FIG. 3

FIG. 4

INVENTORS.
William L. Gappa
Christian E. Buerki

ATTORNEYS
The improvements relate to liquid fuel stoves and ranges in which liquid hydrocarbon fuel is usually employed, and more particularly to the burners and fuel distribution and control thereof, whereby the operation of the burners is controlled by gravity control of the fluid and without the intervention of valves or the like, the burners being of the "wicketless" type and their combustion being started, regulated and extinguished by adjustment of the level of the fuel which is in turn controlled by manipulation of the parts through which it is supplied and of the burners which comprise the usual annular oil trough with lighting ring surmounted by the concentric perforated blue flame combustion chambers or "coves" or other combustion devices well known in the art.

The objects and purposes of the improvements, among others, are to produce a more efficient, safe and durable stove or range construction of the type referred to of simple and strong construction and accurate, convenient and dependable operation, and to reduce the cost of manufacture in materials, labor and fabricating operations. Other objects, purposes and advantages will be apparent from the following description and accompanying drawings forming a part hereof and referred to therein.

In the said drawings—

Fig. 1 is a top plan view of the cooking burners and arrangement of the oil reservoir and stringer pipes embodying the improvements;

Fig. 2 is a front elevation of the parts shown in the plan view of Fig. 1;

Fig. 3 is a side elevation of one of the burners and its oil reservoir shown in Figs. 1 and 2 with the burner in "off" position;

Fig. 4 is a side elevation of the burner and oil reservoir shown in Fig. 3 but with burner in "burning" position.

Referring particularly to Figs. 1-4 of the drawing, 1 represents the oil reservoir base and lower chamber which has upturned therein a common form of glass or metal atmospheric feed bottle 2. The oil reservoir base has orifices 3 and 4 cut into its bottom which orifices extend through one side of a feed or "stringer" pipe 5. The feed stringer pipe 5 and base 1 are held in position by brackets 6 and 7 respectively to which they are secured by any suitable means such as welding, riveting or bolting. The pipe 5 leads into a main feed or stringer pipe 8 which is held rigidly in position by means of a bracket 9 suitably mounted on the stove frame bottom member 10 but which nevertheless is subject to a certain slight degree of torque due to the natural resilience of its metal. The bracket 9 is secured to the frame member 10 by bolting or other suitable means as shown at 11 and attached to the main stringer pipe by welding at 12. In order to add strength to the structure a raised channel piece 13 is attached to the frame member 10 by spot or line welding or other suitable means at 14 so that the base 1 and stringer pipe 5 through the media of the attaching pieces 6 and 7 are firmly and rigidly affixed to the member 10 by means of the reinforcing and connecting channel strip 13.

The main stringer pipe 5 is closed at each end by means of stopper nuts or caps 15 and 15a so that there is fluid entrance into the said tube through the tube 8 only and due to the elevation of the oil reservoir 1 above the level of the tube 8, and exit thereof from the said main tube only through the burner stringer or feed tubes 16, 16a and 16b, these tubes being inserted into the main stringer tube through orifices 17, 17a and 17b thereof, each of said tubes being inserted a short distance into the interior of the main tube 8 to form shoulders 18, 18a and 18b secured by means of welding or brazing as at 19.

The feed tubes 16, 16a and 16b at the front of the frame 10 terminate in plates 20 which are brazed or welded at 21 to the ends of said tubes. These plates are tapped and have plugs 22 screw threaded therein and gripping the plates for the purpose of closing the tube ends and providing cleanout openings when removed should the tubes become clogged. Near the end of each plate 22 away from the cleanout plug there is welded to the plate at 23 an outwardly projecting fulcrum arm 24 which is held in a cam slot 25 (see Fig. 6) whose convolutions form a spiral cam slot in a cam disk 26 at the center of which is rigidly fixed an outwardly extending drive rod 27 which passes through a bearing hole 26 in the indicator plate 28 welded or otherwise fixed to the base frame member 10 by means of the bolts or self-tapping screws 29. The fulcrum arm 24 also passes through the indicator plate 28 and is held in the vertical slot 30 so that when the fulcrum arm 24 follows the convolutions of the cam slot 25 it may only travel up and down vertically and is restrained from lateral movement by the slot. The cam disk 26 is spaced from the indicator plate 28 by a washer 31 and held from inward or horizontal movements by a spacer 32 which in turn is fixed on the drive rod 27 by an indicator knob 33.

