April 14, 1942. M. MAROWSKY 2,279,924

PREHEATER FOR LIGHTING AND HEATING APPARATUS

Filed Dec. 15, 1938

Fig. 1

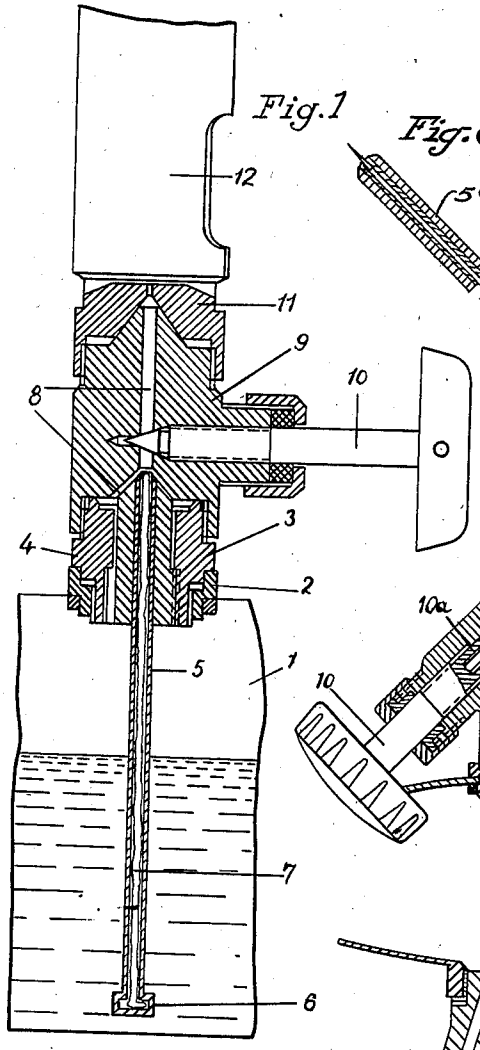
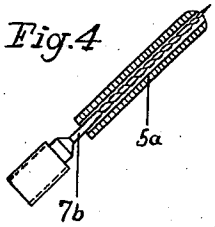


Fig. 6

Fig. 4



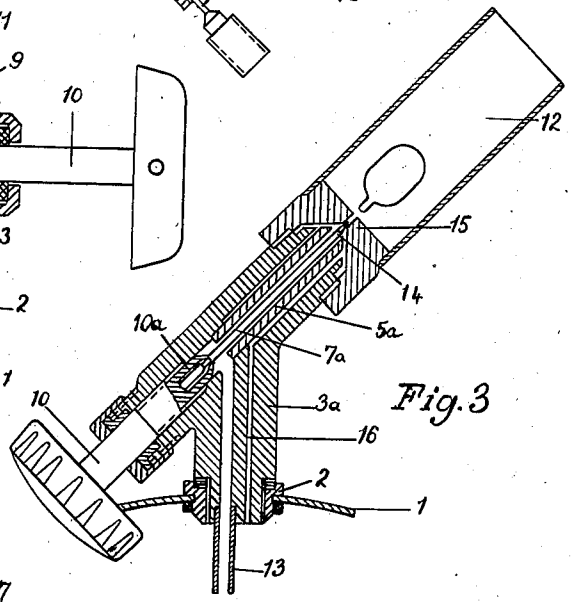


Fig. 3

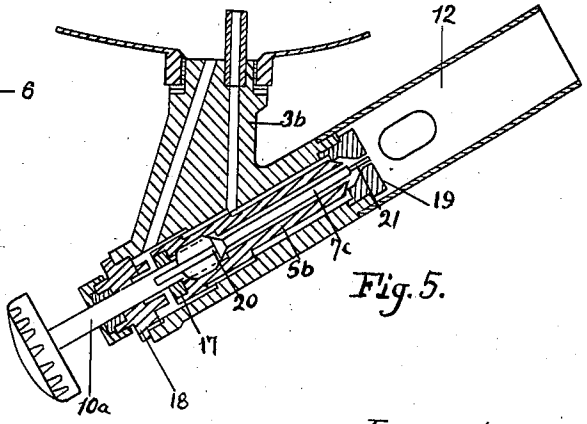
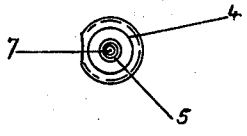


Fig. 5.

Fig. 2.



