United States Patent

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[54] **ADJUSTABLE CHIMNEY T**
4 Claims, Drawing Fig.

[52] **U.S. Cl.** 98/58, 126/85, 110/184
[51] **Int. Cl.** E04f 17/02
[50] **Field of Search** 98/58, 60, 122; 126/85B; 285; 110/184

[56] **References Cited**

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ABSTRACT: An adjustable tee for use with a thermosyphon chimney having separate passages for up flow and down flow of insulating air and with the adjustable tee having three pipe sections in spaced relation to define a pair of annular air passages communicating with the passages of the chimney to have atmospheric air flow through the adjustable tee passages for cooling thereof as induced by the air flow through the chimney passages and with the sections of the tee being adjustable to vary the over-all length thereof to fit the thickness of a wall in which the tee is mounted.

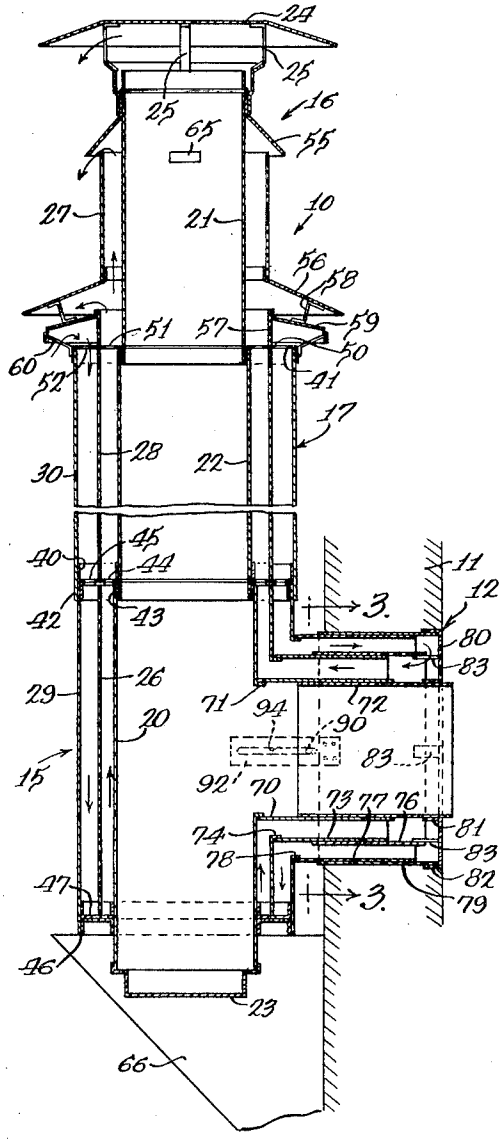


Fig. 1.

