United States Patent [19]

Zanias

[11] **3,872,780**

[45] **Mar. 25, 1975**

[54] **TRIPLE WALL CHIMNEY PIPE ASSEMBLY**

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[73] Assignee: **American Metal Products Corporation,** Los Angeles, Calif.

[22] Filed: **Apr. 3, 1974**

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[52] **U.S. Cl.** ..... **98/60,** 126/307 R, 138/113, 138/114, 285/133 R, 285/138

[51] **Int. Cl.** **E04h 17/02**

[58] **Field of Search** ..... 98/58, 60; 126/307 R, 312; 138/113, 114; 285/47, 133 R, 138; 110/184

[56] **References Cited**

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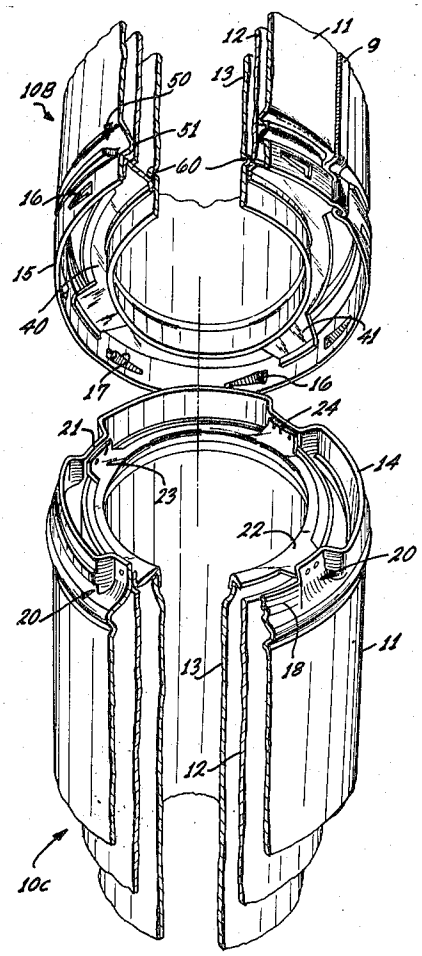
2,275,402	3/1942	Hasenborges et al.	285/133 R
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Primary Examiner—William F. O'Dea
Assistant Examiner—Peter D. Ferguson
Attorney, Agent, or Firm—Herzig & Walsh

[57] **ABSTRACT**

A prefabricated pipe assembly for use in forming a chimney is made up of outer, intermediaate, and inner pipe sections which define spaced apart walls. Groups of projections are formed on the inner periphery of the outer section for maintaining the intermediate section concentrically positioned therein. Spacer ring structure is mounted within the ends of the outer section to hold the intermediate section longitudinally therein and concentrically position the inner section. Cooperating structure is formed on the inner section and spacer rings to hold the inner section longitudinally in place. Interlocking male and female structure is formed on opposite ends of the pipe assembly for joining one with another.

