

[54] **COMBINED BODY BOLSTER CENTER FILLER AND CENTER PLATE FOR RAILWAY CARS**

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[52] U.S. Cl. ....105/199 C

[51] Int. Cl. ....B61c 9/48

[58] Field of Search.....105/226, 199 R, 227, 228, 199 C, 105/199 CB; 308/137

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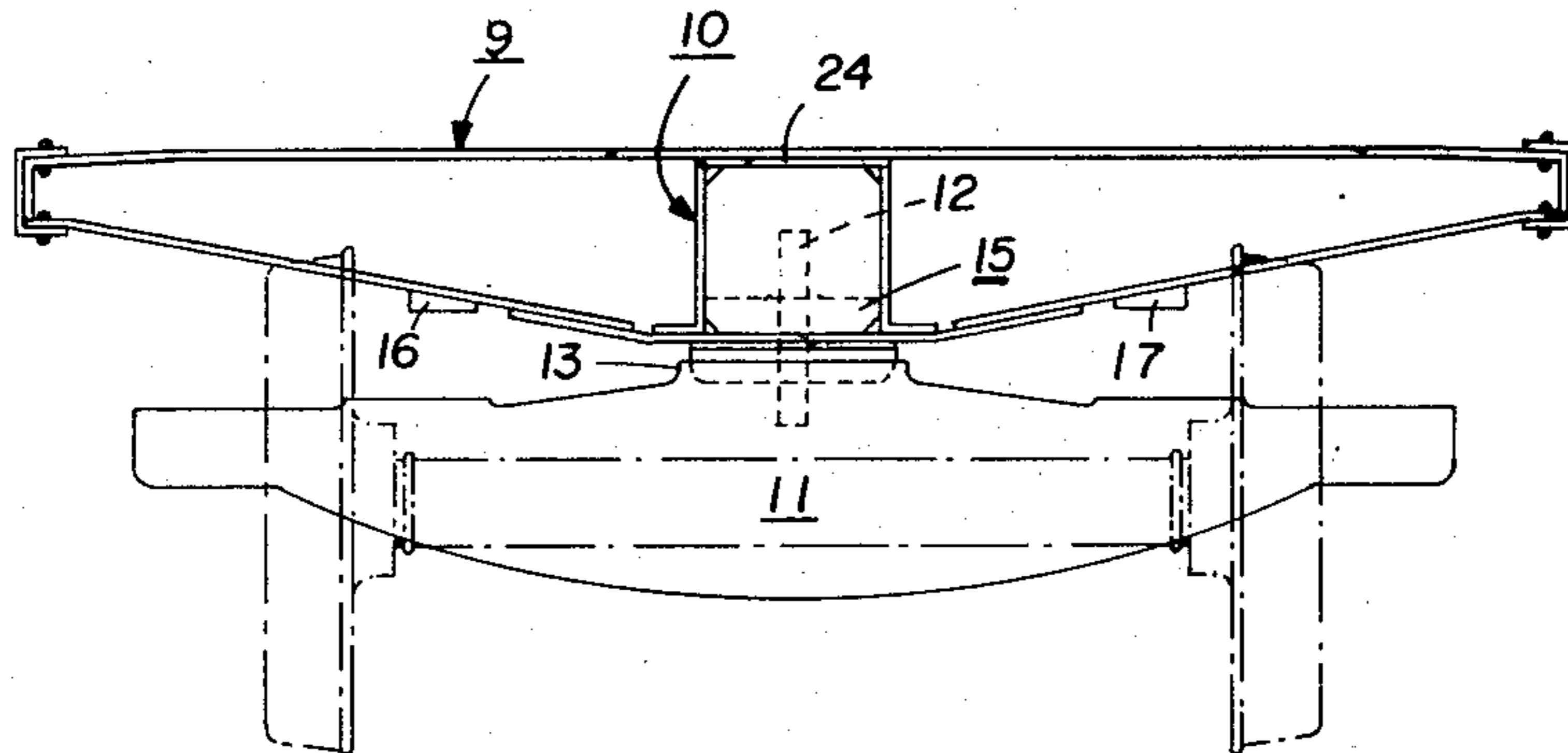
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[57] **ABSTRACT**

A separate cast or forged bowl shaped center plate secured centrally received in the vertical center sill pocket of a freight car body where intersecting the body bolster. Located rigidly, secured, longitudinally displaced within the sill at each opposite end of the center plate is a vertical spacer plate for withstanding the shear and vertical forces service imposed thereat. A separate tie plate horizontally spanning the sill pocket exterior of the center plate and connected to the underedge of each spacer plate provides stiffening reinforcement. By welding the bowl substantially all around to the underedges of the spacer plates and sill wall extents therebetween, maximum in-service load support is provided.