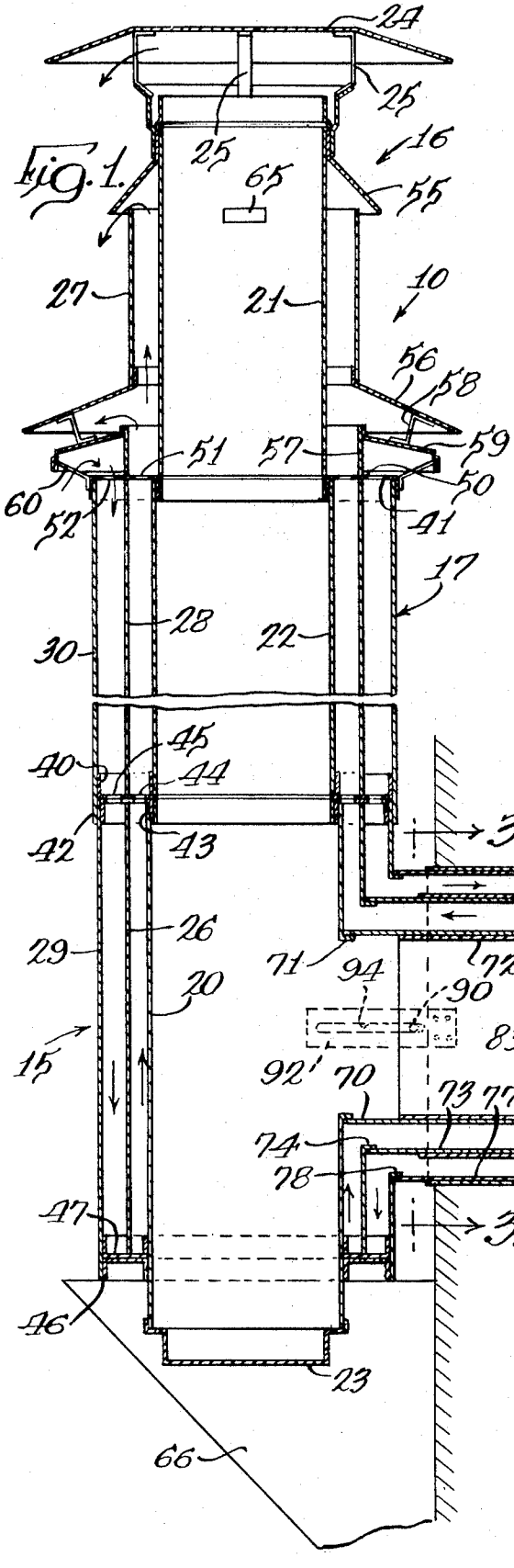


Fig. 2.

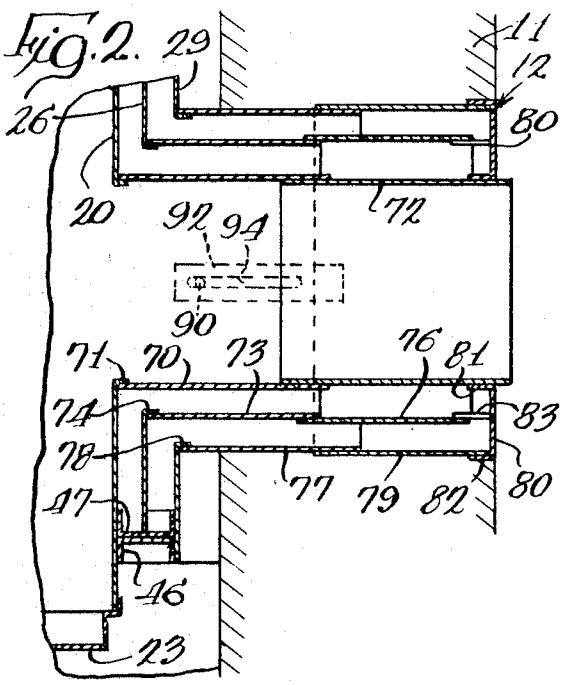
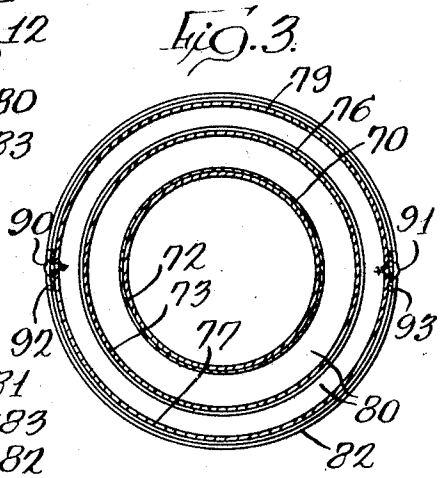


Fig. 3.



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ADJUSTABLE CHIMNEY T

BACKGROUND OF THE INVENTION

This invention pertains to an adjustable tee for association with a thermo-syphon chimney having provision for thermo-syphon air flow for cooling thereof.

Thermo-syphon chimneys are generally known, as shown in the Fluor Patent No. **2,121,319** and Thulman Patent No. **2.634,720** wherein atmospheric air is caused to flow down and up in passages surrounding the chimney flue. However, these patents have not shown a laterally extending tee connection for mounting in a wall which also is subjected to the thermo-syphon atmospheric air flow for cooling thereof and which is constructed to fit the particular wall thickness with which it is associated.

SUMMARY

An object of this invention is to provide a new and improved tee construction for association with a thermo-syphon chimney wherein the thermo-syphon action is utilized for cooling of the tee to permit mounting thereof in a wall with the tee being adjustable to adapt to a variety of different wall thicknesses as required in the particular installation.

Still another object of the invention is to provide an adjustable tee as defined in the preceding paragraph wherein the tee is formed of three concentric pipe sections each of which is formed of a pair of relatively movable telescoping members and wherein the outer members of each section remote from the chimney are interconnected for simultaneous movement to facilitate adjustment of the over-all length of the tee, and means for holding the tee to its adjusted length.

An additional object of the invention is to provide an adjustable tee as defined in the preceding paragraphs in combination with a thermo-syphon chimney wherein the innermost pipe section of the tee connects with the flue of the chimney, the space between the innermost and intermediate pipe sections of the tee communicates with the upflow passage surrounding the flue and the space between the intermediate and outermost third pipe section communicates with the downflow atmospheric air passage of the chimney to have the flow of atmospheric air around the flue also pass through the concentric spaces of the tee for cooling thereof.

Further objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawing.

