

Jan. 2, 1923.

J. LEDWINKA.
DISK WHEEL.
FILED DEC. 28, 1918.

1,441,005

4 SHEETS-SHEET 1

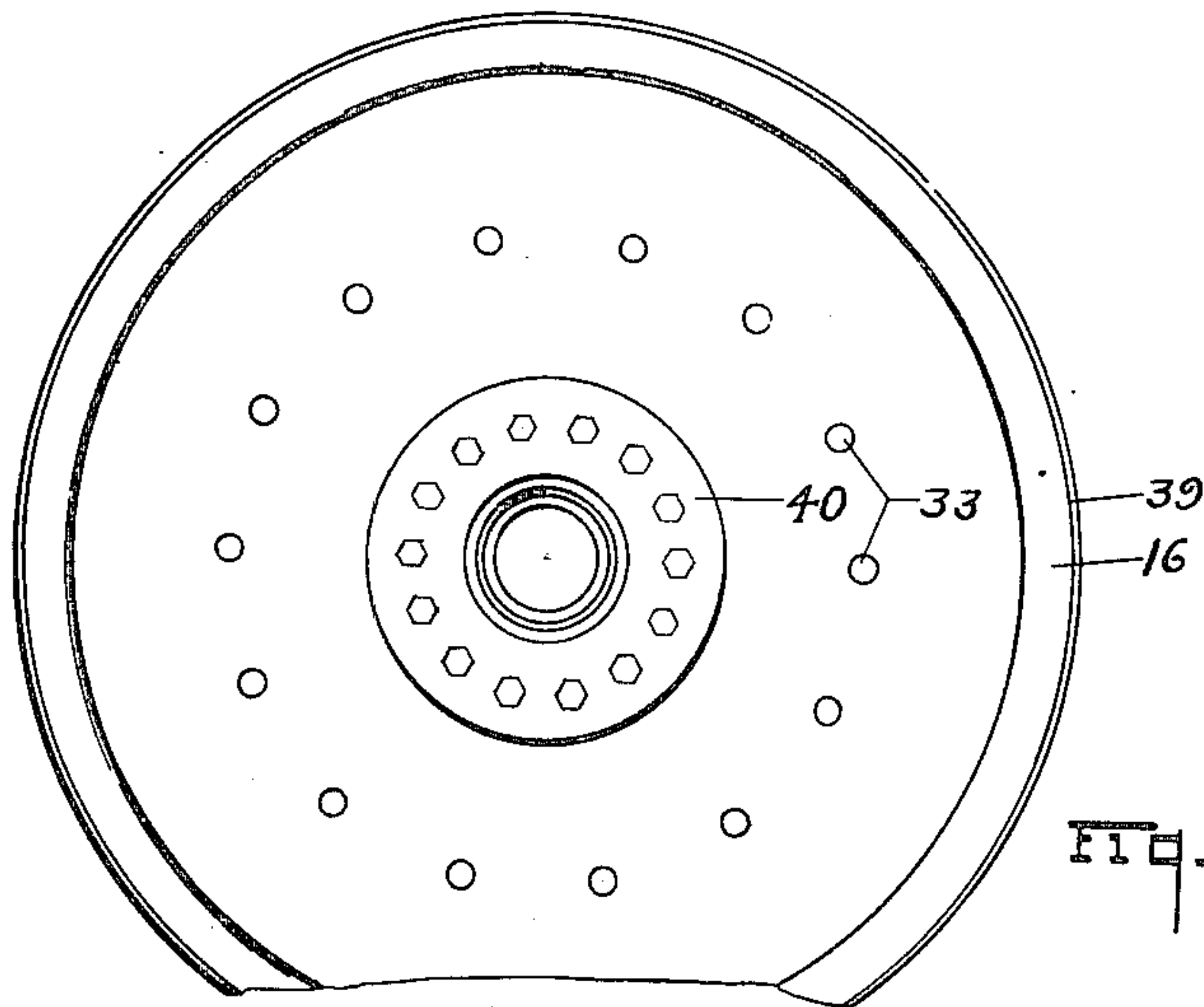


FIG. I.

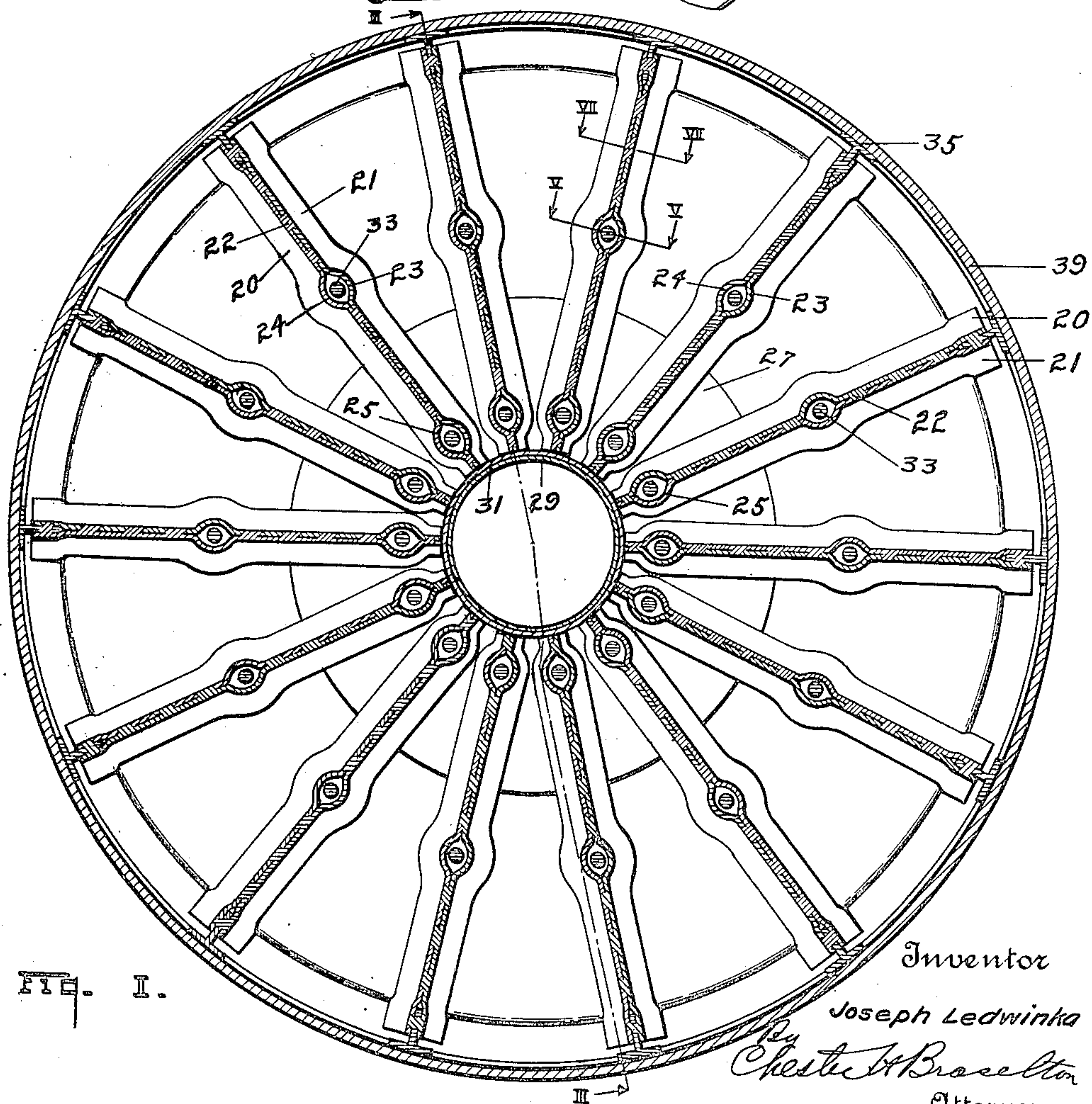


FIG. II.

