

J. V. BOLAND.

CHIMNEY.

APPLICATION FILED DEC. 22, 1906.

907,101.

Patented Dec. 15, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

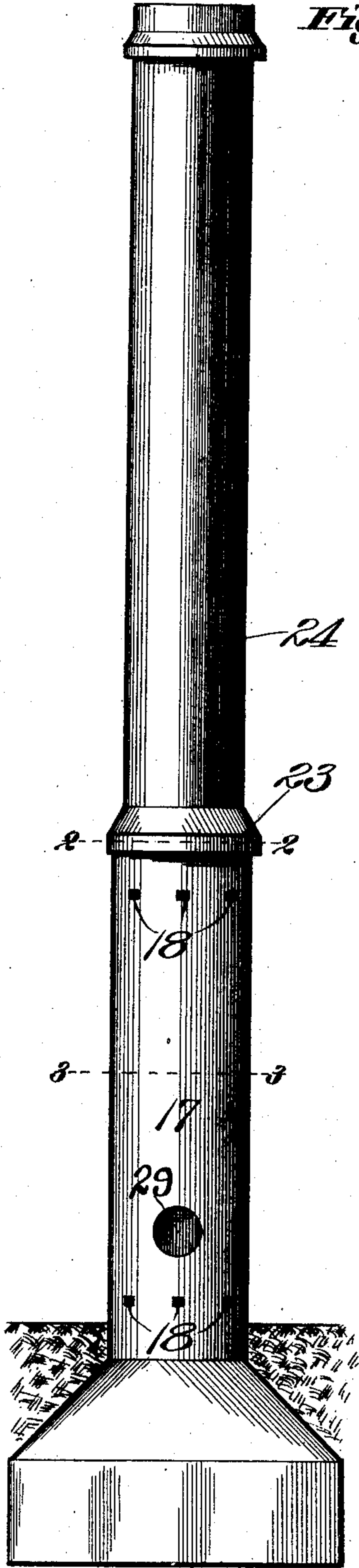


Fig. 2.

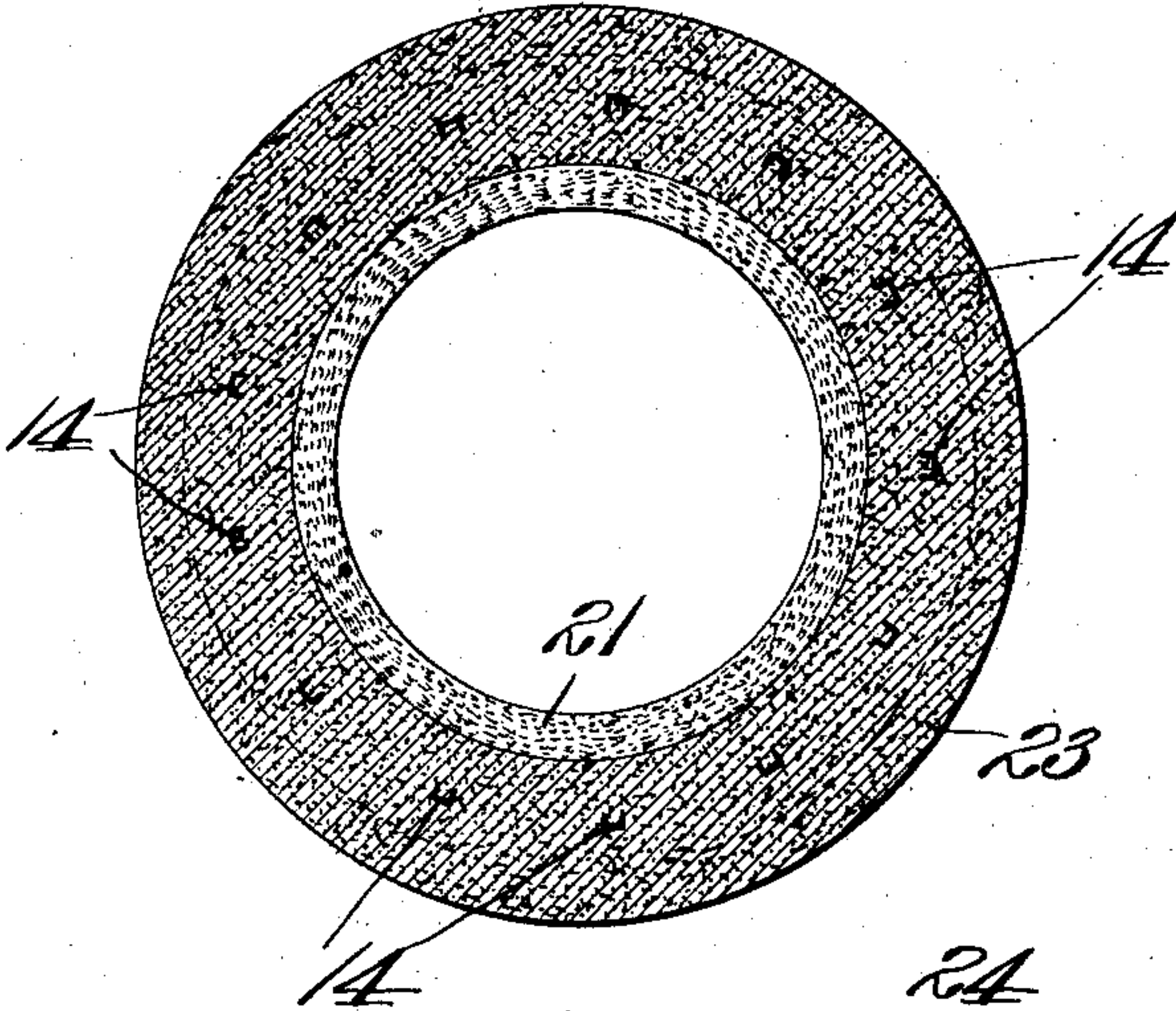


Fig. 4.

