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INTERLOCKING PIPE SHOES

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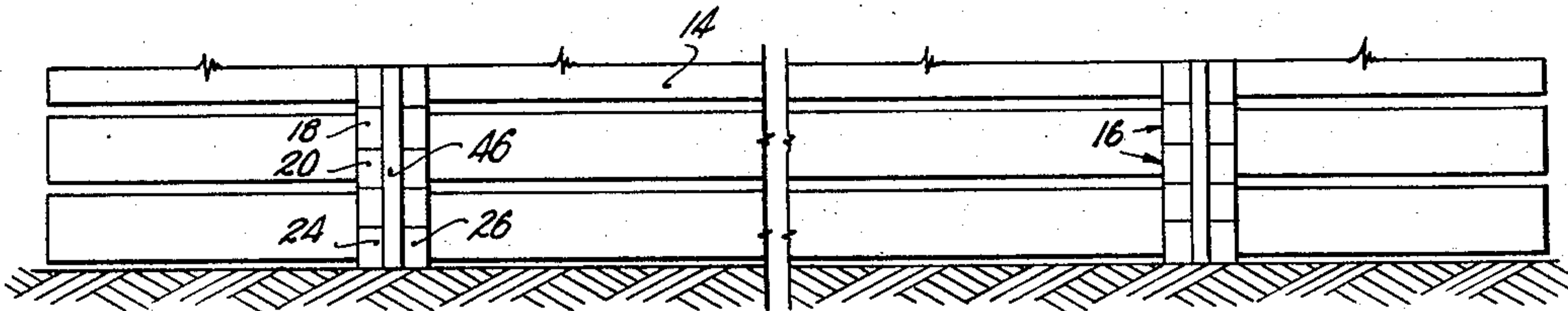


Fig. 1.