13 Claims, 7 Drawing Figures



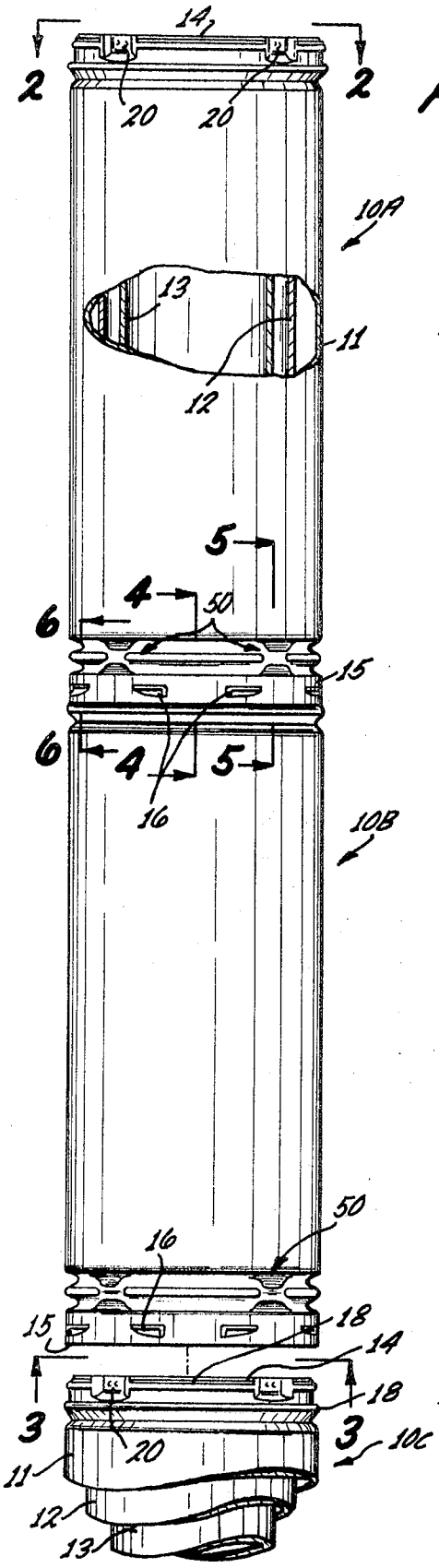


FIG. 1

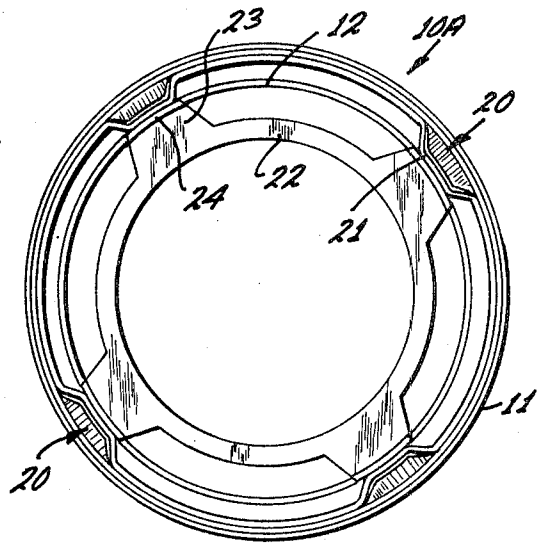


FIG. 2

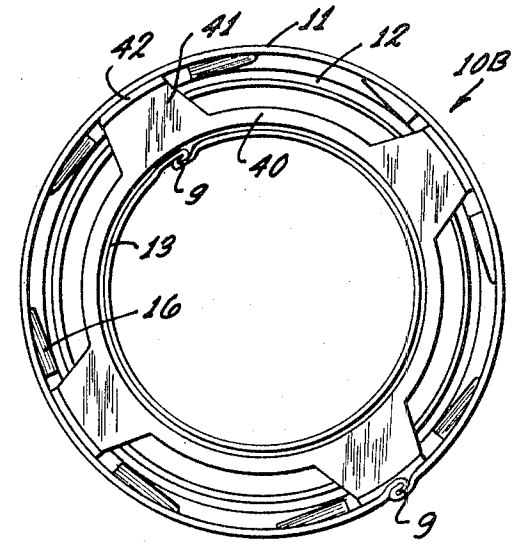


FIG. 3

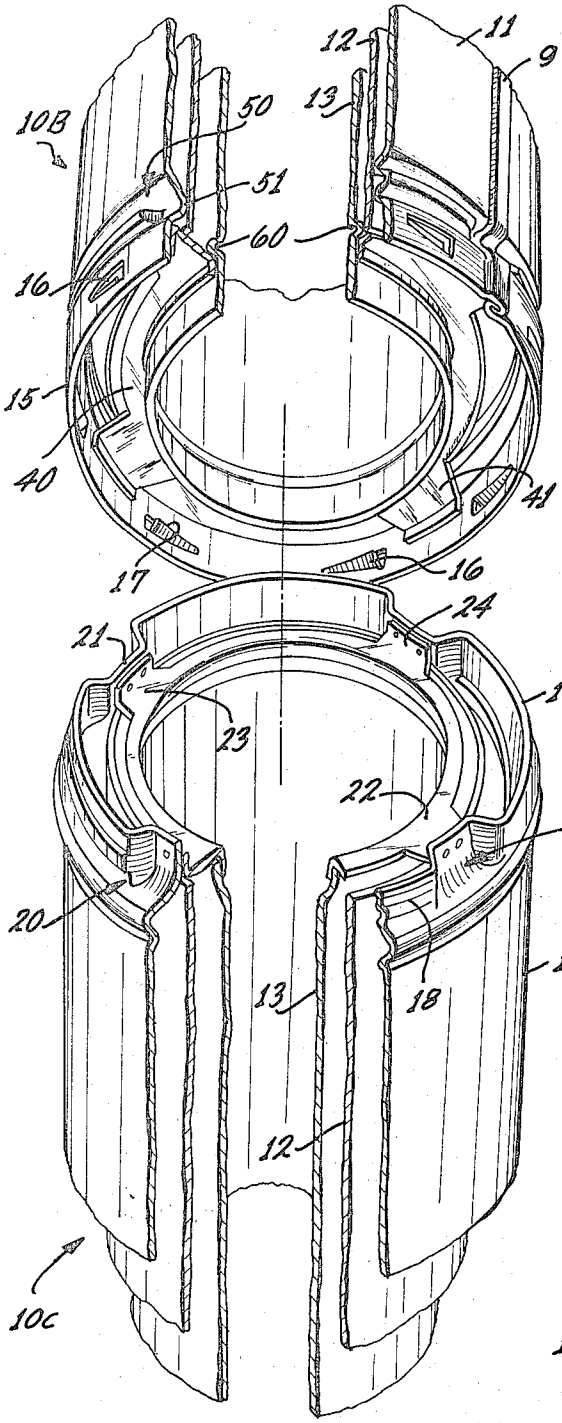


FIG. 7

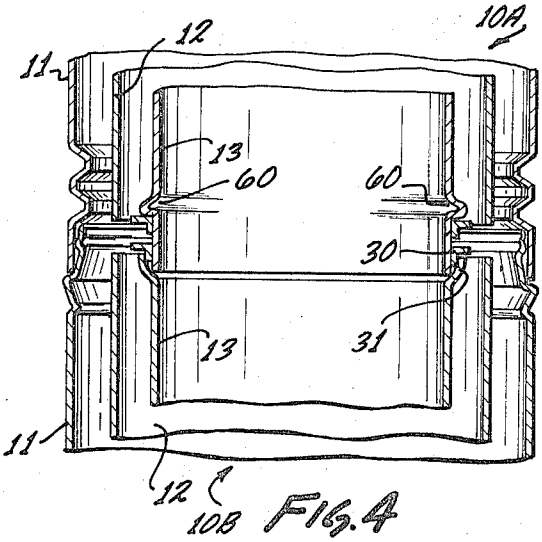


FIG. 4

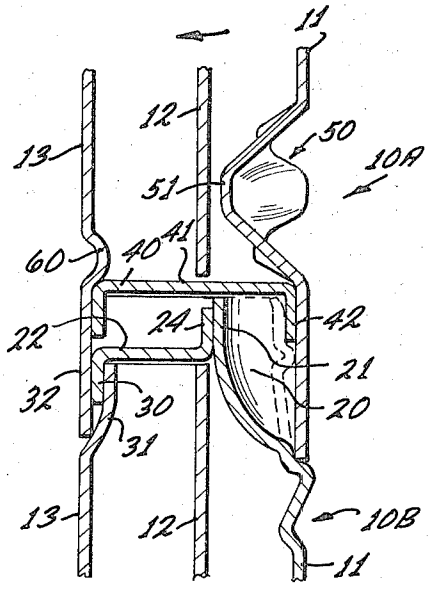


FIG. 5

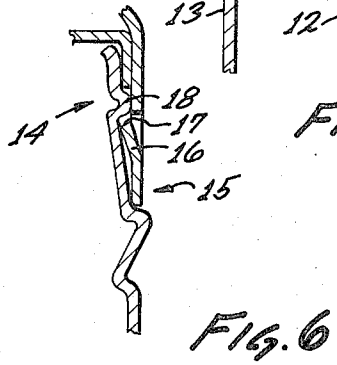


FIG. 6

TRIPLE WALL CHIMNEY PIPE ASSEMBLY

BACKGROUND OF THE INVENTION

The present invention relates to an improved, prefabricated chimney pipe assembly having triple walls held in a spaced apart substantially concentric relationship.

Examples of prior art chimney pipes are illustrated in the below-listed U.S. patents. Attention is particularly called to the patents marked with an asterisk which disclose prior art triple wall chimney pipes.

Patent No.	Date Patented	Inventor
*2,634,720	14 April 1953	R. K. Thulman
2,650,112	25 August 1953	A. Kinkead
2,650,114	25 August 1953	S. Epstein
2,910,308	27 October 1959	J. H. Carr
2,936,184	10 May 1960	S. Epstein
*2,947,303	2 August 1960	S. Epstein
*2,962,053	29 November 1960	S. Epstein

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a chimney pipe assembly of the triple wall type which is an improvement over the prior art and is characterized by having one or more of the following advantages:

a. Capable of providing a safe and durable passage for hot flue gases which does not buckle and effectively distributes heat, thereby to avoid the formation of dangerous hot spots on its wall portions;

b. Capable of being prefabricated by low cost mass production methods and having rapidly reproducible parts which are easily and readily assembled so as to minimize labor costs;