The feed tubes 16, 16a and 16b have cooking burners 34, 34a and 34b mounted near their ter-
mini and at the front of the base member 18, each of these members being mounted on its feed pipe 16b or 16b, or both, by means of a riser 30 consisting of a pipe welded or otherwise inserted into an orifice 37 of the said feed pipe, so that one end of the riser pipe gives access to the interior of the feed pipes 16, 16a or 16b and the other end gives free access to the interior of the burner trough which consists of an inner annular ring 38, outer annular ring 39, bottom joinder ring 40 and annular lip 41, all preferably formed of a single piece of sheet metal so to form an annular trough or channel 42, into which is loosely inserted a capillary lighting ring 42a.

Referring to Fig. 3 and Fig. 4, it will now be seen that when the burner is in "off" position, as shown in Fig. 3, the level of the oil in the feed pipe 16b is below the opening of the riser 30 so that oil cannot flow into the trough 42. When however the burner is in "light" or "burn" position as shown in Fig. 4, the oil in the feed pipe 16a flows into the trough 42 through the riser 35 and is absorbed by the ring 42a, the raising and lowering of the burner being permitted by the flexing of the feed tubes 16, 16a and 16b through the fulcrum 24 riding in the cam slot 25 on the positive turning of the indicator knob 32 affixed to the drive shaft 27 and the cam disk 26. This flexing movement of the feed tubes 16, 16a and 16b is supplemented by the slight movement of their ends which project into the main pipe 8 through openings 17, 17a and 17b and are brazed therewith at 19 to make a strong but slightly flexible joint, as shown in Figs. 3 and 4.

The position of the top burner mechanism is as follows:

When it is desired to light the cooking burner 34b for example, the indicator knob 35 is turned to the "light" position which lowers the burner to the extreme position shown in Fig. 4 and allows oil to flow into the trough 42 through the riser 36, the lowering of the burner being brought about by means of the fulcrum riding in the cam convolutions 25 in the disk 26. When lowered the bottom piece 40 is below the oil level maintained in the reservoir 1 and therefore oil may be absorbed by the light sleeve 40a and the burner is lit the indicator knob is turned to "burn" position or any variation thereof and since the travel of the knob 33 from "light" to "off" position raises the burner 34 by flexing the feed tube 16b, the level of the oil in the channel 42 is adjusted accordingly. Although the feed pipes 16, 16a and 16b are made of relatively inflexible material, since their length is considerably greater than their diameter, they may be forced into a flexed position with respect to the joint 19 by the pressure of the fulcrum arm 24 and associated connections riding in the cam slot 25 and on release of pressure on the conduits they will spring back into alignment. To turn the burner off it is only necessary to turn the indicator knob to "off" position at which time the burner 34b is raised to a position as shown in Fig. 3 where the oil level in the reservoir 1 is below the bottom 48 of the trough 42, and thus no oil is fed to the trough, but any slight amount of oil remaining in the trough will gravitate to the portion of the trough away from the riser 37 and not flow back into the feed pipe 16b, and be evaporated and burned. Thus the provision of the riser 49 and the elevating member 35 at the opposite side of the trough not only assures an approximately level burner trough at normal burner level but also effectuates a gradual rise of the oil level when one or two burners are turned off and a resulting flare up of the other burner or burners.

Should it be necessary to unlog or clean out the feed pipe 16b, the oil supply feed bottle 2 is removed and the cleanout nut 22 is removed by use of a screwdriver or other implement inserted through the orifice 22a in the indicator plate 26 which gives access to the interior of the feed tube 16b.

Various changes in the details of construction and arrangement herein described and shown may be made without departing from the scope and purport of the improvements. Thus the brazed joints of the burner feed conduits and main conduit or "stringer" which provide very strong, accurate and durable connections, resisting the tendency of flexure of the former to cause crystallization and leakage and dispensing with costly and otherwise objectionable "bellow" joints and collars, may have the ends of the said burner conduits projected into the main conduit 44, 43 and 42 and resiliently connected with the main conduit to provide for the absorption of more of the flexure by the latter, and the swinging and guiding movement of the oven burner may be provided for by other means substantially equivalent to those shown. Substantial equivalents of the burner raising and lowering cam slots and of other operating parts may also be employed.

What we claim is:

1. In a device of the character described, a liquid fuel reservoir constructed and arranged to maintain a constant liquid level, a main liquid fuel discharge and supply conduit in communication therewith in which the said level is maintained, a plurality of burners, a relatively inflexible uninterrupted burner supply conduit for each burner in open communication with said main conduit and burner fixed to said main conduit at one end and to the burner at a point distant therefrom and supporting the burner, means for raising and lowering each burner conduit adjacent the burner by forcibly flexing it on its connection with the main conduit and thereby varying the feeding of oil 42a, and the burner with respect to the maintained liquid level, said means comprising a member fixed to the burner conduit and projecting therefrom and a manually operable cam device in engagement with said member whereby movement of the cam device causes vertical movement of said member, the burner conduit and burner.