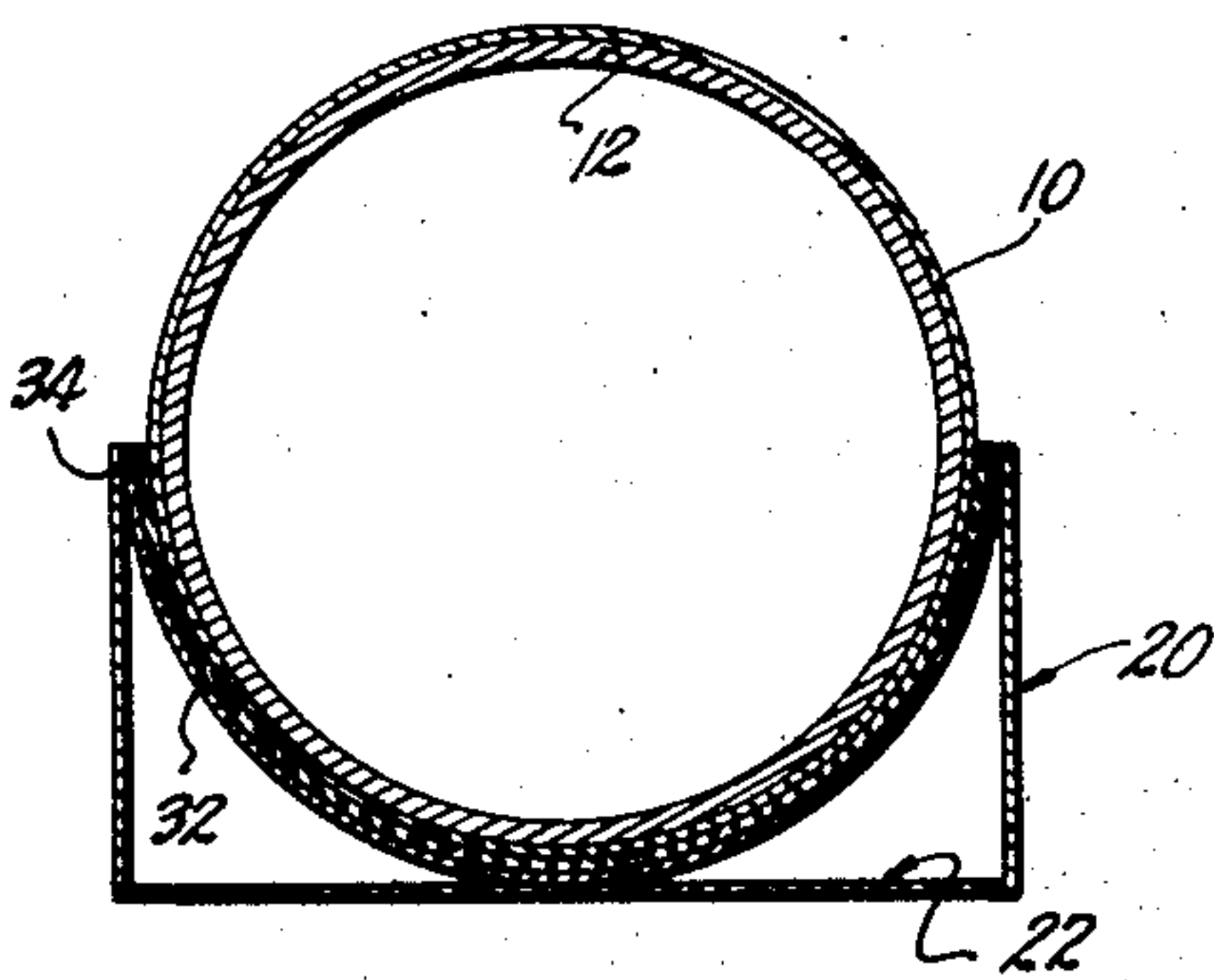


Fig. 3.