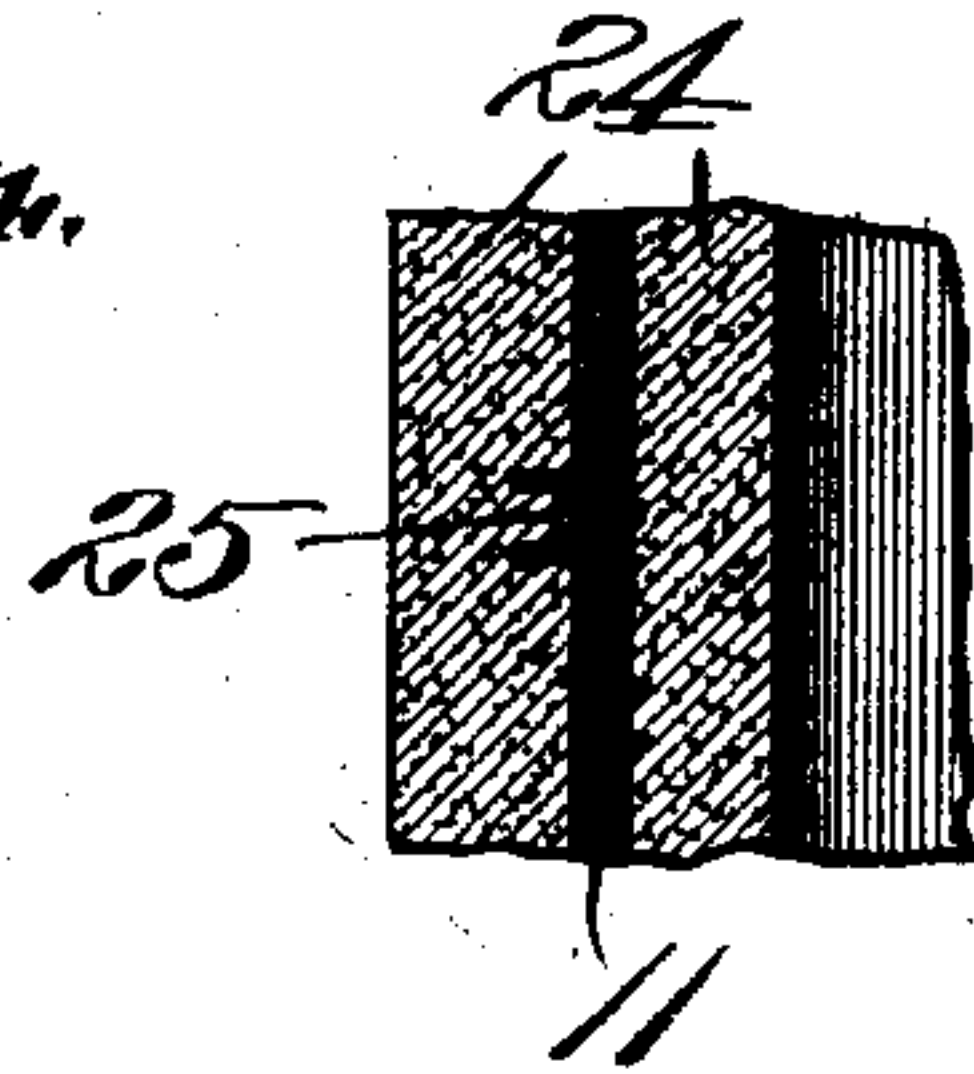


Fig. 3.

