

Sept. 17, 1935.

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2,014,868

AIR FEEDING DEVICE FOR STOVES

Original Filed Oct. 13, 1931 2 Sheets-Sheet 1

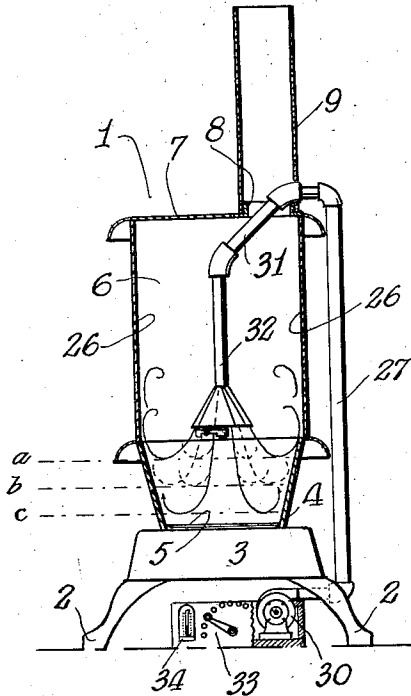


Fig. 1

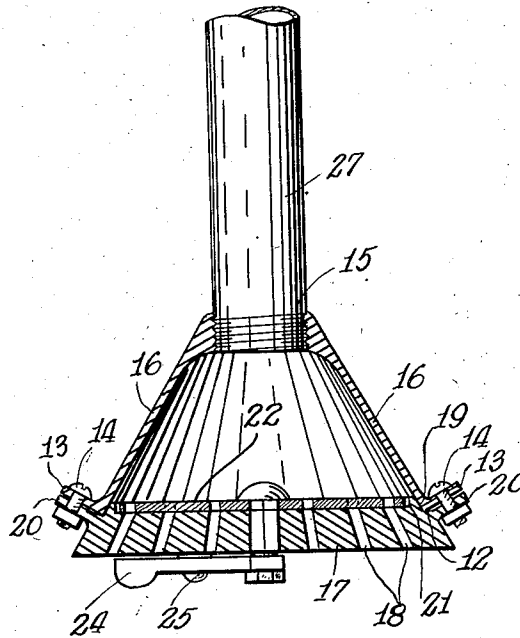


Fig. 2

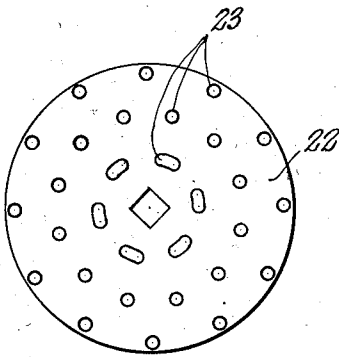


Fig. 3

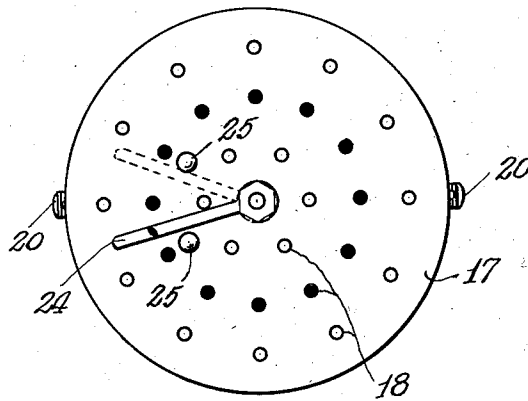


Fig. 4

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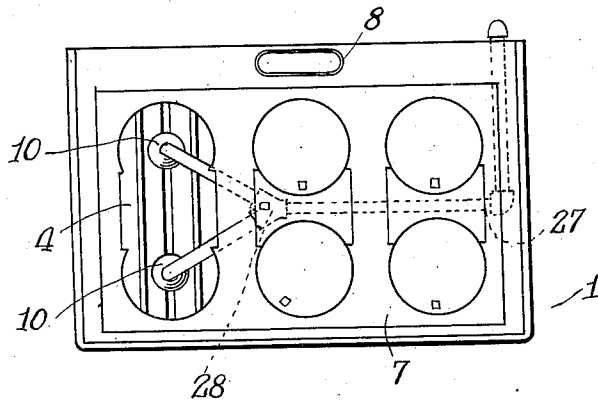


