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VENT OR CHIMNEY CONSTRUCTION

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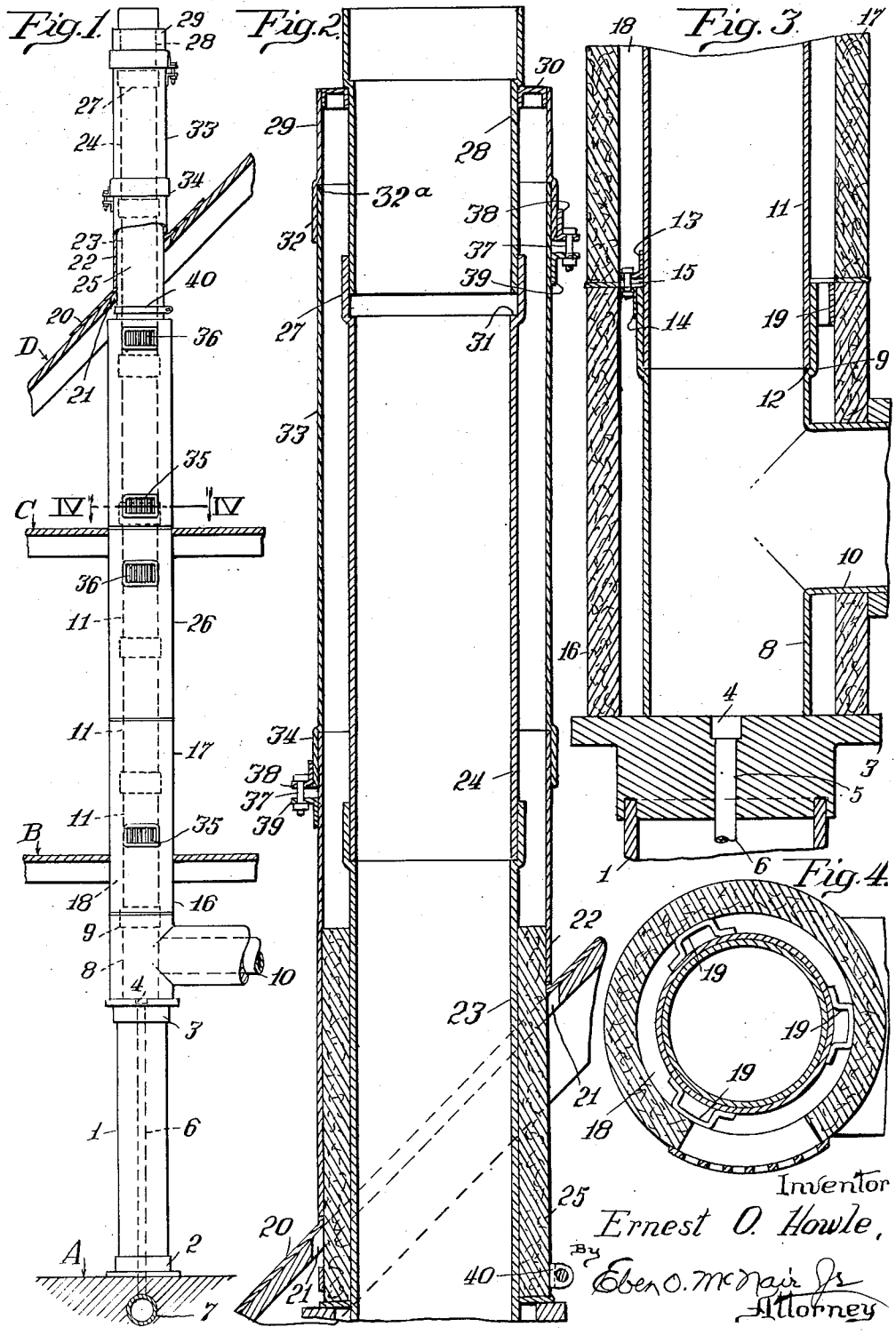

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VENT OR CHIMNEY CONSTRUCTION

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3 Claims. (Cl. 72—94)

The present invention relates to a composite vent or chimney construction and has to do with one which can be manufactured to sell at low cost for installation in low-priced housing projects and which at the same time satisfies building and other requirements relating to fire hazards.

Generally speaking, the vent or chimney of the present invention is made with an inner pipe or flue of sections of vitrified enameled iron, and an outer pipe or casing of sections of heat insulating material. The vent is insulated and constructed so as to possess all the advantages of chimneys constructed of brick or tile or other constructions which do not constitute fire hazards.

