

May 7, 1940.

C. SCOTT-SNELL

2,199,826

MEANS FOR PROMOTING COMBUSTION IN OIL BURNING APPLIANCES

Filed Nov. 8, 1937

7 Sheets-Sheet 1

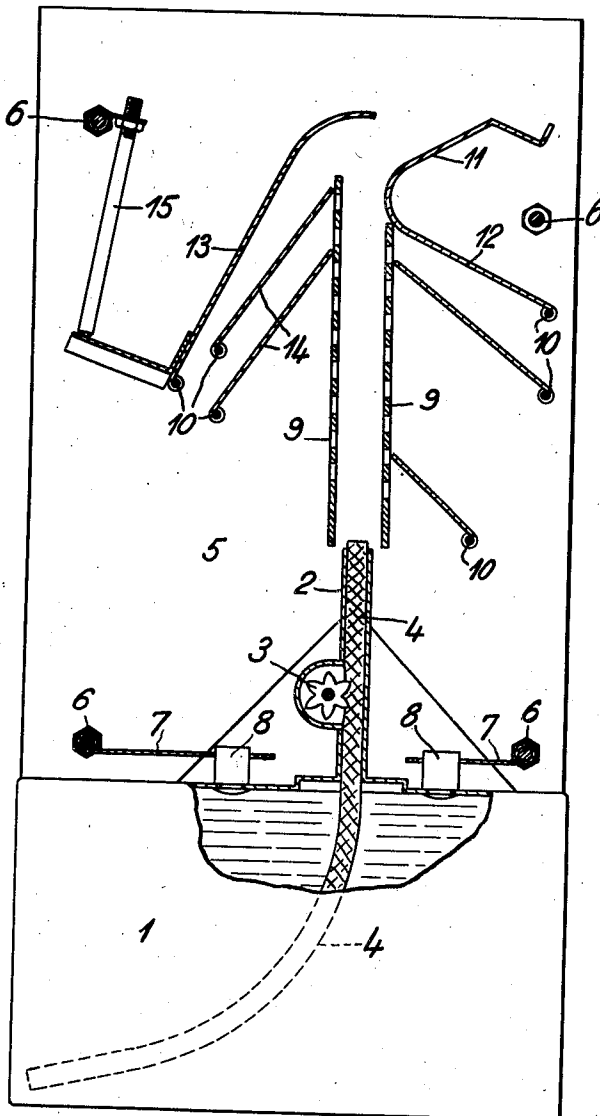


Fig. 1.

INVENTOR
Charles Scott-Snell
BY *A. E. O'Neil*
ATTORNEY.

May 7, 1940.