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4 SHEETS-SHEET 2

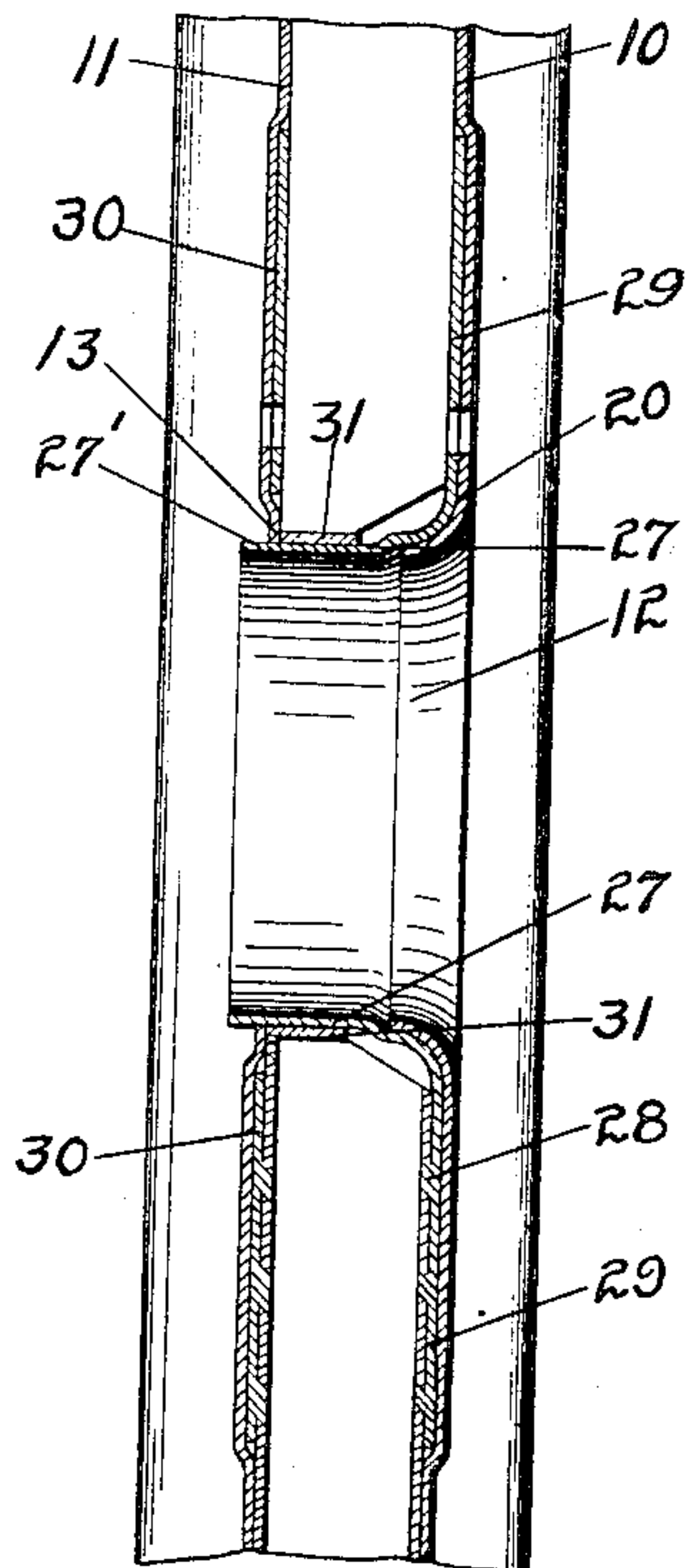


FIG. IV.

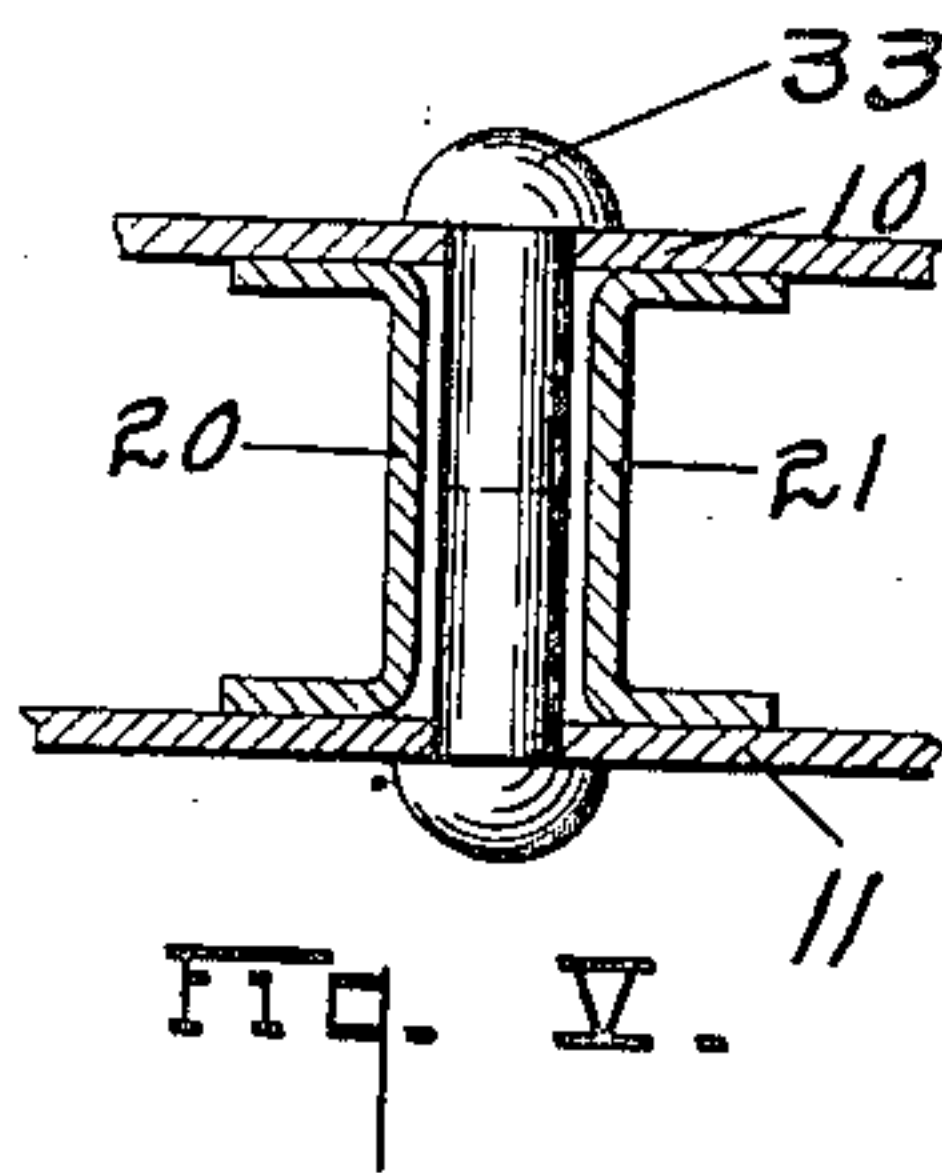


FIG. V.

