

**Feb. 14, 1933.**

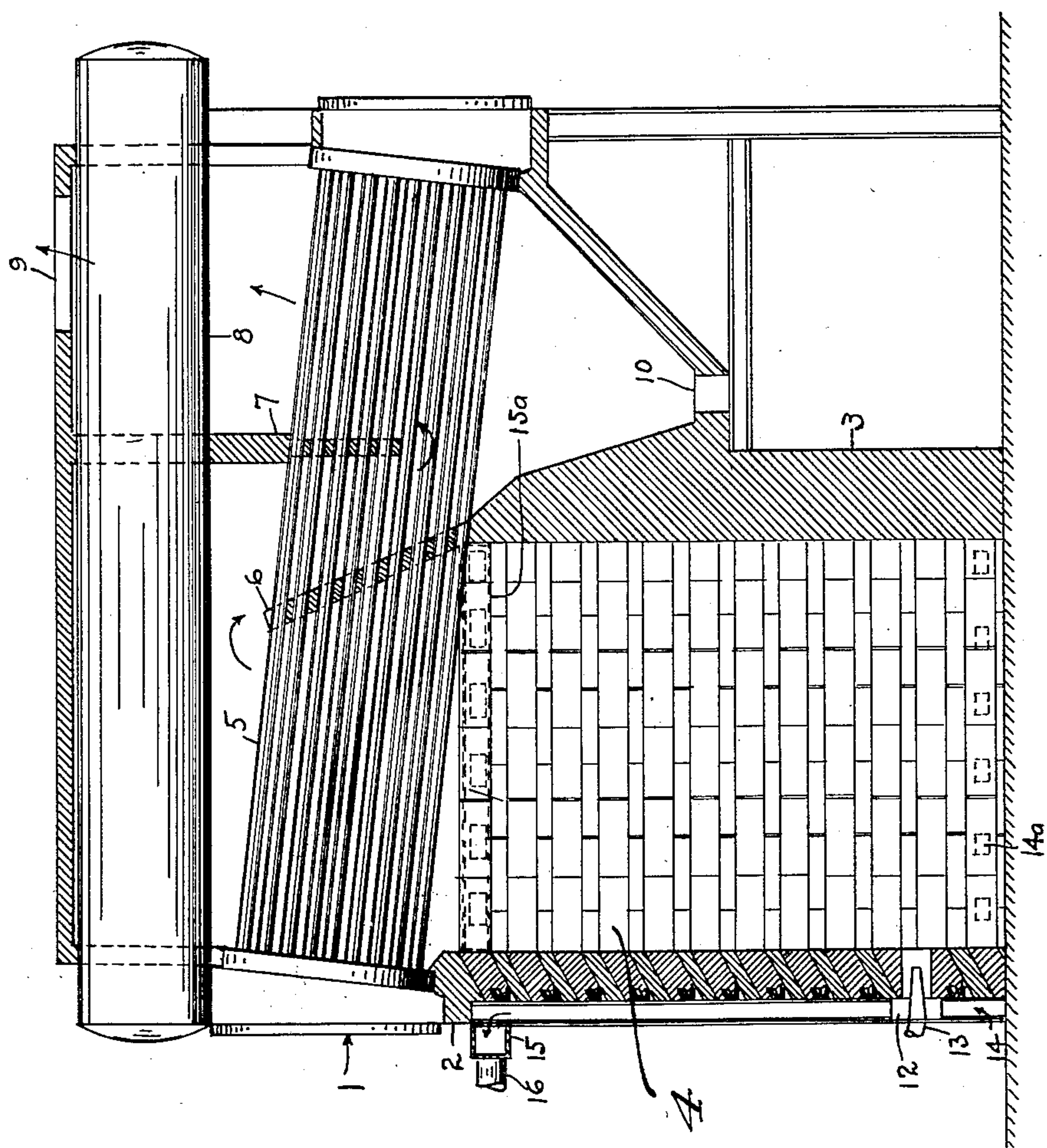
**G. W. DAVEY**

1,897,041

## FURNACE CONSTRUCTION

Filed July 2, 1928

3 Sheets-Sheet 1



**Figure 1**

George W. Davey

INVENTOR

**BY**

Charles A. Clark.