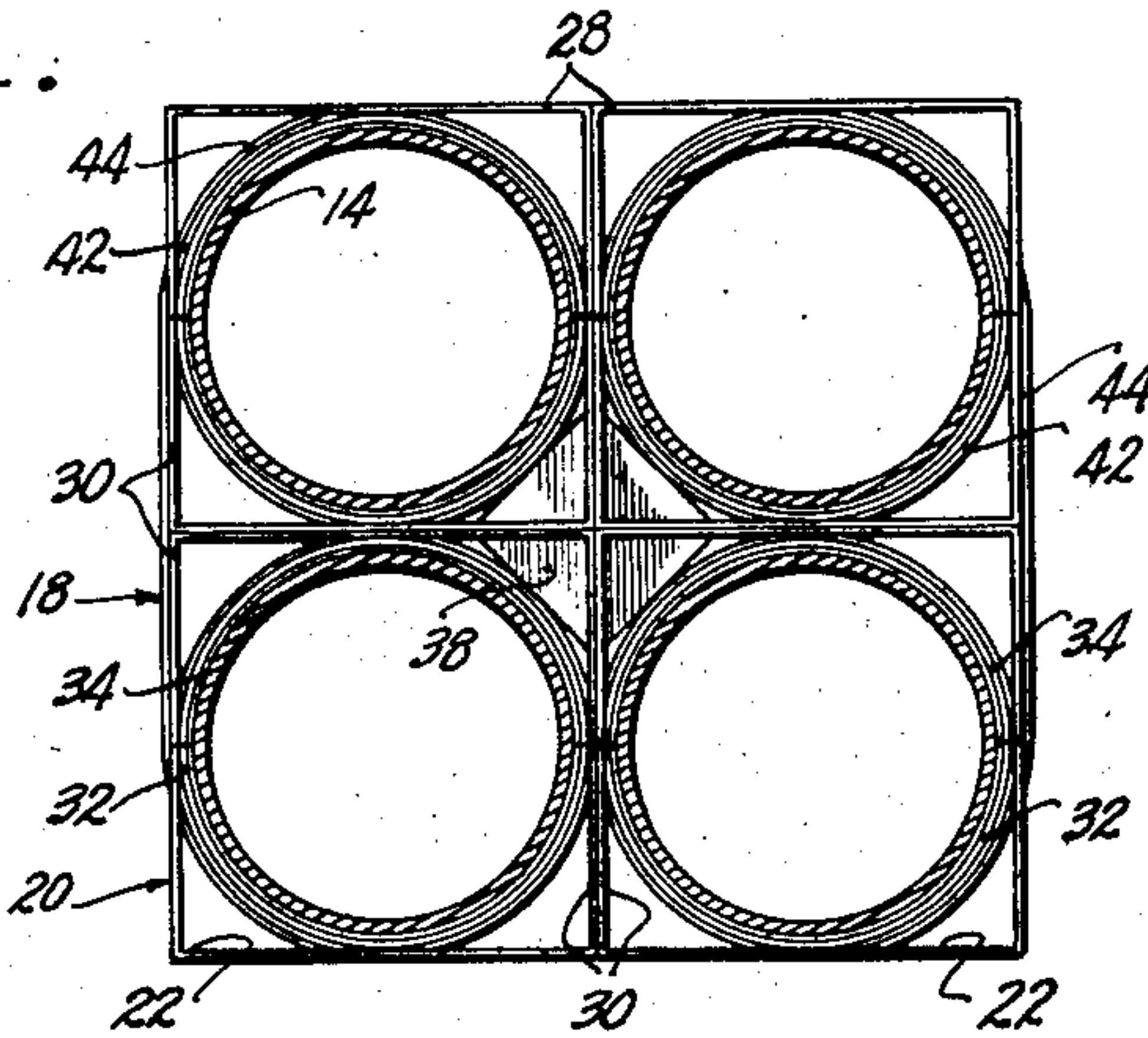


Fig. 2.

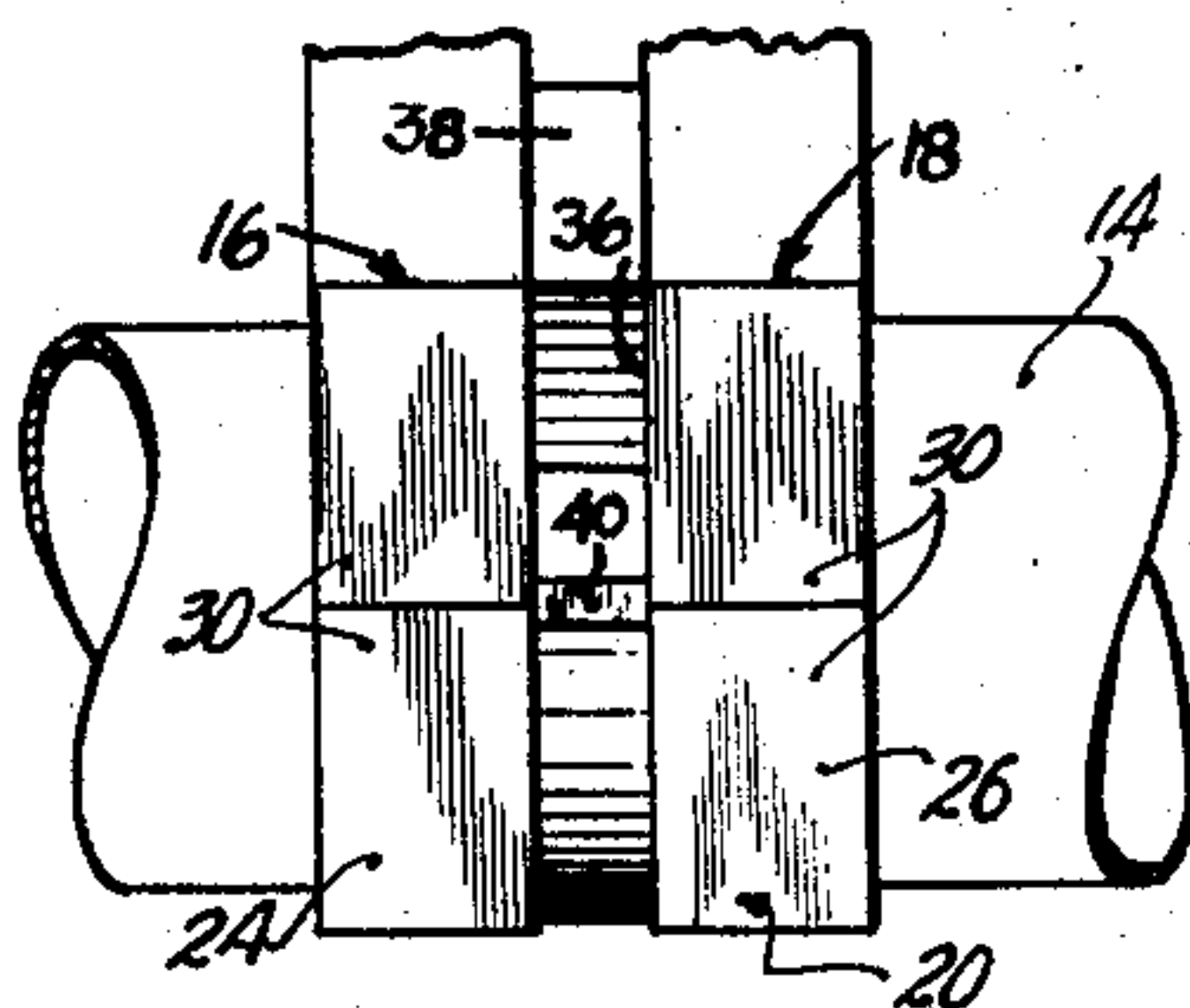


Fig. 5.