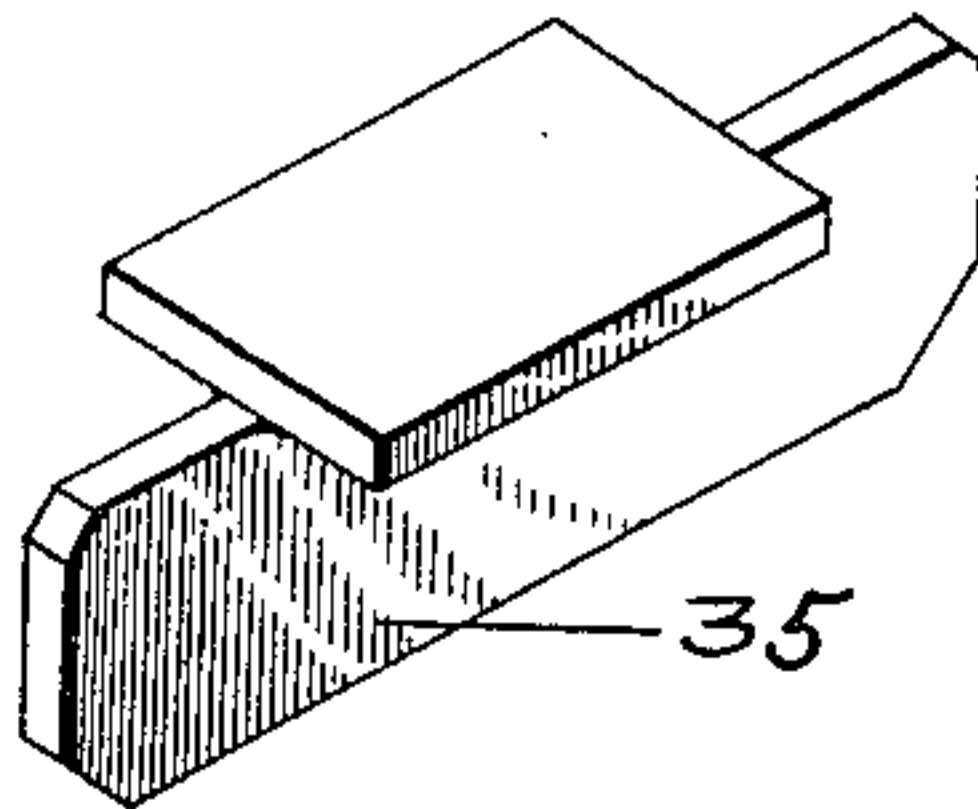


FIG. VI.

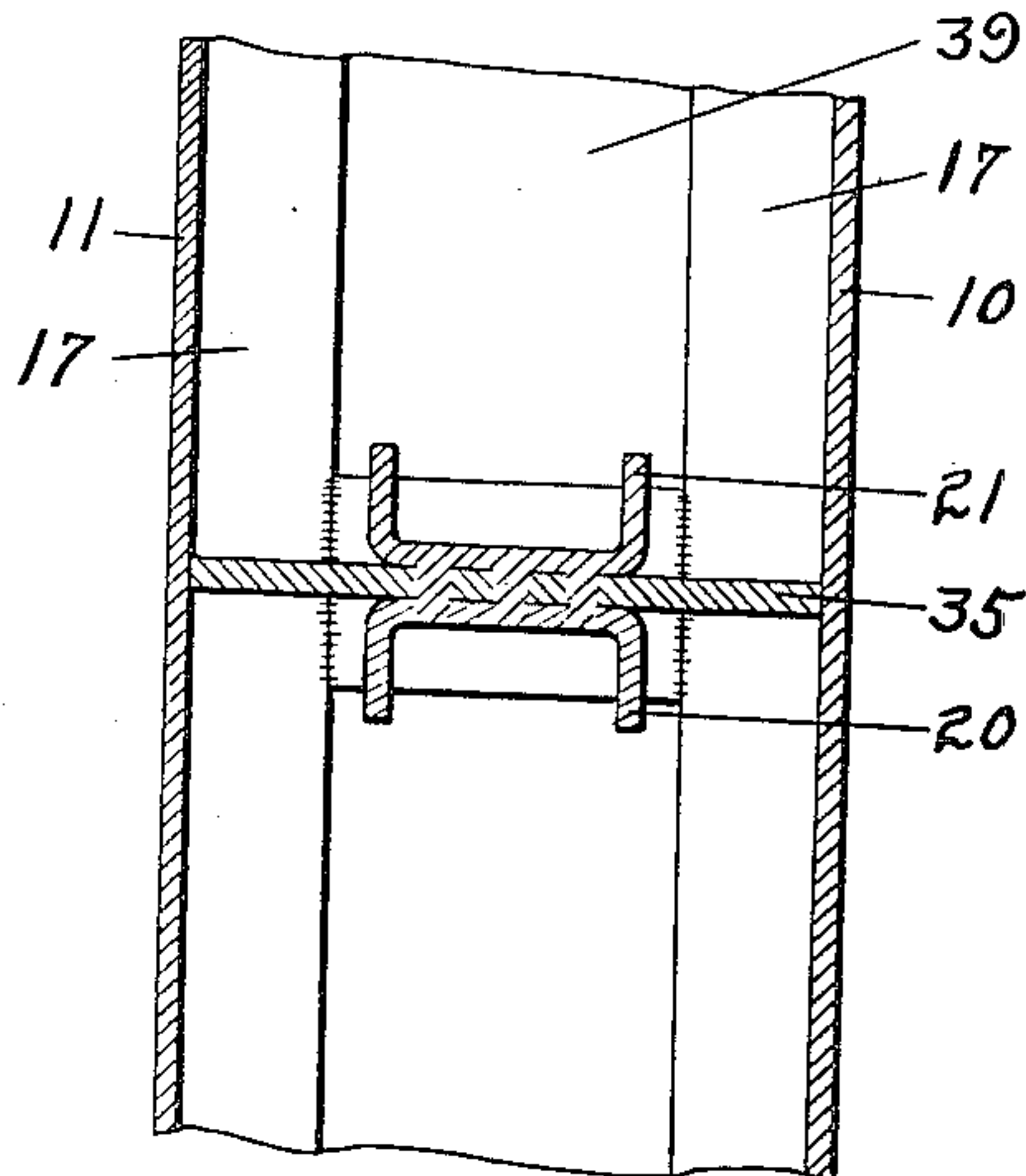


FIG. VII.