c. Capable of being constructed with a relatively small cross-sectional size while still meeting safety requirements, thereby to permit reductions in installation space required, shipping weight, and storage space;

d. Having its inner, intermediate and outer walls held in an accurately spaced apart relationship so as to insure required clearances to meet safety and efficiency standards;

e. Constructed to permit limited movement between assembled parts to prevent buckling caused by thermal expansion and contraction; and

f. Suitable for use with a variety of fuels including oil, wood, coal, and others, and in various building structures including domestic residences.

In accomplishing these and other objects, there is provided in accordance with the present invention a prefabricated pipe assembly for use in forming a chimney made up of outer, intermediate, and inner pipe sections which define spaced apart walls. Groups of projections are formed on the inner periphery of the outer section for maintaining the intermediate section concentrically positioned therein. Spacer ring structure is mounted within the ends of the outer section to hold the intermediate section longitudinally therein and concentrically position the inner section. Cooperating structure is formed on the inner section and spacer rings to hold the inner section longitudinally in place. The projections formed on the outer section hold the intermediate pipe section concentric with the inner and outer pipe sections in a loose fit which permits thermal expansion and contraction without buckling. Interlocking male and female structure is provided on opposite ends of the pipe assembly so that one pipe assembly may be jointed with another in order to form a length of chimney.

Additional objects of the present invention reside in the specific construction of the chimney pipe assembly shown in several drawings hereinafter described in connection therewith.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an elevation view of a partially assembled chimney made up of pipe assemblies according to the present invention, certain of the pipe assemblies being partially cutaway to illustrate internal construction.

FIG. **2** is a view taken along the line **2—2** of FIG. **1.**

FIG. **3** is a view taken along the line **3—3** of FIG. **1,** looking upwards.

FIG. **4** is a view taken along the line **4—4** of FIG. **1.**

FIG. **5** is a view taken along the line **5—5** of FIG. **1.**

FIG. **6** is a view taken along the line **6—6** of FIG. **1.**

FIG. **7** is a perspective view of the male and female end portions of the uncoupled pipe section assemblies of FIG. **1,** shown partially cut away to illustrate internal construction.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings in more detail, there is shown in FIG. **1** a length of chimney made up three sections of pipe assembly **10.** The two uppermost assemblies are illustrated coupled together and are designated **10A** and **10B,** going from the top downwardly. The lowermost assembly **10C** is only partially shown and is illustrated positioned for coupling to the lower end of the assembly **10B.**