C. SCOTT-SNELL

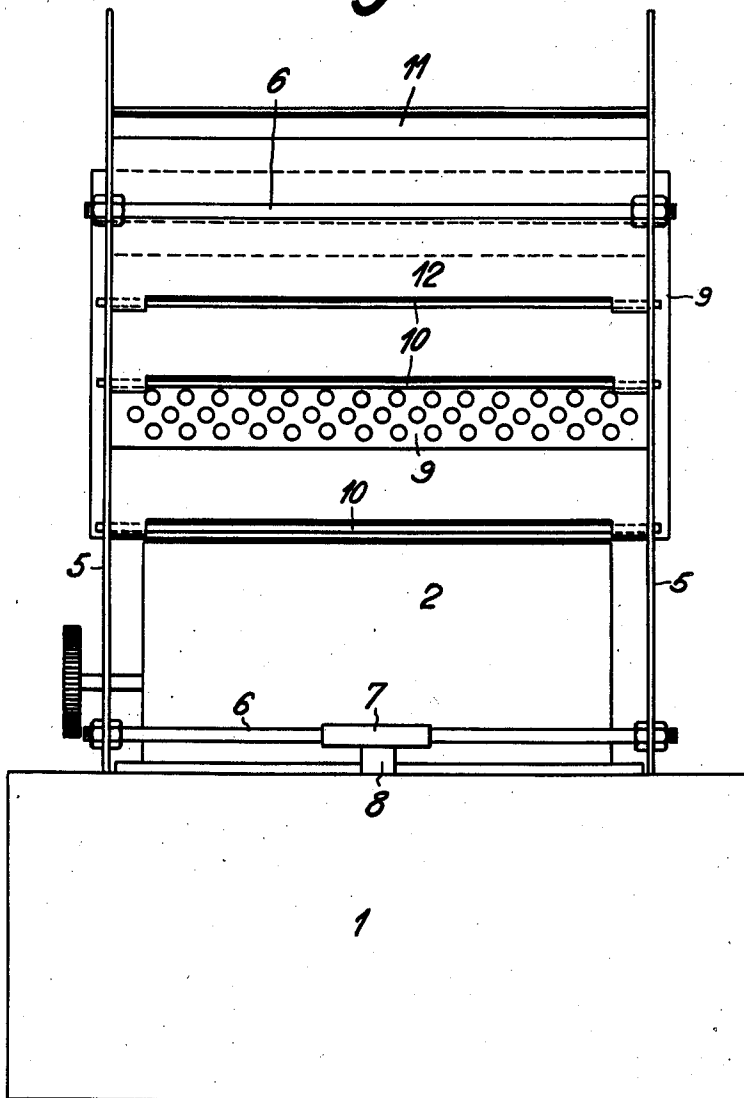
2,199,826

MEANS FOR PROMOTING COMBUSTION IN OIL BURNING APPLIANCES

Filed Nov. 8, 1937

7 Sheets-Sheet 2

Fig. 2.



INVENTOR
Charles Scott-Snell
BY A. E. O'Neil
ATTORNEY

May 7, 1940.

C. SCOTT-SNELL

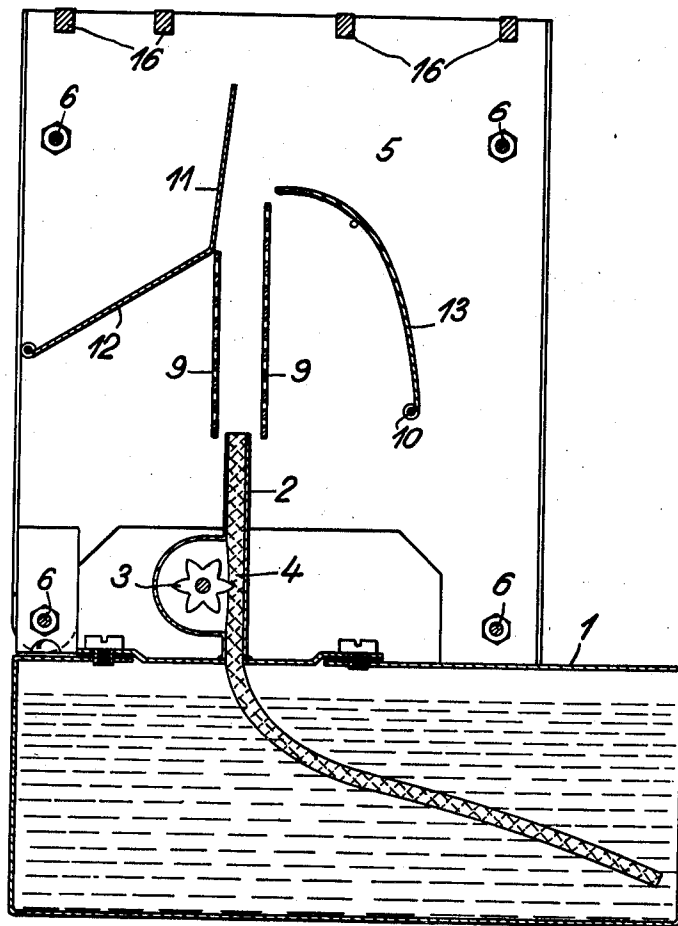
2,199,826

MEANS FOR PROMOTING COMBUSTION IN OIL BURNING APPLIANCES

Filed Nov. 8, 1937

7 Sheets-Sheet 3

Fig.3.



INVENTOR
Charles Scott-Snell
BY A. E. Odell
ATTORNEY

May 7, 1940.