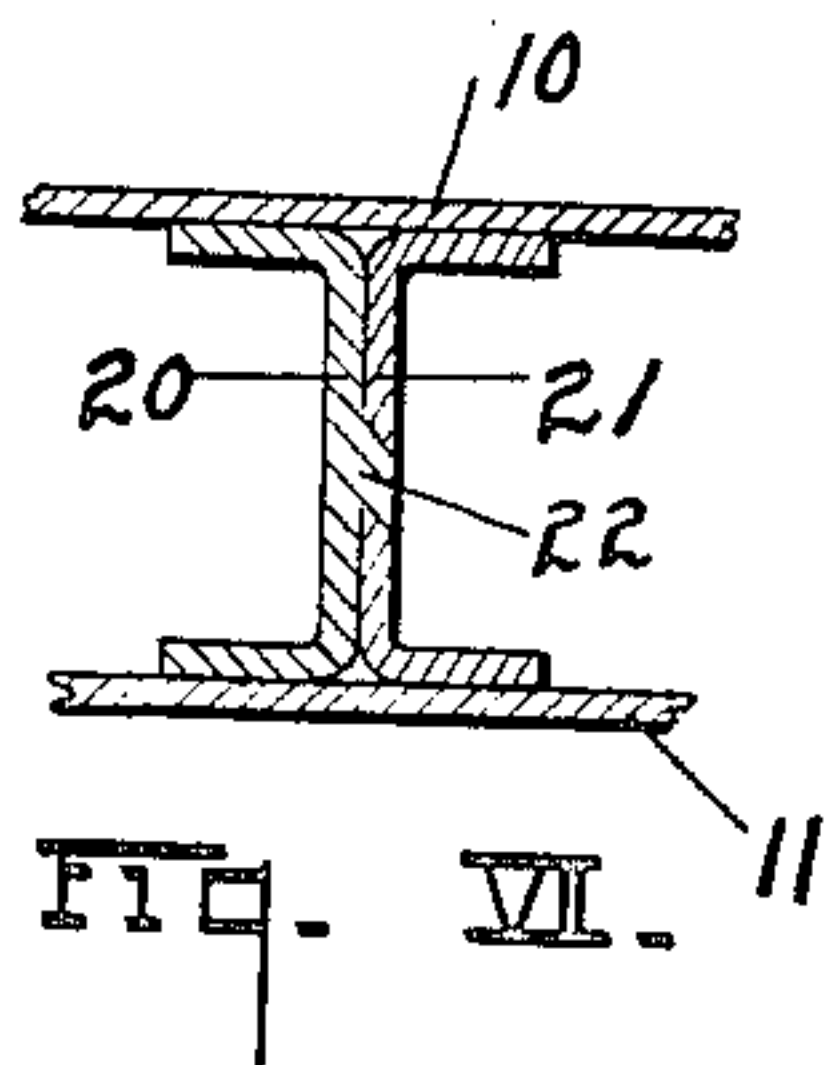


FIG. VIII.

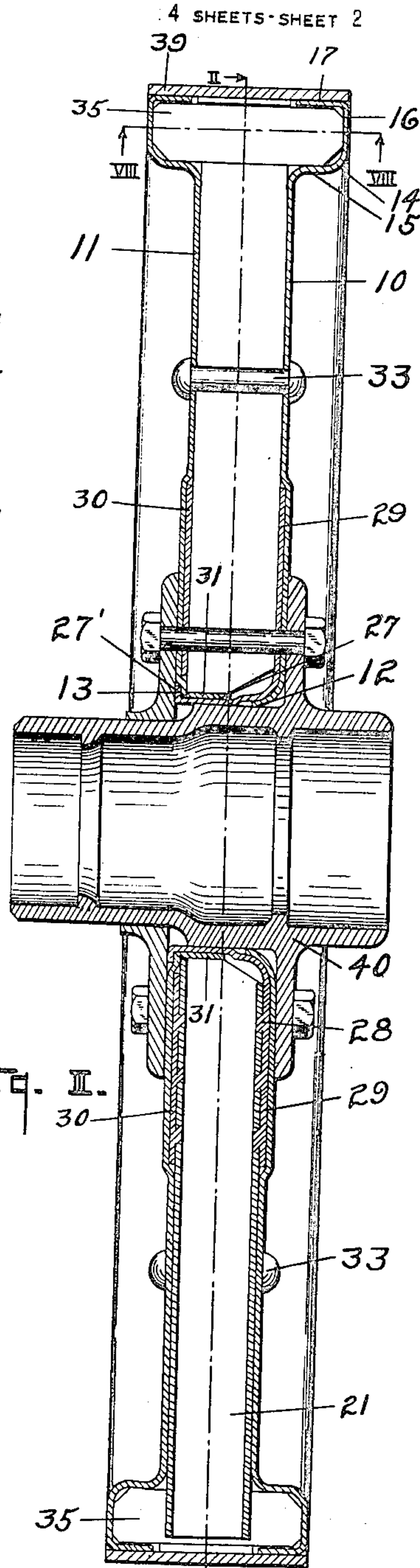


FIG. I.

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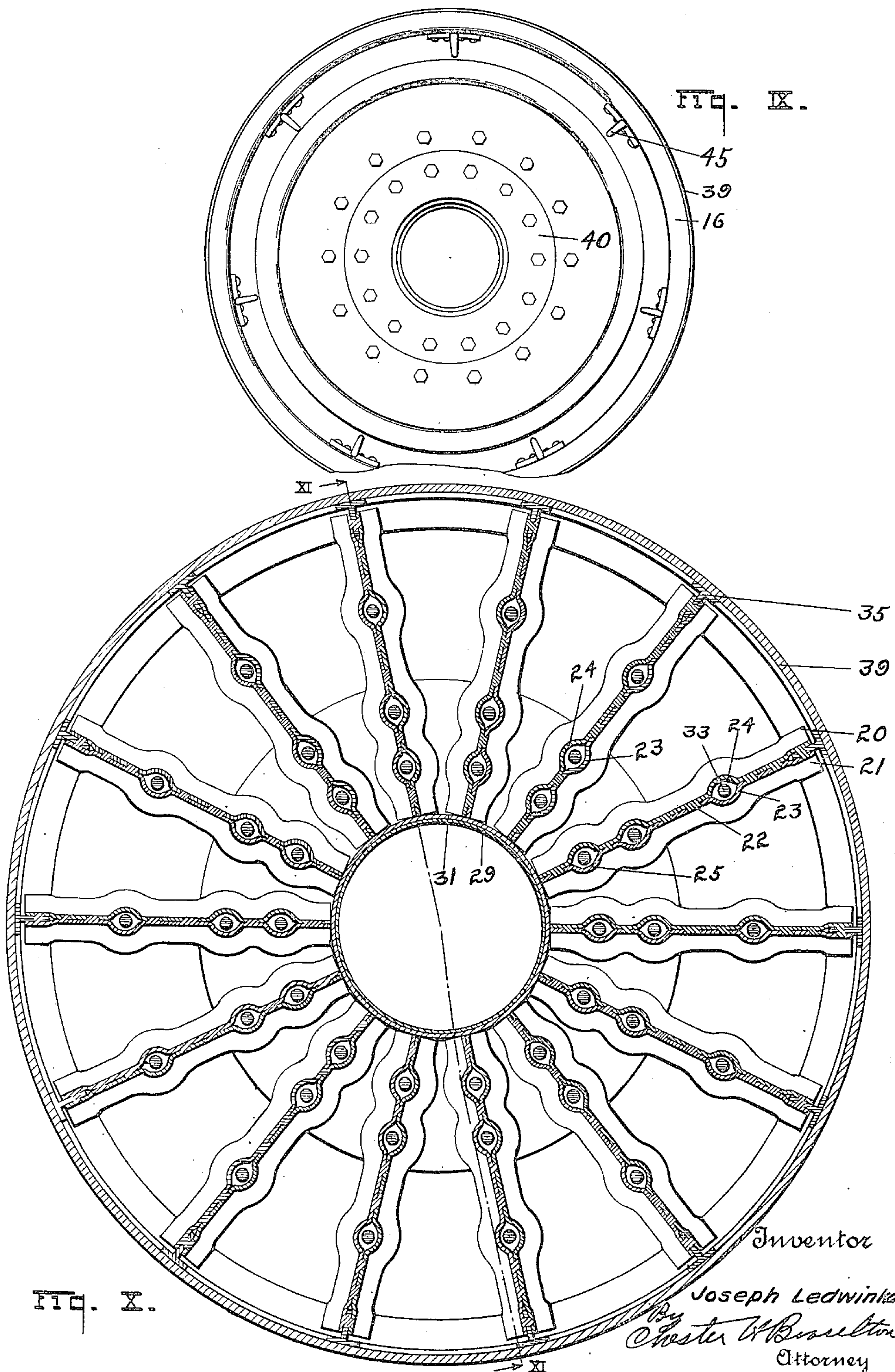
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4 SHEETS-SHEET 4