*ATTORNEY*

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G. W. DAVEY

1,897,041

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3 Sheets-Sheet 2

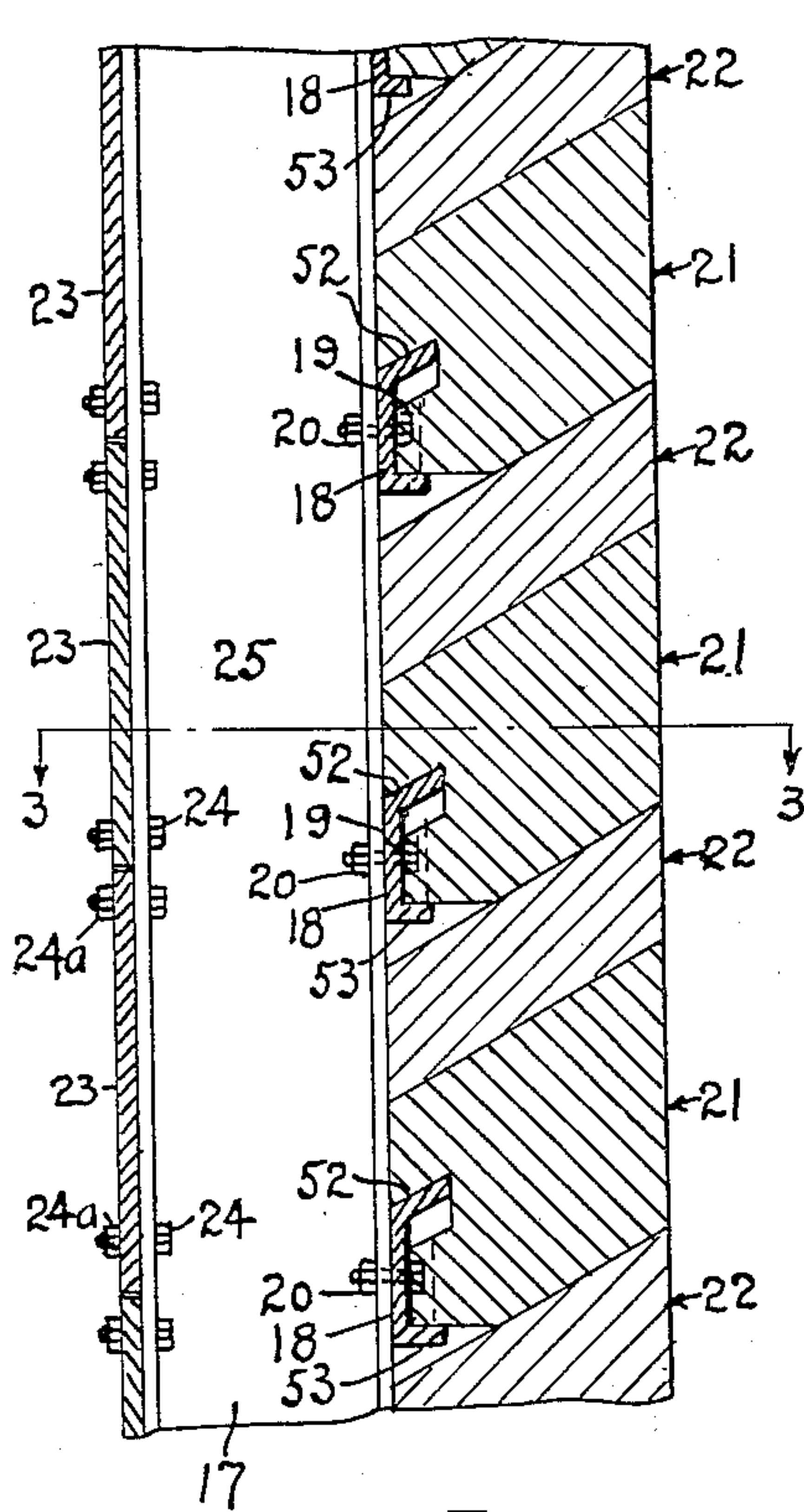


Fig. 2.

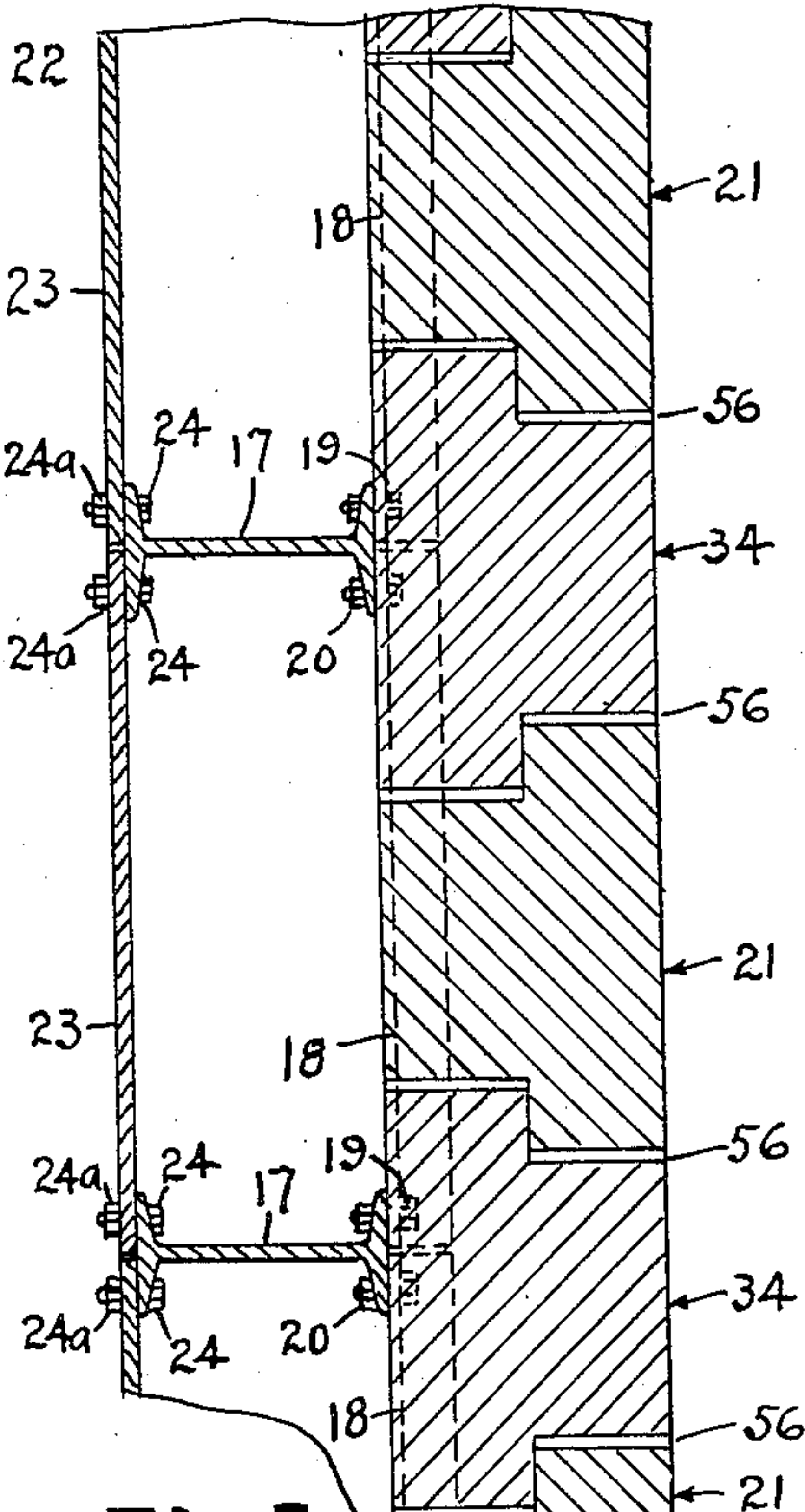


Fig. 3.