**11 Claims, 11 Drawing Figures**



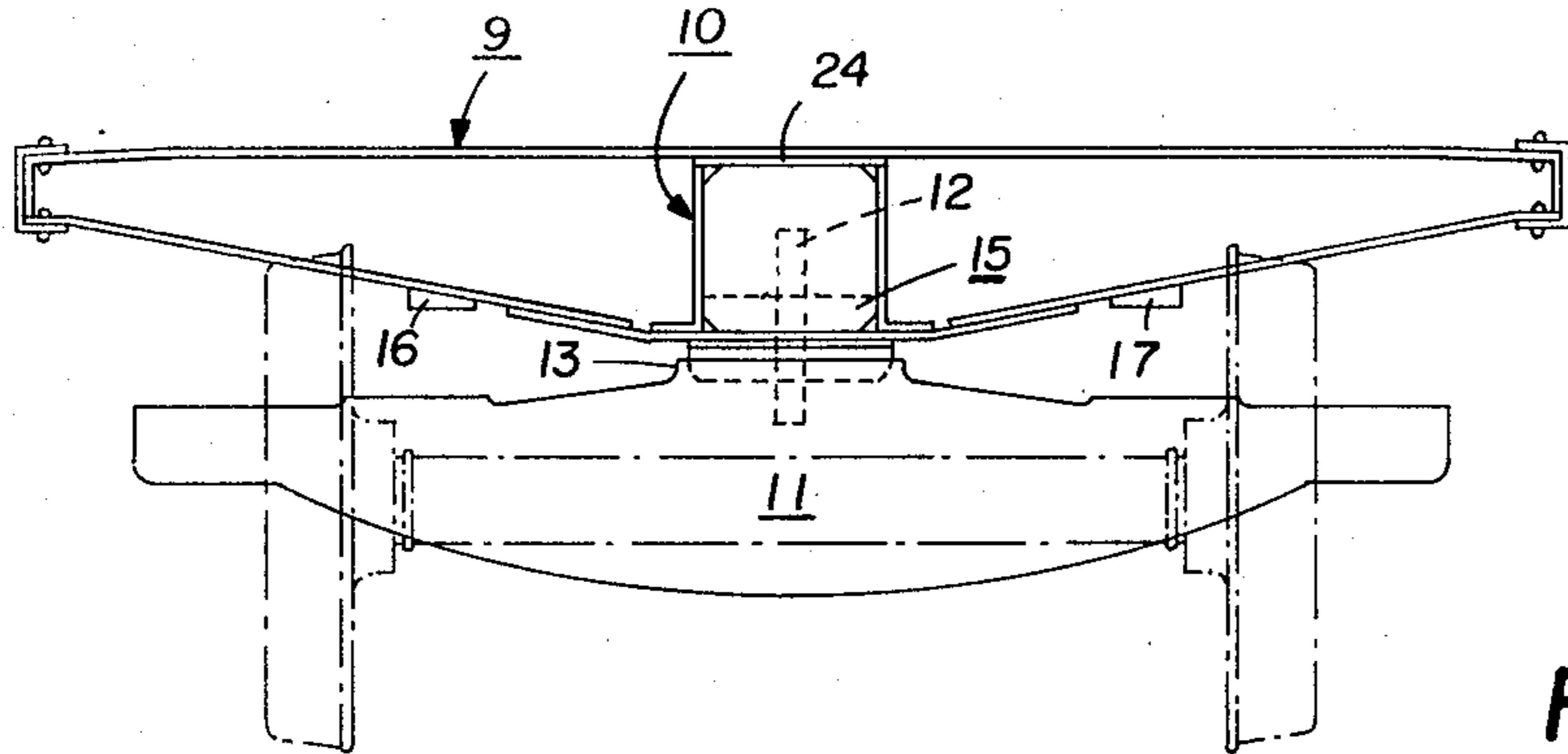


FIG. 1

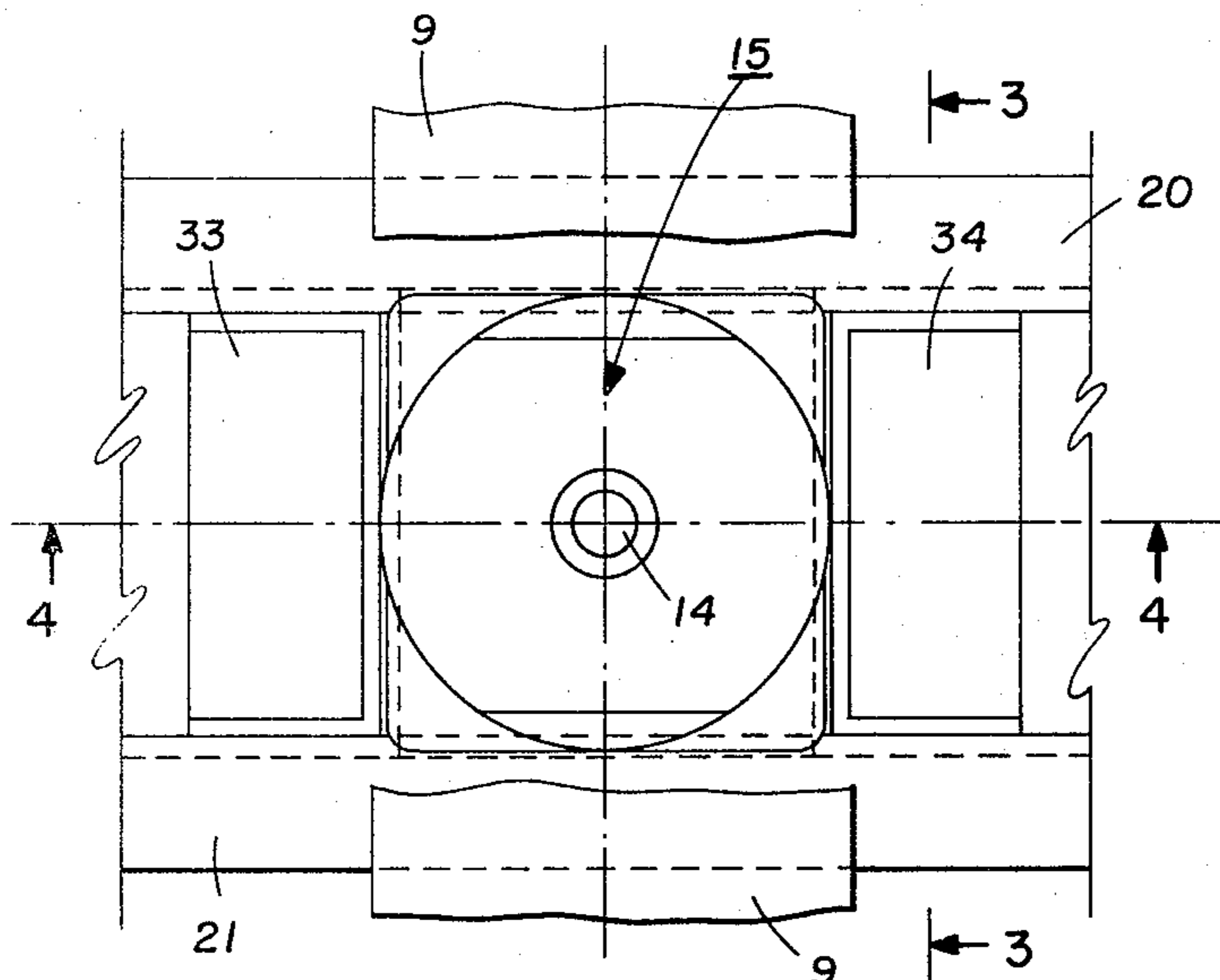


