 9 is also supported by the head and the main burners are supported at one end by these tubes and at their opposite ends by brackets C, see Fig. 7, there being one bracket C for each burner. A refractory plate D is disposed in front of each main burner and these plates are permanently secured between the brackets C and a second set of brackets E of the type shown in Fig. 8.

Each main burner operates on the Bunsen principle, that is, each burner is provided with a Venturi tube section 25 having a burner head 26 at one end and a gas and air inlet 27 at the opposite end, see Figs. 5 and 6. Dust due to the dust laden atmosphere previously referred to tends to gather in the Venturi tubes and the burner heads to such extent as to materially interfere with the proper operation of the burners, hence they have to be removed now and then to be cleaned, and one of the features of the present invention is to provide a burner mounting or support which permits quick removal and replacement of the burners without disturbing the gas connections, the pilot burners, the flash tubes or any other part of the mechanism.

To permit ready removal and replacement of the burners a V-shaped lug such as indicated at 10 is formed at each end of the burner head 26. Each bracket C is provided with a pair of right angular bent ears 11, see Fig. 7 and each ear has a V-shaped recess 10^a formed therein for the reception of the lugs 10. It should also be noted that each bracket C has secured thereto a half section of a housing or shield such as shown at 12 and that a complementary half shield section is secured to one end of each burner head 26 as indicated at 12^a; the shield sections 12 and 12^a when in place enclose a pilot burner, for instance, that shown at 3^a, see Figs. 3 and 4 and as there are four brackets C and four main burners, there will be a complete shield or housing for each pilot burner. The lugs 10 and the V-shaped recesses formed in the ears 11 support the head end 26 of each main burner and the tubes 6, 7, 8 and 9 of the gas manifold forms a support for the inlet end of each main burner. The V-shaped recesses also perform another function, to wit: that of limiting movement inwardly of the main burners on the tubes of the manifold, thereby insuring correct positioning of the Venturi tubes with relation to the gas inlet tubes of the manifold and also insuring correct position of the burner heads with relation to the refractory plates against which the flames of the burners are directed. A flexible clip 14, see Figs. 3 and 4, is also carried by each bracket C, these clips are hook shaped and are made of thin spring steel. They hook over the burner heads 26 and secure them in place.

To remove a main burner it is only necessary to release the clip 14 and then grasp the burner head and pull outwardly so that the lugs 10 clear the recesses in the ears 11 and the inlet end slides off the manifold

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tube. The burner is then free and may be removed for cleaning and when cleaned the inlet end is first slipped over the end of the tube of the manifold, lugs 10 are then aligned with the V-shaped recesses in the ears 11 and shoved into the same. The clip 14 is now applied and this completes replacement of the burner. It should be noted that removal and replacement was accomplished without disturbing any other part of the mechanism.

The brackets C serve three other functions besides that of supporting the main burners and the two halves of the shield sections surrounding the pilot burners. The first of the three additional functions is that of supporting one end of each refractory plate this being accomplished by forming a flange 16 on the bracket C, see Figs. 4 and 7. The second additional function is accomplished by forming a hook shaped finger 17 on one of the ears 11, this finger forms a support which embraces and secures a tube 18 which feeds the pilot burner with gas. The third additional function is accomplished by securing a lug 19 at the opposite ear of the bracket C and forming a recess in the outer end of the lug to receive and support one end of a flash tube.

Before describing the operation and function of the flash tubes, it is desirable to point out that the head of the brooder is composed of an outer or main head A and an inner head R, this latter head is frusto conical in shape and thereby forms an incline annular surface upon which the major portion of the burner and lighting assembly is mounted. For instance, by referring to Figs. 3 and 4 it will be seen that the brackets C and E are secured to the inner head. Between each pair of brackets is secured a refractory plate C and by the brackets C, the main burners, the pilot burners together with their shields or housings and the flash tubes.

It was previously stated that one or more of the main burners and their operating pilot burners might become extinguished accidentally by a gust of wind or otherwise, and that one of the features of the present invention was to provide means for automatically relighting the same. Relighting is accomplished as follows. By referring to Figs. 5 and 6 it will be noted that the front face of the burner head 26 is provided with a series of closely spaced orifices 21 through which gas discharges to feed the flame of the burner, and that one of the orifices 21^a is within the shield of the cooperating pilot burner. This orifice either relights the pilot burner or the pilot burner through this orifice relights the main burner as will later be described. It will also be noted that orifice 21^b at the opposite end of the burner head is connected by means of a slot 22 with an orifice 23 formed in the end of burner head 26. Gas is constantly discharging from orifice 23 into an adjacent flash tube 2^b, see Fig. 3 and burns with a small flame if all burners are operating, but if the burner becomes extinguished orifice 23 will discharge gas into the flash tube and this will travel along the interior of the tube until it reaches the opposite end which is supported and extends through the shield of the pilot burner of another or adjacent main burner. If the pilot is burning it will ignite the gas discharging from the flash tube and a flash back takes place which ignites the gas issuing from orifice 23, the flash back also ignites the gas in the slot 22 and this in turn ignites the gas discharging from orifice 21^b and also the gas issuing from the series of orifices formed in the head of the burners, thus a main burner may be reignited either from a flash tube or from its pilot burner, or in other words from either end of the burner head, this is important, for instance, let it be assumed that all the main burners and the cooperating pilot burners become extinguished with the exception of the pilot burner shown at 2^a, see Fig. 1. If that should happen the main burner 2 would immediately be reignited by its pilot burner and no gas would enter the flash tube 5^b as the gas issuing from orifice 23 would be burning, however, gas is discharging into the flash tube in-