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UNITED STATES PATENT OFFICE

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PREHEATER FOR LIGHTING AND HEATING APPARATUS

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4 Claims. (Cl. 158—81)

The present invention has for an object to overcome difficulties which still occur occasionally in preheaters employing comparatively narrow hair tubes for fuel admission and very wide air nozzles. With the employment of such a hair tube, the inside diameter of which is at the utmost 1/50 of its length, disturbances in working occur occasionally which are caused by the fact that smuts, tinder or other residues from the manufacture of the hair tube become partly detached from the wall and prevent the flow of the fuel. In accordance with the present invention, comparatively wide fuel feed pipes are used instead of very narrow hair tubes, and the effective cross section of which is reduced by the introduction of an insertion pin in such a way that the same proportion is obtained between the inside width and the length as in the case of hair tubes referred to above. Moreover, an annular channel is provided for the admission of air, in accordance with the present invention, in order to avoid the employment of an air nozzle, the mouth of which in the mixing chamber is located in the outlet direction beyond the mouth of the fuel pipe, so that here too the mouth of the fuel passage in the mixing chamber is situated nearer to the outlet nozzle than the mouth of the air passage.

The invention thus provides a preheater for illuminating and heating apparatus fed by liquid fuel under air pressure, wherein an insertion pin is arranged in the fuel feed pipe, by means of which pin the cross section of the feed pipe is reduced.

The invention is illustrated in the accompanying drawing:

Figure 1 of which shows in section an atomizer for a storm lantern or other illuminating or heating apparatus;

Figure 2 is a plan view of part thereof;

Figure 3 shows in section a modification in which the insertion pin is formed as a valve spindle;

Figure 4 shows a further modified form of the insertion pin;

Figure 5 shows a modification in which an atomizer preheater is arranged underneath the fuel reservoir; and

Figure 6 shows a modified form of the tubular piece which receives the insertion pin.

In Figure 1 a fuel reservoir indicated at 1 has a thread nut 2 tightly soldered thereto, a body 3 of the atomizer preheater being screwed therein. This body 3 has at its lower end besides the exterior thread an internal thread into which another body is screwed. The latter serves for receiving a rising pipe 5 which is closed at its lower end by a filter 6 and accommodates in its interior an insertion pin 7. The body 4 has a smooth or plain part the diameter of which is only a little smaller than the corresponding bore of the body 3, and the thread of the body 4 is interrupted locally so that an annular and very narrow channel is formed at the upper part of the body 4 for the admission of air to the mixing chamber 8. The body 4 is conically shaped at its upper end so that the mouth of the fuel passage between the wall of the pipe 5 and the insertion pin 7 therein is located nearer to the outlet opening than the mouth of the annular shaped air channel in the mixing chamber 8. The insertion pin 7 is bent in the form of a hook at its lower end, in order to prevent displacement thereof. This pin 7 is moreover bent once or a number of times before insertion, in order to fit firmly within the rising pipe 5 despite its smaller diameter. The valve body 9 has a bore for the valve spindle 10 and is at its upper end crowned by the outlet nozzle 11 which in turn carries the flame pipe 12. In the embodiment shown in Figure 3 the fuel feed or rising pipe 13 is formed with comparatively large cross section and without an insertion pin. In this case an insertion pin 7a is constituted by an extension of a valve spindle 10a and is shaped at its front end as a slender cone 14 serving for closing the outlet nozzle 15. The fuel pipe 5a is a press fit at its lower end in the body 3a. The insertion pin 7a is loosely secured to the spindle 10, so that it can be freely adjusted towards the nozzle and provide a tight closure. If the inserting pin 7a were rigidly connected to the spindle 10, it might be possible that the conical valve 14 would not be co-axial with nozzle 15 and consequently no complete sealing would be effected in closing the valve. The pin 7a is allowed sufficient play at the point of attachment to the spindle 10 so that it may adjust itself in the axial position with regard to nozzle 15 to effectively seal the opening. It will be recognized that the conical surface of the pin 7a will render the same self-aligning. The valve head is of a slender and conical shape. The air channel 16 leads to an annular space of very small cross-section surrounding the tube 5a, which forms a continuation of the air channel, and the mouth of which latter is also further remote from the outlet nozzle 15 than the mouth of the fuel passage. Instead of the plain insertion pin 7a an insertion pin provided with a coarse thread, as illustrated at 7b in Figure 4 can be used, or alternatively the fuel feed pipe 5 or 5a may be provided with an internal thread, as shown in Figure 6. The threaded surface provided on the pin 7b serves the purpose of extending the path of travel of the fuel flowing through the fuel feed pipe and further to increase the ratio between the length and the cross-section of the fuel feed pipe without altering the external di-

mensions of the structure. The same result is attained by the use of the modification of Figure 6.