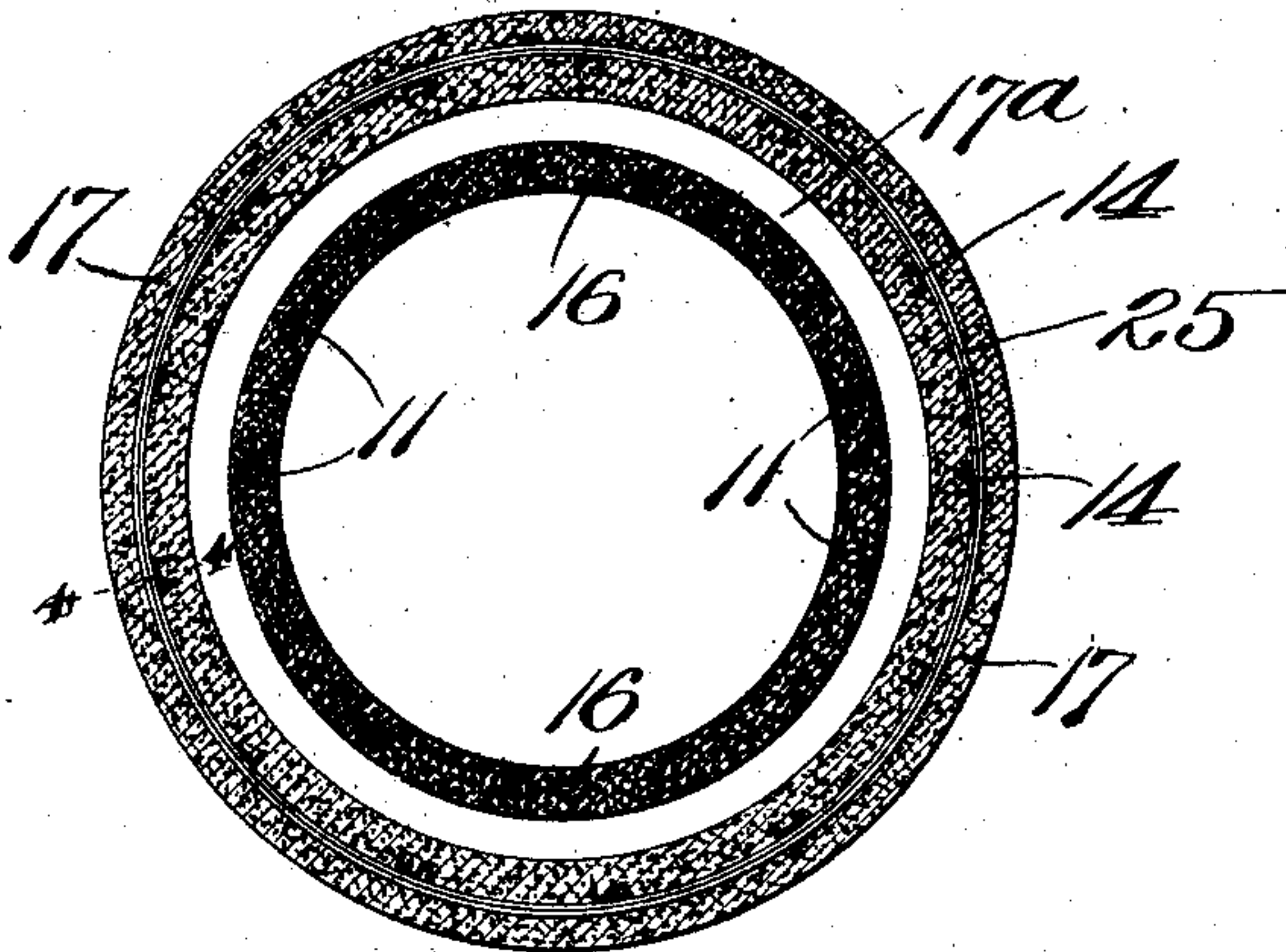
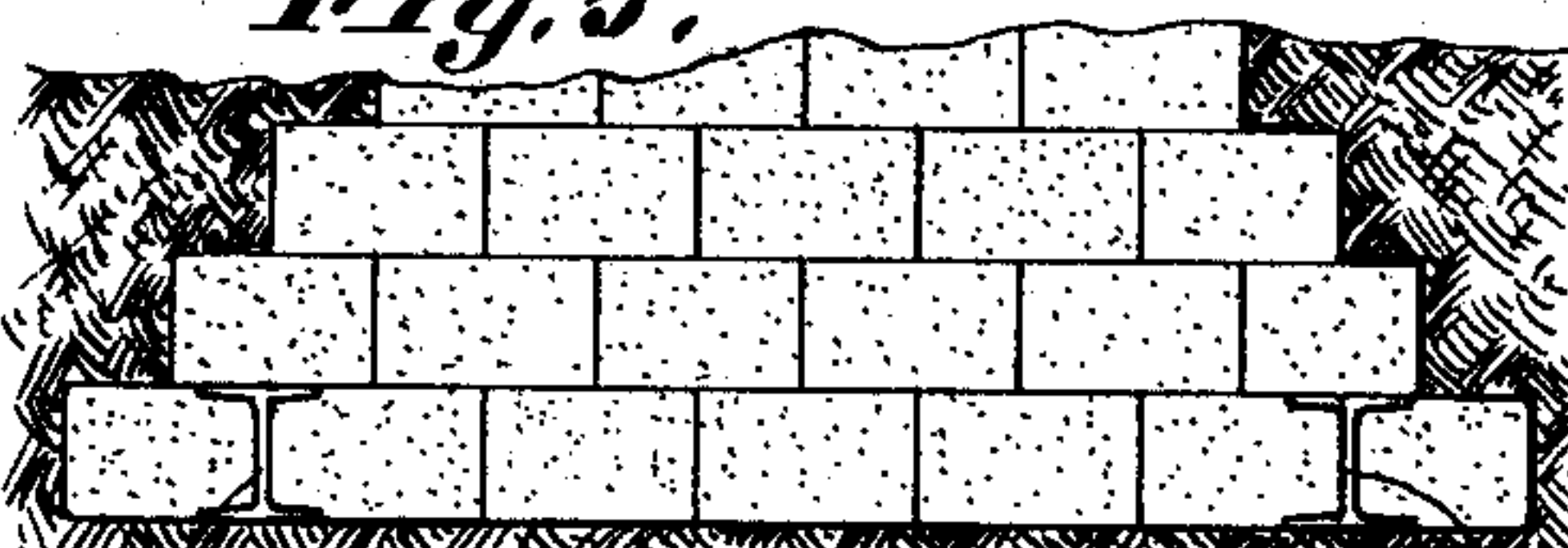


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 11.

