

Aug. 8, 1961

W. R. BUTLER ET AL

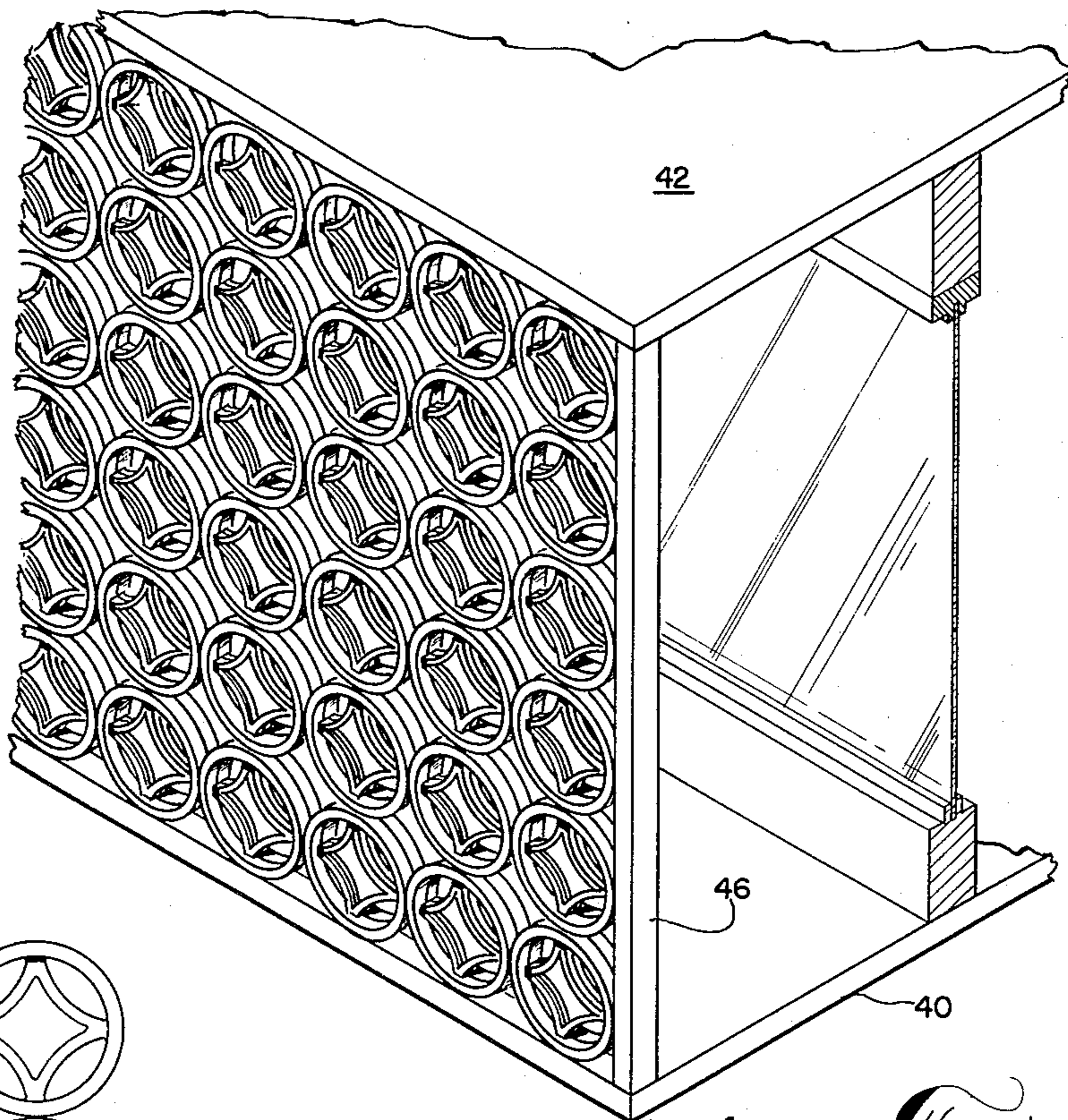
2,995,224

SCREEN TYPE STRUCTURES

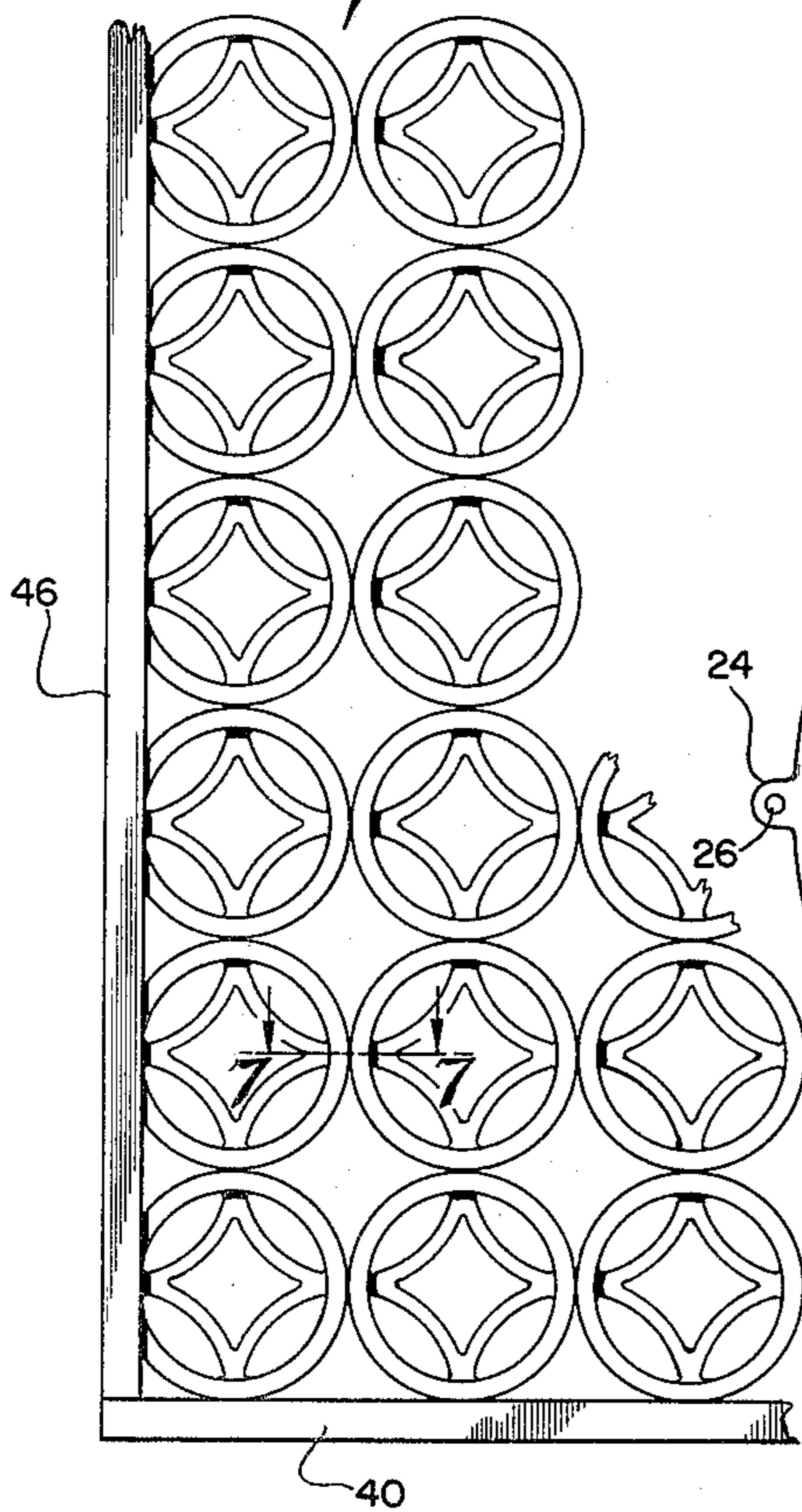
Filed Aug. 14, 1959

3 Sheets-Sheet 1

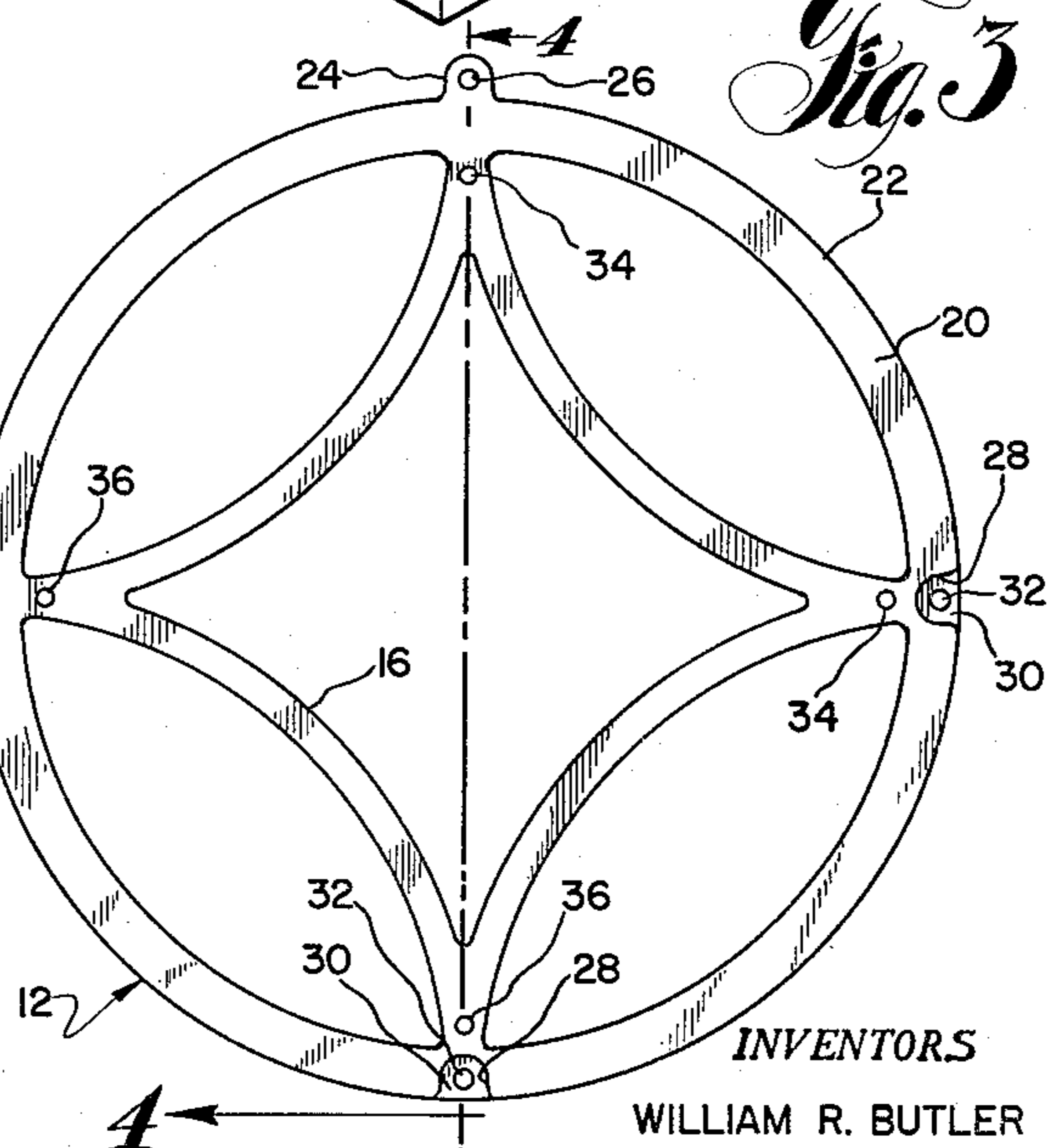
*Fig. 1*



*Fig. 2*



*Fig. 3*



INVENTORS

WILLIAM R. BUTLER  