FIG. 5

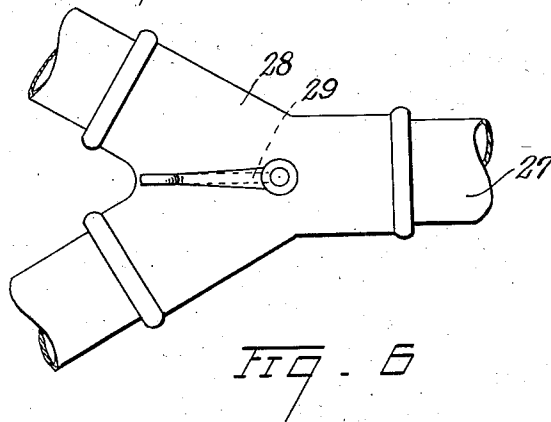


FIG. 6

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AIR FEEDING DEVICE FOR STOVES

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568,560, October 13, 1931. This application
August 5, 1933, Serial No. 683,883

2 Claims. (Cl. 126—77)

This invention relates to an air feeding device for fuel burning stoves, ranges, furnaces, etc., and has as one of its objects to provide an air feeding device that is adapted to facilitate the combustion of fuel, from the coarse to the fine or comminuted fuel.

Another object of the invention is to provide an air feeding device that will project the heat of combustion against the side surfaces of a stove for greater radiation purposes.

A further object of the invention is to provide an air feeding device that is adapted for uniform action irrespective of the changing level of the fuel.

A further object of the invention is to provide an air feeding device, having a forced draft, that is heat resisting due to the passage of air through the head under relatively high velocity, with the velocity changeable with the temperature.

A further object of the invention is to provide an air feeding device that is provided with an adjustable forced draft whereby to conform to the fuel used and the temperature desired.

A further object of the invention is to provide an air feeding device that may be thermostatically regulated.

A further object of the invention is to provide an air feeding device that is cheap to construct, install and renew.

With these and other objects in view reference is now had to the accompanying drawings in which

Fig. 1 is a sectional elevation of a stove showing the device installed;

Fig. 2 is a sectional elevation of the head of the device;

Fig. 3 is a plan view of a valve plate;

Fig. 4 is a plan view of the head from below;

Fig. 5 is a plan view of a range showing a modified form of installation; and

Fig. 6 is a plan view of a Y fitting used in the modified installation.

Having reference to the drawings like numerals refer to like parts throughout the several views and the numeral 1 refers to a stove, the representation of which is intended as typical of stoves in general, which stoves consist of legs 2, a base 3 mounted on said legs, a fire pot or container 4 mounted on the base and containing a grate represented by the parallel lines 5, a combustion chamber 6 mounted on the fire pot, a top 7 closing the upper end of the combustion chamber 6, the top being provided with a collar 8, and smoke pipe 9 mounted on the collar, the assemblage being in the usual manner of such construction.

Obviously the fire pot, or container 4, will contain the fuel necessary to supply the heat required, and as the various levels of the fuel and not the fuel itself particularly, is important for the moment these levels will be represented by the broken and dotted lines within the fire pot (see Fig. 1), and these levels will be designated as shown by the characters *a*, *b* and *c* representing the high, intermediate and low general levels respectively of the fuel.

A comparatively short distance above the high level *a* of the fuel, but disposed adjacent thereto is a head 10 which is preferably positioned centrally at the lower portion of the combustion chamber 6, and this head acting in conjunction with the fuel and the stove 1 forms the burner and will now be explained:

The head 10 comprises a hollow shell 11, formed preferably the shape of a cone, and has its bottom or base open for a purpose to be explained, and is provided on its lower perimeter with a pair of oppositely positioned lugs 13 which are turned at right angles to the sides thereof to receive bolts 14 as shown, and the shell is preferably threaded at its apex, as at 15, to receive the feed pipe which will be presently explained.