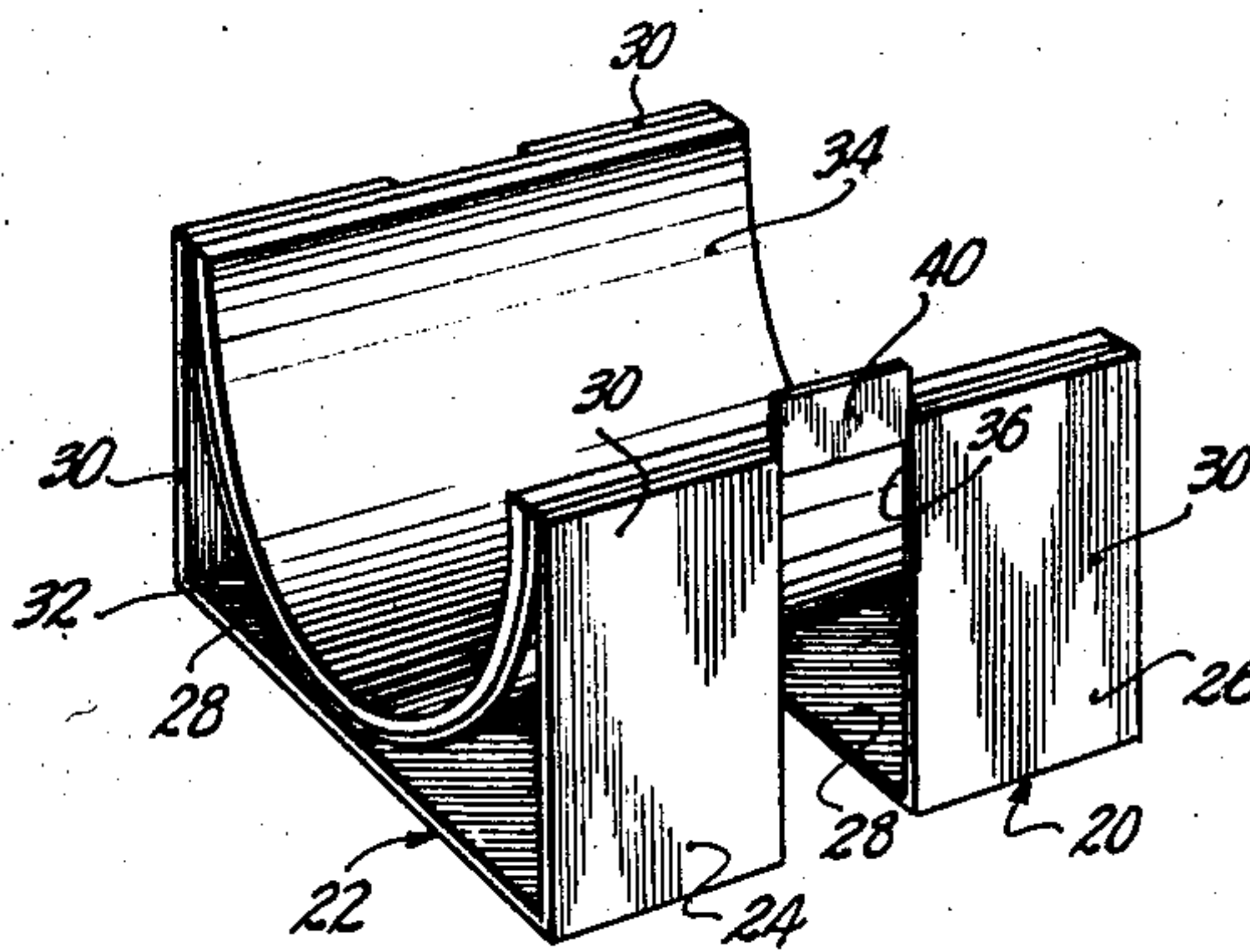


Fig. 4.