The atomizer differentiates only slightly in regard to the mode of operation from the known arrangement. However, it is worth while to mention that the valve needle 7a which constitutes also the insertion pin and is arranged in the direction of the admixture stream allows a still better regulation of the magnitude of the flame. The slender conical formation of the insertion pin 7a also helps to give a good regulating effect. Also the new formation of the air channel as an annular channel contributes considerably to the good result. The new atomizer is suitable also for a hanging arrangement, that is to say underneath the fuel reservoir, for example, for hanging lamps such as in the embodiment illustrated in Figure 5. In the case of the latter the tubular piece 5b is provided at its rear end with external and internal screw threads. The external thread is screwed into the body 3b and into the internal thread of the tube 5b the spindle 10a is screwed only so far rearwardly as it abuts against the ring 17 which is inserted rigidly into the tubular piece 5b. If the spindle 10a is further rotated rearwardly the tube piece 5b is carried along until the latter abuts the locking ring 18. The tubular piece 5b and the spindle 10a are conically shaped at their front end and form thus with corresponding edges on the nozzle 19 and the body 5b, respectively, two valves tightening in the same direction, of which the inner one controls the fuel supply and the outer one the air supply. In order to enable the passage of the fuel through the ring 17 and the spindle thread, the spindle 10a is formed with a groove 20 terminating before the shutting off point. The insertion pin 7c has at its front end a cleaning needle 21. With this arrangement the external thread of the tubular piece 5b prevents a compensation of the liquid level in a closed state.

With the arrangement in accordance with Figure 3 a compensation of the liquid level may take place if this arrangement is employed so as to be placed underneath the fuel reservoir, so that on first opening the valve the fuel discharges. But the amount of escaping liquid quantity may be limited by appropriate choice of the dimensions of the air supplying channels so that the working of the atomizer is thereby not disturbed.

The cross section of the fuel channel directly before the mouth in the mixing chamber is of such dimensions that if circular-shaped this channel will have a diameter which will be at the utmost 1/50 of the length of the fuel feed pipe 5, 5a or 5b as the case may be, so that the nozzle required at this place which obviously will be more easily obstructed, is replaced by a throttled pipe line of comparatively wide cross section, which however, in regard to the mode of execution of the known arrangement will have a particular advantage in that it consists of a tube with a substantially greater cross section which obviously can be more easily kept completely clean internally and free from manufacturing residues.

In the same manner the hitherto existing air nozzles are substituted by a ring channel of a very small width, but, however, of considerably greater cross section than hitherto. By this means the danger of obstruction is reduced to the utmost, but simultaneously the desired throttling of the air is obtained in a complete manner.

I claim:

1. A preheater for illuminating and heating apparatus fed by liquid fuel under air pressure, comprising in combination a reservoir for fuel, a valve body having an outlet nozzle and air and fuel passages communicating with the reservoir, a fuel feed pipe within the valve body defining an annular passage therearound for air, a valve stem in said valve body, an insertion pin in said fuel feed pipe reducing the effective cross sectional area thereof and loosely secured at one end to said valve stem, a cleaning needle provided on the insertion pin for the outlet nozzle.

2. A preheater for illuminating and heating apparatus fed by liquid fuel under air pressure, comprising in combination a reservoir for fuel, a valve body having an outlet nozzle and air and fuel passages communicating with the reservoir, a fuel feed pipe slidable longitudinally within the valve body and defining an annular passage for air therearound, a valve stem in said valve body in co-axial thread connection with the fuel feed pipe to shift the latter within the valve body, towards and away from the outlet nozzle to close and open said air passage, stops within the fuel feed pipe to limit relative motion of said valve stem with respect to said fuel feed pipe, an insertion pin in said fuel feed pipe reducing the effective cross sectional area thereof and loosely secured at one end to said valve stem and of slender conical shape at the other end to close the outlet nozzle to fuel.

3. In a preheater for illuminating and heating apparatus fed by liquid fuel under air pressure, a valve body having an outlet nozzle and an axial passage therethrough, a pipe axially disposed within said passage, said pipe and said passage walls defining an annular air space therebetween, an axially adjustable valve stem in said valve body, an insertion pin secured at one end to said valve stem and extending coaxially through said pipe, said insertion pin being adapted to close said outlet nozzle, means for supplying air to said air space, and means for supplying fuel to said pipe.

4. In a preheater for heating and illuminating apparatus fed by liquid fuel under air pressure, a conduit to conduct the fuel to a mixing chamber, said conduit comprising an elongated pipe of substantially constant internal cross-sectional area throughout its length, an insertion pin extending axially within said fuel pipe to reduce its effective cross-sectional area, means surrounding at least a portion of said fuel pipe but spaced therefrom to define therewith an annular air passage, said pipe terminating at a point beyond said surrounding means, and means cooperating with said pipe and said surrounding means defining the mixing chamber as a conical space axially aligned with said pipe and said surrounding means, said pipe and said surrounding means terminating in said conical space, whereby a mixing of the air and fuel is obtained therein, and means defining said conical space having an outlet at the apex of the conical space leading to the point of combustion.

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