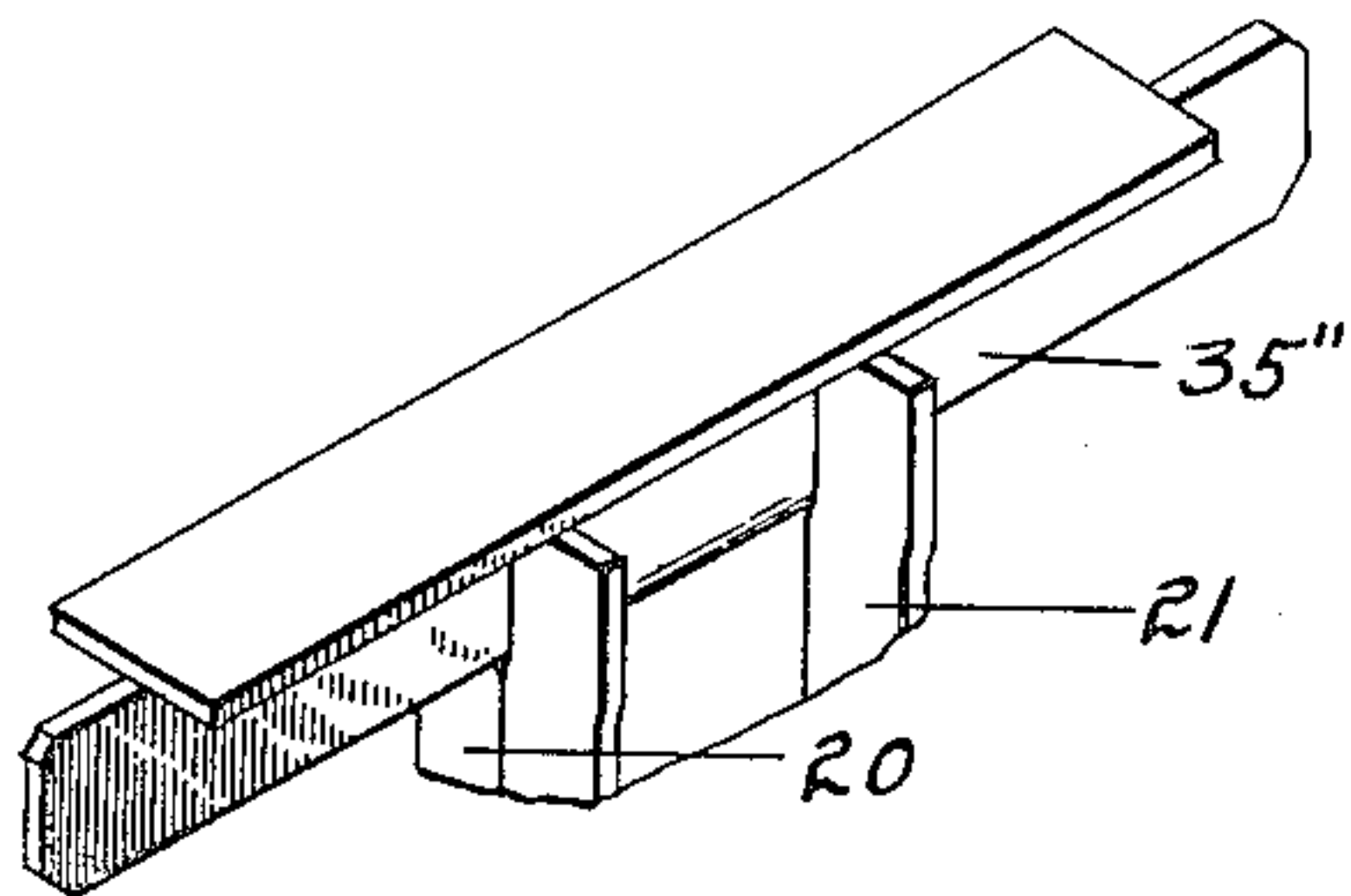


FIG. XI.

