Sept. 5, 1933. W. M. BERRY ET AL 1,925,744

DOWN DRAFT DIVERTER

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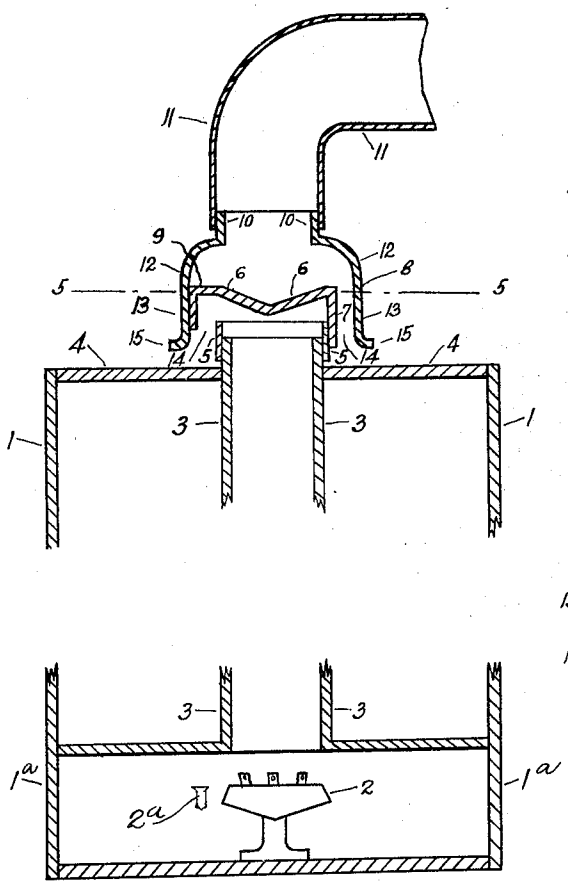


Fig. 1

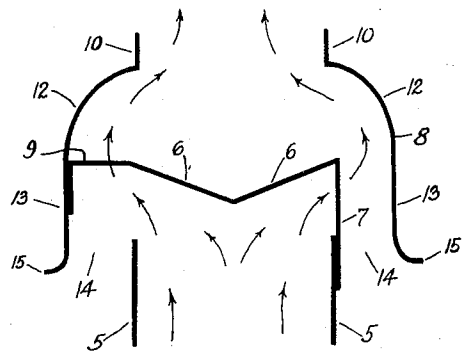


Fig. 2

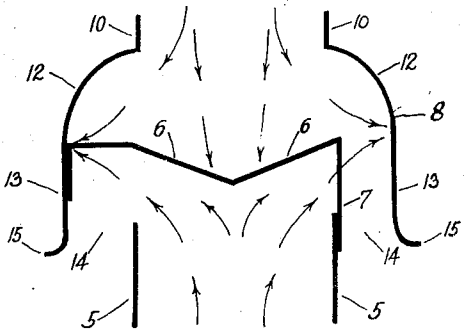


Fig. 3

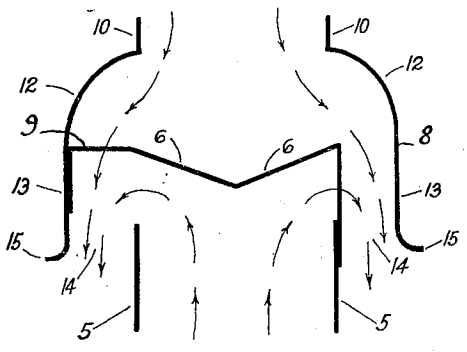


Fig. 4

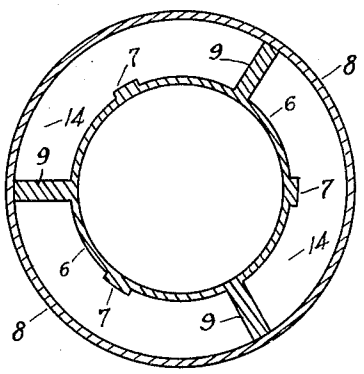


Fig. 5

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DOWN DRAFT DIVERTER

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Application April 29, 1929. Serial No. 359,153

2 Claims. (Cl. 126—307)

Our invention is primarily intended for use with devices such for instance as automatic water heaters in which a pilot light is employed, and its purposes are, to prevent the extinguishing of this pilot light by down drafts of air from the chimney, and at the same time to interfere as little as possible with the regular flow of gases out from the heater.

We attain these purposes by the means shown in the accompanying drawing in which Fig. 1 is a vertical section of a water heater employing our device, the middle part of the heater being removed to save space.

Figs. 2, 3 and 4 are diagrams on an enlarged scale of our device to show the flow of gases under varying conditions, as will be more fully explained hereafter.

Fig. 5 is a cross-section of our device on an enlarged scale on the line 5—5 of Fig. 1.