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dicated at 2^b, 3^b and 4^b and when the gas in tube 2^b reaches pilot burner 2^a there will be a flash back which will ignite burner 3 and its pilot burner 3^a, this in turn will cause a flash back through tube 3^b causing reignition of burner 4 and its pilot burner 4^a and this in turn will cause a flash back through tube 4^b thereby igniting burner 5 and its pilot burner 5^a, thus all the main burners and their cooperating burners were reignited even though no gas was delivered to the flash tube 5^b and this is due to the fact that anyone of the main burners may be ignited from either end, that is, either by its pilot burner or by the adjacent flash tube. There is only one condition under which reignition cannot take place and that is when all the main burners and their pilot burners become extinguished at the same time, that however, has never happened in actual practice, except when the gas is turned off accidentally or otherwise, in fact, it is seldom that more than one or two main burners become extinguished at the same time, but when it happens they are almost instantly reignited either by the pilot burners or the flash tubes.

In the drawings here presented four main burners are shown but two, three, four, five, six or more burners may be employed however, a pilot burner must be disposed at one end of each main burner and one end of a flash tube must be disposed at the opposite end of each main burner, so that the opposite end of each flash tube may be connected with a pilot burner. By so arranging the pilot burners and the flash tubes, ducts are formed between the main burners through which gas may flow to reignite them when extinguished accidentally or otherwise.

The flash tubes seldom require cleaning, but if they do, they may be readily removed as one end of each flash tube is supported by extending into and through an opening formed in a pilot housing while the opposite end of each flash tube is supported in the notched lugs shown at 19, these lugs being provided with prongs 19^a which enter perforations in the flash tube to retain the flash tube against accidental removal from the recess in the lug.

Having thus described my invention, what I desire to claim and secure by Letters Patent is:

1. In a structure of the character described, a plurality of main gas burners each burner having a gas burning orifice and a flash tube gas feed orifice, a gas supply for said burners, a pilot burner disposed adjacent to each main burner in position to ignite gas issuing from the gas burning orifice, a separate gas supply for each pilot burner, a housing mounted adjacent to each main burner and enclosing the pilot burner adjacent thereto, a flash tube attached at one end to and opening into each housing and extending outwardly from the pilot burner housing, each of said flash tubes extending from the attached housing and having its other end adjacent to the flash tube gas feed orifice of an adjacent main burner, and means supporting said other end of each flash tube in alignment with the flash tube gas discharging orifice of the adjacent main burner whereby gas will enter the end of the tube and flow axially therethrough.

2. In a structure of the character described, a plurality of main gas burners each burner having a gas burning orifice and a flash tube gas feed orifice, a gas supply for said burners, a pilot burner disposed adjacent to each main burner in a position to ignite gas issuing from the gas orifice, a separate gas supply for each pilot burner, a housing mounted adjacent to each main burner and enclosing the pilot burner adjacent thereto, a plurality of flash tubes one for each pilot burner, means on each pilot burner housing for enclosing and supporting one end of a flash tube in the housing and adjacent to the pilot burner therein, and means for supporting the opposite end of each flash tube adjacent to a main burner maintaining it in alignment with the flash tube gas feed orifice of the adjacent main burner whereby gas will enter the end of the tube and flow axially

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therethrough toward the pilot burner housing at the other end thereof.

3. In a structure of the character described, a plurality of main gas burners each burner having a gas burning orifice and a flash tube gas feeding orifice, a gas supply for said burners, a pilot burner disposed adjacent to each main burner in position to ignite gas issuing from the gas burning orifice, a separate gas supply for each pilot burner, a housing mounted adjacent to each main burner and enclosing the pilot burner adjacent thereto, a flash tube disposed between each main burner and the pilot burner of an adjacent main burner, and supporting means for each flash tube, said means maintaining each flash tube in alignment with the flash tube gas feeding orifice of each main burner, whereby gas

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discharging from each flash tube gas feeding orifice will enter one end of each flash tube and flow axially through each flash tube to an adjacent pilot burner.

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