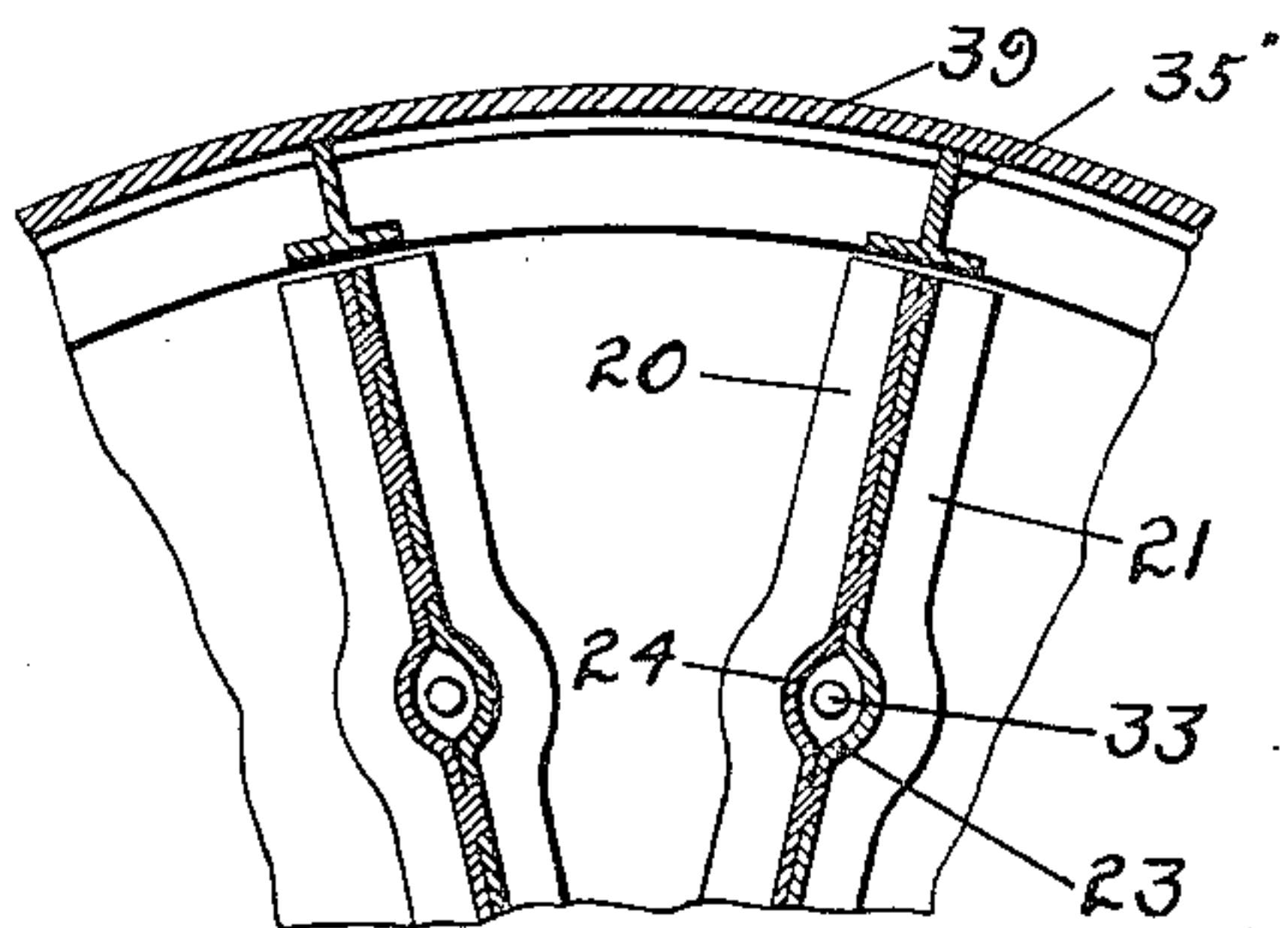


FIG. XII.

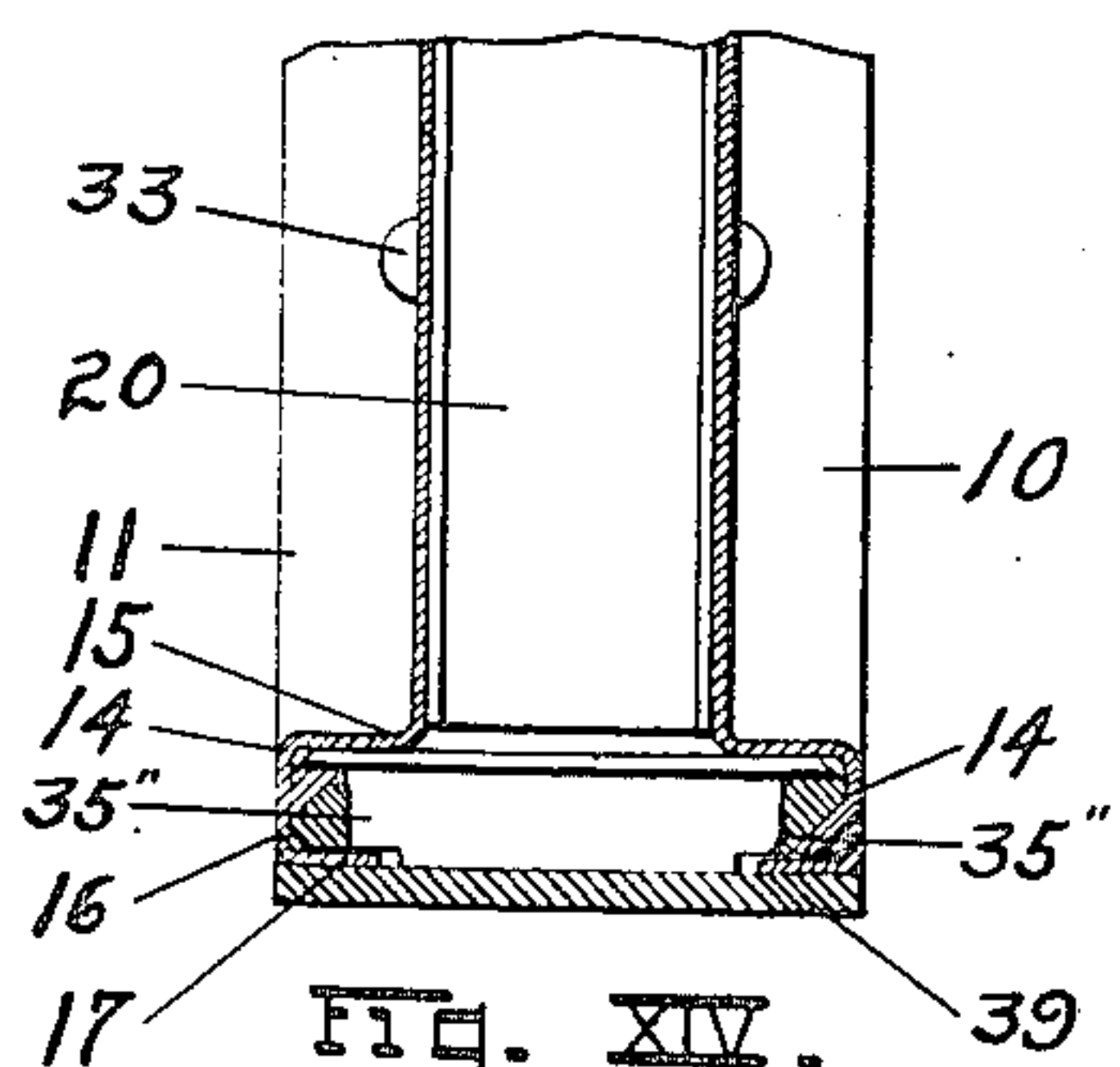


FIG. XIV.

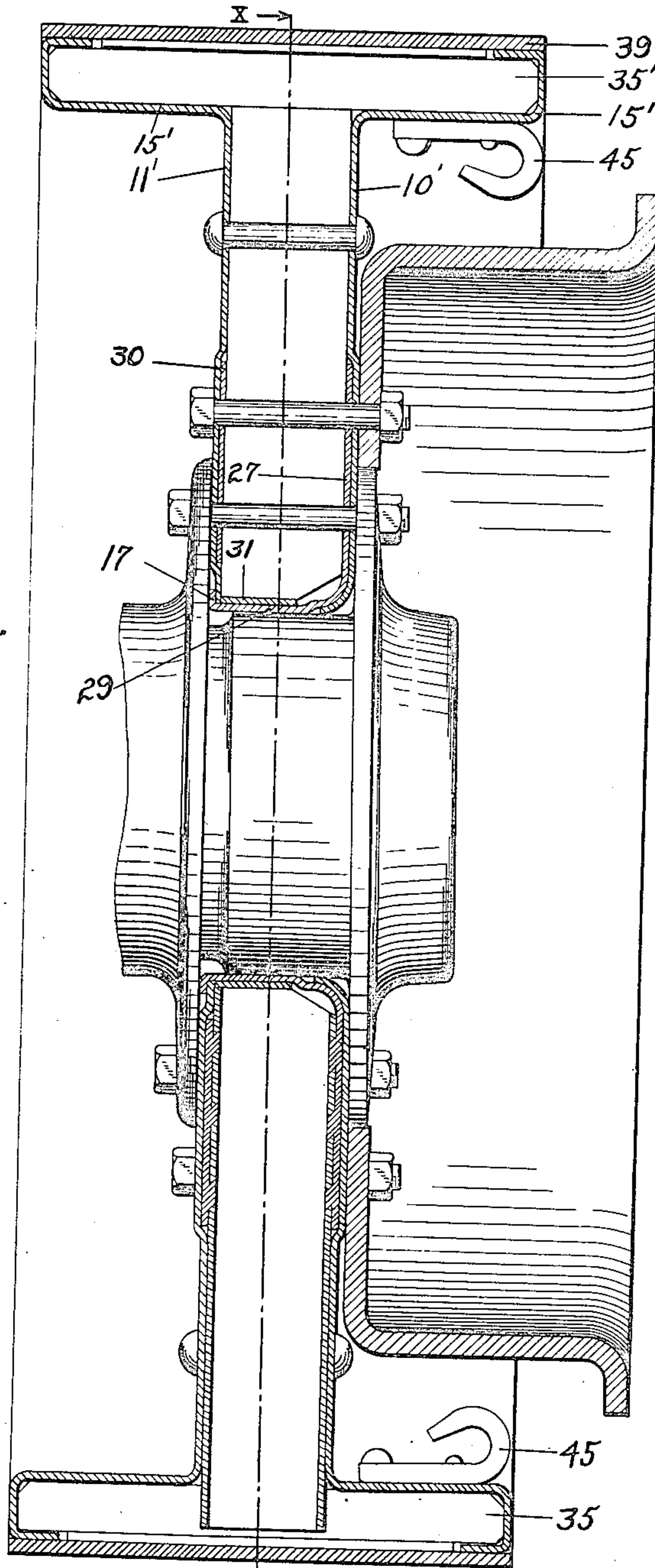


FIG. XI.