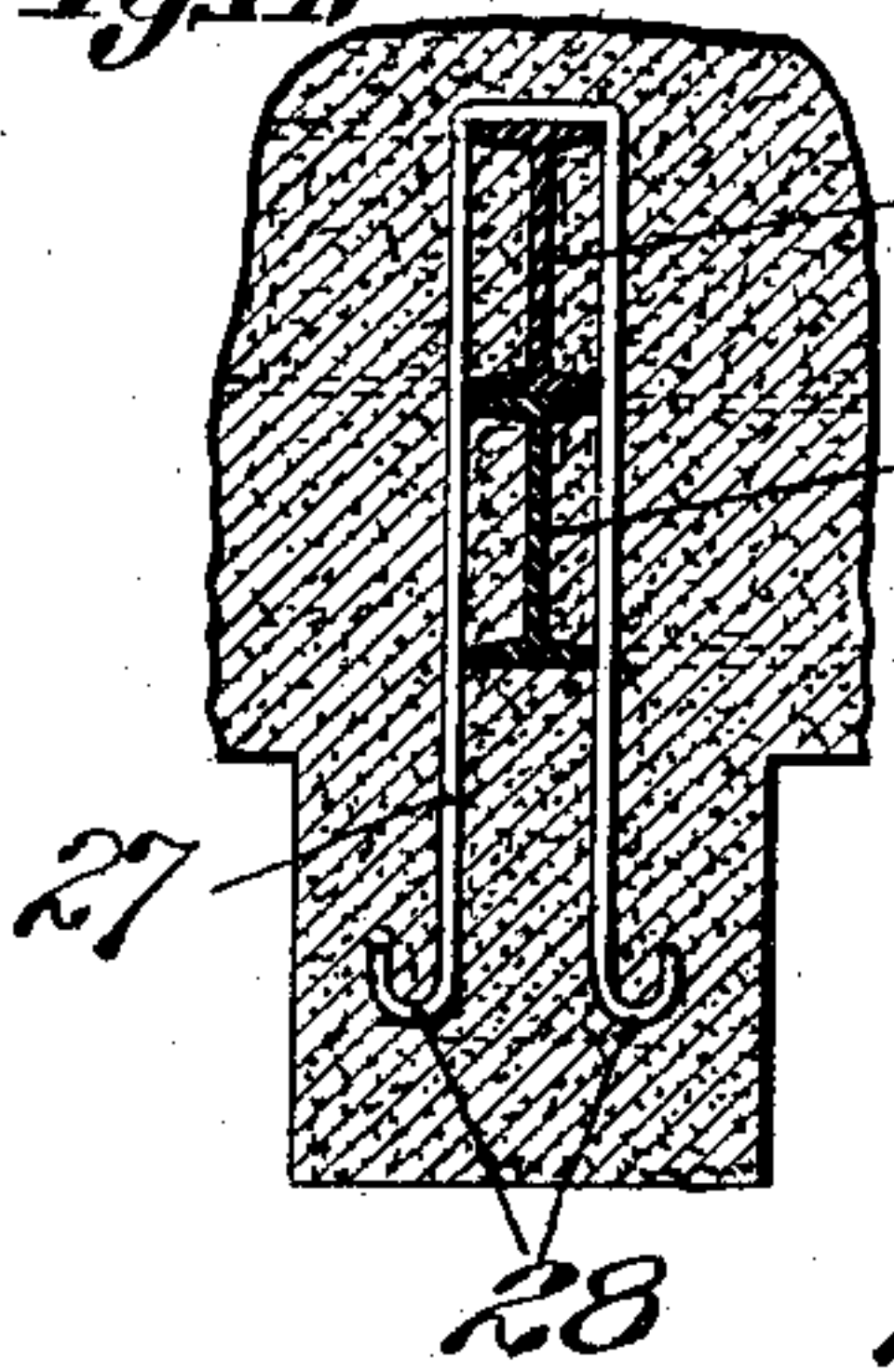


Fig. 6.

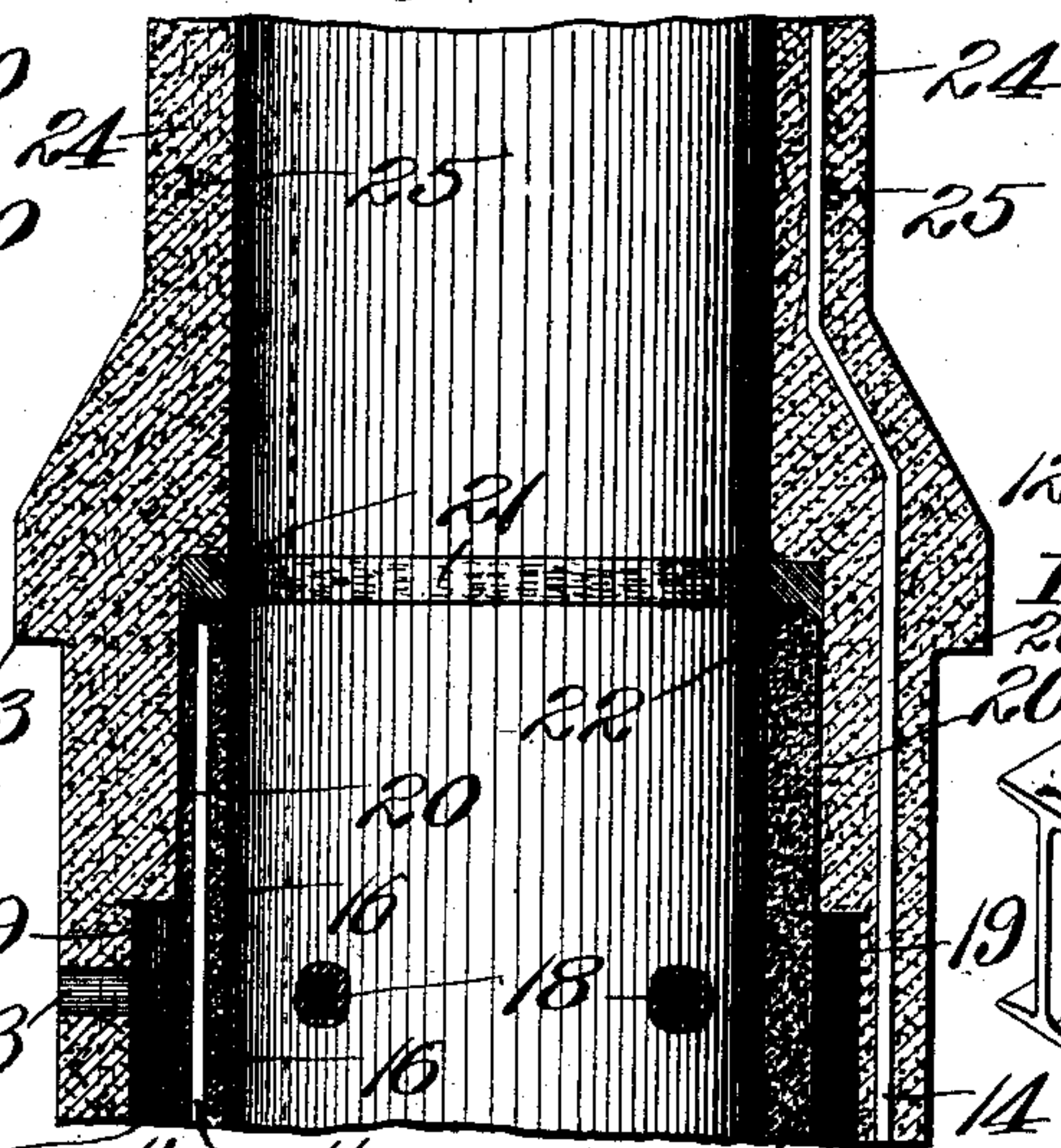


Fig. 9.