2. In a device as specified in claim 1, said cam device comprising a member having a spiral recess therein engaged by the said burner conduit member and mounted for rotation and there being a cam supporting device having a vertical recess also engaged by the last named member and holding it against lateral movement under the pressure of the cam device.

3. In a device of the character described, a liquid fuel reservoir constructed and arranged to maintain a constant liquid level, an uninterrupted liquid fuel discharge and supply conduit in communication therewith in which the said level is maintained, a plurality of burners, a flexible burner supply conduit for each burner in communication with said main conduit and burner fixed to said main conduit at one end and to the burner at a point distant therefrom and supporting the
burner, means for raising and lowering each burner conduit adjacent the burner by flexing it on its connection with the main conduit and thereby varying its position and the position of the burner with respect to the maintained liquid level, said burner being mounted and supported on said burner supply conduit above and parallel to the plane thereof, connecting and spacing supports between diametrically opposed sides of the bottom of said burner and said burner conduit, the said support on the side of the burner farthest from the main conduit having a channel therethrough communicating between the interior of the burner and the said burner conduit for the supply of liquid fuel to the burner and the portion of the burner bottom extending away from said channel being downwardly inclined with respect thereto to the channeled support when the burner is in a position above the said liquid level, whereby a portion of the fluid is retained in the burner when said burner is elevated above the liquid level.

4. In a device as specified in claim 1, the burner supply conduits projecting through the walls of the main conduit, extending into the interior thereof for their full diameter and united by being brazed together on their exteriors and the exterior of said main conduit at their intersection.

5. In a device of the character described, a liquid fuel reservoir constructed and arranged to maintain a constant liquid level, a main liquid fuel discharge and supply conduit in communication therewith in which the said level is maintained, a plurality of burners, a relatively inflexible burner supply conduit for each burner in open communication with said main conduit, a joint between said burner conduit and main conduit at one end and a connection between it and the burner at a point spaced therefrom, means for raising and lowering the burners individually and forcibly flexing said conduit on its connection with the main conduit and thereby varying its position and the position of the burner with respect to the maintained liquid level, said means comprising a member connected with the burner conduit and a manually operable lifting device in engagement with said member, whereby movement of the latter device causes vertical movement of said member, the burner conduit and burner on said flexible joint.

6. In a device of the character described, a liquid fuel reservoir constructed and arranged to maintain a constant liquid level, a main liquid fuel discharge and supply conduit in communication therewith in which the said level is maintained, a plurality of burners, a relatively inflexible burner supply conduit for each burner in open communication with said main conduit, a flexible joint between said burner conduit and main conduit at one end and a connection between it and the burner at a point spaced therefrom, means for raising and lowering the burners individually and forcibly flexing said burner conduit on its connection with the said main conduit and thereby varying its position and the position of the burner with respect to the maintained liquid level, said means comprising a member connected with the burner conduit and a manually operable lifting device in engagement with said member, whereby movement of the latter device causes vertical movement of said member, the burner conduit and burner.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>776,320</td>
<td>Harrison</td>
<td>Nov. 29, 1904</td>
</tr>
<tr>
<td>1,060,458</td>
<td>Kelly</td>
<td>Apr. 29, 1913</td>
</tr>
<tr>
<td>1,150,630</td>
<td>Phillips</td>
<td>Aug. 17, 1915</td>
</tr>
<tr>
<td>1,161,535</td>
<td>Phillips</td>
<td>Nov. 23, 1915</td>
</tr>
<tr>
<td>1,452,354</td>
<td>Blackford</td>
<td>Apr. 17, 1923</td>
</tr>
<tr>
<td>1,488,854</td>
<td>White</td>
<td>Apr. 1, 1924</td>
</tr>
<tr>
<td>1,781,169</td>
<td>Cooper et al.</td>
<td>Dec. 30, 1930</td>
</tr>
<tr>
<td>1,809,892</td>
<td>Ellis et al.</td>
<td>June 16, 1931</td>
</tr>
<tr>
<td>1,873,299</td>
<td>Hoeft</td>
<td>Aug. 30, 1932</td>
</tr>
<tr>
<td>2,088,989</td>
<td>Hurwitz</td>
<td>Aug. 3, 1947</td>
</tr>
</tbody>
</table>