April 30, 1963 J. H. CARR 3,087,408

FACTORY-BUILT CHIMNEY

Filed Oct. 24, 1960 3 Sheets-Sheet 1

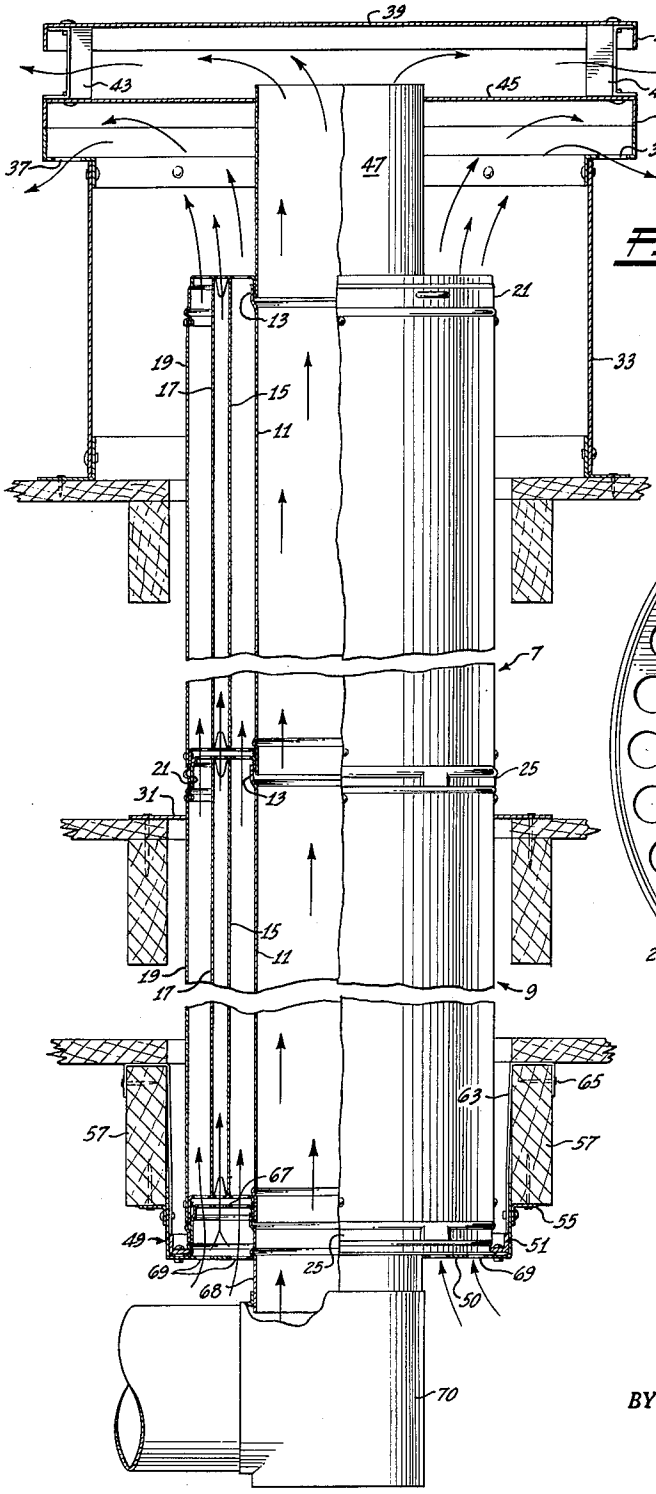


FIG. 1

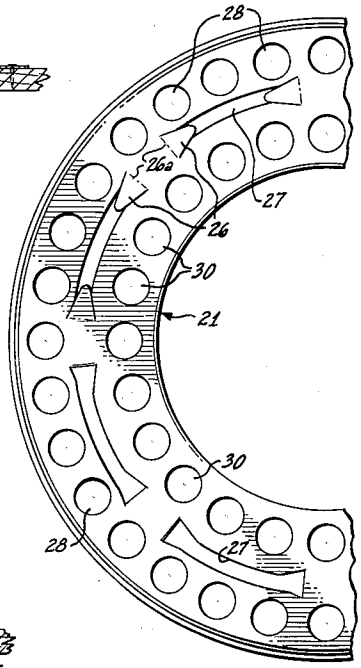


FIG. 2

INVENTOR:
JOHN H. CARR

BY Cochran & Slick
ATTORNEYS

April 30, 1963 J. H. CARR 3,087,408

FACTORY-BUILT CHIMNEY

Filed Oct. 24, 1960 3 Sheets-Sheet 2

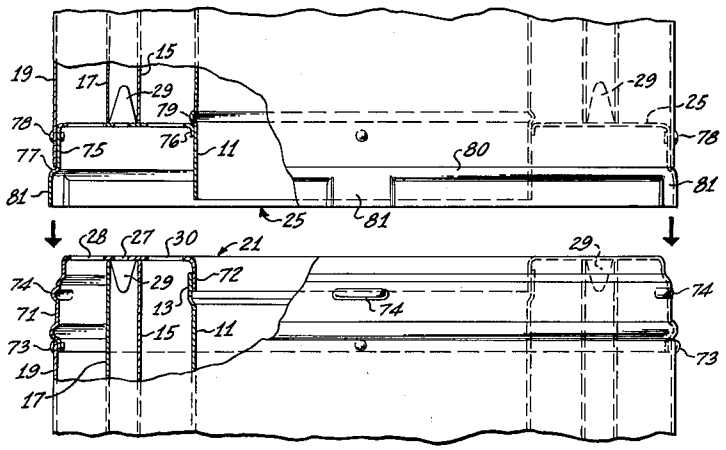


Fig. 3

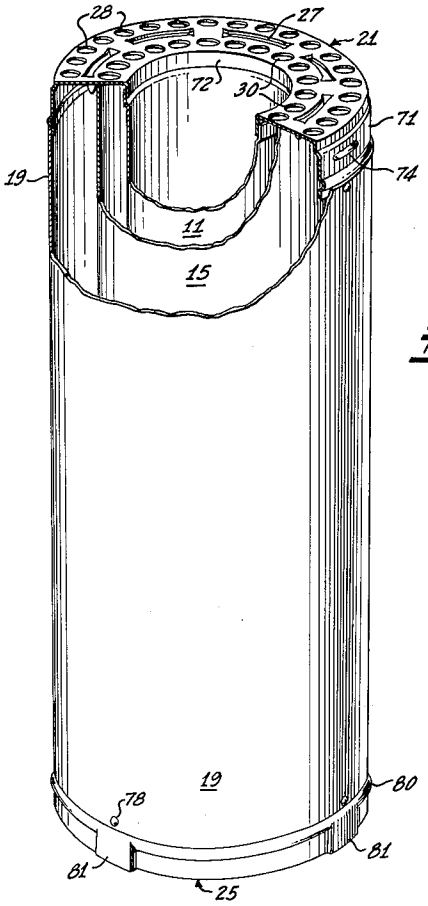


Fig. 6

INVENTOR:
JOHN H. CARR
BY Cushman Darby & Cushman
ATTORNEYS

April 30, 1963 J. H. CARR 3,087,408

FACTORY-BUILT CHIMNEY

Filed Oct. 24, 1960 3 Sheets-Sheet 3

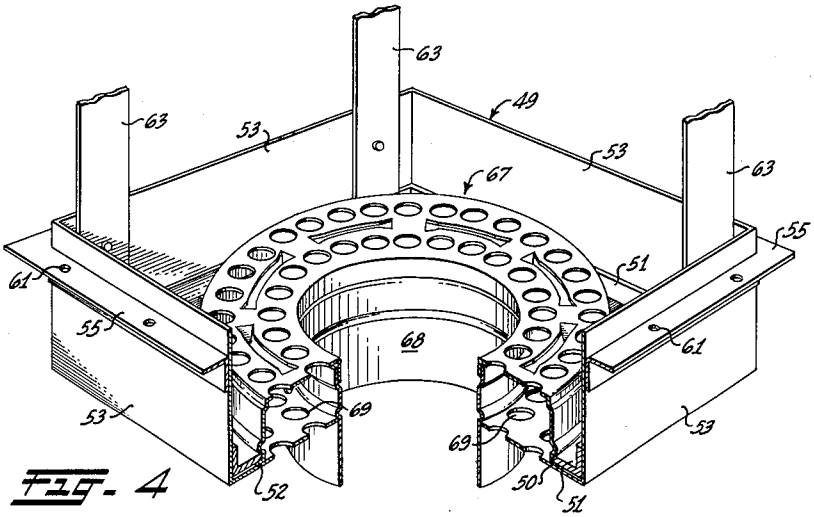


Fig. 4

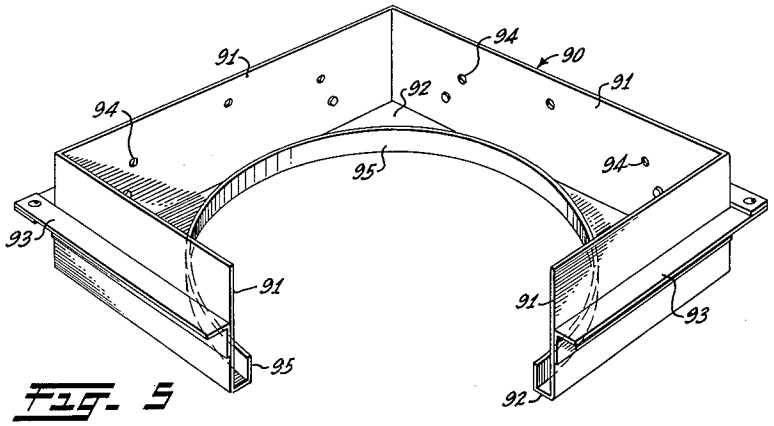


Fig. 5

INVENTOR:
JOHN H. CARR

BY Cushman and Slick
ATTORNEYS

United States Patent Office 3,087,408 Patented Apr. 30, 1963

3,087,408

FACTORY-BUILT CHIMNEY

John H. Carr, Mountain View, Calif., assignor to Dura-Vent Corporation, a corporation of Delaware

Filed Oct. 24, 1960, Ser. No. 64,387
6 Claims. (Cl. 98—46)