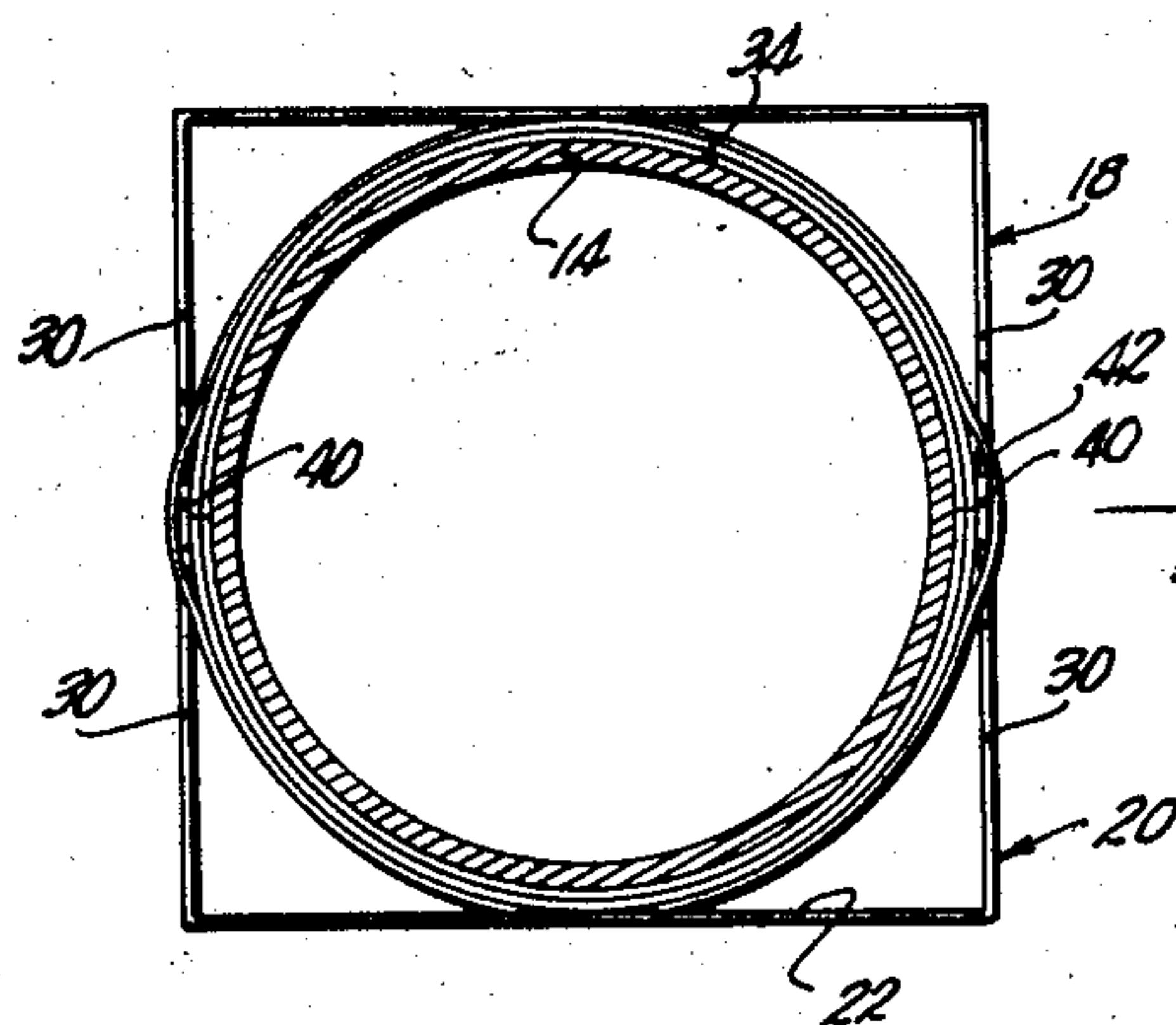
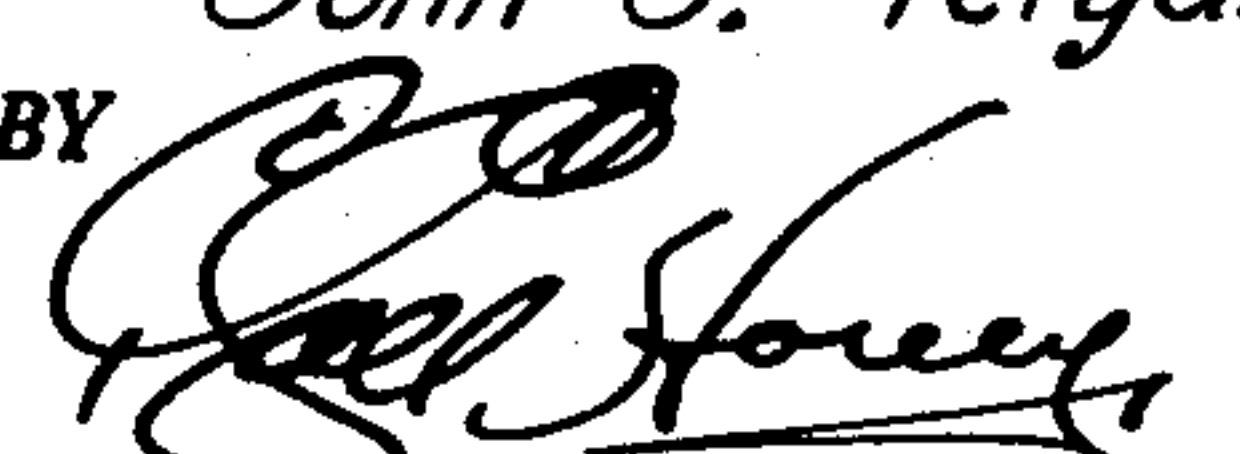