Each of the pipe assemblies **10** are identically constructed and include an outer pipe section **11,** an intermediate pipe section **12** and an inner pipe section **13.** The pipe sections **11-13** are illustrated as being cylindrical and may, for example, be made from rectangular plates of stainless steel by crimping their opposite edges together to form longitudinal seams **9,** as shown in FIG. **3.** The pipe sections **11-13** are appropriately dimensioned for concentric positioning within each other to define spaced apart walls with the intermediate pipe section **12** dimensioned for positioning substantially midway between the inner and outer pipe sections **13** and **11.**

Each of the pipe assemblies **10** has a male end portion **14** and a female end portion **15.** The end portions **14** and **15** are illustrated as being formed as an integral part of the outer pipe sections **11.** The female end portion **15** is shown formed by an annular collar of substantially the same diameter as the outer wall portion defined by pipe section **11** and has inwardly extending locking lances or flanges **16** formed thereon. The flanges **16** are preferably punched out from the collar portion **15.** The locking flanges **16** define locking edges **17** which engage outwardly extending arcuate shaped beads or projections **18** formed around the outer periphery of the male end portion **14.** The projections **18** are illustrated formed in the male end portion **14** by being impressed therein. The male and female end portions **14** and **15** interfit and interlock, as illustrated in FIGS. **4** and **6,** to join one of the pipe assemblies **10** with another.

As shown in FIGS. **2, 5,** and **7,** a group of inwardly extending projections **20** are formed on the inner pe-

ripheral surface of the male end portion **14.** The projections **20** are preferably made by forming indentations in the outer periphery of the pipe section **11** at intervals equally spaced apart circumferentially. The projections **20** illustrated define a common plane substantially perpendicular to the longitudinal axis of the pipe section **11.** Each of the projections **20** is similarly dimensioned and extends inwardly to form an arc portion **21** which is radially positioned approximately at the location whereat it is desired to hold and maintain the intermediate wall portion **12.** An appropriate number of projections **20** is formed on the pipe section **11** to concentrically support the intermediate pipe section **12** therein.

Rigidly secured to each of the projections **20** is an annular spacer ring **22.** The spacer ring **22** is connected to the projections **20** by means of extensions **23** which are illustrated formed integral with the ring **22.** The extensions **23** have flange portions **24** formed on their outer ends which are secured to the projections **20,** such as by being spot welded thereto. The spacer ring **22** and extensions **23** preferably lie in a common plane. The inner diameter of the spacer ring **22** is greater than the outer diameter of pipe section **13** but a selected distance smaller than the inner diameter of the pipe section **12.** Thereby, the spacer ring **22** does not completely close the end of the intermediate pipe section **12** to allow the flow of gas therethrough.

Referring to FIG. **5,** the spacer ring **22** is illustrated positioned in a plane substantially perpendicular to the longitudinal axis of the pipe section **11** with the extensions **23** joining the projections **20** at approximately the points whereat the slope of the projections **20** change from the vertical to an outward slope. The upper end of the pipe section **12** is positioned just below the planar portion of the ring **22** in a loose fitting relationship within the projections **20.** Thereby, space is provided in which the pipe section **12** may thermally expand or contract without buckling.

The inner periphery of the spacer ring **22** is formed to define a downwardly extending annular flange **30.** The annular flange **30** is constructed to have a diameter slightly larger than the outer diameter of the inner pipe section **13** and fits over the outwardly expanding flared upper end **31** of the wall portion **13.** Space is thereby provided for the lower end **32** of the inner pipe section **13** in the upper pipe assembly **10A** to slidably mate within the enlarged end portion **31** of the inner section **13** of pipe assembly **10B** in sliding contact with the annular flange **30.** Thereby, the projections **20** and the annular spacer ring **22** cooperate to hold the upper ends of the pipe sections **11, 12,** and **13** spaced apart in a concentric relationship with respect to each other. As above noted, the pipe assemblies **10** illustrated are dimensioned so that the intermediate sections **12** lie substantially midway between the outer and inner pipe sections **11** and **13.**