PAUL E. FREEMAN  
RONALD L. FLUCKER

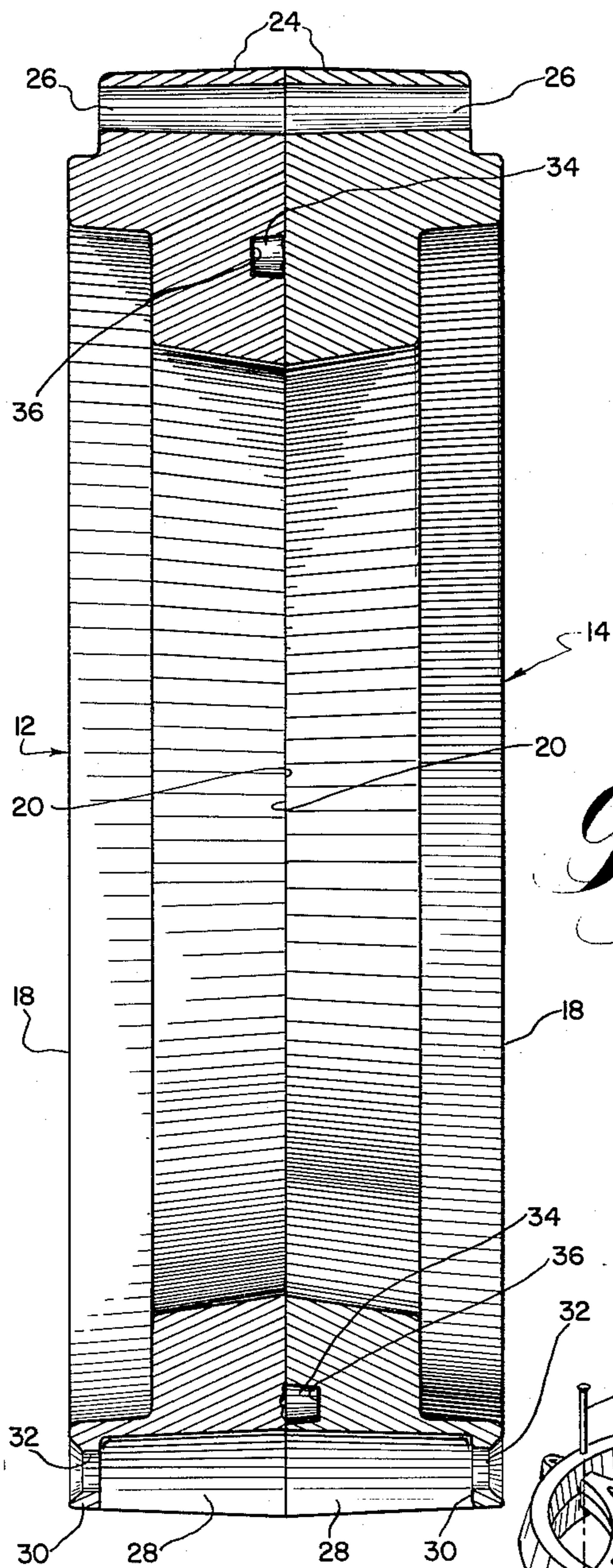
Aug. 8, 1961

W. R. BUTLER ET AL  
SCREEN TYPE STRUCTURES

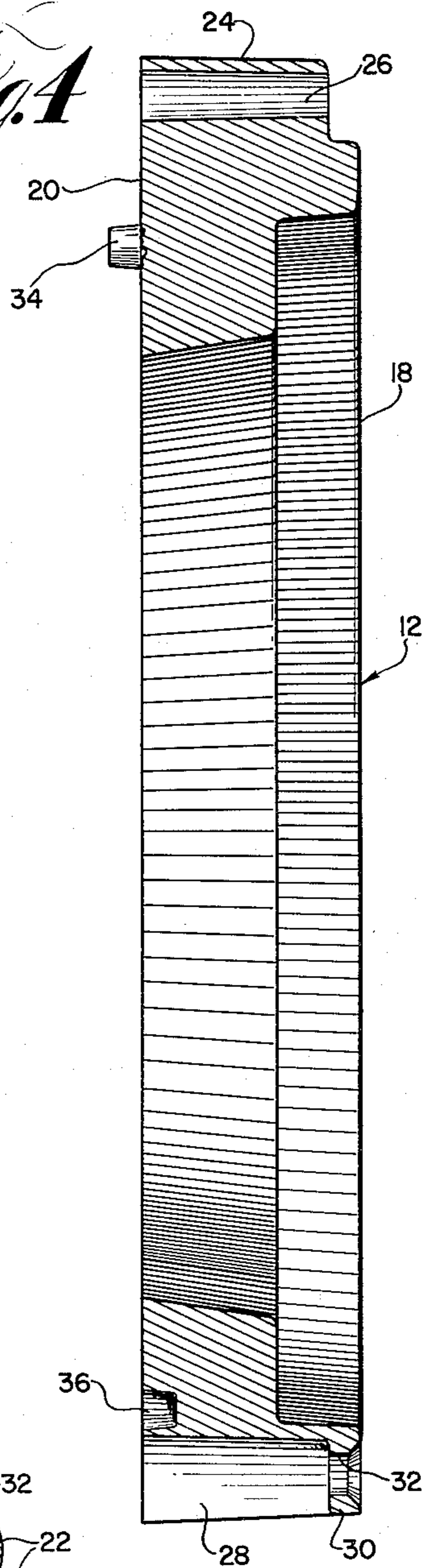
2,995,224

Filed Aug. 14, 1959

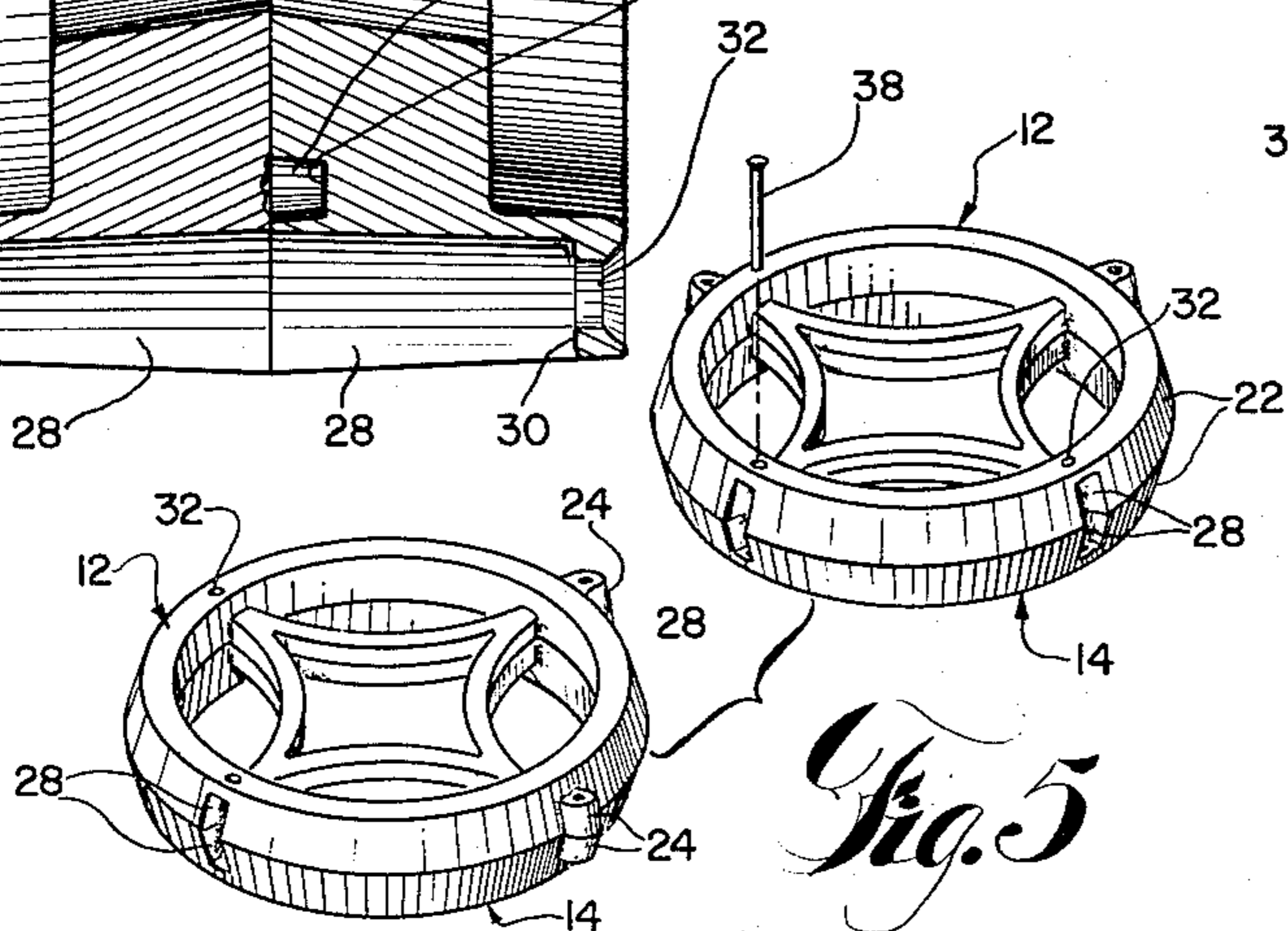
3 Sheets-Sheet 2



*Fig. 4*



*Fig. 6*