An object of the present invention is to provide a sectional chimney having a metallic flue so constructed and set up as to be fireproof and which insulates the flue from closely adjacent portions of buildings to prevent fire, regardless of the temperatures to which the flue may become heated.

Another object of the present invention is to provide a composite sectional vent or chimney which is simple to manufacture and install and which, at the same time, is durable and efficient in operation and which is so constructed as to meet the severe requirements necessary for venting or carrying away the products of combustion of gas, oil or coal fire heaters or appliances.

Another and further object of the present invention is to provide a composite vent or chimney with the inner pipe sections having male and female ends so connected that condensate may fall to the bottom of the chimney and is prevented from leaking out through the joints between adjacent sections.

The invention has for a further object the provision of a novel cap section for composite vent or chimney construction, especially designed for venting gas-fired appliances.

The above, other and further objects of the present invention will be apparent from the following description and accompanying drawing.

The accompanying drawing illustrates a vent or chimney construction embodying the principles of the present invention and the views are offered as follows:

Fig. 1 is a fragmental vertical sectional view through a building of conventional construction showing a basement, first floor and attic, and showing in elevation a vent or chimney of the present invention.

Fig. 2 is an enlarged vertical central section through that portion of the vent or chimney through and above the roof.

Fig. 3 is an enlarged fragmental central sectional view through the lower part of the illustrated vent or chimney.

Fig. 4 is an enlarged horizontal sectional view taken in the plane indicated by line IV—IV of Fig. 1.

The drawing will now be explained.

Referring to Fig. 1, the basement floor is indicated at A, first floor at B, attic floor at C, and the roof at D.

A heater, not shown, fired by gas, oil or coal, is installed in the basement, as is common practice.

A pedestal 1 rests on a base 2 on the floor A of the basement, and at its upper end supports a plate 3. The plate 3 has a central opening 4 communicating with a hole 5 through it, from which a pipe 6 leads to a drain 7 to carry away any condensate forming within the vent.

The vent or chimney is supported on the plate 3.

As illustrated, the first or lowermost section of the inner pipe or flue 8 rests with one end on the plate 3. Its upper end is formed with a female connection 9. Leading laterally from the pipe, is a takeoff 10 which is connected in well known manner to the outlet from the heater.

A number of sections 11 are assembled in endwise relation as described. Fig. 3 illustrates a portion of the section next above section 8 and is assembled by inserting its lower or male end in the female end 9 of the lowermost section. The lower extremity of the section 8 rests on the shoulder 12 formed between the female end and the body of the section. In assembling a vent of the present invention, two or three sections are fitted together in the manner stated, that is, with the male ends down and the female ends up. These sections are provided with lugs 13 and 14, through which are passed bolts 15 which are fastened by nuts in the usual manner. This secures together the set-up sections of the inner pipe.

After two sections of the inner pipe have been connected as described, the insulating sections comprising the outer pipe or flue casing are installed.

The lowermost section 8 of the pipe is surrounded by an insulating section 16 which, because of the presence of the takeoff 10, is usually made in two parts with the parts banded together in a manner well understood.

The next above insulating section 17 is lowered over the assembled sections of the inner pipe meeting the upper edge or margin of the lower-

most outer section 16. The joint between is cemented, thus maintaining the alignment of the insulating sections and preventing escape of air from between the inner pipe and the outer pipe.

The inner diameters of the insulating or outer sections are greater than the exterior diameters of the inner or flue sections and provide an annular air space 18 between the inner pipe and the outer pipe.

In order to maintain alignment of the insulating sections as assembled, the inner sections are provided with a plurality of outstanding lugs 19, three of which are shown in Fig. 4, which are welded or otherwise secured to the exterior of the female ends of the inner sections. It has been found that three such lugs are sufficient to maintain the air space 18 substantially uniform.

The chimney is built up in the manner stated, providing an inner or flue portion or pipe, and an outer covering or casing of insulating material.

The sections constituting the inner pipe are made of vitrified enameled iron which has been found to be acid resistant.

The outer or insulating pipe extends throughout the height of the vent through the building and terminates at its upper end adjacent the roof.

Referring to Fig. 2, it will be noted that the upper end of the vent, which for a major portion of its length is above the roof, is of metal construction.

Flashing 20 is provided with a central aperture to conform to the hole 21 through the roof or the chimney. The flashing margin adjacent the central opening therein is welded to a neck 22 of vitrified enameled iron. This neck extends upwardly from the flashing a sufficient distance to receive other sections, the number of which depends on the height of the chimney which, of course, varies with different constructions.