This application is a continuation-in-part of my application Serial No. 35,651 filed June 13, 1960.

This invention relates to a factory-built chimney of sheetmetal construction and more particularly relates to an insulated chimney for use with gas, liquid and solid fuel-fired equipment wherein the normal flue temperature may be as high a 1400° F. while intermittent temperatures may rise to 1700° F.

Flues which heretofore have been proposed have not been fully satisfactory. One type is of all metal construction but it has been necessary to assemble each of the pipe sections on the job. Thus, it was up to the workmen to assemble an inner pipe, spacers, outer pipes or the like, with the possibility of error in assembly. Further, after such flues are assembled, it is impossible to inspect the inner construction. Another type of factory chimney utilizes a granular insulation which may settle or which can become moist and freeze.

In accordance with the present invention a prefabricated factory chimney is provided of sheet-metal construction having three or four concentric pipes wherein the inner pipe serves as a conduit for the hot gases to be exhausted and wherein the annular spaces between the plurality of pipes convey air upwardly by convection to produce a cooling effect. The outer pipes also serve as a thermal shield. Thus, the outer wall of the chimney is maintained at a safe temperature.

According to one aspect of this invention, a structure is provided for discharging the hot vent gas into the open through one orifice while other orifices spaced below the gas discharge orifice serve to discharge the cooling air whereby the flow of cooling air is not influenced by the flow of the vent gas.

In accordance with another aspect of the present invention, base plates are provided of rigid structure which are easy to install and which provide a completely fire-safe structure.

In the drawings forming part of this application:

FIGURE 1 is a side elevation in section of a complete chimney constructed in accordance with the present invention.

FIGURE 2 is a partial plan view of an end plate.