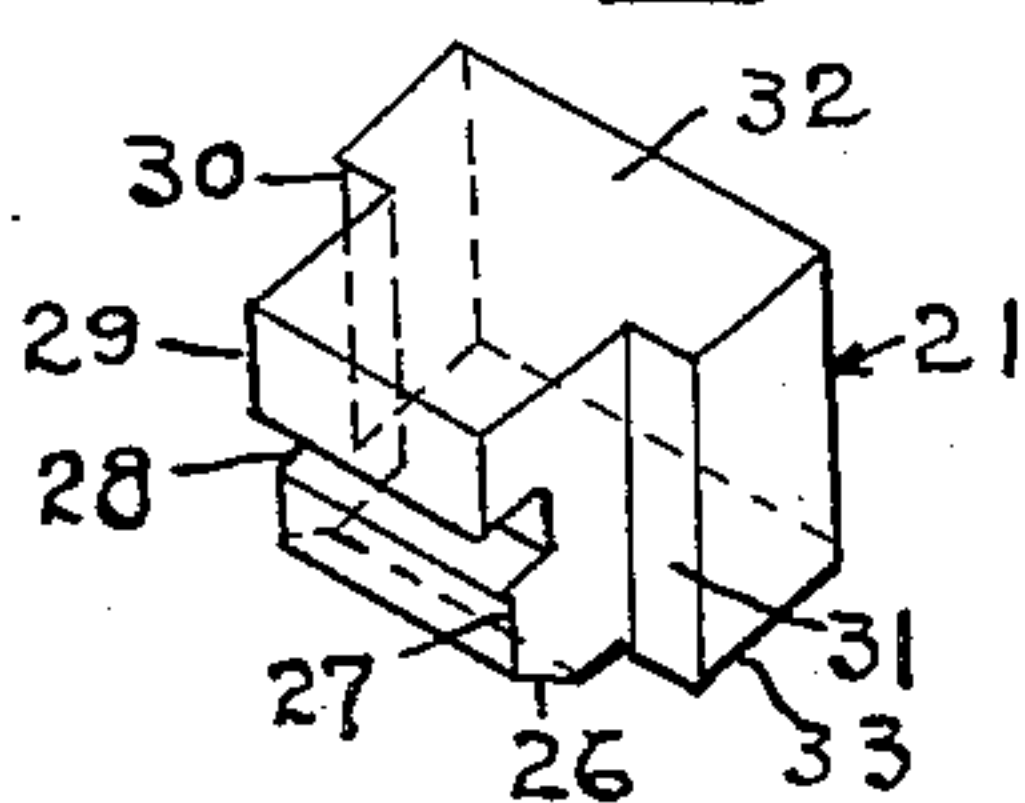


Fig. 4.

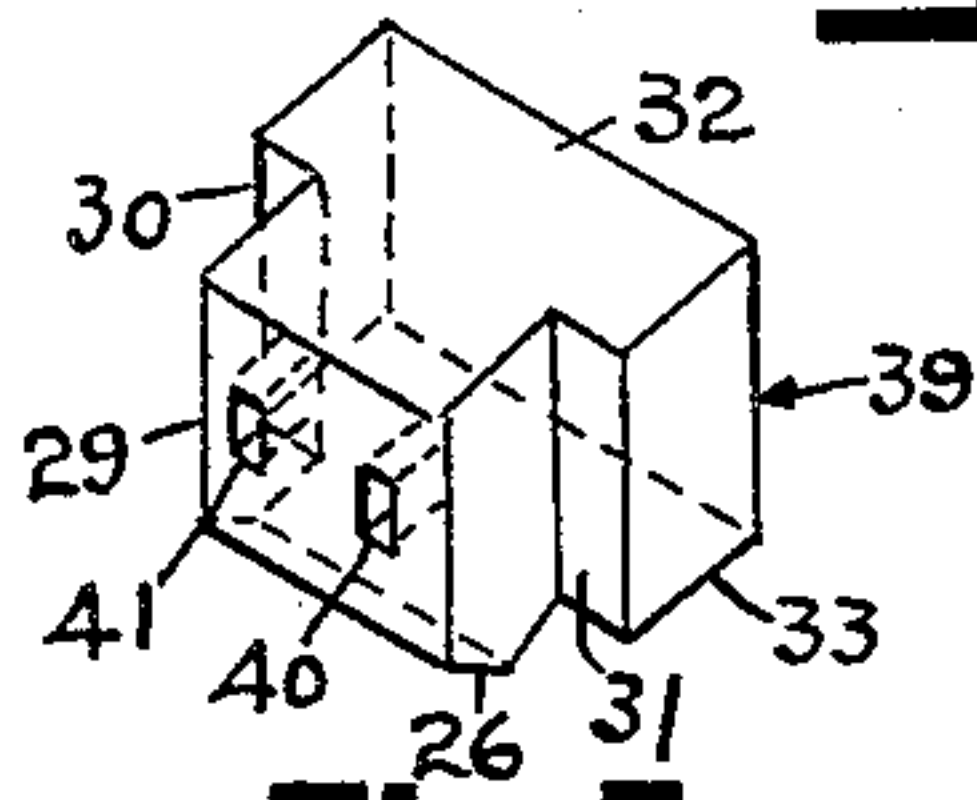


Fig. 5.

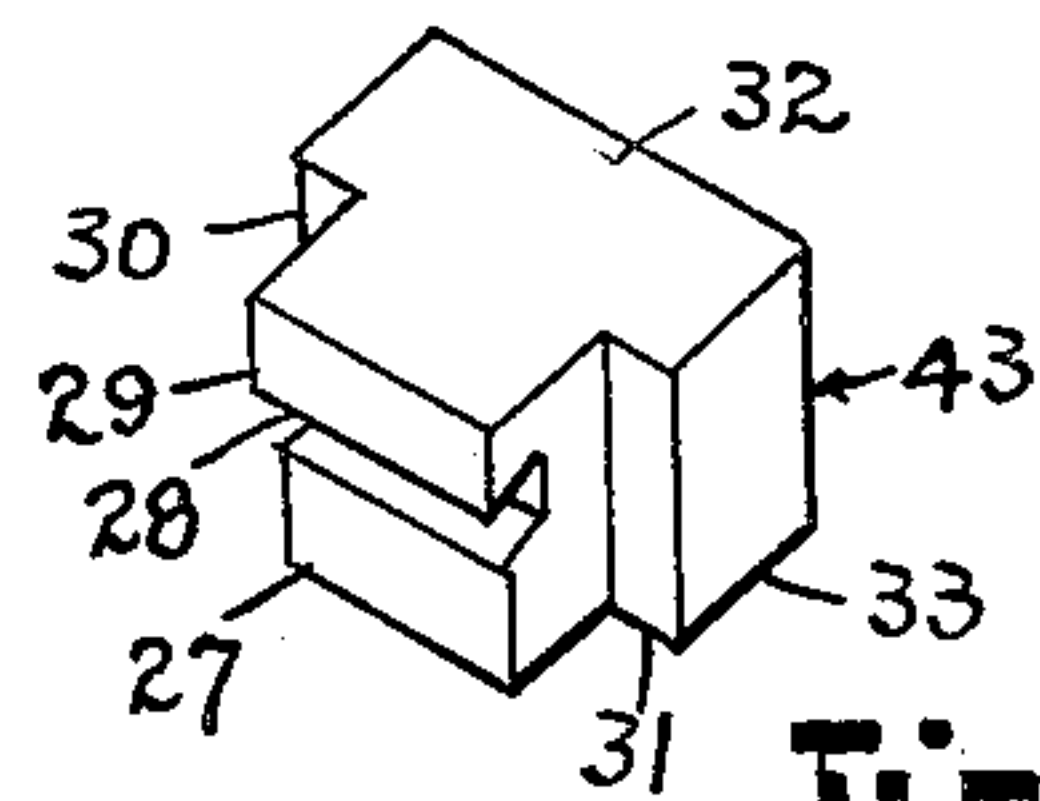


Fig. 6.