C. SCOTT-SNELL

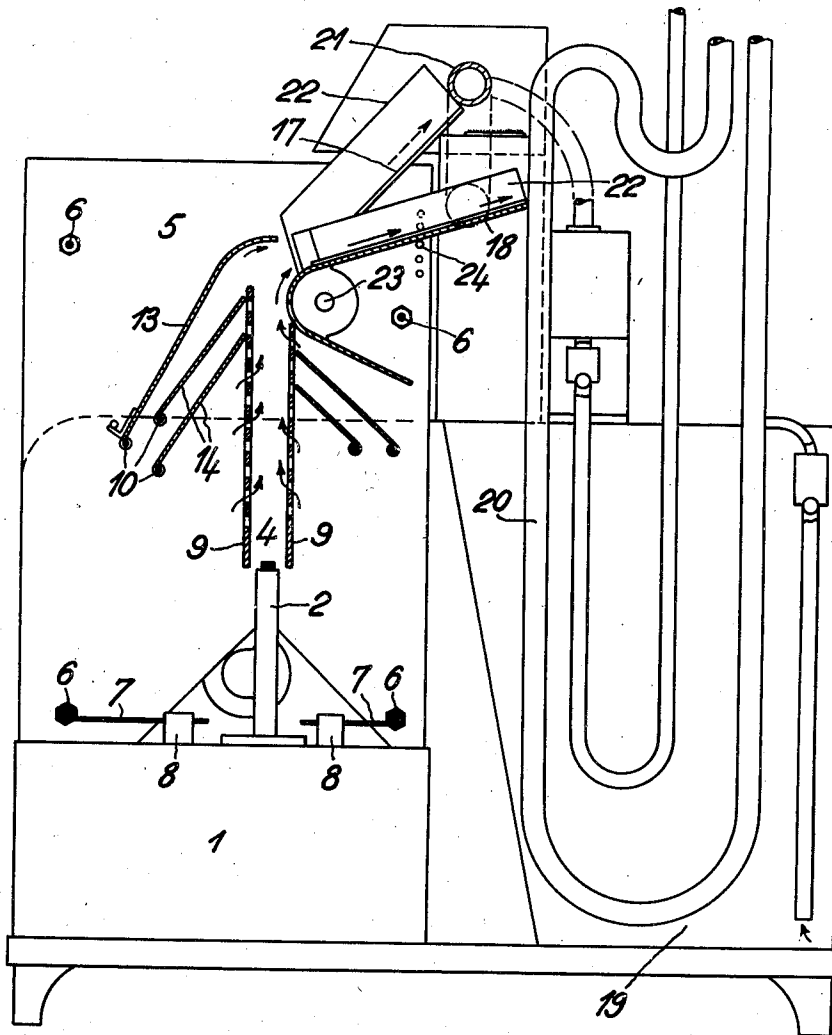
2,199,826

MEANS FOR PROMOTING COMBUSTION IN OIL BURNING APPLIANCES

Filed Nov. 8, 1937

7 Sheets-Sheet 4

Fig. 4.



INVENTOR
Charles Scott-Snell
BY A. E. Dell
ATTORNEY

May 7, 1940.