Referring particularly to the drawing, 1 is a water heater tank of any approved design, provided at its base with a burner chamber 1^a, a burner 2 and a pilot light 2^a. A flue 3 extends upward from the burner chamber 1^a through the tank 1 and out through the top 4, to carry away the gases from the burner 2. Our device consists of a pipe 5 adapted to fit on the upper extremity of the flue 3. An inverted cone 6 is supported on the pipe 5 by vertical brackets 7, at such a distance above its extremity as to furnish a sufficient vent for ascending gases from the burner 2. A bell 8 of substantially the form shown in Figs. 2, 3 and 4 is mounted by horizontal brackets 9 on the upper extremity of the cone 6, as shown in Fig. 5, and is upwardly extended into an integrally formed tubular part 10, adapted to connect with the pipe 11, which conveys away the gases to the chimney. The bell 8, as stated above, is of substantially the form shown in diagrams 2, 3 and 4; that is, it is formed with the upper portion in a curve 12, of approximately hemispherical form, and the lower portion 13 cylindrical, and the mounting brackets 9 are attached approximately where the curve 12 joins the cylindrical portion 13. As shown in the drawings, the bell 8 is larger than the pipe 5, the difference of diameter being such as to leave a ring shaped opening 14, whose area shall be sufficient under any reasonable conditions to furnish a vent into the atmosphere for any down draft through the pipe 11, and also for any gases ascending through the flue 3, as will be more fully explained hereafter. The base of the bell 8 is preferably flanged outward, as shown at 15, to stiffen the bell, and at the same time furnish a freer exit for the gases.

We have illustrated the operation of our device in Fig. 2, under normal working conditions, where no down draft exists through the pipe 11; in Fig. 3, where there is a moderate down draft through the pipe 11, and in Fig. 4, where the down draft through the pipe 11 is so great as not only to prevent the escape of gas through the flue 3, but to cause the gases from the flue 3 and the down draft gases from the pipe 11 to flow out into the atmosphere through the opening 14 in the base of the bell 8.

Referring now to diagram Fig. 2, which represents the normal working conditions of the device. As already stated, the opening between the pipe 5 and the cone 6 is sufficient under normal conditions, to allow a sufficiently free escape for the escaping gases from the burner 2, so that they can pass out around the supporting brackets 7, and are directed by the gentle curve 12 to the tubular part 10, and thence away through the pipe 11.

It will be noted that the relations between the diameter of the cone, pipes and bell, and the radius of curvature of the curve 12 are such as, under these conditions, to furnish practically no resistance to the escaping gases. At the same time the area of the opening 14 is not sufficient to draw in any appreciable amount of additional gases or air from the outside, so that the gases escaping through the pipe 11 are not cooled, so as to check the draft. If, however, a down draft such as for instance a puff of wind down the chimney, begins, its first effect is as shown in diagram Fig. 3. It strikes against the upper hollow surface of the inverted cone 6 and is directed almost squarely outward so as to strike radially against the curve 12; and thus, unless the draft is excessive, stops the down draft through the pipe. In this connection, if the down draft is slight or of short duration, in a short time the upward flow of the gases from the burner 2 reestablish the condition shown in diagram Fig. 2, and the upward flow of gases through the flue 3 is only momentarily checked, as it were. If, however, the down flow of air is long continued or severe, the condition illustrated in diagram Fig. 4 is established; the down draft is directed outward as already stated, by the curve 12, and the cone 6. At the same time the upward flow of gases through the flue 3 continues, and the two come together and flow out into the atmosphere through the opening 14. The high resistance offered by the cone 6 and

the manner in which the different air currents contact with the curve 12, aided by the quieting effect of the curve 12 and the straight portion of the bell 8, make it practically impossible for a sufficient down draft to occur to produce any effect on the pilot light 2a for the burner 2, or indeed, to more than momentarily check the upward flow of gases.

We claim:

1. In a device of the class described, in combination, an entrance pipe and an exit pipe in spaced relation to each other, an inverted cone shaped baffle mounted between said pipes, and a bell connected with the exit pipe and surrounding the baffle and the entrance pipe, said bell comprising a lower cylindrical portion and an upper approximately hemispherical portion joining the lower cylindrical portion in a gradual curve, the lower cylindrical portion extending below the upper end of the entrance pipe, the generatrix of the cone-shaped baffle intersecting the upper approximately hemispherical portion, said baffle being so positioned relatively to the upper approximately hemispherical portion of the bell and having an upper face of a contour to direct down draft gases outwardly to strike substantially radially against said approximately hemispherical portion, the size of the bell being such as to permit the free passage of gases from the entrance pipe around the baffle to the exit pipe, and the form and position of the baffle and the spaced relation of said members being such as to give the freest possible exit to upward flowing gases and offer the greatest resistance to a down draft.

2. In a device of the class described, in combination, an entrance pipe and an exit pipe in spaced relation to each other, an inverted cone shaped baffle mounted between said pipes, said baffle having a reversely conical upper face, and a bell connected with the exit pipe and surrounding the baffle and the entrance pipe in spaced relation therewith, the bell comprising a lower cylindrical portion and an upper approximately hemispherical portion joining the lower cylindrical portion in a gradual curve, the lower cylindrical portion extending below the upper end of the entrance pipe, said baffle being disposed with its upper marginal portion substantially in the same horizontal plane as the lower end of the upper approximately hemispherical portion of the bell, and the angle inclination of the upper face of the baffle being such as to direct down draft gases outwardly to strike substantially radially against said approximately hemispherical portion, the size of said bell being such as to permit the free passage of gases from the entrance pipe around the baffle to the exit pipe.

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