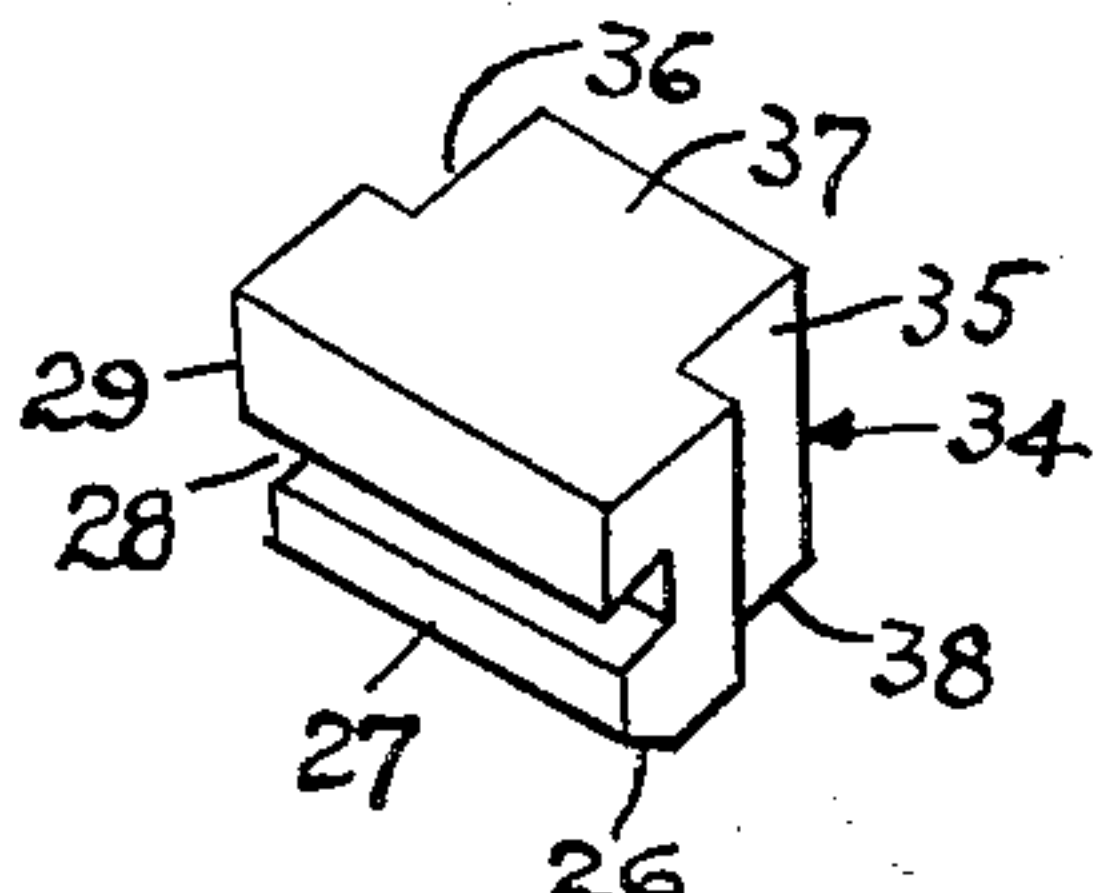


Fig. 7.

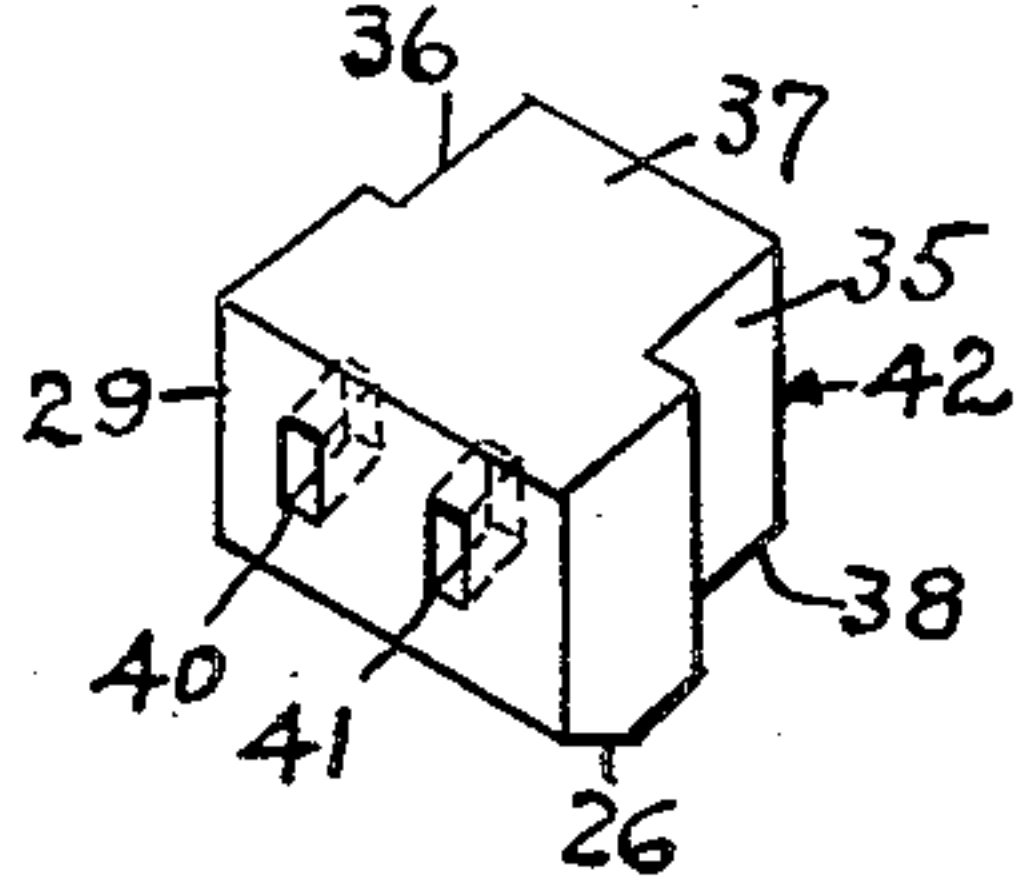


Fig. 8.