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By *Chester H. Braceton*

Attorney

UNITED STATES PATENT OFFICE.

JOSEPH LEDWINKA, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BUDD WHEEL COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DISK WHEEL.

Application filed December 28, 1918. Serial No. 268,752.

To all whom it may concern:

Be it known that I, JOSEPH LEDWINKA, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Disk Wheels, of which I declare the following to be a full, clear, and exact description.

The present invention relates to reinforced metal disk wheels, particularly adapted for use in connection with automobiles, trucks, tractors, and the like, the invention having for an object to provide an improved novel wheel construction of this character, in which a built-up construction is made of assembled units to produce a strong wheel composed of relatively light material. Further objects of the invention are to provide a novel type, particularly efficient for the purposes intended, and so constructed as to facilitate production and assembly of the same into unit and hence to the completed disk wheel, the unit being first completed before assembly of the same relative to a steel disk or disks making up the completed wheel.

A further object of the invention relates to the particular arrangement of reinforcement connecting the ends of the spokes with a periphery of the disk forming the wheel, thereby making a particularly efficient joint at this portion of the built-up structure and producing a particularly strong completed article, it being understood, however, that this latter feature may not be necessarily essential to the broad concept of the invention disclosed herein which includes the improved method of building a completed disk wheel having reinforcing spokes or reinforcing means associated therewith; the entire unit being made so as to facilitate the assembly and thus increase quantity production in an efficient manner.

Further objects of this invention relate to certain economies in the manufacture of the wheel, and certain details of construction, as will hereinafter appear from the detailed description to follow. I accomplish the object of my invention in certain instances by the devices and means described in the following specification, but it is to be understood that the invention may be widely varied without departing from the scope of

the same, as pointed out in the appended claims.

A structure constituting certain embodiments of my invention, one of which may be the preferred, is illustrated in the accompanying drawings in which:

Fig. I is a side elevation of one form of completed built-up disk wheel.

Fig. II is a transverse sectional view taken on the line II—II of Fig. III.

Fig. III is a sectional view taken on the line III—III of Fig. II.

Fig. IV is an enlarged sectional view showing the method of assembly of the built-up disk wheel structure.

Fig. V is a sectional view taken on the line V—V of Fig. II.

Fig. VI is a perspective view of one of the reinforcing elements extending between the radial spokes and the periphery of the disk.

Fig. VII is a sectional view taken on the line VII—VII of Fig. II.

Fig. VIII is a sectional view taken on the line VIII—VIII of Fig. III.

Fig. IX is an elevation of a rear wheel construction corresponding to Fig. I.

Fig. X is a sectional view taken on the line X—X of Fig. XI.

Fig. XI is a sectional view corresponding to Fig. III, taken on line XI—XI of Fig. X, showing the adaptation of the invention of the rear axle or rear wheel of an automobile.

Fig. XII is a perspective view of the connection between the spokes and the periphery of the metal disks of the wheel.

Fig. XIII is a sectional view of a modification of the invention, in which there is no connection between the ends of the radial spokes and the peripheries of the disks.

Fig. XIV is a sectional view transverse to Fig. XIII of this embodiment of the invention.

Referring to the embodiment of my invention illustrated in Figs. I to VIII inclusive, it will be seen that the invention comprehends two units, namely, a disk or a pair of disks and a spoke or spider unit acting as a reinforcing means therefor adapted to be constructed separately and then joined with the disk or disks, as the case may be. To this end I have shown, as a preferred embodiment, a pair of oppositely disposed disks

10 and 11, each of said disks being provided with a central opening 12 and 13 and with an enlarged channel shaped portion at the periphery thereof, indicated by the reference numeral 14, said channel formed by the fact that the body of the disk is turned outwardly to form a flange 15, extended radially as at 16 to form the base of the channel and inwardly turned at 17 to form the outer channel flange at the periphery of each of the disks.

The spoke unit or reinforcing spider assembly will now be described. The spoke elements per se are preferably formed by placing a pair of channel-shaped members 20 and 21 back to back, and spot welding the same as indicated at 22 at any number of places along the juxtaposed channel bottoms. At certain intervals on the spokes the two channel-shaped members are spread apart, as indicated at 23 and 24 to form a circular opening extending transversely of the spokes and adapted to receive rivets for joining the built-up structure to the disk wheel as will hereinafter appear. Likewise adjacent to the central-portion of the wheel the spokes are similarly spread apart, as indicated at 25 to form means for passing through a bolt for securing the wheel to the hub thereof.

Referring to Figs. III and IV, it will be seen that there is provided a sleeve member 27 which is secured to one face of the several spokes in any suitable manner, as for example, by spot welding, the sleeve of the member extending transversely through the opening formed at the inner terminals of an assembly of several spokes of the unit, and the sleeve 27 being provided with an enlarged flange 29 made integral therewith to overlies the faces of the spokes and form the means to which the spokes are spot welded as indicated at 28. A suitable metal washer 30 is secured on the other face of each of these radial spokes in order to further bind the several spokes together and form a central hub portion composed of the sleeve 27 and its flange 29 on one side of the spokes, and the metal washer 30 on the other side thereof. Extending peripherally around the sleeve 27 is a ring 31, which may also be secured thereto by spot welding if desired. It is to be understood, of course, that any means for securing the parts together by riveting, bolting or otherwise, may be substituted for the spot welding referred to herein.

It will be noted from Fig. IV that before assembly with the disks 10 and 11 of the built-up wheel, the sleeve 27 extends straight through the washer 30, on the opposite side of the spokes to which the flange 29 of the sleeve is secured. It will be also seen that the construction thus described forms a spoke unit for the wheel.

The method of assembling the built-up wheel structure will now be described. A disk 10 with its flanged opening 12 upward, is laid down on a support and the completed spider unit formed of the plurality of radiating spokes, sleeve 27 and washer 30 secured thereto, is laid on the disk 10 with the sleeve 27 over opening flange 12, the sleeve 27 at the curved portion thereof between the sleeve proper and the extended flange 29 fitting snugly thereon. The other co-acting disk 11 is thereupon slid over the sleeve 27 and the spoke unit is thus enclosed between the two disks 10 and 11. The outermost portion of the sleeve 27 is then turned over to form the flange 27' binding the parts in position as illustrated in Fig. III, the wheel being placed in a press, and the press operated to flange the end of the sleeve 27 over the disk 11. It will thus be seen that the disk 11 is held together with the spider, consisting of the radiating reinforcement elements and the spokes located between the disks 10 and 11. Thereupon the rivets 33 may be passed through the disks 10 and 11 by insertion in the openings 23 and 24 formed in the radial spokes for that purpose. One suitable method of riveting is to upset one end of the rivet while hot, although any suitable means for riveting the disk and spoke units together may be employed.