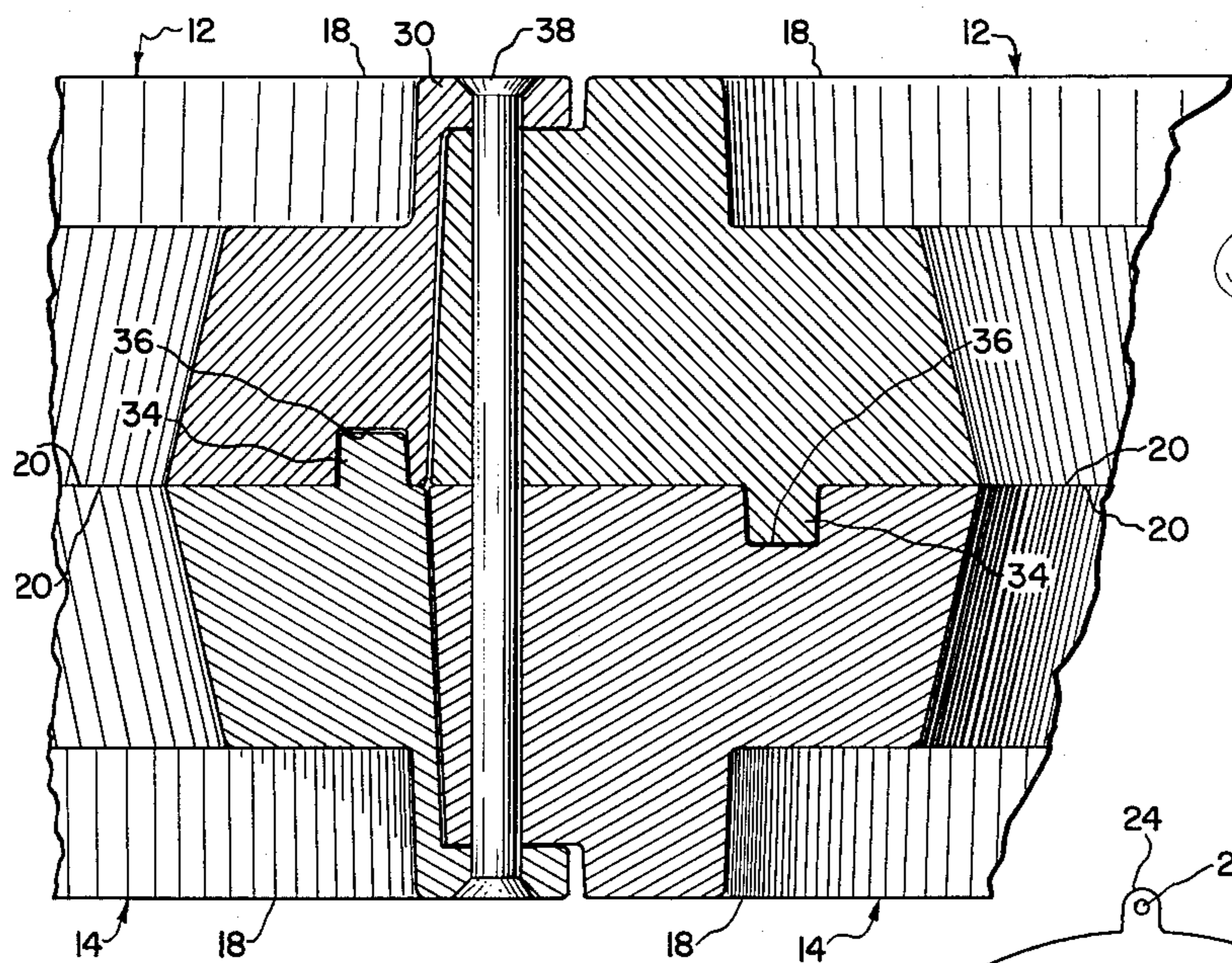


*Fig. 5*

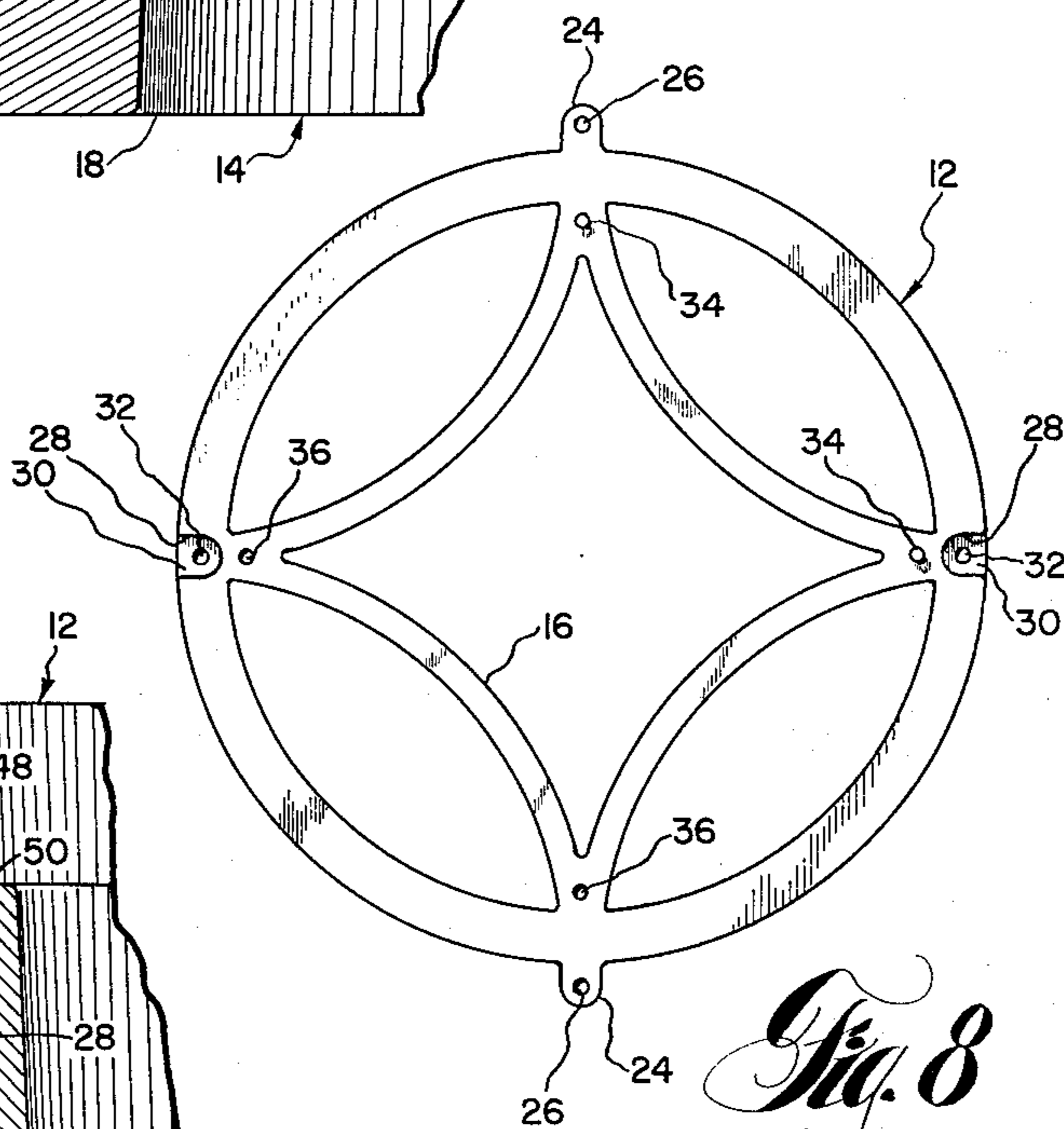
INVENTORS  
WILLIAM R. BUTLER  
PAUL E. FREEMAN  
RONALD L. FLUCKER

**2,995,224**

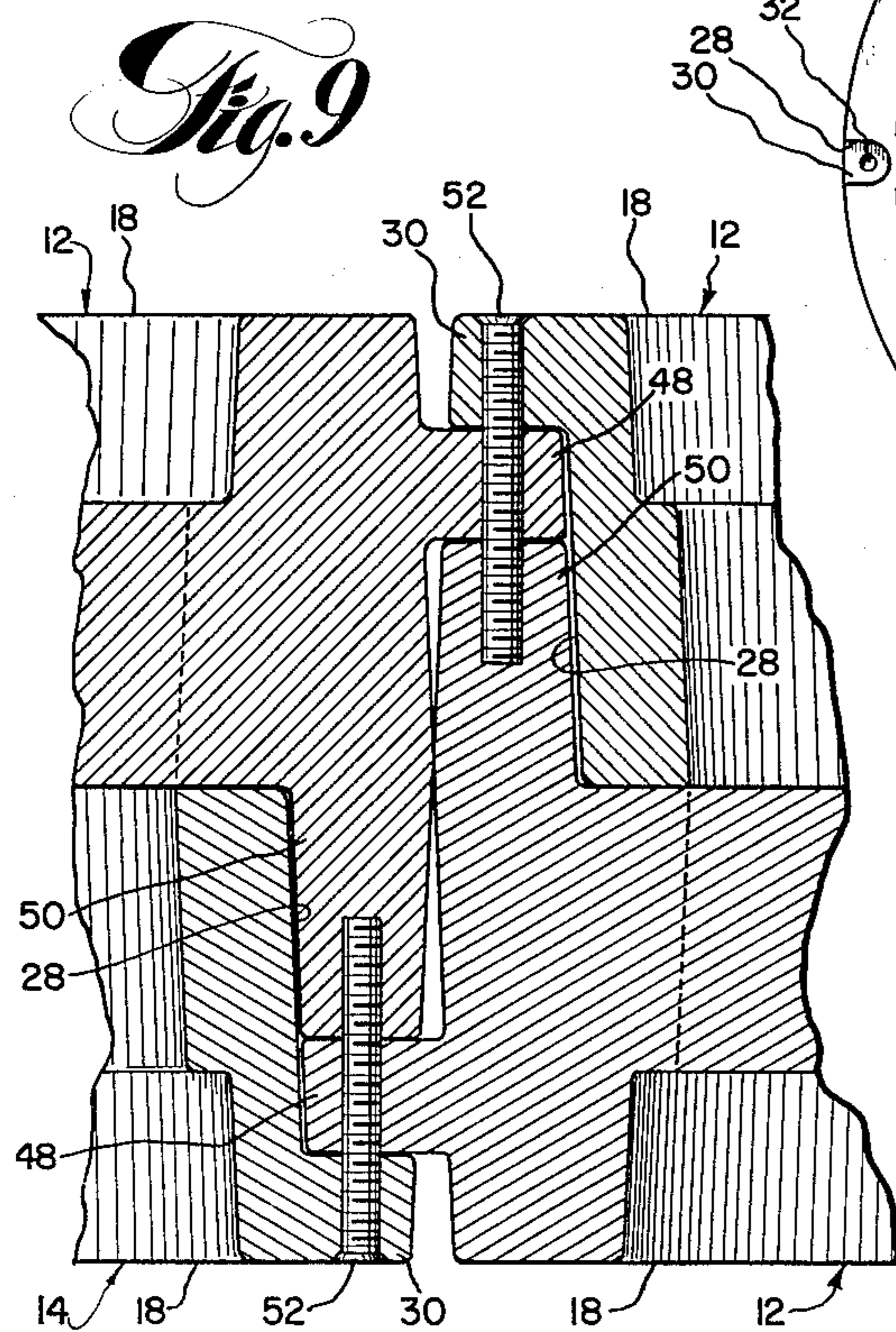
3 Sheets-Sheet 3



*Fig. 7*



*Fig. 8*



*Fig. 9*

**INVENTORS**  
WILLIAM R. BUTLER  
PAUL E. FREEMAN  
RONALD L. FLUCKER

1

2,995,224

## SCREEN TYPE STRUCTURES

William R. Butler, Pittsburgh, Paul E. Freeman, Lower Burrell, and Ronald L. Flucker, Pittsburgh, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa., a corporation of Pennsylvania  
Filed Aug. 14, 1959, Ser. No. 833,731  
6 Claims. (Cl. 189—82)

This invention relates to a building structure, and more particularly pertains to screen type structures for architectural use.

It is the principal object of this invention to provide a structure of the above type which will act as a shading mask against the sun rays and as a concealing overlay on other materials.

A further object of the invention is to provide a structure of the above character made from a plurality of interconnecting units which may be readily assembled to yield a shading and decorative screen of any desired dimension, and in a wide variety of functional and ornamental patterns.