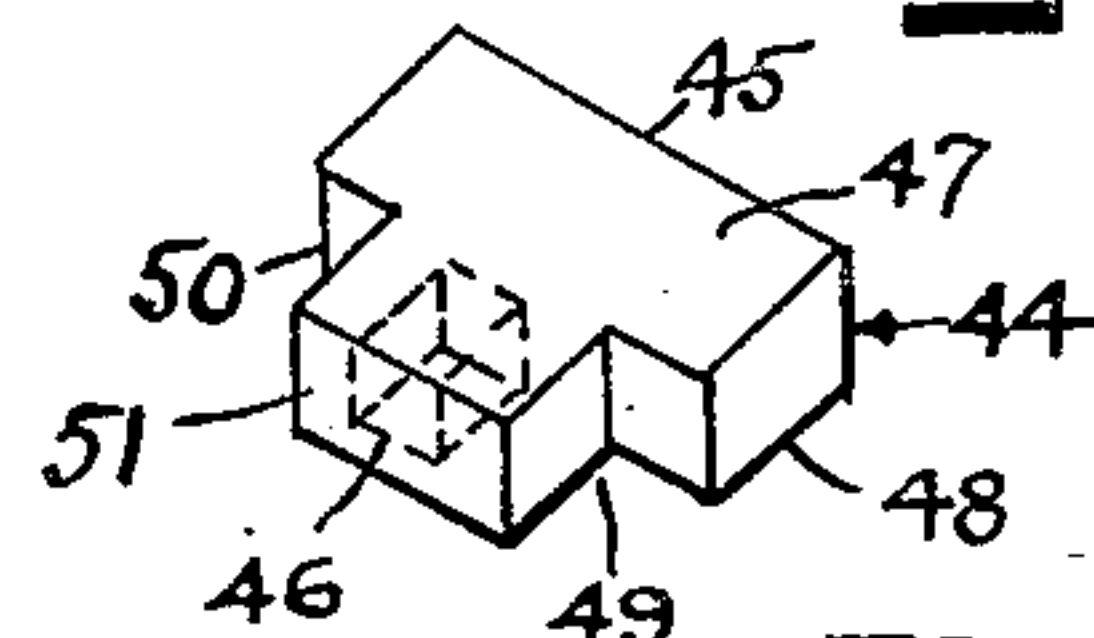


Fig. 9.

George W. Davey  
INVENTOR

BY

Charles A. Clark  
ATTORNEY



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G. W. DAVEY

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FURNACE CONSTRUCTION

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3 Sheets-Sheet 3

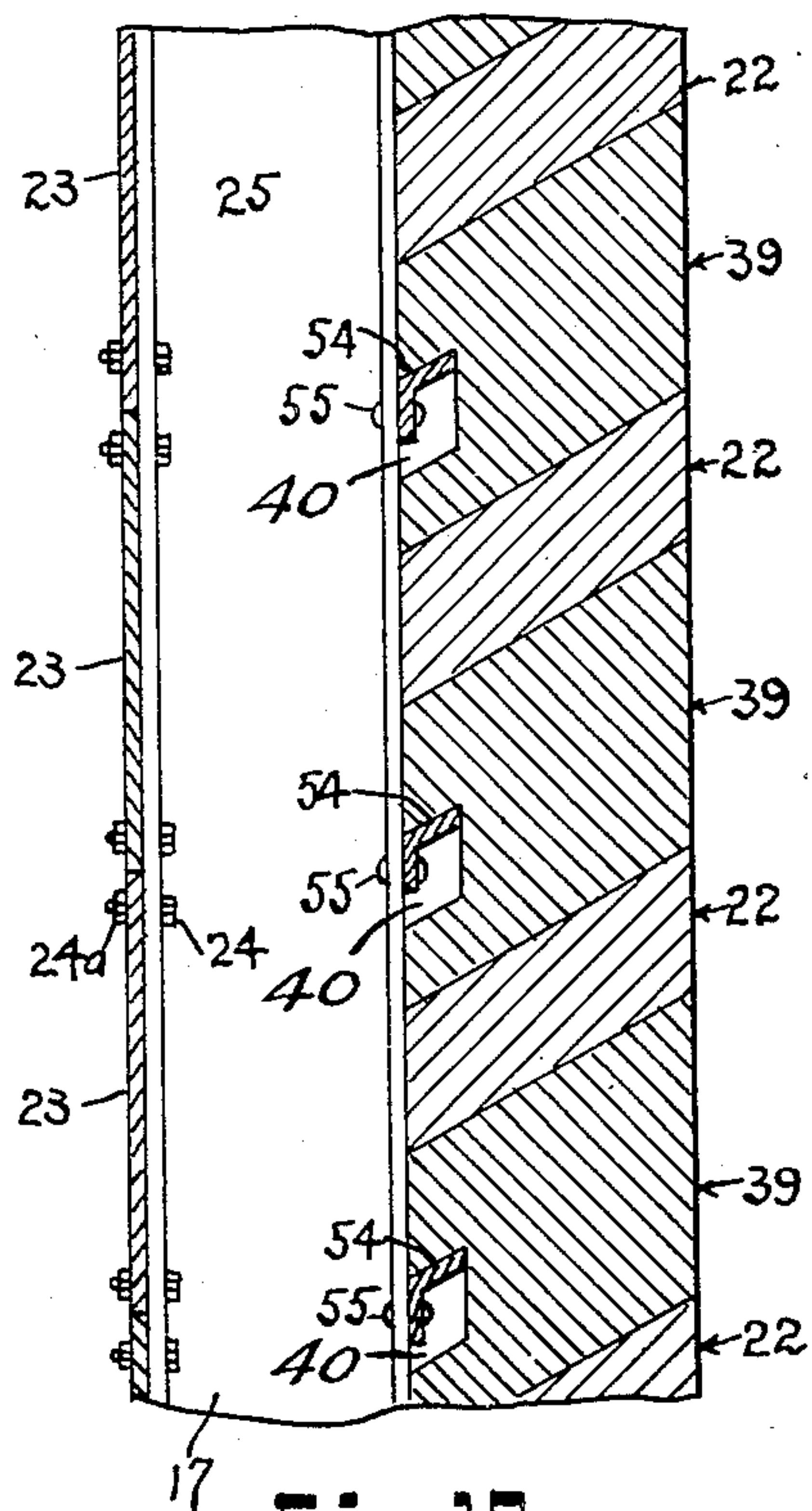


Fig. 10.