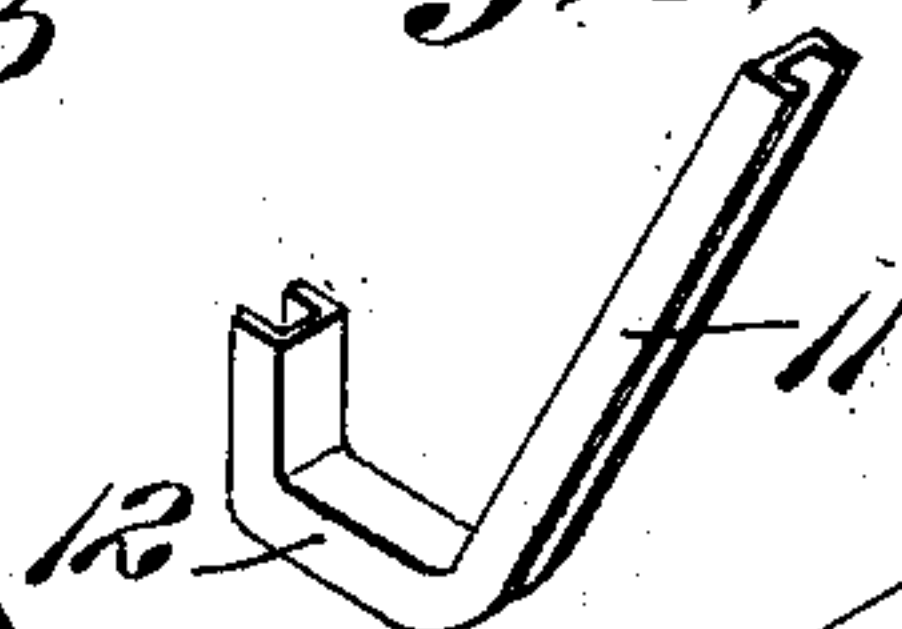


Fig. 10.

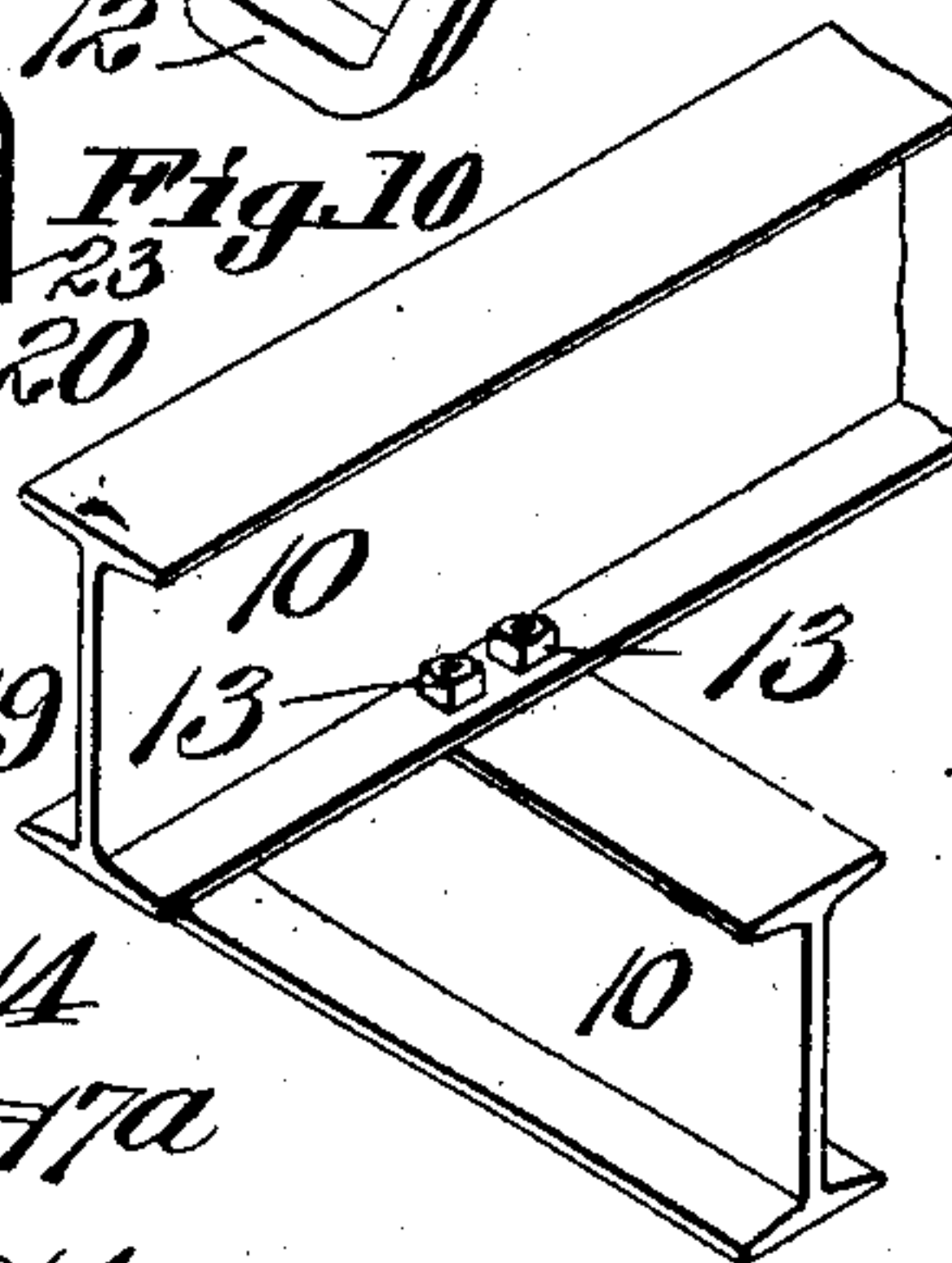


Fig. 8.