The shell 11 may be constructed of any suitable material and while the intent is to maintain a reduced temperature therein by the cooling effect of a blast of air a heat resisting material is to be preferred.

For this reason the design of the shell, and in fact the entire head 10, is such as to readily lend itself to construction even of fire brick, in which latter case the walls 16 thereof obviously would be thicker than that shown, the illustration in Fig. 2 contemplating a metal shell.

Completing the head 10 is a heat resisting directing plate 17 which may be constructed of a like material to that of the shell and this plate is of increased thickness first, to resist the heat and, second, to provide a multiplicity of directed elongated air passages 18, to be explained, and this plate is preferably offset, as at 19, to provide a tight connecting joint with the lower rim 12 of the shell.

The plate 17 is further provided with similar lugs 20 to that of the shell and these are positioned thereon to receive the bolts 14 before mentioned, for the purpose of removable attachment of the plate to the shell, by which means either part of the head may be renewed with a minimum of effort or expense. Obviously other securing means may be employed or other plates may be substituted should other sizes or directions of air

passages be required, as where fire pots of different sizes are encountered.

The plate 17 is further provided with a depression 21 to provide a valve seat, and a valve plate 22 preferably of the disc type is pivotally mounted in the depression to complete a valve whereby to selectively direct a current of air through the selected air passages 18 forming nozzles.

The nozzles 18 consist of orifices of relatively small diameter extended through the directing plate 17 and are arranged in concentric circles 23, each circle forming a series of passages, and these nozzles diverge so that each concentric series succeeding from the center have a greater downward and outward divergence than the preceding series, the angle of inclination of the orifice being disposed to direct the air blasts to predetermined parts of the fuel surface.

The valve plate 22 is perforated in such a manner that the central series of air passages may be always open when each of the other series, of which there are two shown, may be alternately opened by a partial rotation or rocking of the valve plate 22, which rocking is accomplished by an exteriorly positioned operating lever 24 which is suitably attached to the valve plate whereby by an alternate movement of the operating lever between two limiting stops 25 one or the other of the outer series may be opened at will and from the door (or other opening not shown), by means of a poker or other suitable implement, the black dots in Fig. 4 representing closed orifices and the circles representing open nozzles thus conforming to the views in Figs. 1 and 2.

Obviously the valve may be designed to close both outer series simultaneously if desired, or other combinations may be made by suitable arrangement of the orifices in the valve plate.

By this means certain of said air passages 18 may be so selectively employed as to direct the blasts of air to selected parts of the surface of the fuel content of the container, regardless of the fuel level for greatest combustion efficiency and that will constantly provide an angle of deflection therewith that will direct the heat consistently toward the point of greatest effectiveness on the outer walls of the stove even though the surface of the fuel is gradually lowered by being consumed.

In other words with the fuel level at *a*, the angle of deflection of the air say coming from the extreme outer series of orifices, said outer series being represented by the outer curved and solid lines in Fig. 1, the action is as follows:

Upon striking the predetermined part of the fuel surface the air will provide greater combustion at that point and project the heat of combustion against the lower part of the surface 26 of the combustion chamber, then with the fuel level lowered by consumption to the position of *b*, changing the angle of deflection, and by moving the operating lever 24 and closing the outer series the air coming from these passages of different divergence (see dotted lines in this Fig. 1) will provide greater heat at that point and likewise project the heat to the entire surface, and further that with the fuel level lowered to the position of *c* the inner series of passages, obviously of least divergence, will function in like manner.

Hence, while the central series is in constant use, first to provide air to start the fire at any level of the fuel, second to provide a draft to the central mass of fuel, and third to project the flames or heat against the walls or surface 26 of the stove when the fuel is low, this series will

afford an aid to either of the other two series by maintaining combustion in the central area of the mass. Therefore the action of the central series will be unaffected by the action of the open first or outer series with perfect combustion at all times as a result and substantially irrespective of the fuel level.