FIGURE 3 is an enlarged partial view, partly in section, showing two flue pipes about to be joined.

FIGURE 4 is a perspective view of one form of base or support used in combination with the chimney of the present invention.

FIGURE 5 is a perspective view of another form of base member.

FIGURE 6 is a perspective view, partly cut away, of a flue pipe made in accordance with the present invention.

Referring now to the drawings by reference characters, and referring particularly to FIGURES 1 and 2 there is shown a chimney structure having two sections of pipe generally designated **7** and **9**. Although two sections of pipe have been shown, it will be obvious that only a single section might be employed or that more than two sections might be employed. Each of the chimney sections consists of an inner pipe **11** having a flared upper end as at **13**. It will be noted that the flared end **13** receives the downturned rim of a ring **21** (hereinafter described) and that the outer surface of the rim is adapted to fit over the outside of a similar pipe **11** so

that a multiplicity of sections can be coupled together. Surrounding the first pipe **11** is the second pipe **15**, the third pipe **17** and the fourth pipe **19**. In many instances only three pipes are necessary so that the pipe **17** can be eliminated. This form of structure is shown in FIGURE 6. In order to hold the pipes concentric, an upper or male annular ring **21** and a lower or female annular ring, both suitably of pressed metal, are provided. The rings **21** and **25** mate with each other as is hereinafter described in detail. Holes **28** and **30** and slots **27** are provided for the free circulation of air. It will be noted that in forming the slots **27** tongues of metal **26** are left attached to the ring **21** at each end of the slot. These tongues are then bent inwardly on the lines **29** forming the fingers **28** which serve to retain the pipe **15** and, if used, the pipe **17** in place. Similar fingers are used on the bottom rings and are described in detail hereinafter. The rings **21** and **25** can be fastened to the pipes **11**, **15**, **17** and **19** by rivets, welding or may be merely pressed together. Normally, only the outer pipe **19** is riveted to the rings, the other pipes being locked in place by the rings and fingers.

In order to permit the pipe to pass through a floor opening, an annular ring **31** is provided having a suitable opening to receive the outer pipe **19**.

The cap assembly proper consists of a rectangular outer wall **33** to which is attached a lower cap **35** which is somewhat larger in size than the wall **33** and which has openings **37** located near the bottom thereof. Mounted over the lower cap **35** is a top cap **39** which has a downturned rim **41** thereon. The top cap **39** is supported from the lower cap **35** by means of a series of pillars **43** which forms a discontinuous support for the top **39** and which permits gas to pass between the lower cap **35** and the top cap **39**. The lower cap **35** has an upper plate **45** having a hole at the center thereof which supports a small inner pipe **47** which mates with the outer surface of the inside rim of ring **21** and can enter pipe **11** if necessary as previously described.

One form of support or base structure is shown in FIGURE 4 and consists of a rectangular pan-like member **49** having a bottom **50** and upstanding side walls **53**. Attached to the side walls **53** is the flange members **55** which can be pressed upwardly against joists **57** as is shown in FIGURE 1. The flange **55** has nail holes **61** therein so that the bottom support can be nailed to the joists **57** as is shown in FIGURE 1. Further, straps of metal, such as plumber's tape **63**, are fastened near the four corners of the device which can be brought over the joists and nailed as at **65**. The bottom of the member **50** is provided with a ring, similar to that shown in FIGURE 2, designated **67**. This is held by the rim **52** which is held under the spacer plate **51** on the base **50**. A series of openings **69** corresponding to holes **28** and **30** are provided in the bottom **50** of the base, so that air can circulate freely upwards. The bottom **50** and ring **67** serve to retain a short length of pipe **68** which can be coupled to a conventional T **70**.

The form of support shown in FIGURE 4 is for heavy duty applications wherein a large number of pipe sections must be supported. In many instances, such as when only a few pipe sections need be supported, a simpler base member such as is shown in FIGURE 5 may be employed. In FIGURE 5 the base, generally designated **90**, is provided with side walls **91** and bottom **92**. Attached to the walls **91** are angle members **93** which serve to locate the base with respect to a framework of joists (not shown). Nail holes **94** are provided for nailing the base to the joists. Set within the bottom **92** is a ring **95** which is adapted to receive and support the bottom of a section of pipe.