The sections comprising the inner pipe are extended upwardly through the roof, which may be observed in Fig. 2. The section 23 is joined at its lower end, which is below the roof, while its upper end extends above the roof. Another section 24 is engaged with the female upper end of the section 23 in the manner heretofore stated to complete the inner or flue portion of the vent.

Between the inner pipe of the vent and the neck 22, a plug 25 of insulating material is inserted. This occupies all of the space between the inner and outer pipes throughout the length of the plug and is to prevent any moisture, which perchance accumulates within the space between the pipes above the roof, leaking down onto the insulating sections below it or into the space between the inner and outer pipes. The joint between the lower end of the filler 25 and the topmost section 26 of the insulating casing is cemented, thus sealing the joint against air escape.

It will be noted that the upper end of the inner pipe section 24 is provided with a female end 27.

The cap structure is formed of iron which is enameled and vitrified and comprises an inner pipe or shell 28 and an outer pipe or shell 29, which pipes are concentric and which, at or near their upper ends, are welded or otherwise secured to a filler ring 30, thus connecting the pipes together adjacent their upper ends and making a unitary structure. The lower end of the pipe 28 fits within the female end 27 of the section 24, but stops short of the shoulder 31 in said section. This makes a telescopic joint to allow relative endwise movement taking place between the pipe 28 and the sections constituting the inner pipe of the vent, which movement occurs with temperature variations.

The lower extremity of the outer pipe 29, designated as 32, is formed as a female end or skirt and receives the upper end of an outer section 33 which is mounted on the neck 22. The lower end of the section 33 has a female end portion 34 to receive and cover the upper end of the neck 22. By this construction, there is provided an inner or flue pipe with the joints so arranged that condensate, formed within the flue pipe, will drip down the flue and escape to the drain 7 through the pipe 5 without at any time leaking through any of the joints between the several sections constituting the inner pipe.

The formation of the skirt 32 provides an internal shoulder 32a in the outer pipe 29, between its ends. This shoulder rests on the top of the casing 33 to support the cap or upper section in place. The diameter of the skirt 32, it will be observed, is greater than the diameter of the balance of the outer pipe 29. Thus that portion of the outer pipe below the shoulder surrounds and overlaps the outer surface of the casing to thereby seal the joint against moisture seepage from the exterior of the cap section to the interior of the casing.

The entrance or projection of the inner pipe 28 into the upper end of the flue section 24 results in the flue section overlapping the lower end of the inner pipe 28, thus sealing the joint therebetween against moisture seepage from the interior of the pipe 28 to the outside of the flue pipe 24, thereby preventing seepage of acidulous condensate from within the pipe 28 to the exterior of the flue. Such condensate in gas-fired appliances is sulphuric acid, which, if it escaped, would damage the casing and the walls surrounding it.

Also, any rain, snow or other moisture gathering on the exterior of the outer portion of the vent, above the roof, will travel down this outer portion without leaking through any of the joints in the several sections constituting it.

The fact that the neck 22 is welded to the flashing 20, prevents any leakage through the roof.

The space between the inner pipe and the outer pipe above the roof is a dead air space which serves as a heat insulator, preventing dissipation of radiant heat from the inner pipe to the atmosphere, so that the inner pipe remains warm which aids in maintaining draft through the vent and prevents formation of ice on the upper end of the vent.

Convection heat is caused by admission of air to the space between the inner pipe and outer pipe through openings 35 made in the outer pipe or insulating covering near the floors, such as the first floor B and the attic floor C. Similar openings are made in the outer pipe or insulating casing near the ceilings as shown at 36, so that air circulated between the inner pipe and the outer pipe becomes heated by radiation from the inner pipe, and as convection heat passes out through the openings 36 into the spaces to be heated, the air, as it cools, falls and is again circulated through the inlets 35 upwardly along the inner pipe and outwardly through the exits 36.

The filler 25, interposed between the inner and outer pipes through the roof, prevents the escape of any of the heated air from between the

inner pipe and the outer pipe above the joint between the filler **25** and the uppermost section **26** of the outer pipe, so that all of the convection currents present between the inner pipe and outer pipe are utilized for heating purposes.

It has been found that when the attic is heated, heat losses through the attic floor are reduced materially, if not eliminated entirely. This fact increases the heating efficiency of the heating plant and circulating system and obviously reduces the cost of heating.