C. SCOTT-SNELL

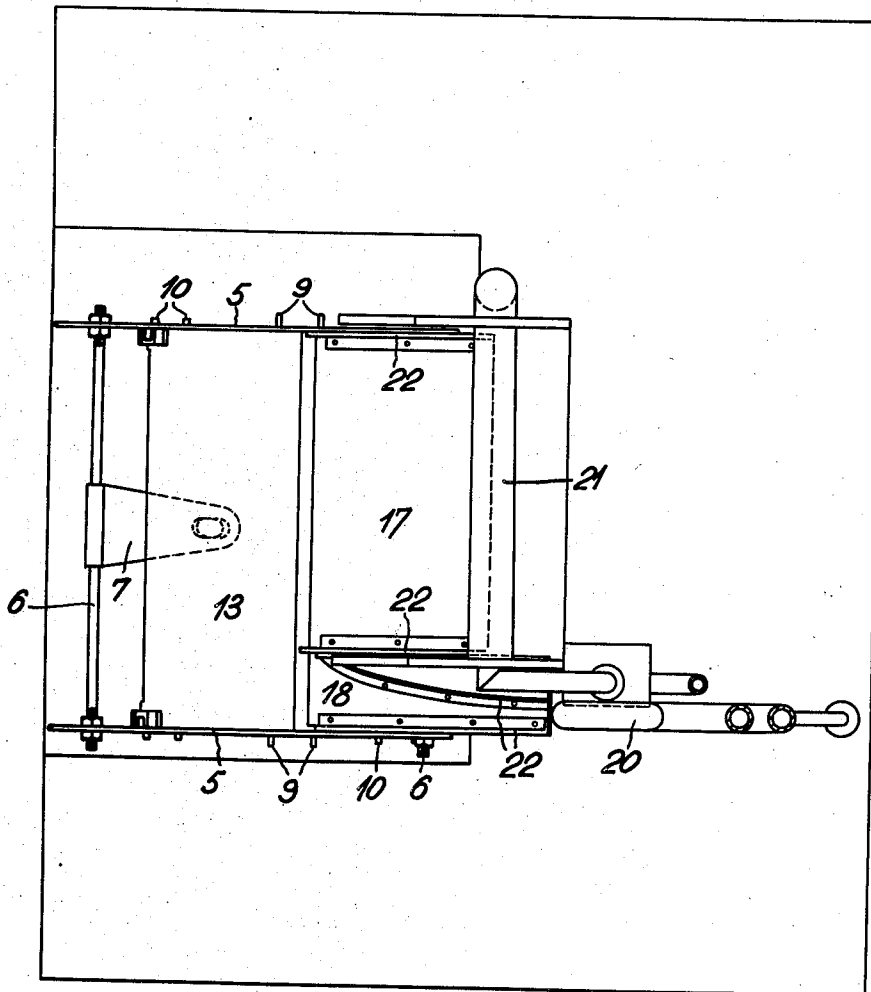
2,199,826

MEANS FOR PROMOTING COMBUSTION IN OIL BURNING APPLIANCES

Filed Nov. 8, 1937

7 Sheets-Sheet 5

Fig. 5.



INVENTOR
Charles Scott-Snell
BY *A. E. Odell*
ATTORNEY

May 7, 1940.

C. SCOTT-SNELL

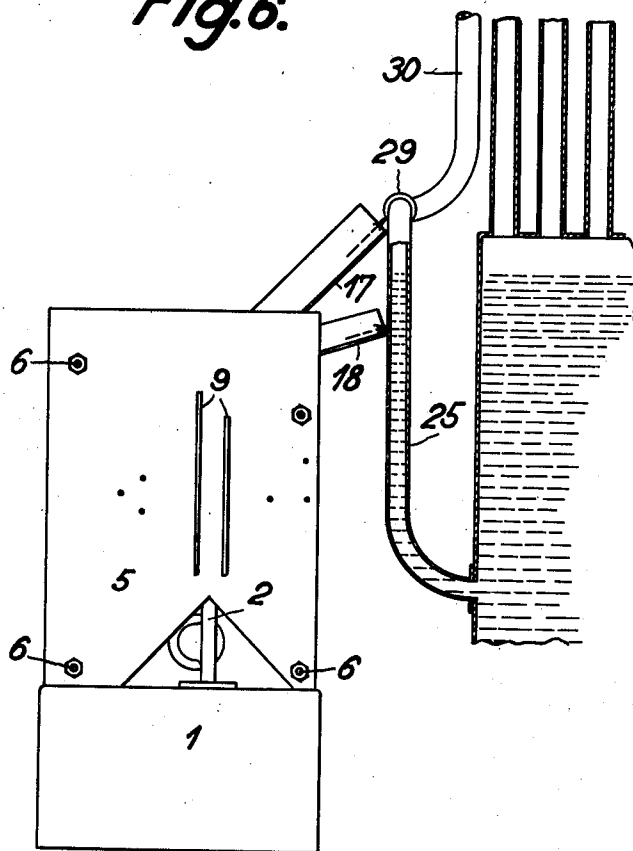
2,199,826

MEANS FOR PROMOTING COMBUSTION IN OIL BURNING APPLIANCES

Filed Nov. 8, 1937

7 Sheets-Sheet 6

Fig. 6.



INVENTOR
Charles Scott-Snell
BY *A. E. Odell*
ATTORNEY

May 7, 1940.