A further object of the invention is to provide screen type structures of generally modular construction which lend themselves to economical and complete manufacture from regularly employed building materials, particularly light metals such as aluminum.

Another object is to provide screen type structures of generally modular construction of individual identical modules so that one is the duplicate of the other thereby eliminating the necessity of employing right and left or male and female members or requiring the manufacture of different complementary modules.

A still further object is to provide screen type structures of generally modular assembly of individual identical modules incorporating over and under arrangement of a pair of the modules in a preselected assembly thereof.

These together with other objects and advantages of the invention will best be understood by referring to the following detailed specification of preferred embodiments thereof, and to the accompanying drawings, in which:

FIGURE 1 is a fragmentary perspective view of a typical screen assembly illustrating one embodiment of the invention installed as a shading and vision screen exterior to a building wall;

FIGURE 2 is a fragmentary front elevational view of a typical screen structure falling within the scope of the invention;

FIGURE 3 is a rear elevational view of one particular module;

FIGURE 4 is a cross sectional side view taken on line 4—4 of FIGURE 3;

FIGURE 5 is a partially exploded perspective view;

FIGURE 6 is a cross sectional view of a modular assembly incorporating over and under arrangement of a pair of the modules;

FIGURE 7 is a cross sectional view taken on line 7—7 of FIGURE 2;

FIGURE 8 is a view similar to FIGURE 3 modified to illustrate a substitute arrangement of lug and recess members; and

FIGURE 9 is a cross sectional view of a modified form of screen assembly falling within the scope of the invention.

In general, the improved screen structure of the present invention comprises an openwork grille of modular assembly. The individual identical modules, employed

2

preferably in paired over and under arrangement, are disposed in a plurality of contiguous rows aligned in a common plane. Each module has along its marginal edge projecting boss or lug members and inwardly extending recesses, matching complementary elements on the adjacent modules when joined substantially along the marginal edge.

Similar numerals designate similar parts throughout the various views.

Referring to FIGURES 1 through 7 of the drawings, 10 designates generally a screen structure of modular assembly. The individual modules 12 and 14 (FIGURE 6) are identical so that parts described with reference to one module are found on the other. The modules 12 and 14 illustrated are substantially symmetrical and of cylindrical configuration having spoke-like members 16, but almost any geometrical configuration may be employed such as oval, diamond or the like, including modules of asymmetrical configuration.

Each individual module 12 has an outwardly facing surface 18, an opposed parallel surface 20 for engagement in face to face relation with surface 20 of module 14, and a marginal edge portion 22. A pair of bosses or lugs 24 disposed angularly at 90° to each other, and having axial openings or apertures 26, project outwardly beyond the marginal edge portion 22 of each module. Each boss extends axially along the marginal edge of the module for a thickness less than the axial depth of the marginal edge portion, and preferably terminates in one of the plane surfaces of the module.

A pair of recesses 28 extend inwardly into the marginal edge portion of the module and are adapted to be complementary to the lug projection 24 of a module joined at the marginal edge as explained in greater detail hereinbelow. Recesses 28 are disposed angularly at 90° to each other and diametrically opposite bosses 24. Each recess is further provided with a bottom web 30 having an aperture 32. The web 30 is so disposed as to lie in the same plane surface of, and is of a thickness substantially equal to, the foreshortened axial length of the boss 24.

Module 12 also preferably has a pin 34 and recess 36 in its plane surface 20, matching complementary elements on surface 20 of module 14 to locate paired modules 12 and 14 in registry when brought together. The pins 34 in addition take the shear along the neutral axis of the modular assembly. This substantially eliminates the leaf spring effect in a screen under a bending load such as caused by strong winds, thereby increasing the structural strength.

In assembling a pair of modules 12 and 14 in over and under arrangement, module 12 (FIGURE 3) is inverted 180°, and brought over underlying module 14 such that the plane surfaces 20 are brought into engagement. The contacting plane surfaces 20, as shown in FIGURE 6, are in registry when brought together in face to face relation by reason of the pin and recess registration means 34—36. Outwardly extending bosses 24 of module 12 are brought into abutting alignment with outwardly extending bosses 24 of module 14, and the inwardly extending recesses 28 are similarly presented in paired spaced relationship. (See FIGURES 5 and 6.) It will be observed that the paired spaced recessed webs 30 provide a clear distance therebetween forming a slot or channel substantially equal to the length of paired abutting bosses 24 and is adapted to be complementary thereto. The slot formed between the paired spaced recessed webs 30 is adapted to receive the abutting aligned

bosses 24 of adjacently disposed paired modules. Thus, the over and under assembly of a pair of the modules is receptive of substantially marginal edge assembly with adjacently disposed over and under assembly of paired modules with paired abutting bosses engaged between the spaced webs of the recesses. A fastening means such as rivet 38 (FIGURE 7) extends through the aligned apertures 26 and 32 in the bosses and webs respectively to secure the assembly. The paired modular assemblies may be disposed in a plurality of contiguous rows in vertical and horizontal directions, and in any desired dimensions.

The paired arrangement of the modules is generally desirable in order to provide depth to the screen structure for adequate shading against the sun rays. However, under certain circumstances, it may not be necessary to employ the modules in paired relation. It thus will be observed from FIGURE 7 that modules 14 may be eliminated from the assembly to provide a screen type structure comprising individual modules of singular depth in contrast to the over and under paired assembly. The recess of one module would receive the complementary boss of an adjacent module. Assembly would be secured by a fastening element 38 extending through aligned apertures through the lug and recessed web as described above. Further, pin and recess registration means are unnecessary and may be omitted.