FIG. 2

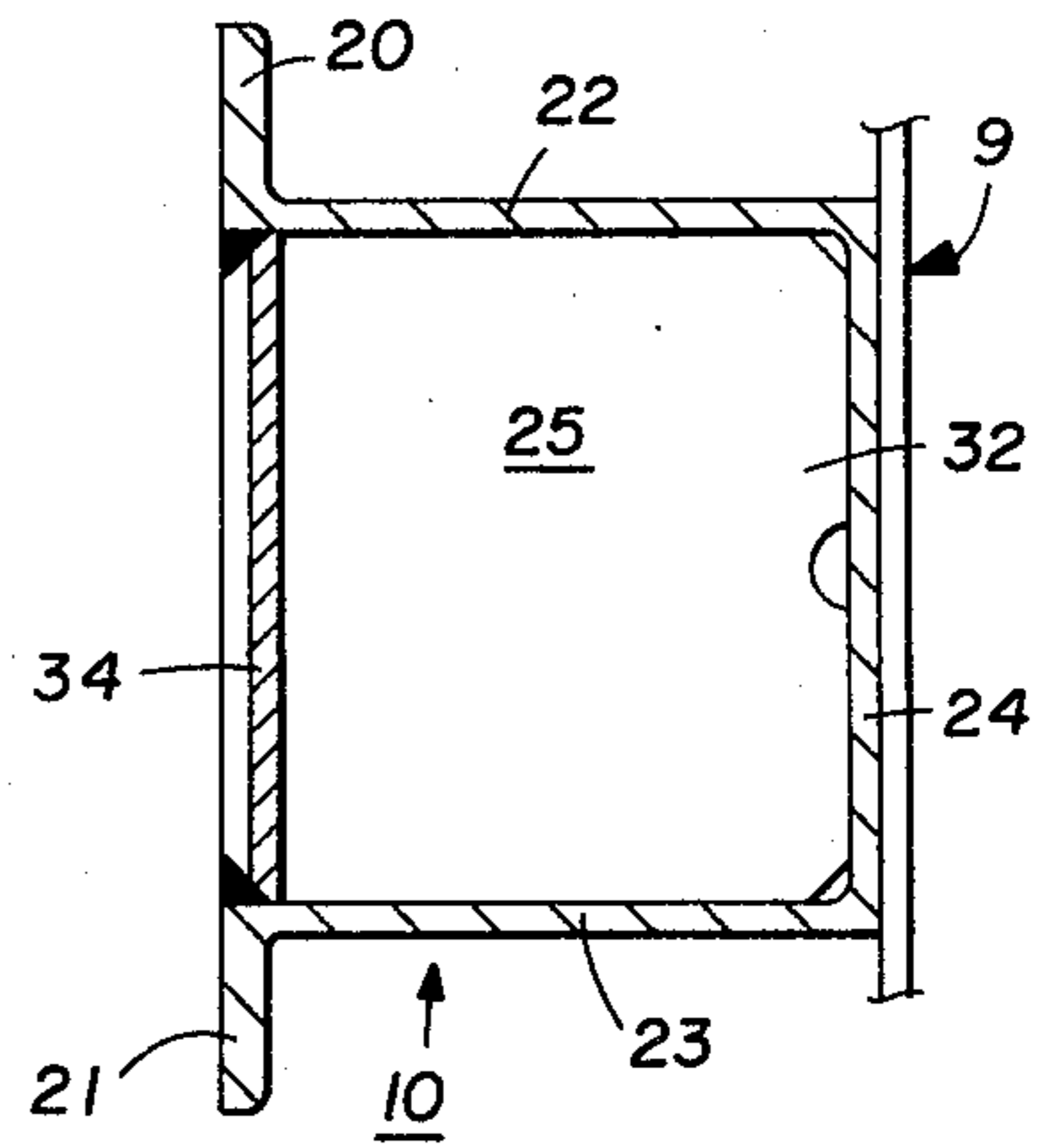


FIG. 3

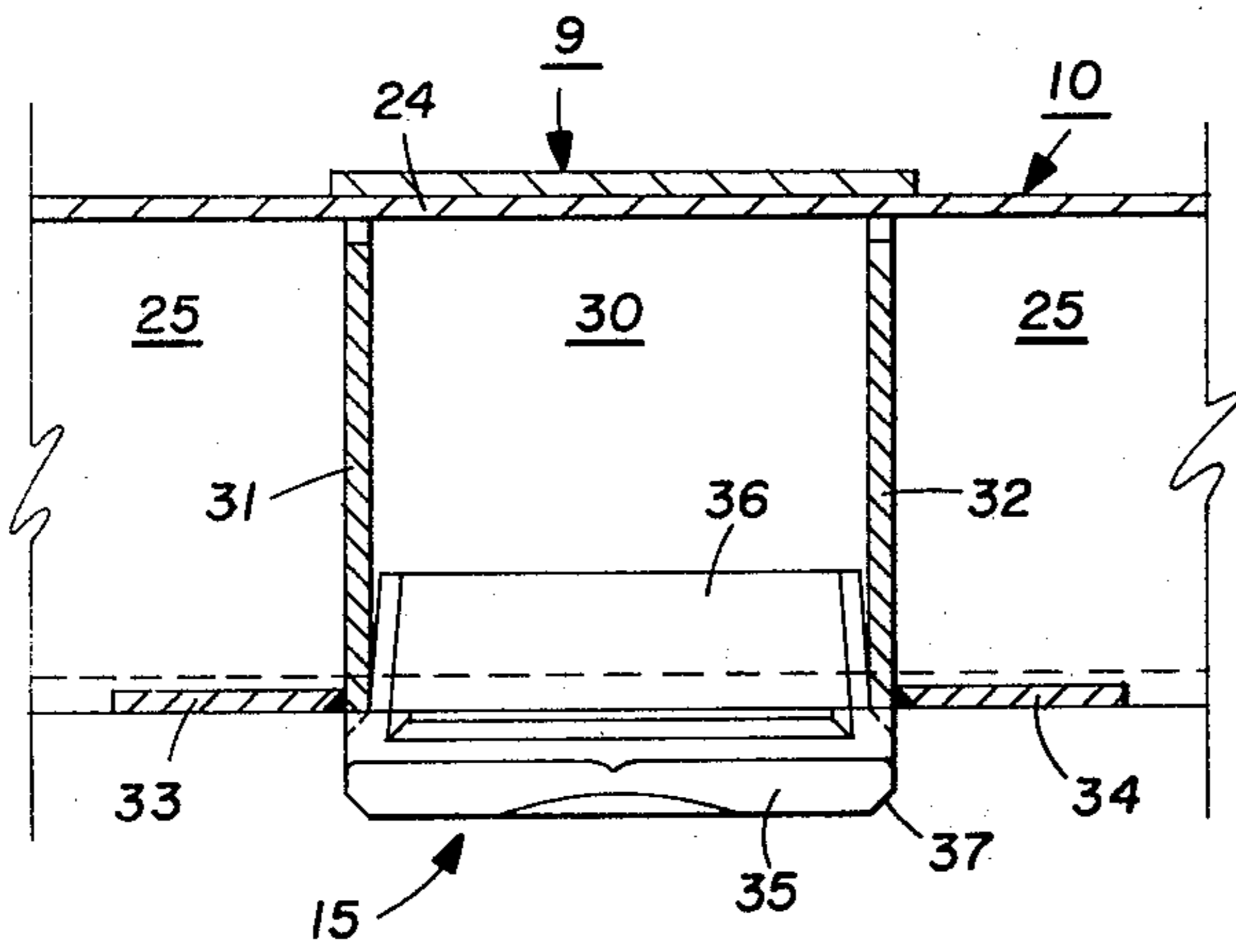