A view of the lower female end of the pipe assembly **10B** is shown in FIGS. **3** and **7.** As there shown, a planar spacer ring **40** is mounted within the female end portion **15.** The ring **40** itself corresponds in size to the ring **22** and has outwardly extending planar extensions **41** thereon. The extensions **41** correspond in number to the extensions **23** on the ring **22,** are similarly shaped, are dimensioned to reach the inner surface of outer pipe section **11,** are equally spaced apart circumferentially, and are positioned in radial alignment with the projections **20** formed on the upper end of the pipe assembly. Formed on the outer end of the extensions **41** are flange portions **42** which extend downwardly perpendicularly to the plane of the ring **40.** The flange portions **42** are rigidly secured preferably by spot welding to the inner periphery of the outer pipe section **11.**

As shown in FIG. **5,** the outer wall portion of the outer pipe section **11** is indented above the plane of the ring **40** at points preferably in circumferential alignment with the extensions **41** to form projections **50** having inner arc portions **51** positioned in substantially the same radial position as the vertical extending portions **21** of the projections **20.** Thereby, the arc portions **51** function to loosely hold the lower end of the intermediate pipe section **12** in a concentric relationship between the pipe sections **11** and **13.** The lower end of the pipe section **12** rests upon the supporting structure formed by the extensions **41** on the spacer ring **40.**

An annular projection **60** is formed around the outer periphery of the inner pipe section **13,** preferably by being indented therein, adjacent its lower end but a spaced distance therefrom. The annular projection **60** lies in a plane substantially perpendicular to the longitudinal axis of the pipe section **13** and is longitudinally positioned from the lower end of the inner pipe section **11** to rest against the inside surface of the spacer ring **40** when the flared end **31** of the inner pipe section is fitted around the inwardly extending annular flange **30** of the upper spacer ring **22.** The lower end **32** of the inner pipe section **11** extends downwardly from the annular projection **60** formed therearound and is dimensioned for insertion into the male end **14** of an adjacent pipe assembly **10,** as shown in FIG. **4.**

Although I have herein shown and described the invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention.

What is claimed is:

1. A pipe assembly for forming a chimney, comprising:

substantially cylindrical outer, intermediate and inner pipe sections, and pipe sections being positioned concentrically one within the other and dimensioned to define spaced apart walls;

a group of projections formed on the inner peripheral surface of said outer pipe section adjacent each end thereof for maintaining said intermediate pipe section concentrically positioned within said outer pipe section, the length of said intermediate pipe section being less than the length of said outer pipe section but at least as long as the longitudinal distance between said groups of projections;

first and second spacer rings, each of said spacer rings having an outer diameter a predetermined amount smaller than the inner diameter of said intermediate pipe section and an inner diameter larger than the outer diameter of said inner pipe section;

support structure secured between said outer pipe section and said spacer rings mounting said first and second spacer rings concentrically within said outer pipe section at opposite ends thereof, said support structure positioned to hold the ends of said intermediate pipe section longitudinally within the ends of said outer pipe section in a longitudinal

position in which portions of the outer periphery surface of said intermediate pipe section are positioned within each of said groups of projections and hence are held concentrically positioned thereby; and

cooperating structure means formed on said spacer rings and inner pipe section for supporting said inner pipe section within said intermediate pipe section, said structure means being operable to hold said inner pipe section in a substantially fixed longitudinal position concentric with said outer pipe section.

2. The invention defined in claim **1** wherein each of said groups of projections are formed by making circumferentially spaced apart indentations in the outer peripheral surface of said outer pipe section.

3. The invention defined in claim **1** wherein each of said groups of projections is comprised of more than two projections, the projections in each of said groups being spaced apart circumferentially substantially equally.

4. The invention defined in claim **3** wherein said projections in each of said groups define a common plane substantially perpendicular to the longitudinal axis of said outer pipe section.