It will be observed that once the modules have been assembled, as illustrated in FIGURES 1 and 2, an essentially self-sustaining structure is provided which in addition will sustain loads, such as caused by strong winds, applied in a direction generally transverse to the parallel faces 18 and 20. Also, on reference to FIGURES 1 and 2, it will be observed that the lowermost row of panels rest on a footer, such as an extended floor or patio surface 40 and are structurally engaged by a projecting porch roof 42 or the like along the upper row of modules to provide structural stability to the screen structures described. Also, a channel bar 46 may be employed for capping or end framing the structure as well as lending support. The screen structure also may be supported by suitable angle bars (not shown), when placed adjacent the exterior of a building wall.

There is illustrated in FIGURE 8 an alternate arrangement of boss and recess members. Therein the projecting bosses 24 are disposed diametrically opposite each other, as are the recesses 28, and further each boss is disposed angularly at 90° to the recess. On inverted disposition in over and under plane surface contacting assembly of a pair of the modules, the bosses are brought into paired alignment and the recesses in paired spaced relationship, substantially as described above.

FIGURE 9 illustrates a further modified form of screen structure in which the module is provided with a recess 28 and web 30 substantially as described above, but further has boss 48 extending outwardly from its marginal edge portion 22 and lug 50 extending rearwardly from surface 20. On marginal edge assembly with adjacently disposed modules in over and under arrangement, the bosses 48 and lugs 50 from oppositely disposed modules in adjoining relationship present themselves in abutting alignment for engagement by the complementary recess 28. Assembly is secured, for example, by means of a self-tapping screw 52.

When desired, the module may be so constructed as to be provided with slightly sloping surfaces or marginal rims. Thus, the amount of heat and light entering the screen will be reduced.

The modular construction of the invention may have a wide variety of geometrical patterns and may be surface decorated and/or colored to provide functional or design characteristics as might be desired. Thus, the invention permits the assemblage of an economical screen system in any particular dimension, and in an almost infinite variety of functional and ornamental patterns.

The shading and/or vision screen structures of the invention may be used in a wide variety of applications. Principally among these, the screen structures or systems may be used as screen curtains on the exterior of building walls; vision screens or barriers and partitions in rooms, patios and gardens; and as concealing overlays on old facades, cooling towers, elevator penthouses, canopy soffits and lobby walls.

Having thus described the invention generally and specific embodiments thereof, we claim:

1. In a screen type structure comprising a modular assembly of individual identical modules incorporating over and under arrangement of a pair of the modules in a preselected assembly thereof, each module having opposed parallel surfaces and a marginal edge portion, a pair of bosses extending outwardly beyond the said marginal edge portion, a pair of recesses complementary to the bosses extending inwardly into the said marginal edge portion, a pair of said modules on inverted disposition in over and under plane surface contacting assembly presenting their outwardly extending bosses in paired alignment and their inwardly extending recesses in paired spaced relationship, the said over and under assembly being receptive of substantially marginal edge assembly with adjacently disposed over and under assemblies with the aligned bosses received within the complementary spaced recesses, and fastening means to secure said assembly.

2. In a screen type structure comprising a modular assembly of individual identical modules incorporating over and under arrangement of a pair of the modules in a preselected assembly thereof, each module having opposed parallel surfaces and a marginal edge portion, a pair of bosses extending outwardly beyond the marginal edge portion, the said bosses being of less thickness than the depth of the said marginal edge portion and terminating in one of the plane surfaces of the module, a pair of recesses complementary to the bosses extending inwardly into the marginal edge portion, said recesses each having a bottom web lying in the same plane surface and being of a thickness substantially equal to the foreshortened length of the bosses, a pair of said modules on inverted disposition in over and under plane surface contacting assembly presenting their outwardly extending bosses in paired abutting alignment and their inwardly extending recesses in paired spaced relationship, the paired spaced recess webs providing a clear distance therebetween substantially equal to the length of the paired abutting bosses, aligned apertures through the over and under pairs of abutting bosses and paired spaced recess webs, pin and recess registration means in the over and under plane contacting surfaces of a pair of the modules, said over and under assembly being receptive of substantially marginal edge assembly with adjacently disposed over and under assemblies with abutting bosses between the spaced webs of the recesses, and fastening means extending through the aligned apertures in the bosses and webs to secure the assembly.

3. The structure according to claim 2 wherein the individual identical modules are of a substantially symmetrical configuration.

4. The structure according to claim 2 wherein the said bosses are disposed angularly at 90° to each other and the said recesses are disposed angularly at 90° to each other.

5. The structure according to claim 2 wherein the said bosses are disposed diametrically opposite each other and angularly at 90° to the said recesses.

6. In a screen type structure comprising a modular assembly of individual identical modules incorporating over and under arrangement of a pair of the modules in a preselected assembly thereof, each module having opposed parallel surfaces and a marginal edge portion, a pair of bosses extending outwardly beyond the marginal

5

edge portion and being of less thickness than the depth of the said marginal edge portion, a pair of lugs rearwardly extending along the said marginal edge, a pair of recesses complementary to the said bosses and said lugs extending inwardly into the said marginal edge portion, 5 a pair of modules on inverted disposition in over and under plane surface contacting assembly and in marginal edge assembly with adjacently disposed modules in over and under arrangement presenting the said bosses in abutting alignment with the said lugs for engagement by 10

6

the said complementary recesses, and fastening means to secure said assembly.

**References Cited in the file of this patent****UNITED STATES PATENTS**

|         |        |               |
|---------|--------|---------------|
| 3,168   | Terry  | July 12, 1843 |
| 261,282 | Vedder | July 18, 1882 |

**FOREIGN PATENTS**

|         |               |               |
|---------|---------------|---------------|
| 117,824 | Australia     | Nov. 26, 1943 |
| 348,412 | Great Britain | May 14, 1931  |