C. SCOTT-SNELL

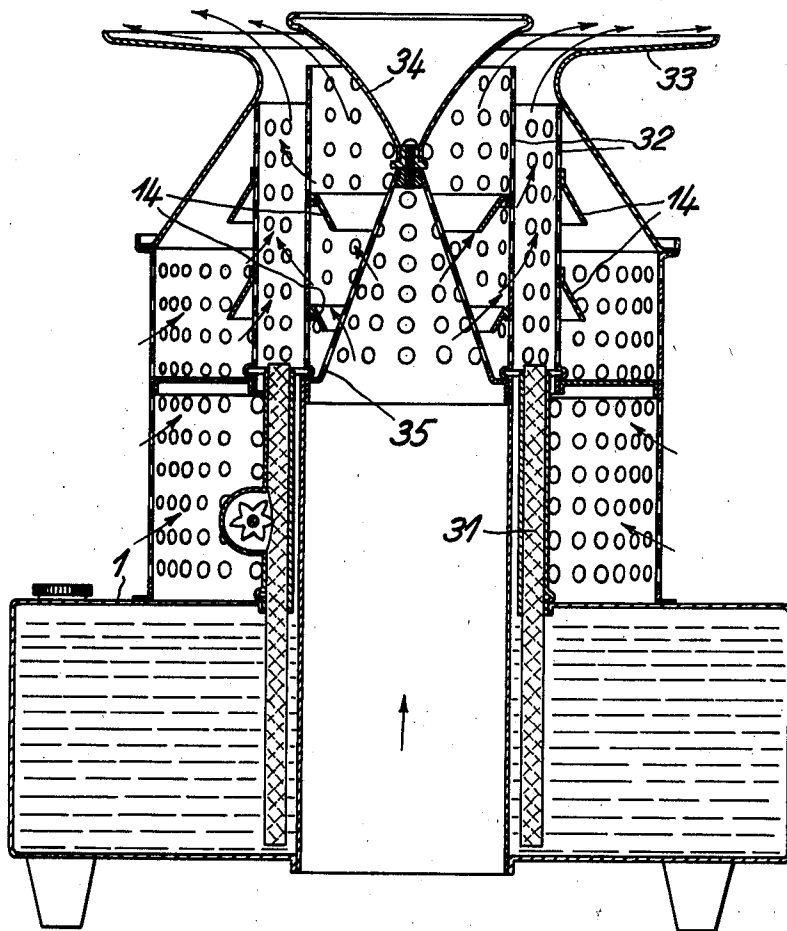
2,199,826

MEANS FOR PROMOTING COMBUSTION IN OIL BURNING APPLIANCES

Filed Nov. 8, 1937

7 Sheets-Sheet 7

Fig. 7.



INVENTOR
Charles Scott-Snell
BY A. E. O'Leary
ATTORNEY

UNITED STATES PATENT OFFICE

2,199,826

MEANS FOR PROMOTING COMBUSTION IN
OIL BURNING APPLIANCESCharles Scott-Snell, Kingsbridge, Devon, Eng-
land, assignor of one-half to Maud Lillian
Davys, London, EnglandApplication November 8, 1937, Serial No. 173,331
In Great Britain November 6, 1936

7 Claims. (Cl. 158—88)

This invention relates to wick type stoves in which a blue flame is obtained without the aid of a chimney or a forced draught, by the aid of a hot mixture chamber, forming a widened prolongation of the wick tube, with perforated walls through which air has access to the vapourised fuel rising from the wick.

It is common to have a heating flame spread laterally and nearly horizontally by and beneath the utensil or other object which it heats. The present invention rests on the principle that a flame can be spread laterally and nearly horizontally by means of a surface beneath it, provided there is no access of air between the flame and the surface. Such a surface therefore affords a means of deflecting the flame, if desired, from the vertical, and even of spreading it nearly horizontally to heat what is placed above it. But other advantages in respect of ease of control and increased fuel burning power result from this limitation of access of air to one side of the flame, the attainment of which does not necessitate deflection of the flame towards the horizontal, and therefore, particularly for cases where it is desired that the stove shall throw out heat more or less horizontally, the invention extends to stoves in which the surface preventing access of air is substantially vertical.

According to the invention, to render the flame easier to control and to make possible greater maximum consumption of fuel without luminosity or smoke, access of air beyond the hot mixture chamber is limited to one side of the flame by the provision of an imperforate flame plate prolonging one wall of the chamber, and either substantially vertical or inclined away from the opposite wall of the chamber, over which plate the flame sweeps and against which it is held by air directed upwardly and toward the flame plate by an inclined and usually curved deflector fitted on the other side of the mixture chamber, with the result that the flame remains blue throughout its extent. It is of advantage to provide additional deflectors on each side of the mixture chamber, both to protect it from draughts and to impart an upward direction to the incoming air. The uppermost of these on the flame plate side may be made continuous with the flame plate, and in case the latter is greatly inclined to the vertical, should merge into it by a gradual curve.