FIG. 4

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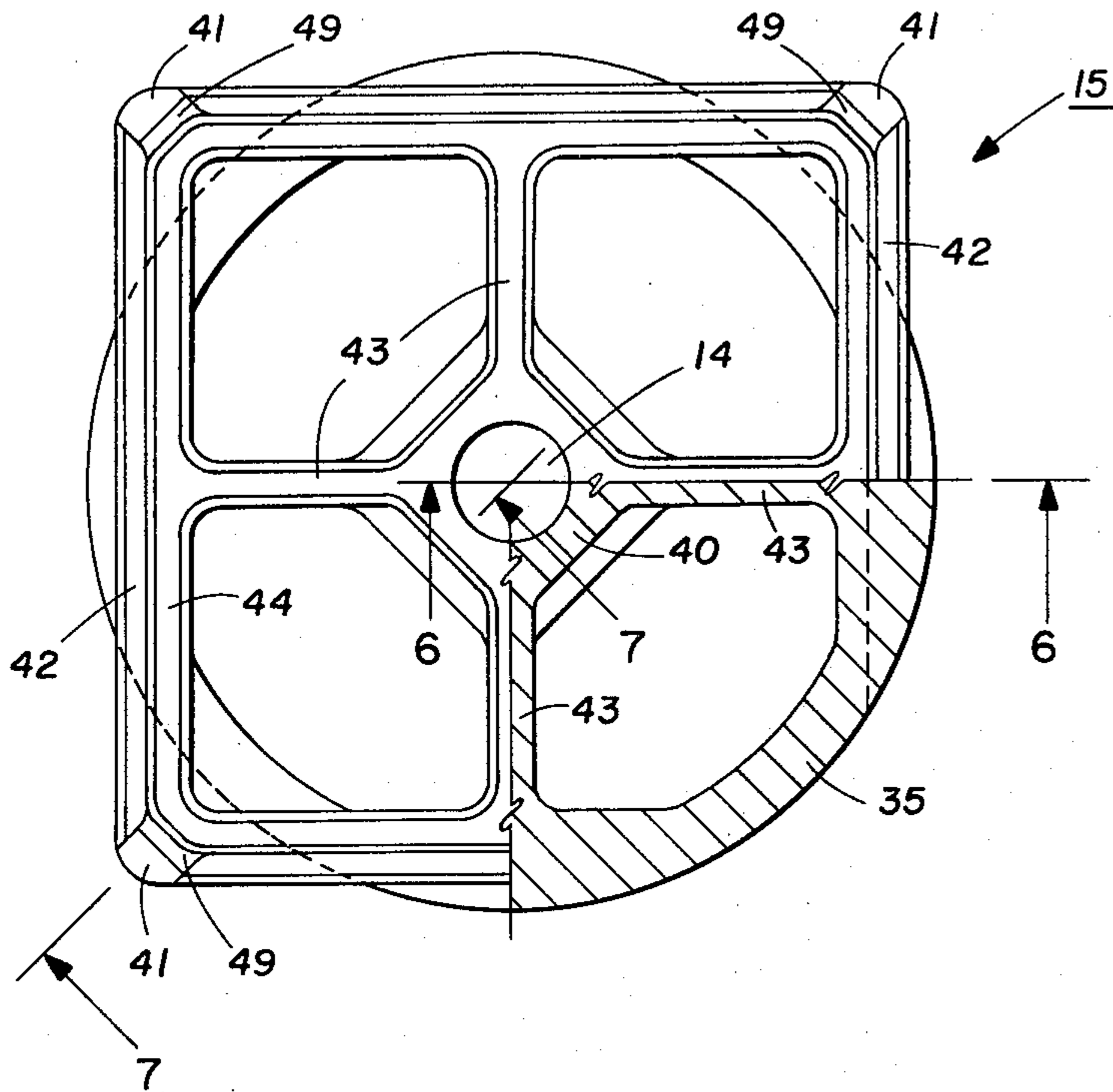