DESCRIPTION OF THE DRAWING

FIGURE 1 is a central vertical section of a thermo-syphon chimney in combination with the adjustable tee shown in mounted relation with a building wall;

FIGURE 2 is a fragmentary section of the structure shown in **FIGURE 1** and showing the adjustable tee in a maximum extended position; and

FIGURE 3 is a vertical section, taken generally along the line **313** in **FIGURE 1**.

DESCRIPTION OF THE EMBODIMENT

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail an embodiment of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. the scope of the invention will be pointed out in the appended claims.

The combination is shown in **FIG.** 1 wherein a thermo-syphon chimney, indicated generally at **10**, is mounted externally and adjacent to a building wall **11**, with the connection between a space heater or other unit within the building to the thermo-syphon chimney being made by means of an adjustable tee, indicated generally at **12**. as shown in **FIGURES 1** and **2**, the adjustable tee extends through an opening in the wall **11** and can be accommodated to walls of different thickness, as noted by comparing **FIG.** 1 and 2.

The thermo-syphon chimney per se forms no part of this invention and only general reference is made thereto for an understanding of the principles of the invention. This chimney is made up of a number of units fitted end-to-end to form a chimney of the desired height, with there being a chimney base unit, indicated generally at **15**, forming the bottom of the chimney and a chimney top unit, indicated generally at **16**. A sufficient number of chimney intermediate units, indicated generally at **17**, are disposed between the chimney base unit **15** and the chimney top unit **16** to form the over-all desired height. A chimney flue is defined by inner duct sections **20, 21** and **22** of the chimney units with the lower end of the flue being closed by a cap **23**. The upper end of the flue is being open to atmosphere but covered by a rain cap **24** held in spaced relation from the upper end of the flue duct section **21** by a series of thin attaching straps **25** secured therebetween.

An upflow air passage for the flow of atmospheric air around the flue of the chimney is provided by a duct surrounding the chimney flue and defined by the duct sections **26, 27** and **28** of the chimney units **15, 16** and **17**, respectively.

A downflow air passage for atmospheric air is provided by a second duct surrounding the duct providing the upflow air passage which is made up of a duct section **29** and a duct section **30** of the chimney units **15** and **17**, respectively.

The chimney units are constructed for interfitting in end-to-end relation and, for this purpose, the duct sections of each chimney unit are held together by an end cap having a central aperture through which flue gases can pass. A pair of end caps **40** and **41** are disposed at the opposite ends of the intermediate chimney unit **17** and engage the duct sections **22, 28** and **30** extending therebetween to hold them in assembled relation, with the lower end of the second duct section **30**, as indicated at **42**, extending downwardly to fit over the upper end of the base chimney unit **15** to interfit parts together. The upper end of the chimney base unit **15** has an end cap **43** for the same purpose as the end caps **40** and **41** and the adjacent end caps **40** and **43** have a series of apertures **44** and **45** formed therein and in communicating relation to permit the flow of atmospheric air therethrough.

An end cap **47** is fitted at the lower end of the chimney base unit **15** between the flue section **20** and the second duct section **29** to hold the parts in assembled relation and a second cap member **46** is fitted therebelow and extends between the same parts as the cap **47** and also into contact with the lower end of the first duct section **26** to close off communication between the atmospheric air downflow and upflow passages at the lower end of the chimney in order to have cooling air flow about the tee structure later described.

An end cap **50** closes off the upper end of the intermediate chimney unit **17**, except for the central opening to permit the flow of flue gases and holds the duct sections in assembled relation with a number of apertures **51** and **52** therein to permit atmospheric air flow.

The chimney top unit **16** has an annular rain cover **55** secured to the flue section **21** and outwardly flared to overlie the upper open end of the duct section **27** which forms the final portion of the upflow air passage whereby upflowing air heated by travel along the flue can exhaust to atmosphere. The duct section **27** has an outwardly flaring rain cover **56** depending from its lower end which overlies and is spaced from the upper end of a duct section **57** forming a continuation of the upflow air passage from the intermediate chimney section **17** whereby atmospheric air flowing upwardly can in part discharge outwardly under the rain cover **56**, with the remainder traveling upward and discharging outwardly under the rain cover **55**. The rain cover **56** is supported by a series of narrow straps **58** secured to the underside thereof and to the upper side of an annular cover **59** extending outwardly from the outer surface of the duct section **57** to a location beyond

the upper end of the second duct section **30** of the intermediate chimney unit **17**, and being supported therefrom by a series of narrow straps **60**.