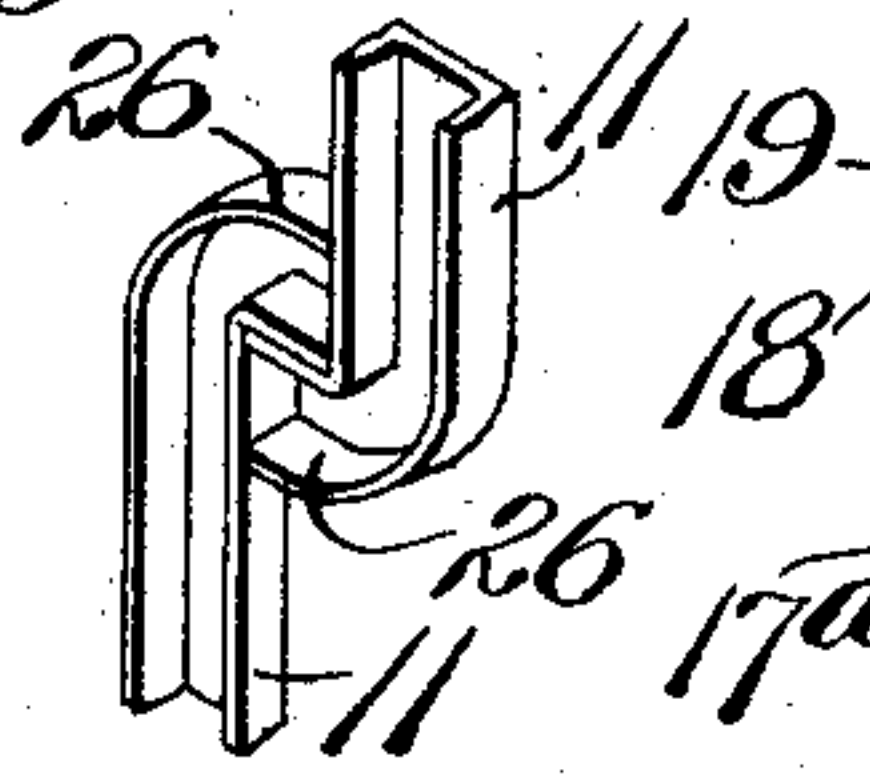
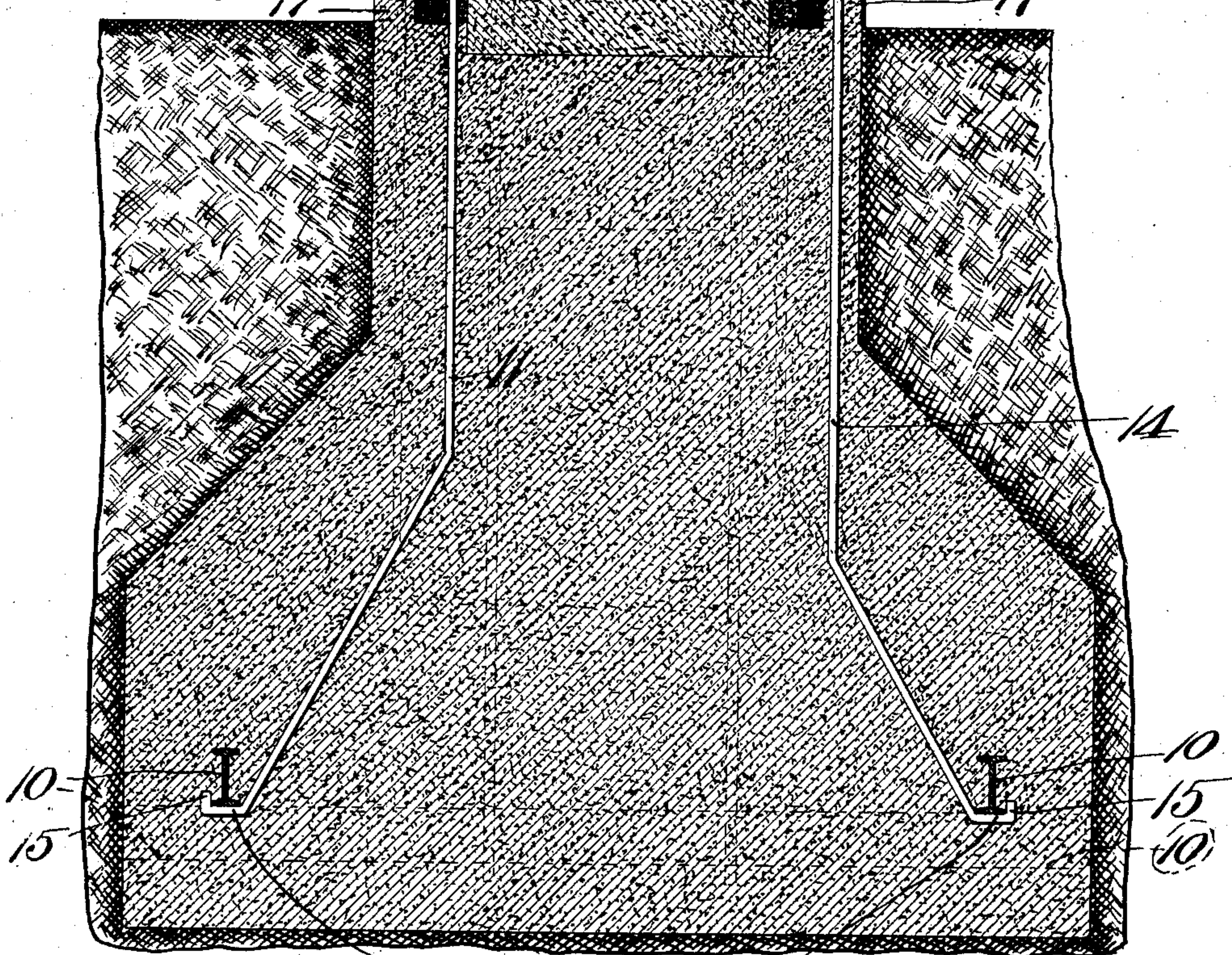