FIG. 5

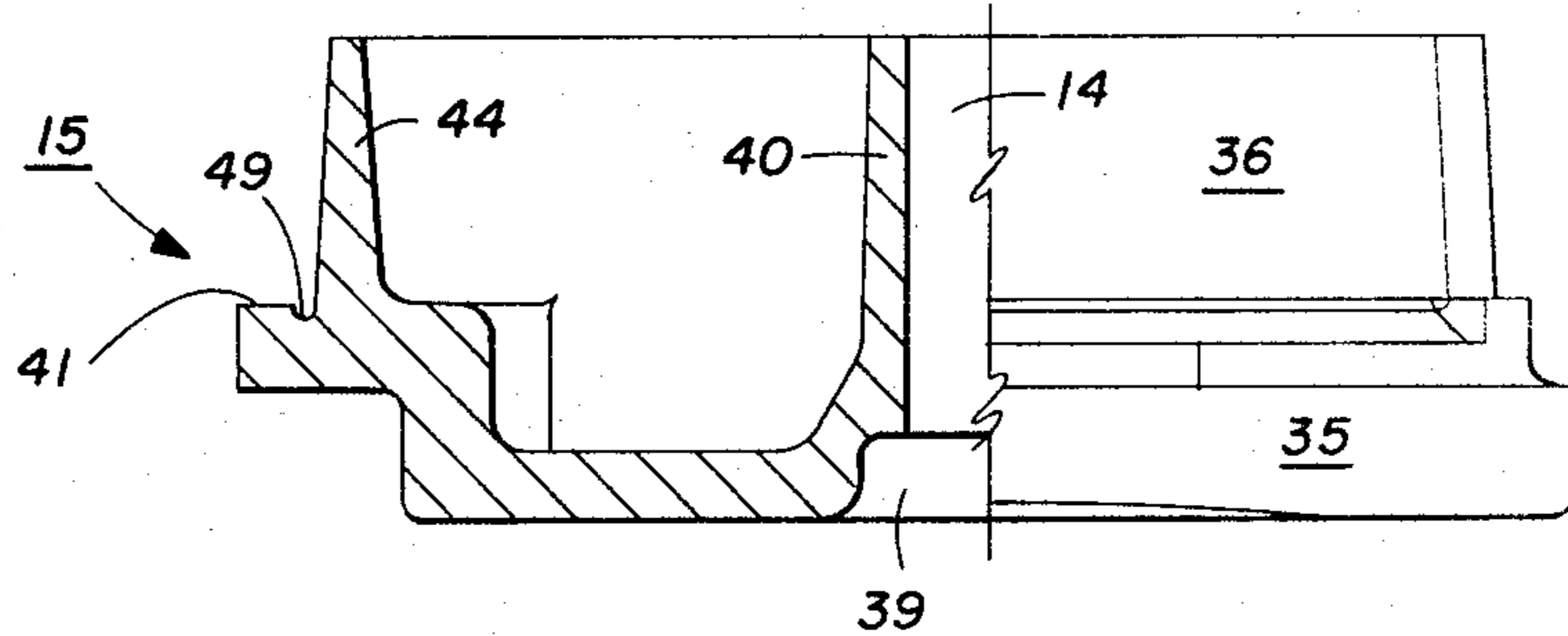


FIG. 7

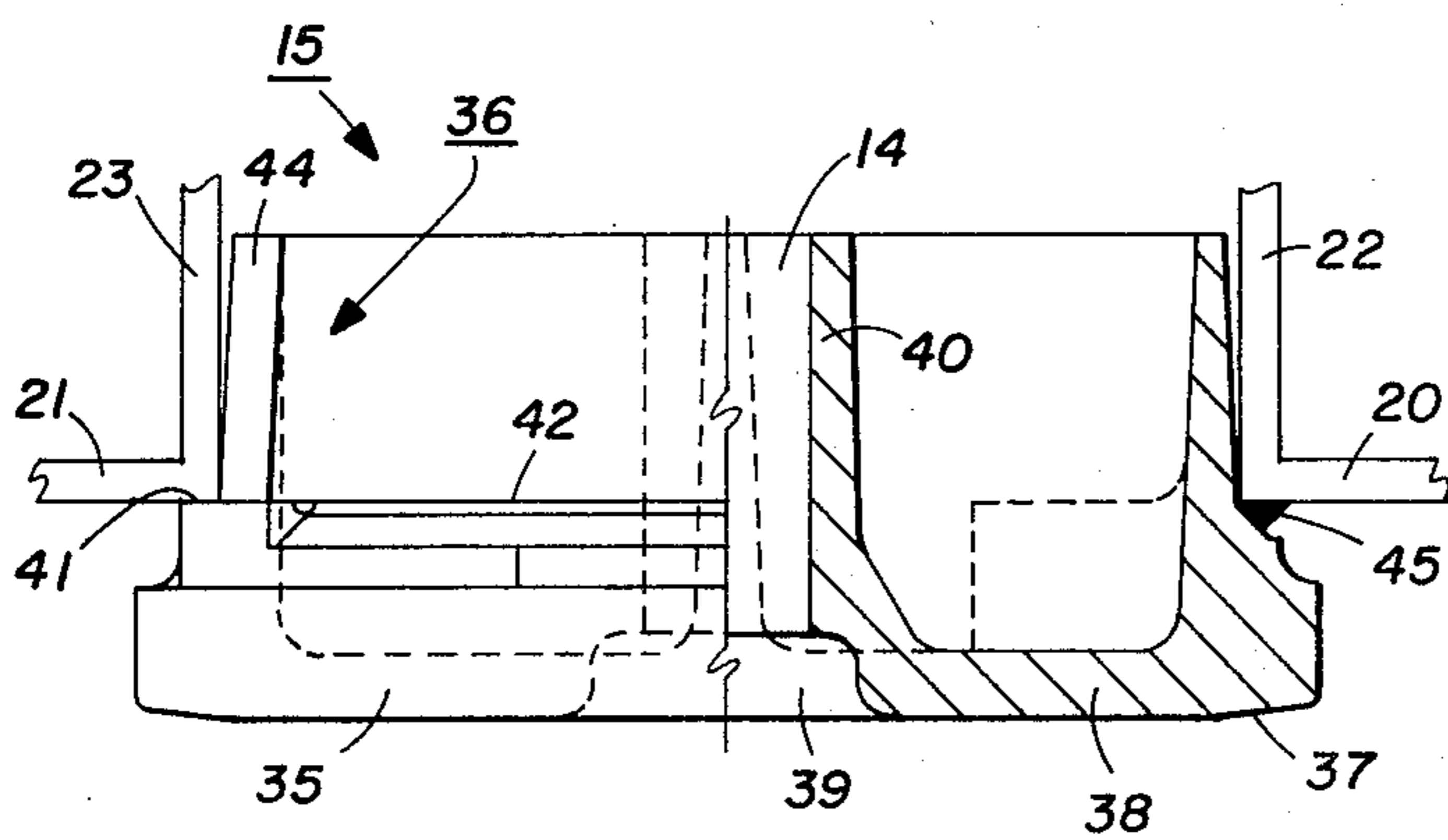


FIG. 6

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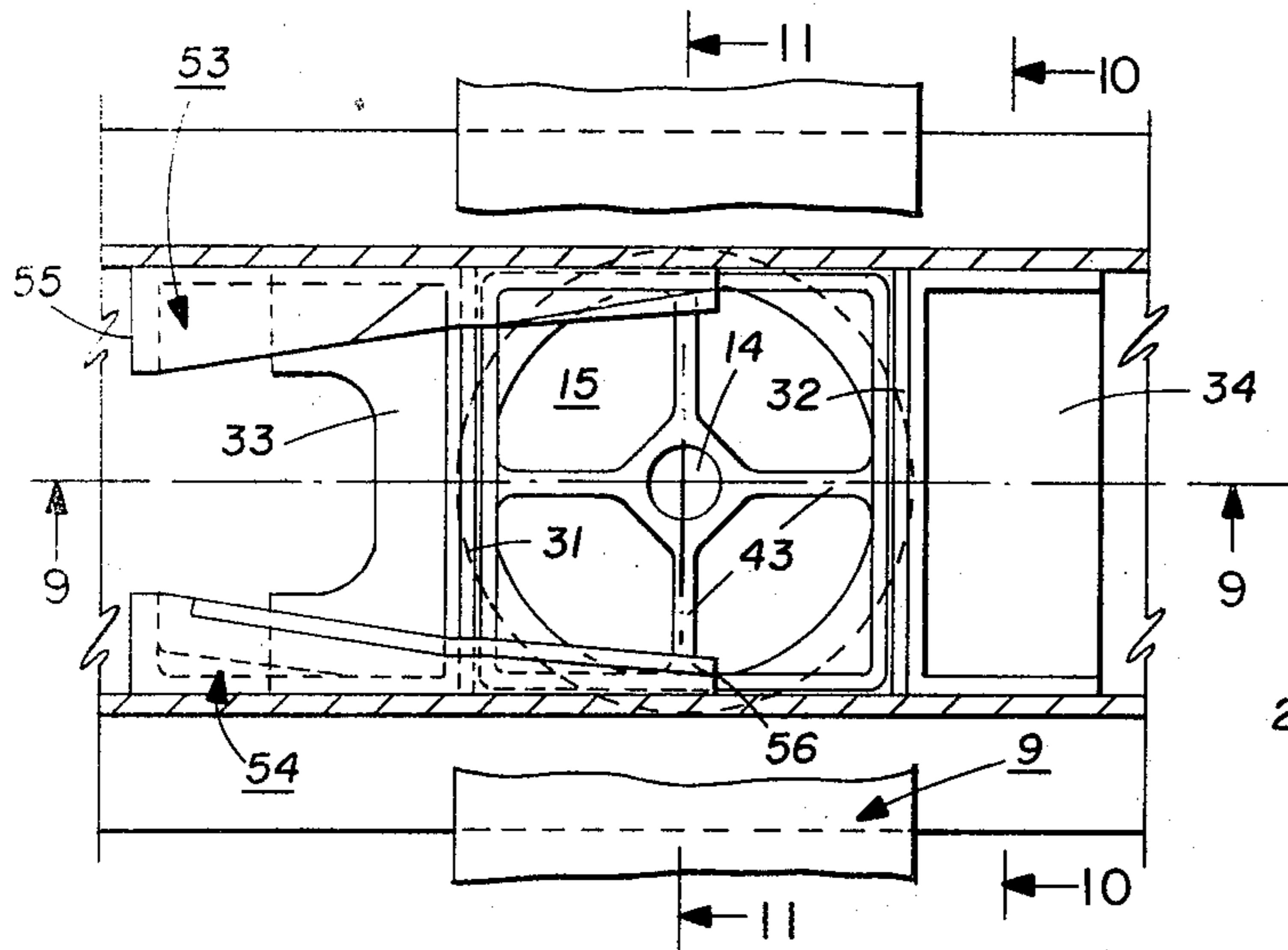