5. The invention defined in claim **1** wherein said support structure comprises extensions formed as an integral part of said spacer rings, said extensions corresponding in number to said projections and each being rigidly secured to said outer pipe section in radial alignment with one of said projections.

6. The invention defined in claim **5** wherein each of said spacer rings and said extensions formed integral therewith are planar and define a common plane, said extensions being secured to said outer pipe section to extend substantially perpendicular to the axis thereof whereby said spacer rings are positioned in a plane substantially perpendicular to the axis of said outer pipe section.

7. The invention defined in claim **1,** wherein said structure means for supporting said inner pipe section within said intermediate pipe section comprises:

an inwardly extending annular flange portion formed on said first spacer ring, said annular flange portion being concentrically positioned with respect to said outer pipe section;

an outward annular flare formed on the end of said inner pipe section adjacent said first spacer ring, said outward flare being dimensioned to mate with said annular flange portion by fitting thereover; and

an annular projection formed around the outer periphery of said inner pipe section adjacent its other end but a spaced distance therefrom, said annular projection being longitudinally positioned to rest against the inside surface of said second spacer ring whenever the flared end of said inner pipe section is fitted around the inwardly extending annular flange portion of said first spacer ring, the end portion of said inner pipe section extending outwardly from said annular projection formed therearound being for insertion into the annular flange portion of the first spacer ring of a second of said pipe assemblies at the time of assembling two of said pipe assemblies together.

8. The invention defined in claim **7** wherein said outer pipe section has formed on its opposite ends interlocking male and female structure means for joining one of said pipe assemblies with another.

9. The invention defined in claim **8,** wherein:

said support structure comprises extensions formed as an integral part of said spacer rings, said extensions corresponding in number to said projections and each being rigidly secured to said outer pipe section in radial alignment with one of said projections;

each of said spacer rings and said extensions formed integral therewith are planar and define a common plane, said extensions being secured to said outer pipe section to extend substantially perpendicular to the axis thereof whereby said spacer rings are positioned in a plane substantially perpendicular to the axis of said outer pipe section; and

each of said groups of projections are formed by making circumferentially spaced apart indentations in the outer peripheral surface of said outer pipe section, each of said groups of projections being comprised of more than two projections, the projections in each of said groups being spaced apart circumferentially substantially equally, said projections in each of said groups defining a common plane substantially perpendicular to the longitudinal axis of said outer pipe section.

10. The invention defined in claim **1** wherein said outer pipe section has supporting on its opposite ends interlocking male and female structure means for joining one of said pipe assemblies with another.

11. The invention defined in claim **1** wherein said pipe sections, said projections, said spacer rings, said support structure means and said cooperating structure means are dimensioned with respect to each other to accommodate a limited amount of relative movement due to settling, thermal expansion and contraction, or the like, without damage.

12. In a prefabricated pipe assembly for use in forming a chimney having outer, intermediate, and inner pipe sections defining spaced apart walls, the improvement in combination therewith of:

first and second longitudinally spaced apart groups of projection means formed on the inner periphery of said outer pipe section for maintaining said intermediate pipe section concentrically positioned therein;

a pair of spacer rings each having an outer diameter a predetermined amount smaller than the inner diameter of said intermediate pipe section and an inner diameter larger than the outer diameter of said inner pipe section;

support structure secured between said outer pipe section and said spacer rings mounting said first and second spacer rings concentrically within said outer pipe section at opposite ends thereof, said support structure positioned to hold the ends of said intermediate pipe section longitudinally within the ends of said outer pipe section in a longitudinal position in which portions of the outer peripheral surface of said intermediate pipe section are positioned within each of said groups of projection means and hence are held concentrically positioned thereby; and

cooperating structure means formed on said spacer rings and inner pipe section for supportin said inner pipe section within said intermediate pipe section, said structure means being operable to hold said

inner pipe section in a substantially fixed longitudinal position concentric with said outer pipe section.

13. The invention defined in claim **12** wherein male and female interlocking structure means are formed on opposite ends of said pipe assembly for joining one of said pipe assemblies with another.

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