Fig. 6.

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## INTERLOCKING PIPE SHOES

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10 Claims. (Cl. 214—10.5)

This invention relates to improvements in structure for facilitating the handling, stacking and shipment of articles requiring protection from damage by virtue of their own weight, and has for its primary object the provision of means for individually suspending the articles at all times even including times of shipment in stacked relationship.

It is the most important object of the present invention to provide an improved shoe structure for use with elongated objects such as pipes, particularly those that are coated with a protective substance that is easily damaged during handling and shipment of the pipes, the shoe structure being adapted to not only individually suspend each pipe, but to hold the same out of contact with the adjoining pipes and against movement not only relative to the shoe structures themselves but relative to other pipes in the stack.

Another important object of the instant invention is the provision of a novel shoe structure made up of two parts adapted to be clamped on the pipe in gripping relationship thereto and provided with means interlocking the shoe sections themselves against relative movement when the same are bound tightly on the pipe.

Another important object of the instant invention is the provision of shoe structure of the aforementioned character that is so constructed as to permit the utilization of interlocking means in the nature of a key to hold a plurality of the shoe structures against relative movement when a number of pipes are stacked through use of the shoe structures thereon.

Another object relates to the way in which the shoe structures are made as to permit use of tying tapes not only to bind the sectional shoes on the pipe, but to tie together a plurality of shoes with their pipes suspended thereby, and even an entire load of pipes to prevent displacement during shipment.

A still further object of the instant invention is to improve upon the pipe shoe forming the subject matter of my copending application, Serial No. 399,876, filed December 23, 1953, this being a continuation-in-part thereof.

In the drawing:

Figure 1 is a fragmentary, side elevational view of a stack of pipes showing a pair of stacks of interlocking pipe shoes made pursuant to my present invention holding the pipes individually suspended.

Fig. 2 is an enlarged, cross-sectional view through a plurality of pipes showing the interlocking shoe structures therefor in end elevation.

Fig. 3 is a cross-sectional view still further enlarged, taken through a pipe having a protective coating thereon and through the lowermost section of the interlocking pipe shoe forming the subject matter of this invention.

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Fig. 4 is a perspective view of one of the shoe sections.

Fig. 5 is a side elevational view of one of the pipe shoes shown mounted on a pipe; and

Fig. 6 is a cross-sectional view similar to Fig. 3 but showing both sections of the shoe in elevation tied to the pipe, parts being broken away to reveal details of construction.

While the shoe structure forming the subject matter of the instant invention is designed primarily to prevent damage to a protective coating 10 commonly employed on pipes 12 used underground for conveyance of gas, oil and other fluids, it is to be understood that it may also be used in connection with pipes 14 that are devoid of the protective coating 10 and as are illustrated in Figs. 1, 2, 5 and 6.

Each of the interlocking pipe shoes shown in the drawing is broadly designated by the numeral 16 and includes an upper section 18 and a lower section 20. Since the two sections 18 and 20 are identical, but one will be described. It includes a base 22 composed of a pair of identical U-shaped elements 24 and 26, having bights 28 and spaced, parallel legs 30.