As before stated, the sections comprising the inner pipe and those sections employed for the portion of the vent above the roof are made of vitrified enameled iron. The various sections are made of iron, and when lugs, such as lugs **19** and **13**, have to be attached, these are then welded in place and the completed section enameled and then vitrified.

The vent construction of the present invention lends itself readily to low cost housing projects where, for example, a bungalow or cottage has the heating unit in one of the rooms. In such event, the room containing the heating unit receives its heat from the unit, and any spaces above that room to be heated are heated by convection currents from the outlets **36** in the vent structure.

Exhaustive tests have proved that an outer insulating casing of the character herein employed meets the requirements of building codes and insurance companies as to fire hazards, as its insulating qualities are such as to maintain a low temperature on the exterior of the insulating pipe, regardless of the highest temperature to which the inner pipe would be subjected in the normal use of heating plants. In fact, tests made with abnormal temperatures have proved that, under such conditions, the heat insulation of the outer pipe is such as to maintain a temperature on its exterior surface in the neighborhood of 125 degrees F., which is well within the range of good building practice.

The formation of the sections of the inner pipe, of vitrified enameled iron, makes possible their manufacture in quantity lots at reasonable prices. The insulating sections are made preferably longer than the iron sections so as to break joints between the inner and outer pipes. The cementing of the joints of the outer pipe confines air circulation to the annular space between the inner pipe and the outer pipe and prevents any air circulation from within one insulating section to the next, as of course course the cement seals the ends of the insulating sections.

The lower end of the vent or chimney, instead of being supported by the pedestal **1** and the plate **3** as described, might be supported on bars suitably fixed in the adjacent frame structure of the building. When this form of support is utilized, it is unnecessary then to employ the inlets **35** for air admission to the space between the pipes, as enough air would enter this space from the lower end of the vent.

The provision of the air space between the inner and outer pipes provides insulation against conduction of radiated heat from the inner pipe or flue to the insulating section or outer pipe, thus aiding and maintaining the temperature of the outer pipe at a minimum.

While no adjacent building structure has been shown, it is to be understood that the vent or chimney of the present invention could very readily be built within a wall with perfect safety from fire.

Where the vent is installed in a bungalow or cottage with the heater on the first floor and the vent is installed in a wall, the takeoff **10** would be insulated where the takeoff passes through the wall, the insulation stopping flush with the exterior surface of the wall.

It is to be remembered that the sections constituting the inner pipe are bolted together, while the sections constituting the outer pipe are cemented together, thus providing a structure which is sufficiently rigid for all practical purposes.

The sections extending above the roof are bolted together by bolts **37** passing through lugs **38** and **39**, so that the resulting structure is rigid against destruction by wind.

The invention has been described herein more or less concisely as to details. It is to be understood that the invention is not to be limited thereby, as changes may be made in the arrangement and proportion of parts and equivalents may be substituted without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. A cap section for the upper end of a vent or chimney which latter comprises a flue and an enveloping casing, a unit structure having inner and outer shells permanently connected together only adjacent the upper end of the outer shell and otherwise laterally spaced from each other, said outer shell having an internal shoulder between its ends to rest on the upper end of the casing for supporting the cap section in place on the chimney, the inner shell being entered within the flue, the connection of said shells constituting the sole support of the inner shell when the section is in place on a chimney and the support of the section in the manner stated maintaining the inner shell in pendant relation with respect to the flue whereby relative longitudinal movement between the flue and the inner shell may occur incidental to temperature differences in the flue and shell.

2. An upper end section for a chimney used for venting gases of combustion, said section comprising two concentrically arranged pipes permanently connected together as a unit by a band adjacent the top of the outer pipe and otherwise radially spaced from each other, the lower end of the outer pipe being of greater diameter than the balance of the pipe to form an internal shoulder between the ends of the outer pipe to rest on the top of the chimney and to provide a skirt below the shoulder to overlap the outer surface of the chimney below its top, construction being such that said section may be applied to and removed from the chimney as a unit.

3. A unitary double pipe structure for use as the uppermost section of a chimney utilized for venting gases of combustion, said structure including an inner pipe adapted to telescopically enter the flue of said chimney and form a continuation of the same, an outer pipe laterally spaced from the inner pipe and having a shoulder to seat on the top of the chimney and also having a skirt below said shoulder to overlap the outer surface of the chimney with slip fit, and a permanent connection between said pipes constituting the sole support of the inner pipe with respect to the flue when said structure is in place on the chimney.

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