The device is assembled as is shown in FIGURE 1. Flue gas is discharged through the center pipe 11 through the top cap 39 around the pillars 43. Air is drawn upwardly by convection through the openings 69, through the holes 28 and 30, the slots 27 and the spaces formed between the pipes 11, 15, 17 and 19, respectively, and will be discharged through the openings 37.

Turning now to a description of the pipe sections proper and referring patricularly to FIGURES 3 and 6, the pipes 11, 15, 17 and 19 are held in concentric relationship by an upper ring 21 and a lower ring 25. The pipe 17 may or may not be used. Each of the rings is preferably made of a single piece of drawn metal. The upper or male ring 21 has a downturned outer rim 71 and a shorter downturned inner rim 72. The downturned rim 71 is riveted to the pipe 19 by means of the rivets 73. Around the periphery of the rim 71 is a series, preferably four, of arcuate beads 74. The lower or female ring 25 similarly has an outer downturned rim 75 and a short inner downturned rim 76. The outer rim 75 has a shoulder 77 thereon so that the rim has one portion of smaller diameter to which the pipe 19 is riveted by the rivets 78. The inner pipe 11 has a bead 79 thereon which engages the ring 25 holding the inner pipe firmly in place. The ring 25 has an annular groove 80 near its edge and has a series of slots 81 leading from the groove 80 to the outer edge. The number of slots 81 will, of course, correspond in number and placement with the beads 74. Of course, the rings 21 and 25 have the holes 28 and 30 and the slots 27 and the fingers 28 previously described.

In order to lock two mating pipe sections together, as is shown in detail in FIGURE 3, the beads 74 are placed adjacent to the slots 81 and the two pipes forced together. When the beads 74 reach the groove 80, the pipes are given a slight relative turning movement, locking the two sections firmly together.

Obviously many modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

The structure of the present invention meets underwriter's requirements for high temperture installations and provides a relatively low cost replacement for masonry structures.

I claim:

1. A pipe section adapted for use in a prefabricated, factory built chimney comprising an inner pipe and an outer pipe concentric therewith, flat perforated rings at each end of said pipe section holding the inner and outer pipes concentric, at least one additional pipe disposed between said inner and outer pipes, said additional pipe being concentric therewith, fastening means on each of said rings to hold said additional pipe in spaced relationship to the inner and outer pipes, one of said rings forming a male connection at one end of said pipe section and at the opposite end of said pipe section a female connection formed by the outer pipe.

2. The structure of claim 1 wherein the fastening means on said rings comprises a series of struck-out fingers extending inwardly from said rings said fingers engaging said additional pipe.

3. The structure of claim 1 wherein the ring forming the male connection has a plurality of struck-out beads thereon and wheerin the female end has an annular groove formed at the end thereof with a series of corresponding slots leading from said groove to the end of the ring whereby said beads can be forced into said slots until the rings are in engagement and turned relative to each other whereby said beads will be engaged by said groove.

4. The structure of claim 3 wherein there are four equally spaced beads and slots.

5. The structure of claim 1 wherein a pipe section is held by a base plate, said base plate being in the form of a rectangular pan having upstanding side walls, means on said side walls for attaching the base to a frame member, and the bottom of said base plate having an annular ring adapted to engage and hold a female ring on a pipe section.

6. The structure of claim 1 wherein a top structure is provided comprising a lower cap and an upper cap, means whereby gas in the inner pipe can pass in the space between the upper cap and the lower cap, and means whereby rising air will be discharged from the spaces between the inner and outer pipes, under the lower cap.

References Cited in the file of this patent

UNITED STATES PATENTS

499,856	Schaffer	June 20, 1893
2,054,859	Kitching	Sept. 22, 1936
2,650,112	Kinread	Aug. 25, 1953
2,764,972	Ryder	Oct. 2, 1956
2,856,837	Thulman	Oct. 21, 1958