FIG. 8

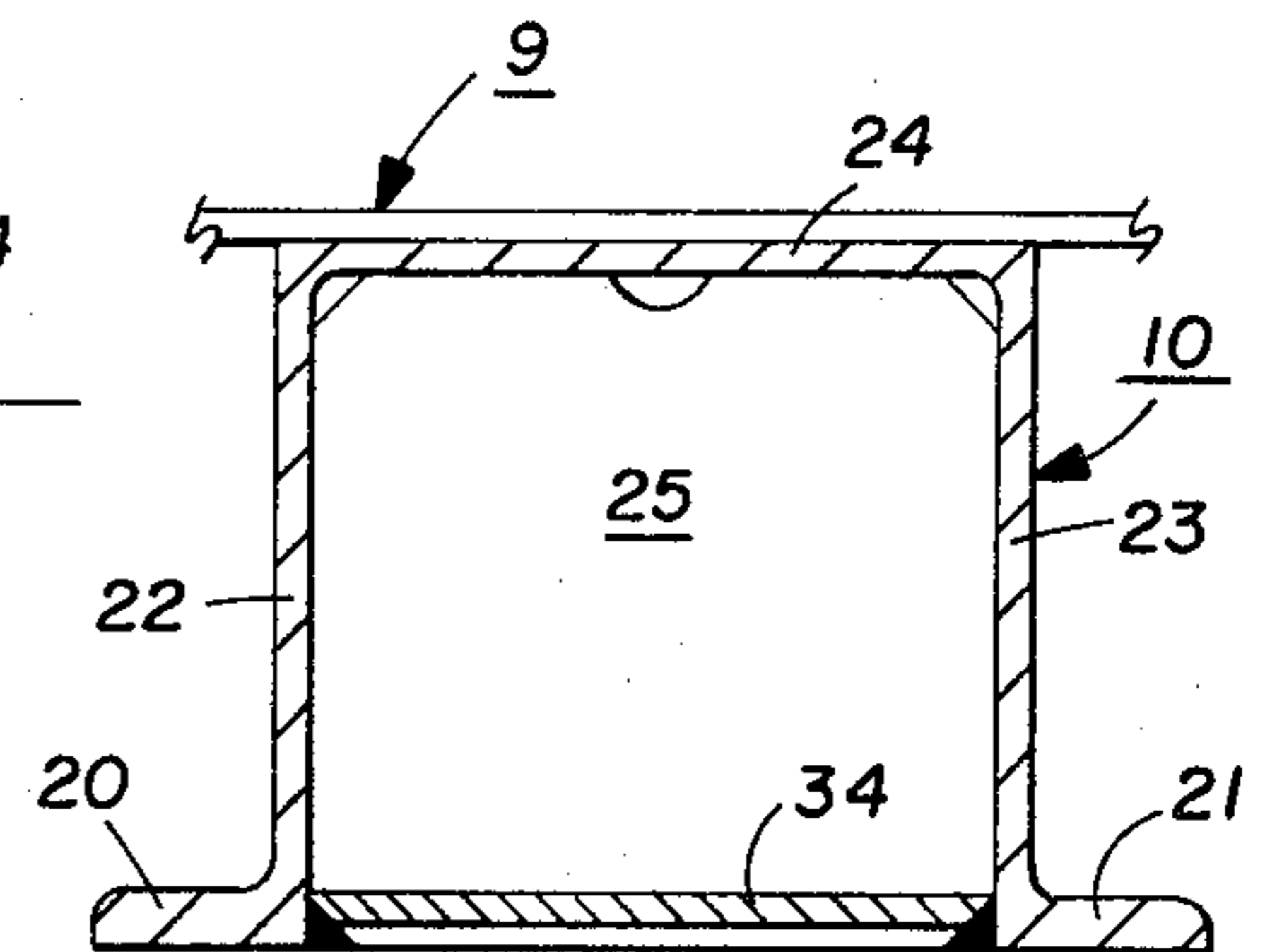


FIG. 10

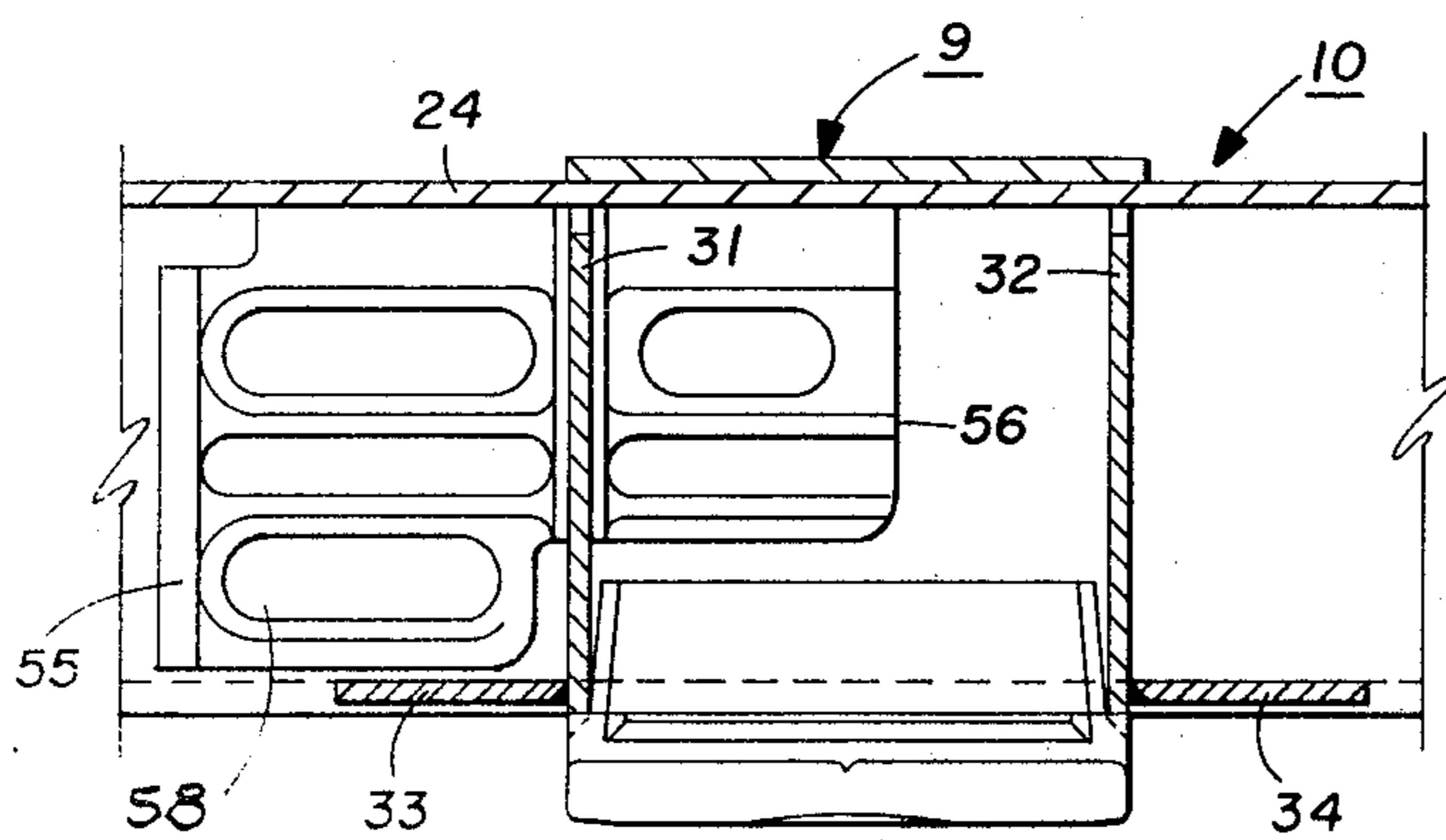


FIG. 9

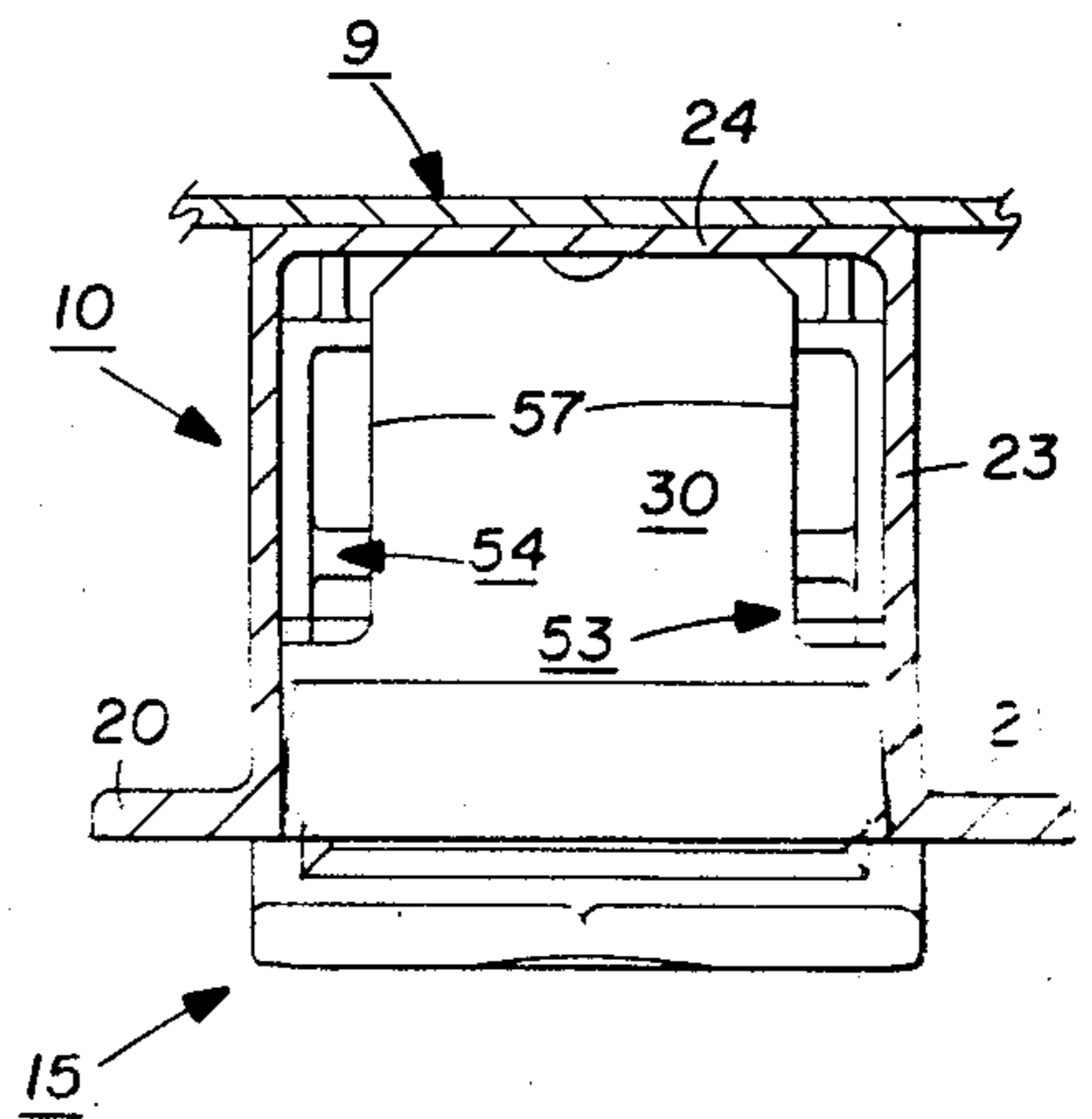


FIG. 11

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## COMBINED BODY BOLSTER CENTER FILLER AND CENTER PLATE FOR RAILWAY CARS

### BACKGROUND OF THE INVENTION

1. The field of art to which the invention pertains includes the art of railway rolling stock and more specifically to a freight car body underframe for mounting onto the bolster of a supporting truck.

2. It is conventional the the entire freight car weight is carried on two circular center plates secured to two body bolsters and which engage two mating female bowls on cooperating truck bolsters. As a consequence, the center plates must endure not only the weight of car and loading distributed over their engaging surfaces under standing conditions, but also the shifting concentration and dynamic augment of these loads with associated wear encountered under rolling in-service conditions. In accordance with the prior art a preferred construction has been the combination of a fabricated or cast steel center filler with or without draft lugs, a through bottom cover plate and a separate center plate bolted or welded to the bottom cover plate. This permits easy removal of the center plate when it has become worn or cracked and over the years has been found to provide a center plate life-expectancy of about 5 to 10 years.

With the recent advent of higher, longer and heavier cars for increased lading capacity, it has been found that such prior designs have been unable to withstand the greater load forces imposed thereby. Center plates under these conditions have been generally characterized by reduced life expectancies on the order of one to two years rendering maintenance and car down time costs unduly excessive if not prohibitive. One approach to offset the increased failure rate has been a center plate made integral with the center filler and draft lugs, all of cast steel and either bolted or slot welded to the center sill. While this construction improved the failure rates, wear continued as before and because removal of the center filler is difficult, repair on the center plate has to be conducted without removal from the car continuing to complicate the problems of maintenance. Other approaches have similarly encountered limitations of either high initial costs, high maintenance costs or both.

### SUMMARY OF THE INVENTION

The invention relates to an improved body bolster center filler-center plate combination for railway freight cars. More specifically, the invention relates to such an improved combination for use with freight cars as to afford substantially greater structural capacity more readily able to accommodate higher in-service load forces imposed by the larger and heavier car loadings. The consequent result of the design of the invention is to decrease previous failures and afford a life expectancy to the center plate more nearly approaching and even equal to optimum life expectancy of the car itself. Not only is the design hereof capable of accommodating the current trend toward heavier car loading but it achieves the result without resorting to obvious approaches of increased mass or more expensive materials and/or foundry practices. To the contrary, the instant design achieves greater load carrying capacity by a material reduction and at substantially less cost than would have been reasonably expected when compared to similar purpose structures of the prior art.