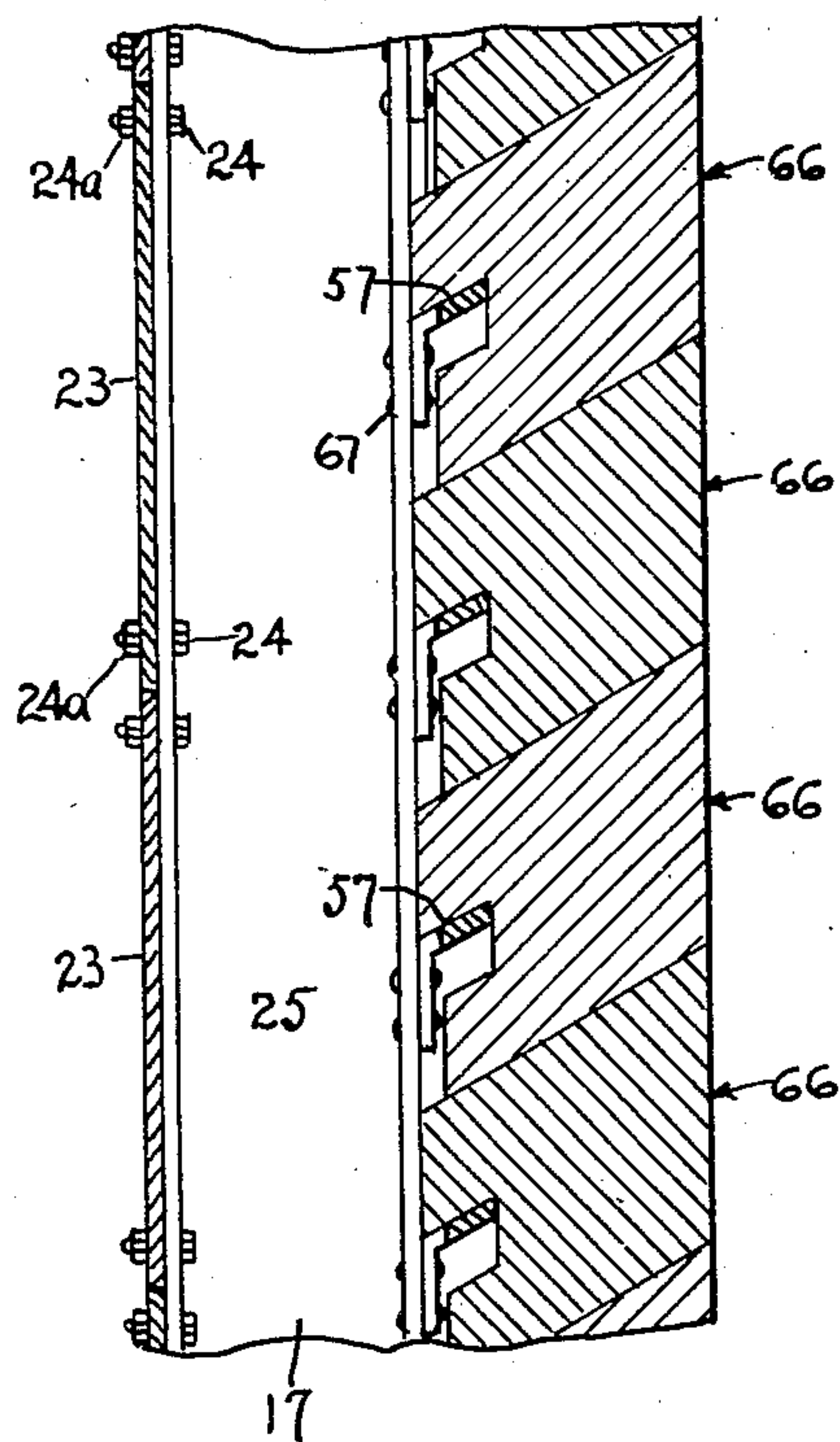


Fig. 11.

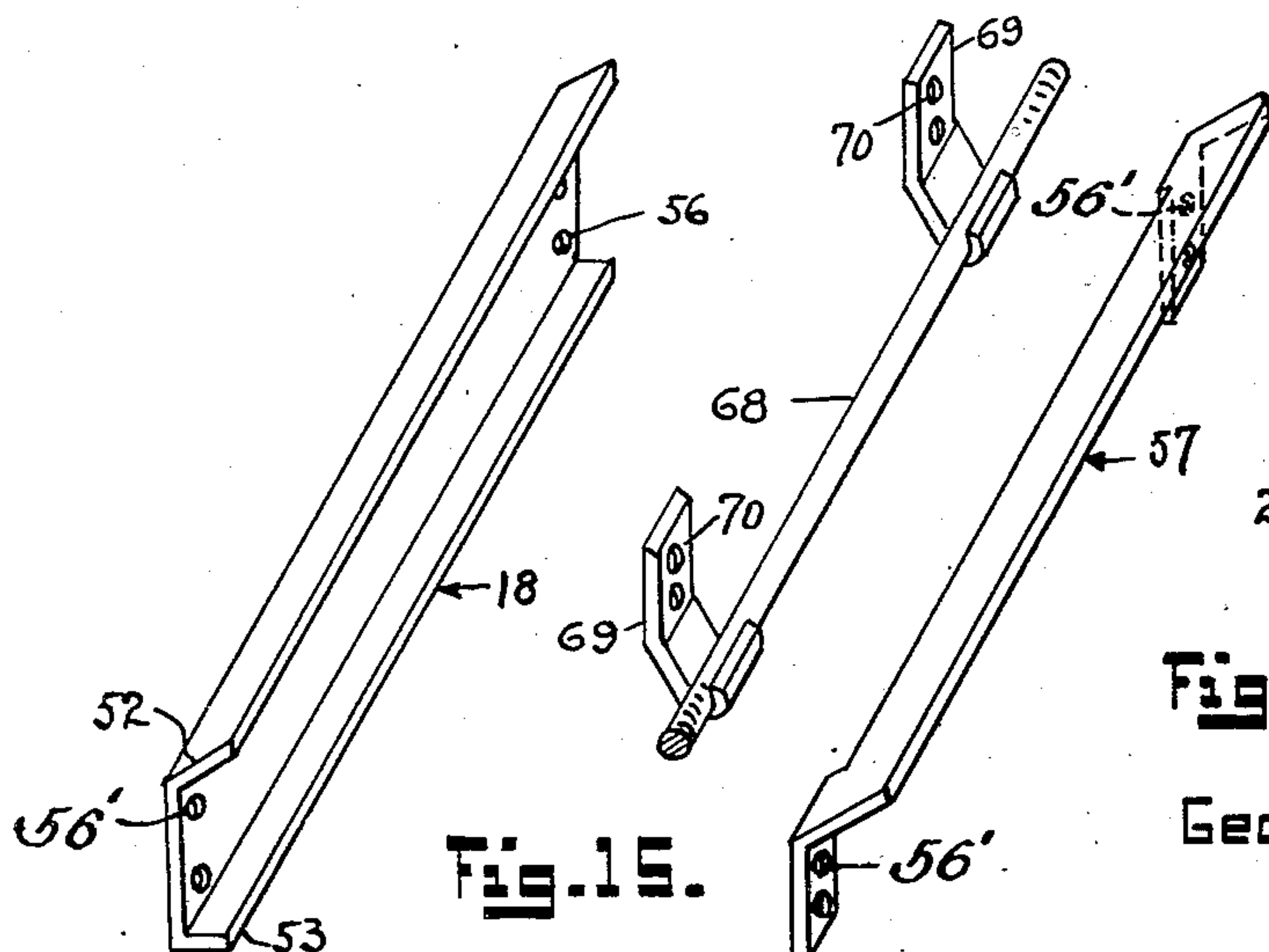


Fig. 12.