The legs 30 embrace a semi-cylindrical saddle member 32 having a convex surface that may rest directly upon the bights 28 and a concave surface that is lined with a suitable pliable substance such as heavy sponge rubber 34, the liner 34 being attached to the saddle member 32 in any suitable manner such as by use of an adhesive or cement.

Similarly, the saddle member 32 may be attached to the polygonal base 22 as by welding to the legs 30 and/or the bights 28.

As is clear in the drawing, the two U-shaped elements 24 and 26 of the base 22 are spaced apart to present a space therebetween adapted to receive an interlocking key 38 (Fig. 2) in the nature of a polygonal block that is preferably as thick as the width of space 36. Each section 18 and 20 is also provided with interlocking means in the nature of an ear 40 within the space 36 adjacent the free ends of one pair of legs 30 and extending beyond the proximal edge of the saddle 32 as seen in Figs. 4 to 6 inclusive.

It is seen that all of the identical sections 18 and 20 are interchangeable and that the same may be employed in pairs to present shoe structure 16 which completely circumscribes the pipe 14 when the edges of the saddles 32 and the free ends of the legs 30 are brought into abutting relationship as best seen in Figs. 2, 5 and 6.

The two sections 18 and 20 are thereupon bound or tied tightly to the pipe 14 through use of a relatively narrow tape 42 circumscribing the semi-circular saddle sections 32 and engaging the diametrically opposed ears 40 that hold the sections 18 and 20 against relative movement, all as shown in Fig. 6 of the drawing. When the tape 42 is applied, the liners 34 are compressed and the shoe structure 16 is held against all movement with respect to the pipe 14. The completed shoe structure 16, therefore, constitutes a cylindrical liner and a cylindrical saddle completely surrounding the pipe 14; together with a pair of spaced, rectangular bands each of which surrounds the cylindrical saddle.

It is preferred that each pipe 14 is provided with at least two shoe structures 16, depending upon the lengths of the pipes 14, and the pipes are thereupon stacked in units of four each, as shown in Fig. 2, with proximal bights 28 in interengagement and interlocked by



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virtue of key 38 in proximal spaces 36, key 38 serving to lock the four shoe structures 16 against relative movement, whereupon a tying tape 44 slightly wider than the tape 42, is used in the spaces 36 and around the four cylindrical saddles of the four shoes 16 when the latter are in interengagement, to tie together all four units. From Fig. 5 it can be ascertained that key 38 is preferably slipped into a locking position in aligned spaces 36 of a pair of shoe structures 16 when the same are positioned with their respective bights 28 in abutting relationship. Thereupon, another pair of shoe structures 16 having their respective spaces 36 in alignment are brought into position against the first mentioned pair of shoe structures 16 with the key 38 also disposed in adjacent, aligned spaces 36 of the second pair of shoe structures 16 to thereby preclude relative reciprocation of all four of the shoe structures 16. The four shoe structures 16 may then be described as being disposed in quaternary relationship with respect to key 38.

Finally, when a number of units of four pipes each are to be stacked for shipment within, or on a means of conveyance such as a truck or boxcar, a still wider tape 46 substantially as wide as the space 36, is used to tie together or bind the entire carload of pipes 14.

It is seen that when the pipes are provided with their protective coatings 10 as shown in Fig. 3 of the drawing, such coatings will be protected by the shoes 16 since each pipe is individually suspended and no pipe carries any of the load because the weight of all of the pipes are absorbed by the stacks of shoes 16. Use of the liner 34 permits clamping of the shoes 16 tightly to the pipe because of the compressibility of the material from which liners 34 are made and at no time can the pipes shift relative to their shoe structures. By the same token, the sections 18 and 20 cannot become displaced relatively because of the ears 40, and the keys 38 lock all of the shoes 16 against relative movement.

Manifestly, additional keys 38 may be used when assembling a carload of pipes 14 in the manner illustrated by Fig. 1 of the drawing. In the event the shoe structure is to be used solely in connection with pipes or the like wherein no protective coating such as at 10 is employed, the liner 34 may be omitted but in such instance it would be more difficult to hold the shoes 16 against rotative or longitudinal movement with respect to the pipes through use of the tying tape 42.