By means of partition walls, of a height greater than the flame depth, erected on the flame plate, the flame may be divided and its parts caused to diverge in the plane of the flame plate. Or by dividing the flame plate itself into parts of differ-

ent inclination the flame may be split into parts diverging in a vertical plane. To prevent lateral access of air walls should be erected on the flame plate, or each part of the flame plate along its lateral edges.

Such division of the flame makes the stove applicable to the heating of separate but neighbouring objects; for instance the stove burners of a pressure-fed oil stove, or the vapourizer and thermal pump of stoves in which such a pump delivers fuel to a vapourizer.

Examples of embodiments of the invention are illustrated in the accompanying drawings.

Figure 1 is a cross-section and Figure 2 a front elevation of a flat wick stove.

Figure 3 is a cross-section of a modification in which the flame plate is vertical.

Figures 4 and 5 are sectional side elevation and plan respectively of a stove constructed according to the invention with a divided flame, and fitted as an igniter to a larger stove.

Figure 6 diagrammatically illustrates the application of a stove with a divided flame to the heating of water and superheating of steam.

Figure 7 shows a stove with an annular wick. In the stove of Figures 1 and 2 an oil reservoir 1 carries a wick tube 2 of usual construction with means 3 for raising and lowering the wick 4. Upon the reservoir are erected two side plates 5, connected together and stiffened by bolts 6. This structure is located upon the reservoir or tank and secured to it by any suitable means such as the tongue 7 engaging over studs 8 upon the tank. The side plates carry in slots the two perforated walls 9 of the hot mixture chamber spaced a little wider apart than the walls of the wick tube 2 so that there is no possibility of contact between them and the wick when the wick is turned up. The side plates 5 also support the flame plate and deflectors, for instance by means of rods 10 inserted in perforations in the side plates, over which rods the edges of the several plates are rolled. The flame plate 11 is shown as standing at a small angle to the horizontal, and it is made continuous with a deflector 12 upon the same side of the mixture chamber. The flat parts of the flame plate and deflector stand at an acute angle to each other but their junction is a nosing of large radius of curvature around which the flame can be led. The wall of the mixture chamber which is, in effect, prolonged by the flame plate may terminate a little lower than its fellow. Outside the latter is placed a baffle or deflector 13 slanting upward and at its top bent over as to direct the air streaming up beneath it

towards the flame plate. This may be supplemented by additional deflectors 14 on each side of the mixture chamber, which serve both to protect the chamber from direct transverse draughts, and to impart an upward direction to the air entering between them. All of these deflectors with the flame plate may be turned back about the rods which carry them to give easy access to the mixture chamber for cleaning. Figure 1 shows an adjustable stop 15 for determining the working position of the baffle or deflector 13.

It is important that there should be no gap between the flame plate 11 and the wall 9 on the same side of the mixture chamber; for otherwise air enters between the flame and the flame plate, and the flame will leave the plate and burn yellow. Nor can the flame be caused to make any sudden large deflection in its course; therefore the more the flat part of the flame plate departs from the vertical, the more necessary it is to round off its junction with the deflector 12. Too sharp a deflection from the vertical is likely to lead to the flame leaving the plate, when air has access to both sides of it and incomplete combustion results.

The length of the flame plate depends upon the maximum length of flame it is desired to burn or in other words upon the maximum rate of fuel consumption desired. Its inclination is governed by the purpose for which the stove is intended. The form of stove shown in Figures 1 and 2 may be fitted with supports to carry a kettle or other vessel above the central flat part of the flame, or it may be used when it is desired to heat by the tip of the flame an object beneath which a vertical flame cannot readily be accommodated, as hereinafter described with reference to Figures 4 and 5. Where a vertical flame is all that is required, as may be the case both in cooking stoves and in stoves for heating rooms, the flame plate may be vertical or substantially so as shown in Figure 3, where the side plates are shown as fitted with bars 16 to support a cooking vessel. No supplementary deflectors are shown.

In the stove of Figures 4 and 5 the flame plate is made in two parts 17, 18 of different inclination. The stove is shown as fitted into the reservoir 19 of a main stove supplied by a thermal pump 20 which forwards oil from the reservoir 19 to a vapourizer 21. In order that air may have no access to the edges of the flames which are not protected by the side plates 5, walls 22 are erected upon the edges of the flame plates 17 and 18.