Fig. 13.

Fig. 14.

BY

Charles A. Clark.

ATTORNEY

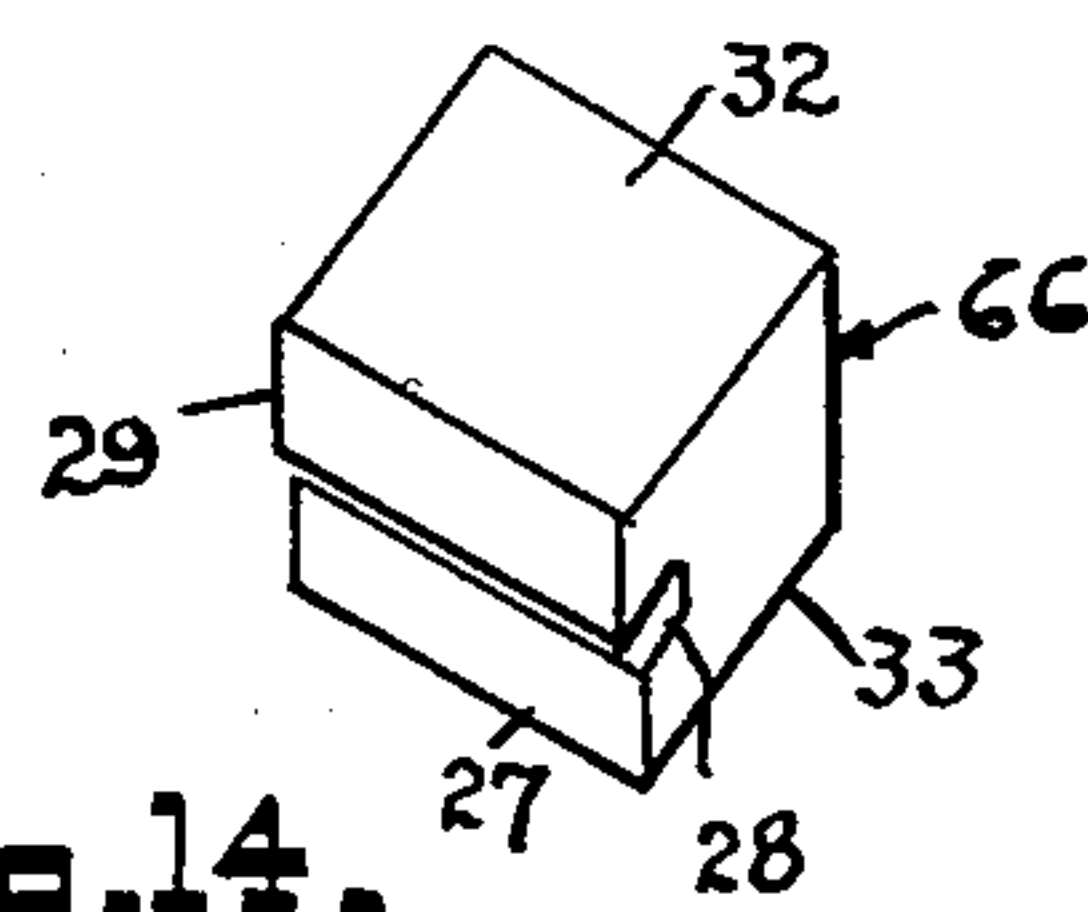


Fig. 15.

George W. Davey  
INVENTOR



# UNITED STATES PATENT OFFICE

GEORGE W. DAVEY, OF MAHWAH, NEW JERSEY

## FURNACE CONSTRUCTION

Application filed July 2, 1928. Serial No. 290,014.

My invention relates to furnace construction and refers more particularly to a unit or segmentally supported wall that is maintained positioned by gravity.

One object of my invention is to provide a framework for a furnace comprised of a series of buckstays, upon which are held a series of brackets adapted to hold firebrick.

Another object of my invention is to provide a furnace wall wherein the firebrick constituting the wall are held positioned by gravity.

A further object of my invention is to provide a furnace wall wherein the firebrick constituting the wall are substantially diamond shaped.

A still further object of my invention is to provide a unit or segmentally supported wall that can be easily repaired from the outside of the furnace.

Still another object of my invention is to provide a unit or segmental furnace wall wherein any part of the furnace wall can be easily repaired without interfering with any other portion of the wall.

Another valuable feature of my invention resides in the method of construction whereby the back of the wall may be cooled by passing air into the bottom of the space between the buckstays and taking it out at the top.

A further valuable feature of my invention resides in the combination of a series of buckstays holding a single furnace wall on one side by unique brackets and holding a series of detachable doors on the other side.

A still further valuable feature of my invention consists of the particular construction of a furnace wall wherein the labor cost is reduced, the furnace construction simplified and the wall may be built up with unskilled labor.

It is obvious that any portion of a wall or a complete wall may be constructed by utilizing this method of construction.

With these and other objects in view, I accomplish these results by the means shown in the accompanying drawings, which illustrate the preferred embodiment of my invention, wherein similar numerals refer to

like parts throughout the several views, in which:—

Figure 1 is a longitudinal section of a furnace illustrating the application of the wall to one type of furnace.

Figure 2 is a partial detailed vertical section of the wall.

Figure 3 is a partial detailed horizontal section of the wall taken on the line 3—3 of Fig. 2.

Figure 4 is an isometric view of one of the blocks with a supporting groove.

Figure 5 is an isometric view of a complementary block with a supporting groove.

Figure 6 is an isometric view of one of the blocks with supporting holes.

Figure 7 is an isometric view of a complementary block with supporting holes.

Figure 8 is an isometric view of another of the blocks with a supporting groove.

Figure 9 is an isometric view of the intermediate block.

Figure 10 is a partial vertical section of the wall utilizing an oblique angle.

Figure 11 is a partial vertical section of the wall utilizing the part shown in Figure 13.

Figure 12 is an isometric view of the support shown in Figures 1 and 2.

Figure 13 is an isometric view of the support shown in Figure 11.

Figure 14 is an isometric view of the block shown in Figure 11.

Figure 15 is an isometric view of another form of support.

The furnace 1 is comprised of a front wall 2, a bridge wall 3, and side walls, one of which is shown by 4, boiler tubes 5, baffles 6 and 7, drum 8, outlet to stack 9, ash cleanout opening 10, air box 12 and a burner 13, which may be oil or pulverized coal.