This result is achieved in accordance with the invention by eliminating the need for a separate center filler component and mounting the center plate to the underside of the center sill. By means of vertical spacer and horizontal tie plates in the sill pocket thereat, adequate structural resistance against shear and vertical forces is provided. At the same time when repair of the center plate is required it can be removed for service remote from the car.

It is therefore an object of the invention to provide a novel body bolster center filler-center plate construction for railway cars.

It is a further object of the invention to provide a novel center filler-center plate construction for railway cars having greater load carrying capacity than compared to similar purpose units of the prior art.

It is a further object of the invention to provide a center filler-center plate construction as in the last mentioned object in which the center plate is removable for replacement or repair.

It is a still further object of the invention to provide a center filler-center plate construction as in the aforesaid objects by a design less costly to produce than the lesser load capacity units of the prior art.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevation of a bolster construction containing the invention hereof in a first embodiment shown assembled on a supporting truck bolster;

FIG. 2 is a partial underside plan view of the center plate mounted onto the center sill of the car body;

FIG. 3 is a sectional elevation taken in the bolster direction substantially along the lines 3—3 of FIG. 2;

FIG. 4 is a sectional elevation taken substantially along the car center line 4—4 of FIG. 2;

FIG. 5 is a topside plan view, partially in section of the center plate;

FIG. 6 is an elevation in partial section taken substantially along lines 6—6 of FIG. 5;

FIG. 7 is an elevation in partial section taken substantially along the lines 7—7 of FIG. 5;

FIG. 8 is a topside sectional plan view of a second invention embodiment in accordance herewith for accommodating draft lugs;

FIG. 9 is a sectional elevation taken substantially along the car center line 9—9 of FIG. 8;

FIG. 10 is a sectional elevation taken in the bolster direction substantially along the lines 10—10 of FIG. 8; and

FIG. 11 is a sectional elevation taken substantially along the bolster center line 11—11 of FIG. 8.

Reference for purposes of orientation is first made to FIG. 1 in which a body bolster 9 having side bearing supports 16 and 17 extends transversely to a car body intersecting the body center sill 10 thereon. Bolster 9 contains center plate 15 and is normally connected via an interfit with bowl 13 to a truck bolster 11. A vertical king pin 12 extending upward from bowl 13 through a bore 14 in center plate 15 provides a safety measure against separation in the event of any vertical displacement in service. Such a connection is conventional in the industry and will not be further described. Mention herein to "top," "bottom," "underside," "topside," "horizontal," "vertical," etc. will be with regard to the orientation shown and described in connection with FIG. 1.

Referring now to FIGS. 2—4 there is shown a first combination embodiment of center filler-center plate in which use of draft lugs is omitted. As can be seen, center sill 10 is conventionally comprised internally in cross-section as an inverted U-shaped steel-rolled section consisting of vertical side walls 22 and 23 joined by top wall 24 to define a centrally interior longitudinally extending hollow pocket 25 therein. At the underside for increasing strength of the section are a pair of parallel longitudinally extending flanges 20 and 21 laterally integral with side walls 22 and 23.