Details of construction particularly as regards the nature of base 22 may be varied and at the same time make use of interlocking means 38 and 40 within the spirit of this invention and it is, therefore, desired to be limited only by the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In combination, a plurality of stacks of superimposed, sectional shoe structures, each having an upper and a lower section and adapted to carry an article between the sections, each section including a semi-cylindrical saddle member, said members being in abutting relationship when disposed in their article receiving and carrying position, each of said sections having a pair of aligned spaces on each side of the member, said spaces being disposed in substantially perpendicular relationship to the axis of the member; and removable means disposed in adjacent aligned spaces of the shoe structures when four of the same are disposed in quaternary relationship with the axes of the cylindrical members being in substantially parallel relationship, said removable means precluding relative reciprocation of the shoe structures.

2. Shoe structure as set forth in claim 1 wherein said removable means is a rectangular component adapted to fit into said spaces in conforming relationship therewith.

3. In combination, a plurality of stacks of superimposed, sectional shoe structures, each having an upper

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and a lower section and adapted to carry an article between the sections, each section including a semi-cylindrical saddle member, said members being in abutting relationship when disposed in their article receiving and carrying position, each of said sections having a pair of aligned spaces on each side of the member, said spaces being disposed in substantially perpendicular relationship to the axis of the member; ear means on each of the sections and extending outwardly from the latter, each of said ear means being in alignment with the spaces on respective sections and disposed in one of the spaces of another section when a pair of the sections are disposed in said position; and removable means disposed in adjacent aligned spaces of the shoe structures when four of the same are disposed in quaternary relationship with the axes of the cylindrical members being in substantially parallel relationship, said removable means precluding relative reciprocation of the shoe structures.

4. In combination, a plurality of stacks of superimposed, sectional shoe structures, each having an upper and a lower section and being adapted to carry an article between the sections, each section including a semi-circular saddle member and a pair of spaced, substantially parallel, U-shaped elements joined to the saddle in embracing relationship thereto and presenting a pair of aligned spaces between the elements; an outwardly extending ear on each of the sections in alignment with the spaces thereof, said ear being disposed in one of the spaces of another section when a pair of sections are positioned with the saddle members and elements in abutting relationship; and key means removably disposed in adjacent, aligned spaces of the shoe structures when four of the same are disposed in quaternary relationship with the axes of each of the cylindrical members being in substantially parallel relationship to hold the same in stacked relationship and preclude relative reciprocation.

5. Shoe structure as set forth in claim 4 wherein each of said elements has a bight and a pair of legs disposed angularly with respect to its corresponding saddle member presenting a pair of substantially triangular spaces between the elements on each side of the member for receiving the key means.

6. Shoe structure as set forth in claim 5 wherein said key means is a rectangular plate, each corner of the plate being disposed in a corresponding, adjacent space of one of the shoe structures.

7. Shoe structure as set forth in claim 6 wherein said ear means consists of a rectangular, flat, relatively thin ear secured to the saddle member and extending outwardly from the edge thereof, said ear being positionable in an aligned, adjacent space of another section forming one of the shoe structures without interfering with entrance of an edge of the plate into the space.

8. In shoe structure of the kind described, a shoe section including a semi-cylindrical saddle member adapted to engage the outermost surface of an elongated pipe; a pair of initially flat bands, each band being bent to present a U-shaped element having a pair of parallel, spaced legs and a flat bight; means securing the bands to the member with the latter cradled between the legs of the elements, said bands being disposed in spaced relationship to present a pair of aligned, triangular shaped spaces, one on each side of the member and located in substantial perpendicular relationship to the axis of the member; and an ear secured to the member and extending outwardly therefrom in alignment with the spaces.

9. Shoe structure as set forth in claim 8 wherein there is provided resilient pad means on the concave surface of said cylindrical member for preventing damage to the outermost surface of pipe.

10. In shoe structure of the kind described, a pair of shoe sections adapted to receive a pipe therebetween, each of said sections including a semi-cylindrical member having a pair of linear edges, the edges of one of the sections being in abutting relationship with the corre-



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sponding edges of the other section when the shoe structure is on the pipe, there being a pair of initially flat bands for each section respectively, each of said bands being bent to present a U-shaped element having a pair of parallel, spaced legs and a flat bight, means securing 5 a pair of the bands to each member respectively with the latter cradled between the legs of the elements, said bands being disposed in spaced relationship to present a pair of aligned, triangular shaped spaces, one on each side of the member, and an ear secured to each of the 10 members respectively in alignment with its respective spaces, said ears extending outwardly from one of the linear edges of the members, the ears being disposed on

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opposite sides of the members whereby when the sections are in position on a pipe, the ears extend into adjacent aligned spaces on opposite sides of the sections.

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