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN V. BOLAND, OF ST. LOUIS, MISSOURI.

CHIMNEY.

No. 907,101.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed December 22, 1906. Serial No. 349,147.

To all whom it may concern:

Be it known that I, JOHN V. BOLAND, a citizen of the United States, residing at St. Louis, Missouri, have invented a new and useful Chimney, of which the following is a specification.

This invention relates to chimneys, and more particularly to that class of chimneys comprising a reinforced monolithic wall structure and a reinforced base; and the object of the invention is to produce a chimney comprising a suitable base structure in which is embedded a frame, and a wall structure rising above the base and having a series of reinforcing members embedded therein and attached at their lower ends to the frame in the base, and a section of elastic material embedded in the wall structure so that the parts of the wall near the outer and inner surfaces may yield relatively without breaking the wall structure.

A further object is to produce a chimney of type referred to comprising two concentric walls separated by an intervening air space opening to the exterior at its upper and lower ends, said two walls uniting and forming a single wall above said air space, and the inner wall embedding a section of elastic, or expansive and compressible, material, so that the inner and outer walls may expand or contract relatively without breaking the wall structure.

Another object is to provide a monolithic chimney wall structure mounted upon a strong base and have a multiplicity of connected reinforcing bars extending into the base and being there fastened to a rigid base frame, thereby making a structure such as will withstand the shocks and forces of storms, earthquakes and like destroying forces.

Other objects and advantages will become obvious from the following description, reference being made to the accompanying drawing wherein I have shown one form of my invention and in which:

Figure 1 is an elevation of a finished chimney constructed in accordance with my invention. Fig. 2 is a cross sectional view taken approximately on the line 2—2 of Fig. 1. Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 1. Fig. 4 is a sectional view of a portion of the wall structure showing, in section, one of a multiplicity of rings which are embedded in the walls. Fig.

5 is a view of a portion of a base constructed of separate bodies or blocks which might be used instead of a monolithic concrete base. Fig. 6 is a vertical section of the wall structure at the upper end of the air space, showing the arrangement of the elastic material in the walls. Fig. 7 is a similar sectional view of lower portion of the wall structure and of the base. Fig. 8 is a perspective view of the joined ends of two of the upright reinforcements. Fig. 9 shows the means whereby the upright reinforcements are joined or fastened to the base frame to provide maximum strength in order to resist the forces of storms, earth vibrations, etc. Fig. 10 shows the base frame parts fastened together. Fig. 11 shows a type of anchor or auxiliary reinforcement that may be used in connection with the base.

In practicing this invention an excavation of suitable dimensions is made in the ground and a quantity of concrete (as illustrated in Fig. 7) is spread over the bottom of the excavation. A frame, comprising a rectangular series of metal beams 10, is placed in the excavation, the ends of certain of said beams resting upon others thereof. An inner annular series of upright metal beams 11 are provided with hooks 12 on their lower ends, which hooks engage under the beams of the base frame, thereby bracing the superstructure against damage from storms, earth vibrations and the like. The metal beams 10 are preferably of the flanged type and have bolts or rivets 13 extending through holes in the flanges and fastening the beams rigidly together, all of which tends toward maximum strength. The inner annular series of upright beams 11 are surrounded by an outer annular series 14, which are also fastened to the base frame by means of hooks 15. The hooks on the various uprights engage firmly upon the base frame so that there can be no movement thereof relative to the base frame after the excavation is filled with the embedding material.

The excavation is filled with concrete level or approximately level with the ground, making a firm monolithic foundation. An inner wall structure 16 rises above the base embedding the annular series of uprights 11. This inner wall is composed of a mixture of approximately two-fourths burnt clay, one-fourth raw milled clay, and one-fourth cement, as ingredients. Such a wall with-

stands the damaging effects of heat and of variations of thermic conditions to a maximum degree, and is much better and more enduring than concrete. An outer concrete wall structure 17 surrounds the inner wall and embeds the outer annular series of uprights 14, said two walls being concentric, and there being an annular air space 17^a separating said two walls. Through the outer wall near the upper and lower ends of the air space a series of air holes 18 are formed through which cooling currents of air may circulate to prevent overheating of the inner wall. The two walls are built up to a suitable height and the air space 17 is closed by a bridge 19, of metal or other suitable material. The inner wall 16 is then extended a suitable distance above the bridge and is encircled by a sleeve 20, of non-combustible elastic or yielding material such, for instance, as asbestos and the outer wall of concrete is built against said sleeve thereby embedding the latter in the single wall structure so formed (Fig. 6). At the upper extremity of the elastic and yielding sleeve 20 an annular section 21 of elastic material such, for instance, as asbestos is embedded in the wall structure extending from the end of the sleeve to the inner surface of the chimney. The periphery of said annular section 21 is turned down as indicated at 22 to hold it from creeping out during varying thermic conditions of the chimney. The inner series of uprights 11 terminate below the section 21 while the outer series converge toward the axis of the chimney just above the section, as shown in Fig. 6. A strengthening ledge 23 is formed integral with the wall structure at the point of this union of the two walls, and above the ledge a single wall 24 rises to the desired altitude embedding and being reinforced by the extended uprights. The uprights are encircled at intervals by rings 25 which hold them in proper relation and serve as guides in adjusting them.