This example of construction shows the flame of the stove divided into two or more parts operating at different levels, the one upon the thermal pump 20, the other upon the vaporiser 21; once the main stove is started the heating will be continued by the flame of the main stove seen immediately beneath the vaporiser. If walls such as 22 diverging from each other are erected upon a single flame plate the flame is divided into parts diverging in the plane of the plate, each extending over any desired fraction of the width of the wick. The inclination of the flame may be adjusted since the flame plate 18 is pivoted at 23, the axis of curvature of its rounded nosing, and supported by rods 24 which may be set in any of several positions in the side plates 5.

Figure 6 shows diagrammatically the application of a stove with its flame divided into vertically divergent parts to the heating of the circulating fluid of a room heating system. The lower flame operates on a tube 25 containing

water, and the upper flame upon a tube 29 through which the steam generated flows, so that superheated steam is supplied to the circulating pipes 30.

Figure 7 shows an application of the invention to a stove with an annular wick 31. The perforated walls 32 of the mixture chamber are cylindrical, and the flame plate is shown as continuing the outer wall. It therefore becomes a slightly coned or dished disc 33, preferably with an upturned rim if the coning is very flat. The deflector 34 becomes an inverted flaring cone, centrally supported upon a rod or a conical skeleton 35. The deflectors 14 also become cones, the inner ones inverted. If the flame plate continued to the inner wall of the mixture chamber, it would be a vertical cylinder, and the deflector 34 would become an upright truncated cone, extending from the outer wall of the mixture chamber and somewhat domed or incurved at its upper edge.

Two such stoves as shown in Figures 1 and 2 may be built back to back upon a common reservoir so that their flame plates bring to one line the flames from two wicks.

I claim:

1. In a wick type oil burner the combination of a wick tube having two principal parallel walls, a mixture chamber above and co-axial with said tube having two principal perforated walls parallel with the walls of the wick tube, an imperforate flame plate contiguous with one principal wall of said chamber and inclining away from the other, and a deflector beside said other wall of said chamber slanting upward and towards the flame plate.

2. In a wick type oil burner the combination of a wick tube having two principal parallel walls, a mixture chamber above and co-axial with said tube having two principal perforated walls parallel with the walls of the wick tube, an imperforate flame plate contiguous with one principal wall of said chamber and inclining away from the other, a deflector continuous with said flame plate and below it sloping upward toward the chamber, and a second deflector beside said other wall of said chamber slanting upward and towards the flame plate.

3. In a wick type oil burner the combination of a wick tube having two principal parallel walls, a mixture chamber above and co-axial with said tube having two principal perforated walls parallel with the walls of the wick tube, an imperforate flame plate contiguous with one principal wall of said chamber and prolonging it upwardly, and a deflector beside the other principal wall of said chamber slanting upward and towards the flame plate and ending above the upper edge of the mixture chamber.

4. In a wick type oil burner the combination of a wick tube having two principal parallel walls, a mixture chamber above and co-axial with said tube having two principal perforated walls parallel with the walls of the wick tube, an imperforate flame plate contiguous with one principal wall of said chamber and inclining away from the other, a deflector continuous with said flame plate and below it sloping upward toward the chamber, a second deflector beside the said other wall of said chamber slanting upward and towards the flame plate and additional deflectors beside the walls of the mixture chamber inclining upwardly and towards them.

5. In a wick type oil burner the combination of a wick tube having two principal parallel walls,

a mixture chamber above and co-axial with said tube having two principal perforated walls parallel with the walls of the wick tube, an imperforate flame plate contiguous with one principal wall of said chamber prolonging it and curving gradually from the vertical away from the other principal wall of the mixture chamber to a small angle with the horizontal, and a deflector beside said other wall of said chamber slanting upward and towards the flame plate.

6. In a wick type oil burner the combination of a wick tube having two principal parallel walls, a mixture chamber above and co-axial with said tube having two principal perforated walls parallel with the walls of the wick tube, a plurality of imperforate flame plates contiguous with one principal wall of said chamber and in-

clining away from the other at different angles to the horizontal, and a deflector beside said other wall of said chamber slanting upward and towards the flame plates.

7. In a wick type oil burner the combination of a wick tube having two principal parallel walls, a mixture chamber above and co-axial with said tube having two principal perforated walls parallel with the walls of the wick tube, an imperforate flame plate contiguous with one principal wall of said chamber and inclining away from the other, divergent dividing walls erected upon said flame plate, and a deflector beside said other wall of said chamber slanting upward and towards the flame plate.

CHARLES SCOTT-SNELL.