The air may circulate in the front wall through the inlet 14, passing upwardly into the manifold 15, and taken therefrom to any desirable place by the pipe 16, and the air in the side walls may enter the wall through the inlets 14a and pass into the manifold 15a, similar to the manifold 15 and the air may be utilized therefrom as desired.

The structure is comprised of a plurality of I beams 17, to which a series of brackets 18



are held by the bolts 19 and nuts 20, each bracket supporting courses of bricks 21, said brackets spaced when desired to provide for a filler block 22 therebetween and on the

5 outside of these buckstays or I beams 17 is bolted a series of doors 23 by the bolts 24 and nuts 24a, so that when the wall is completed, the space 25 will provide an air space for circulating air behind said wall.

10 The block 21, seen in Figs. 1 and 2, and shown in detail in Fig. 4 is provided with a flat seat 26, a recessed part 27, an upwardly sloping groove 28, a projecting portion 29, and notches 30 and 31, the parts 27 and 29, 15 being at right angles to the surface 26, and the top 32 and bottom 33, sloped upwardly parallel to the groove 28.

The blocks 34, shown in Figure 5 are each provided with the same flat seat 26, recessed 20 part 27, upwardly sloping groove 28, a projecting part 29, and the notch 35, which engages a corresponding notch 30 of the block 21, and a notch 36 adapted to engage with a notch 31 of the block 21, the top surface 37 and bottom surface 38, being similar to the parts 32 and 33 in block 21.

The block 39, shown in Figure 6, is similar to the block 21, shown in Figure 4, except that the wall 29 is deeper, the recessed part 27 30 eliminated, and the slot 28 replaced by the upwardly sloping pockets 40 and 41.

The block 42, shown in Figure 7, is similar to the block 34, shown in Figure 5, except that the wall 29 is deeper, the recessed part 27 eliminated and the notch 28 replaced by the upwardly sloping pockets 40 and 41.

The block 43, shown in Figure 8, is similar to the block 21 shown in Figure 4, except that the part 26 is done away with; otherwise it is exactly the same and bears the same numerals.

The intermediate block 44, shown in Figure 9 has a front surface 45 and a back surface 46 paralleling each other, a top surface 47 and bottom surface 48 sloping upwardly and the notches 49 and 50, and when the blocks 39 and 42, are used the pocket 51, as shown by the dotted lines in Figure 9, is provided.

In Figures 2 and 3, the structure shown comprises the buckstays 17, supporting on one side the brackets or angle supporting pieces 18 by the bolts 19 and nuts 20, the upwardly projecting angular end 52 55 of the bracket projecting into the groove 28 of the blocks 21 and 34, and the lower right angled shelf 53 holding the blocks 21 and 34 upon the surface 26; and upon the top of the sloping surface 32, of these blocks the blocks 44 are placed, these two types 21, 34 and 44 comprising the only shapes required to build up a wall or the wall may be built up without the use of these intermediate blocks at all.

In Figure 10 the blocks 39 and 42, shown

in Figures 6 and 10, are used, the upward sloping pockets 40 and 41 engaging with upward sloping angles 54 held to the buckstays 17 by the rivets or bolts 55.

The blocks preferably have the notches 30, 31, 35, 36, 49 and 50 to provide for the expansion spaces 56, (see Fig. 3) to take care of the lateral expansion of the wall, the vertical expansion being taken care of by the pockets 28 or 40 and 41, depending upon the type of 75 block utilized.

In Figure 12 one form of unit or segmental wall supporting element is shown illustrating the parts 52 and 53 and the holes 56', for bolting to the I beams 17, as illustrated in Figures 2 and 3. 80

In Figure 13 another form of unit or segmental wall supporting element 57 is shown, wherein the bolting holes 56' are the same as shown in Figure 12 and the assembly of this 85 form is shown in Figure 11 wherein the elements 57 are shown riveted to the I beams by the rivets 67.

In Figure 14 the blocks 66 illustrated therein are the ones utilized in Figure 11, wherein 90 the parts 27, 28, 29, 32 and 33, are the same as corresponding parts of blocks previously described, this block, however, having no lateral notches or shoulders like those shown in Figures 4 to 9 inclusive. 95

In Figure 15 the alternate support shown is comprised of a rod or pipe 68 which may be held to the buckstays 17 by means of the offset supports 69 that are provided with bolt 100 holes 70 for bolting to the said buckstays.

Having thus described and illustrated the preferred embodiment of my invention I do not wish to limit myself to the exact construction or arrangement of parts shown, since it is evident that modifications may be made 105 therein without departing from the spirit of the invention or scope of the claims.

I claim:

1. A furnace wall structure including in combination, a series of upright buckstays, 110 a series of vertically spaced brick supporting ledges carried thereby, each ledge having an upwardly and inwardly inclined shoulder in the nature of a hook portion, and a plurality of bricks carried by said ledges, the outside 115 face of each brick being formed with a correspondingly inclined pocket adapted to supportingly embrace said hook portion and the upper and lower faces of each brick being likewise correspondingly inclined whereby to 120 permit removal of the bricks on a ledge by bodily motion in the direction of said incline without disturbing bricks on an adjacent ledge.

2. A furnace wall structure including in 125 combination, a series of upright buckstays, a series of vertically spaced brick supporting members carried thereby, and a plurality of bricks carried by said members, the outside face of each brick being formed with an up- 130



wardly and inwardly inclined pocket adapted to supportingly embrace a supporting member and the upper and lower faces of each brick being correspondingly inclined whereby to permit removal of the bricks on a supporting member by bodily motion in the direction of said incline without disturbing bricks on an adjacent member.

3. A furnace wall structure including in combination, an upright buckstay, a plurality of vertically spaced brick supporting members carried thereby, and a brick hung on each member, each such brick, on its face adjacent the supporting member, being formed with a pocket inclined upwardly and away from the supporting member, said pocket being adapted to supportingly embrace the member, and the upper and lower faces of each such brick being correspondingly inclined whereby to permit removal of the brick on one supporting member by bodily motion in the direction of the incline without disturbing the brick on an adjacent member.

4. A furnace wall structure including in combination, an upright buckstay, a plurality of vertically spaced substantially horizontally disposed brick supporting members carried thereby, a plurality of bricks forming a course hung from each member, and filler bricks between such hung courses resting upon the hung course immediately below, each of the bricks in a hung course, on its face adjacent the supporting member, being formed with a pocket adapted to supportingly embrace the member, the upper and lower faces of all of said bricks being inclined upwardly and away from the vertical plane of the wall as a whole whereby to permit removal either of the filler brick without disturbing the hung brick or of hung bricks on one member and the filler bricks supported thereon without disturbing the hung bricks on an adjacent supporting member, such removal taking place by bodily motion in the direction of the incline.

Signed at New York, in the county and State of New York, June, 1928.

GEORGE W. DAVEY.

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