The uprights in each series are of divers lengths. When the end of any of the uprights is reached in building up the wall another upright is connected to the end of the one embedded by interlocking hooks 26, which tend toward greater strength and rigidity of the finished structure.

In some instances bracing or reinforcing anchors may be utilized in connection with the base. One form is shown in Fig. 11 in which a strap comprising two arms 27 is placed over the ends of the beams 10, the ends of the strap extending downward and having hooks 28 on their lower ends. These straps may be located at the corners of the base frame or elsewhere just as preferred or most desirable and, in either instance, extend considerable distance below the base in special holes formed for their reception. These holes are filled with concrete after the straps

are located, thereby strengthening and bracing the entire structure against inclination caused by soft or yielding ground.

An opening 29 affords ingress for the smoke through any suitable flue or conduit leading from the furnaces, said opening being below the top of the inner wall so that there may be a reduction of intensity of heat before encountering the concrete upper wall.

A chimney constructed in accordance with the above description is a strongly reinforced monolithic structure, being integral from base to top. The reinforcing beams being attached to the base frame, and the various beams being attached to others continuing to the top, make a rigid structure which will, to a maximum degree, withstand nature's destructive forces. The elastic and yielding material embedded within the wall structure allows for varied expansion or creeping of the different parts of the chimney without resulting in cracks or breaks and without damaging weakness to the wall. There can be relative expansion, or contraction, and other movements, between the outer and inner walls under the varying atmospheric and thermic conditions to which they are subject and exposed, without the consequent separation or weakening heretofore sometimes encountered.

The base of the chimney may be constructed of blocks or bodies of concrete or other material as indicated in Figs. 1 and 5. These blocks or bodies may be disposed in such way as to embed the beams 10 and the lower ends of the uprights the same as the concrete. Either construction may be used as conditions demand or individual preferences may determine.

I am aware that there may be variations in arrangement and details of construction without departing or varying from the scope of the invention. I do not restrict myself to inessential or unnecessary features but

What I claim and desire to secure by Letters Patent is:

1. A chimney comprising two substantially concentric walls, a yielding connecting element extending to and forming part of the inner surface of the chimney at the upper end of the inner wall and forming an air tight joint and integral connection with the outer wall and permitting said two walls to expand and contract, relatively, without breaking, and a single wall rising above said two walls, substantially as and for the purpose specified.

2. A chimney comprising two substantially concentric, walls, a sleeve of an elastic element encircling the upper end of the inner wall and being embedded between said two walls, an annular section of elastic material at the upper extremity of said sleeve extending to the inner surface of the chimney, and a single wall rising above said two walls, substantially as and for the purpose specified.

3. A chimney comprising two substantially concentric walls, a bridge connecting said two walls near their upper ends, the outer wall being built inwardly over and on
5 said bridge, a sleeve of an elastic element separating the two walls above said bridge and forming an air tight joint, a section of elastic material embedded in the wall structure above the sleeve, and a single wall rising
10 above said two walls, substantially as and for the purpose specified.

4. A chimney comprising two substantially concentric walls, metal beams embedded in said walls, a sleeve of an elastic element encircling the upper end of the inner
15 wall and being embedded between said two walls, a section of elastic material at one extremity of said sleeve extending toward the inner surface of the chimney, and a single
20 wall rising above said two walls, substantially as and for the purpose specified.

5. A chimney comprising an annular series of upright metal beams, an inner concrete wall embedding said metal beams, an outer
25 wall surrounding said inner wall, a bridge connecting said two walls near the upper end of the inner wall, a single wall rising above said two walls and being integral with the outer wall, and a section of elastic material
30 forming an integral connection between the upper end of the inner wall and the lower end of the said single wall and forming a surface which is continuous with the inner surface of the inner wall and the single wall, substan-
35 tially as and for the purpose specified.

6. A chimney comprising, in combination with a base, the lower section having double walls forming an interposed air-space open to the atmosphere near its upper and lower ends
40 and composed, as to the outer wall, of upright metal beams anchored in and rising from said base and concrete embedding said metal beams, and as to the inner wall, of

metal beams anchored in and rising from said base with concrete embedding them, and the
45 upper section formed of a single wall composed of extensions of the upright beams of the outer wall and concrete embedding said extensions, and a section of elastic material forming an integral connection between the
50 upper end of the inner wall and the lower end of the single upper wall whereby said inner and outer walls may expand and contract relatively without breaking, said elastic material forming a surface which is continuous
55 with the inner surface of the inner wall and the single wall.

7. A chimney comprising, in combination, a base formed of metal beams embedded in foundation material and a flue-forming wall
60 structure having a double-walled lower section forming an interposed air-space and composed, as to the outer wall, of upright metal beams anchored in and rising from said base and concrete embedding said beams, and as
65 to the inner wall, of metal beams anchored in and rising from said base with wall-forming material embedding them, and a single-walled upper section composed of inwardly-deflected extensions of the upright beams of
70 said outer wall and concrete embedding said extensions, and a section of material having greater elasticity than the wall-forming materials and forming an integral connection between the upper end of the inner wall and the
75 lower end of the upper wall and extending to and forming part of the continuous inner surface of the chimney.

In testimony whereof, I hereunto affix my signature to this specification this 29 day of
80 October 1906, in the presence of two witnesses.

JOHN V. BOLAND. [L. S.]

Witnesses:

J. D. RIPPEY,

F. J. McCASLIN.