An air blast obviously will regulate combustion and combustion will provide heat, with the greater the velocity of the air blast the greater the heat; hence, as the air all passes through the head 10 the velocity and volume of air passing through the head will tend to counteract the effect of the heat on the material of the head in proportion to the heat.

Therefore when high heat obtains a high velocity of air is also present in the head to resist the action of the high heat on the head by its cooling effect.

That the device is applicable to other than circular fire pots is clearly shown in Fig. 5 where the device is shown installed in a range, and where two heads are shown coming from a common feed pipe 27 and joined therewith by a Y fitting 28.

In this case a butterfly valve 29 may be installed in the Y fitting to control the air current flow to either one or all of the heads and by this means fires of different intensities may be obtained simultaneously at different parts of the stove or range.

To provide an air blast to the head or heads a fan 30 is provided, preferably of the centrifugal type, and the fan is connected to the head by the main feed pipe 27 which is intended for insertion into the stove through the smoke pipe 9 and over the collar 8, thereby avoiding mutilation of the stove.

The pipe is directed preferably as shown running diagonally as at 31, from the point of entrance into the stove in the shortest line to the center of the combustion chamber, thence downward, as at 32, by which disposition the flame being directed against the side walls of the stove will not contact the pipe except should an unreasonably strong blast of air be turned on that will force the flame to pass up the smoke pipe, passing by that part of the feed pipe crossing thereover; this however would be unnecessary and wasteful of fuel.

The fan 30 is preferably motor driven and the speed of the motor is controlled by a rheostat, represented as at 33, which may be hand or foot operated or which may in turn be controlled by a thermostat, represented as at 34.

In use the head 10 is installed in the stove somewhat above the top level *a* that the fuel may assume and the motor and other operating equipment may be installed in any convenient place, or as shown under the stove.

With the thermostat set for the proper temperature the fire will be started by placing a small amount of kindling on the fuel, and then paper on top of the kindling, with both under the head.

The paper is now ignited in the usual manner and the motor turned on to drive the fan whereby to force a blast of air into and through the head, and the blast now passing through the central orifices onto the kindling soon starts the mass of fuel burning in the center.

Either of the two outer series of orifices that may be open at this time will act to aid in carrying off the smoke created by the freshly started fire.

After the fire has started and burned outward within range of the influence of either of the

outer series of orifices the flames are forced against the side walls of the combustion chamber with the burnt gases passing up the smoke pipe.

When the fuel has been consumed to the intermediate level *b*, the second series of orifices are brought into effect by the manipulation of the operating lever 24, as above described, and with the outer series now closed the outer walls are maintained at the desired temperature.

Continuing with the fuel level at its lowest point *c* the central orifices will provide an air blast at an angle of deflection to deflect the heat to the side walls, as in the above cases, but in this case and with the outer series cooperating a very strong blast may be provided which condition will be utilized to rejuvenate the fire after it has been permitted to lay dormant, as over night.

The purpose of a rheostat and thermostat being old in the art these need no further description.

This application is intended as a re-file for our abandoned application filed October 13, 1931, Serial No. 568,560, and abandoned October 15, 1932.

Having thus described our invention we claim

1. The combination with a stove having a fire pot halving upwardly extending sides, of a blower head disposed centrally above said fire pot, said blower head comprising a hollow shell adapted for cooling by a blast of air, a heat re-

sisting directing plate removably attached to said shell, and provided with a plurality of concentric series of downwardly and outwardly diverging air passages formed in said plate, each concentric series succeeding from the center and having greater outward divergence than the preceding series, a valve plate pivotally mounted on said directing plate within said shell, and provided with orifices selectively registerable with a series of said passages, an exteriorly positioned operating lever attached to said valve plate, and means to provide a controlled and cooling blast of air to said blower head.

2. The combination with a stove having a combustion chamber, of a blower head contained within said combustion chamber and provided with a source of air supply, and provided with a directing plate, groups of passages of selected inclinations formed in said plate, one group of passages being disposed to direct air blasts downwardly and outwardly against predetermine parts of the fuel surface therein, and another group of passages being disposed at an angle to deflect said blasts to the combustion chamber walls, and means to optionally select a group of said inclined air passages.

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