To receive center plate 15 there is defined about the geometric center of bolster 9 a central pocket 30 formed open and exposed at the bottom by parallel spaced apart vertically arranged spacer plates 31 and 32 and the included portions of sill walls 22 and 23 therebetween. Each spacer plate is complementary to the internal sill cross-section thereat and is completely welded about its periphery in a rigid fixed relation to the intersecting surfaces of side wall 22 and 23 and top wall 24. Further securing the spacer plates in the latter relation, for reasons as will be explained below, are horizontal tie plates 33 and 34 each extending laterally across pocket 25 adjacently

outward of pocket 30. The tie plates are arranged with their undersurface between and substantially co-planar with the undersurface of side flanges 20 and 21 and are secured welded on three sides to the contiguous surfaces of sill walls and spacer plate thereat. By this means a completely rigid joint is formed at the intersection of the tie plate to the lower end of the spacer plate.

Center plate 15 hereof, generally comprising a bowl-like configuration is most clearly shown in FIGS. 5-7. The center plate comprises a lower cap section 35 of generally circular extent and of a diameter greater than the internal clearance dimensions of pocket 30. Communicating integral with the cap is an upper webbed section 36 of dimension able to be received within pocket 30. Centrally located in cap 35 is a recess 39 communicating with bore 14 formed in an upstanding hub 40 and through which a truck bolster king or center pin 12 is received as described above in connection with FIG. 1. Bevel flats 37, at the under opposite corner edges of cap 35, provide line instead of point contact against truck bowl 13 during dynamic in-service oscillation therebetween.

The topmost portion of cap section 35 is represented by four corner positioning pads 41 each having a finished horizontally extending surface and connecting with intermediate bevelled welding surfaces 42. Upper section 36 includes a thin encircling web 44 which extends integrally upward from the plane of pads 41 and slopes approximately  $2^{\circ}$ - $3^{\circ}$  inward to permit easy insertion within fill pocket 30. Providing additional reinforcement to central hub 40, are a plurality of web flanges 43 extending radially to merging with each of the enclosing side walls of web 44. Center plate 15 in its entirety is preformed of cast steel or the like without the necessity of hot pressing and by virtue of its size can be easily handled for purposes of finish machining and/or heat treatment if desired.

Assembly of the center plate into pocket 30 is by first placing positioning pads 41 against the exposed surface edges of sill and spacer plates and then butt welding around at 45 between surface 42 and adjacent sill or spacer edges thereat. When so secured, the side welds act in forming a secured and completely boxed structure with center plate 15 closing off the pocket bottom. At the same time, spacer plates 31 and 32 welded on three sides to the sill walls thereat become welded on their fourth side to center plate 15. In this relation the upright spacer plates are ideally secured for resistance against parallelogramming of the sill during rock and roll of the moving car. By being so secured, the spacer plates act as a virtually perfect bolster shear transfer device while also serving as vertical load support. Should the center plate require maintenance by virtue of either failure or wear it can similarly be removed without disturbing the balance of the structure.

Referring now to FIGS. 8-11, there is shown a second embodiment in accordance herewith modified to accommodate draft lugs as when the center pin to face of rear draft lug distance is on the order of less than about 27-30 inches. This embodiment therefore includes the same center plate 15 assembled into pocket 30 in a similar manner as above and is otherwise modified only to accommodate a pair of draft lugs designated 53 and 54.

Each lug comprises a relatively wedge-shaped composite perforated casting of numerous slots 58 and extending in a direction of the center line of car from the larger lug face end 55 to its opposite terminal end 56 located just beyond the bolster center line. Spacer plate 31 is coped at 57 to fit the lugs for welding therebetween. In addition, each lug is welded top, side and along the periphery of slots 58 to sill top wall 24, and side walls 22 or 23 thereat. By this means, should the draft lugs incur overload resulting in some yielding of the attachment welds, the affected spacer plate still has sufficient flexibility to yield longitudinally without distress. At the same time, since plate 31 is secured on all sides, the draft load is divided between side and top flanges of the sill.

By the above description there has been disclosed a novel combination of center filler and center plate for freight cars

having increased capacity to withstand greater carloads without failure than heretofore. In accordance herewith, the center plate is initially produced as a separate component affording greater versatility with respect to the latter as for heat treating, machining, or the like if desired. In event of wear or failure, the center plate can be readily removed for maintenance without the expensive down time as has been associated with integral center plate-center fillers of the prior art. Not only is the construction hereof relatively simple as compared to prior art devices despite its relatively increased load carrying capacity, but by virtue of such simplicity, materials and labor for fabrication is significantly reduced resulting in substantial cost savings of manufacture. Whereas the invention has been principally described in connection with freight cars, it obviously could be employed if desired in passenger cars or the like.

Since many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the drawings and specification shall be interpreted as illustrative and not in a limiting sense.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A body bolster center filler-center plate assembly for a railway car comprising in combination:

- a. a center sill having walls contiguously arranged generally U-shaped in cross-section and forming a centrally open interior;
- b. a body bolster of longitudinal extent having a centrally defined laterally extending opening receiving said center sill intersecting therewith;
- c. spacer plates longitudinally spaced apart secured within said sill interior to the walls thereof, at least one of said plates being located on each side of the center of intersection between said bolster and sill;
- d. said spacer plates and portion of sill side walls included therebetween defining a generally rectangular bottom-open pocket in which to receive a center plate;
- e. a center plate having a first portion of exterior dimension greater than said pocket for extending outward of the underside thereof and connecting with a second portion of reduced exterior dimension received within said pocket; and
- f. means securing said center plate to the underedge of said pocket walls forming a fixed rigid structure thereat, said center plate being detachable upon removal of said means.

2. A center filler-center plate assembly as in claim 1 in which said center sill also includes laterally outward flanges integrally extending longitudinally along the underside thereof.

3. A center filler-center plate assembly as in claim 1 including horizontal tie plates adjacently exterior of said defined pocket secured to the sill side wall and spacer plate thereat.

4. A center filler-center plate assembly as in claim 3 in which said pocket is generally square and said center plate is secured welded to the underedges of said pocket walls.

5. A center filler-center plate assembly as in claim 4 in which said center plate includes a centrally hollow upstanding hub to receive a king pin from a truck bolster on which it is to be supported.

6. A center filler-center plate assembly as in claim 1 including draft lug means secured interior of said sill in the vicinity of said pocket and extending in a direction generally parallel to the center line of said sill.

7. A center filler-center plate assembly as in claim 6 in which said draft lug means includes a pair of draft lugs with one of said pair secured to one sill wall and the other of said pair secured to the other opposite sill wall.

8. A center filler-center plate assembly as in claim 7 in which at least one spacer plate is coped for a draft lug to extend into said pocket.

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9. A center filler-center plate assembly as in claim 8 in which said one spacer plate is coped at opposite edges for both draft lugs to extend into said pocket.

10. A center filler-center plate assembly as in claim 9 in which said draft lugs are fixedly secured to said one spacer plate at the coped portions thereof.

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11. A center filler-center plate assembly as in claim 10 in which the fixed connection between said draft lugs, said one spacer plate and said sill transmit draft forces imposed against said lugs divided between the top and side walls of said sill.

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