It will be noted that there may be employed a reinforcement element located in the enlarged periphery of the disks, and connecting the disks with the radial spokes. One suitable construction for this purpose consists in the T-shaped member 35, shown in perspective in Fig. VI. This element is inserted at the end of the several spokes before the assembly of the spoke unit to the disks and spot welded in position, if desired. After assembly of the spoke unit between the disk in the manner just indicated, the T-portion of the reinforcement element may then be spot welded to the opposed flange 17 on each of the channels on the disks 10 and 11 in the manner illustrated in Fig. VIII. Any other means for securing the reinforcement element 35 between the spokes and the enlarged portion of the flanges on the disks 10 and 11 may be used.

After assembly of the wheel, the band 39 is shrunk on to the terminal flanges 17 of the disks and the wheel may be completed by assembly to a hub 40 in any desired manner.

The embodiment of the invention illustrated in Figs. IX, X, XI and XII is suitable for the rear wheels of a motor vehicle, differing from the embodiment just described in that there are provided more transverse openings in the spokes in order to permit the passage of bolts for securing to the face of the disk, the brake flange

or hub used with the wheel. Moreover, it will be noted that the flanges 15' of the disks 10' and 11' are made considerably deeper than the flanges 15 in the embodiment of the invention, illustrated in Fig. III, thereby giving a stronger construction and materially strengthening the entire built-up structure. In order to co-operate therewith, the T-shaped reinforcement elements 35', illustrated in Fig. XII, are enlarged accordingly and the entire structure is thereby materially strengthened throughout. It will be noted that the flange 15' has secured thereto a plurality of hooks 45 which are adapted to receive the non-skid chains used with the wheels.

In Figs. XIII and XIV, I have illustrated an embodiment of the invention in which the reinforcing members 35'' are not connected with the radial spokes of the construction but are simply welded into the channels 14 formed on the disks, and secured therein for the purpose of transversely reinforcing the peripheral edge of the disk. Moreover, in this embodiment of the invention these T-shaped elements are inverted, the T being located opposite the terminal of the spokes of the construction. Otherwise, the embodiment of Figs. XIII and XIV is substantially the same as that of Figs. I to VIII inclusive, and Figs. IX to XII inclusive.

While I have described my invention in more or less detail and as being embodied in certain forms, I do not desire or intend to be limited thereto, as on the contrary my invention contemplates broadly all proper changes in the form, construction, and arrangement of the parts, as well as the omission of certain elements and the substitution of equivalents therefor, such for example, as the omission of one of the disks 10 or 11 and it is evident that the construction may be otherwise modified, as circumstances may suggest or necessity render expedient.

Having thus described my invention, what I desire to secure by Letters Patent of the United States and claim is:

1. In a device of the class described, the combination of a pair of disks, reinforcing means between said disks, a sleeve connected centrally with said reinforcing means adjacent one of said disks and extending through the other of said disks, a washer associated with said sleeve and connected with said reinforcing means, and means to clamp said members together.

2. In a device of the class described, the combination of a pair of cooperating disks, each provided with a central opening, a spoke unit comprising a plurality of radial spokes, each of said spokes being provided with transverse openings therethrough, means independent of said openings to secure said spokes to one of said disks and

means passing through the openings in said spokes to clamp said spoke unit between the disks.

3. In a built-up disk wheel construction, the combination of a disk, a plurality of radiating spokes, and means for connecting the outer terminals of said spokes with the peripheral portion of said disk operative to reinforce said periphery against transverse strain.

4. In a device of the class described, the combination of a pair of co-acting disks, each of said disks being provided with an enlarged periphery, a plurality of reinforcing radial spoke members, each of said members being formed of two units, and a reinforcing and connecting element located between the two units of said spokes, and extending into the enlarged peripheral portion of each of said disks, and means for securing said members to said spokes and to said disks.

5. In a device of the class described, the combination of a pair of opposed disks, a reinforcing spider located between said disks, said spider consisting of a plurality of radial units forming spokes, each of said units being formed of channel members placed back to back and provided with flanges adapted to rest in contact with the inner face of each of said disks, and means to clamp said disks together with said reinforcing spider located therebetween.

6. In a device of the class described, in combination, a pair of opposed cooperating discs provided with central openings and enlarged peripheral portions, a reinforcing spider located between said disks, said spider being composed of a plurality of radiating spokes, each of said spokes being composed of opposed channel members placed back to back, provided with flanges on either side thereof, adapted to bear against the inner face of each of said disks, means located centrally of said spider to join said spider to one of said disks, means to join the other of said disks and said central means, and additional means for clamping said spider between said disks to form a built-up unit; said radial spokes being provided with connecting means joined to the enlarged peripheral portion of each of said disks.

7. In a device of the class described, the combination of a reinforcing spider including a plurality of radiating spoke members, a sleeve secured to said spider and extending axially thereof, and a disk secured to said spider and contacting therewith, said disk having a central opening through which said sleeve extends, the end of said sleeve being flanged outwardly over the outer face of said disk.

8. In a device of the class described, the combination of a reinforcing spider includ-

ing a plurality of radiating spoke members, a sleeve secured to said spider and extending axially thereof, and a pair of disks clamped together and enclosing said spider, one of said disks having a central opening through which said sleeve extends, the outer end of said sleeve being flanged over the outer face of said disk.

9. In a device of the class described, the combination of a reinforcing spider including a ring, and a plurality of radiating spoke members the inner ends of which abut said ring, and a disk connected to and contacting with the said spider.

10. In a device of the class described, the combination of a reinforcing spider including a ring, a plurality of radiating spoke members the inner ends of which abut said ring, and a sleeve connected to said spoke members and extending axially of said spider through said ring, and a disk secured to and contacting with said spider.

11. In a device of the class described, the combination of a reinforcing spider including a ring, a plurality of spoke members radiating therefrom the inner ends of which abut said ring, and a plate secured to the sides of said spoke members and having a central sleeve extending axially of the spider through said ring, and a disk connected to and contacting with said spider.

12. In a device of the class described, the combination of a reinforcing spider including a plurality of radiating spokes, a disk connected to and contacting with said spider, and reinforcing members connected to the

ends of said spokes and the periphery of said disk.

13. In a device of the class described, the combination of a reinforcing spider including a plurality of radiating spokes, a pair of disks disposed on opposite sides of said spider and connected together, and transverse bars secured to the ends of said spokes and connected at their ends to the peripheries of said disks.

14. In a device of the class described, the combination of a reinforcing spider including a plurality of radiating spokes, a pair of disks disposed on opposite sides of said spider and connected together, and transverse T-bars connected to the ends of said spokes and the peripheries of said disks, the base of each of said T-bars being outwardly presented.

15. In a device of the class described, the combination of a reinforcing spider including a plurality of radiating spokes, a pair of disks disposed on opposite sides of said spider and connected together, said disks having peripheral channels facing towards each other, transverse T-bars connected to the ends of said spokes and having their ends disposed in said channels and connected to said disks, the base of each T-bar being outwardly presented and disposed between the peripheral edges of said disks, and a rim mounted on said edges and T-bars.

In testimony whereof, I affix my signature.

JOSEPH LEDWINKA.