Upon operation of the heating device with which the chimney is associated, the hot flue gases flow upwardly and discharge out from under the rain cap **24** at the top of the chimney. The heated chimney, as a result, induces flow of atmospheric air in the direction shown by the arrows, whereby atmospheric air enters under the cover **59** and flows to the upper ends of the downflow air passages and, after flowing downwardly to a point of communication with the upflow passages, flows upwardly for discharge from under either the rain cap **56** or the rain cap **55**. In order to insure a sufficient flow of cooling air through the air passages, at least one opening **65** is provided in the flue top duct section **21** to cause part of the cooling air to be pulled therethrough from the upflow air passage and discharge with the flue gas.

The thermo-syphon chimney can be supported from the building wall, by suitable straps, and as shown a plate **66** at the lower end connects the chimney to the wall.

The adjustable tee utilizes the thermo-syphon atmospheric air flow for cooling thereof and embodies three concentric tubular pipe sections in spaced relation to define two annular air passages. The first pipe section provides for flow of flue gases therethrough and has an inner member **70** fitted to a flange **71** surrounding an opening in the base flue duct section **20** and a telescoping member **72** fitted in the member **70** for movement relative thereto. A second pipe section is disposed in concentric spaced relation to the first pipe section and has an inner member **73** fitted around a flange **74** defining an opening in the base first duct section **26** and a second member **76** telescoped onto the outer surface of the first member **73** for movement relative thereto. A third pipe section is disposed around the second pipe section in concentric spaced relation and has an inner member **77** fitted on a flange **78** formed around an opening in the base second duct section **29** and a second member **79** telescoped onto the member **78** and movable relative thereto.

With the interfitted telescoping relation of the members of the pipe sections, it will be noted that the tee can be adjusted from a minimal length of **FIGURE** 1 to any position up to the maximum extension, shown in **FIGURE** 2, to fit a variety of wall thicknesses.

An end cap **80** closes off an end of the tee, remote from the chimney **10**, with a central opening having a surrounding inturned flange **81**, fitted onto the outer member **72** of the first pipe section to connect the two components for movement together. An outer perimetral flange **82** of the cap fits over the outer end of the member **79** of the third pipe section and is secured thereto by suitable means, such as welding, to connect the cap and member for movement together. The end cap **80** is spaced from the end of the second pipe section member **76**, but is connected thereto by a series of narrow straps **83** to connect these components for movement together.

With this construction, adjustment of the end cap **80** and the members **72**, **76** and **79** of the pipe sections is simultaneous to provide the desired over-all length for the tee. The tee can be held in adjusted position by releasable interengaging means in the form of a pair of threaded members **90** and **91** threaded into suitable openings in the fixed member **77** of the third pipe section and engaging in an elongate slot of a pair of members **92** and **93** fastened to the member **79** of the third pipe section and with the slot therein being shown in **FIGURES** 1 and 2 at **94** for the member **92**.

As shown by the arrows in **FIGURE** 1, the thermo-syphon atmospheric air flow in the chimney can only occur by generally horizontal flow in air spaces defined between the three pipe sections of the tee, with the downflow air passing around the connecting straps **83** of the cap **80** into the upflow air passage. The air circulation for cooling of the tee is assured by the closing off of the bottoms of the atmospheric air flow passages at the lower end of the chimney base section **15**. The tee can be adjusted to different positions, without any modifying effect on the thermo-syphon air flow since the communication between the passages for the airflow is not affected by the lengthwise adjustment of the tee.

We claim:

1. In combination, a thermo-syphon chimney having a central flue and a pair of surrounding spaced apart ducts closed off at their lower end defining air passages surrounding the flue for downflow and upflow of atmospheric air, said air passages having their upper ends open and a cover structure associated therewith, and an adjustable tee comprising, a first pipe section at an angle to said flue and communicating therewith, a second pipe section concentric with and spaced from the first pipe section and communicating at one end only with the air upflow passage, a third pipe section concentric with and spaced from the second pipe section and communicating at one end only with the air downflow passage, means at the opposite ends of said sections closing off the space between the first and second pipe section and the second and third pipe sections with communication therebetween to connect the upflow and downflow air passages of the chimney and cool the adjustable tee, each of said pipe sections having a pair of relatively movable telescoping members, and means interconnecting all the movable members of the pipe sections whereby the length of the pipe sections can be adjusted simultaneously.

2. The combination of claim **1** wherein said interconnecting means includes a cap with a central opening fitted against the ends of the movable members of the first and third pipe sections and spaced from the end of the movable member of the second pipe section, and means connecting the cap to the last mentioned movable member without obstructing air flow therebetween.

3. The combination of claim **2** wherein the members of the third pipe section are adjustably fastened together to hold the adjustable tee at the desired length.

4. The combination of claim **1** wherein said flue has an opening and said first pipe section connects thereto and each of said ducts has an opening to which the second and third pipe sections connect.