

Aug. 8, 1961

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2,994,918

DIE ASSEMBLY FOR PELLET MILLS

Filed Nov. 27, 1959

2 Sheets-Sheet 1

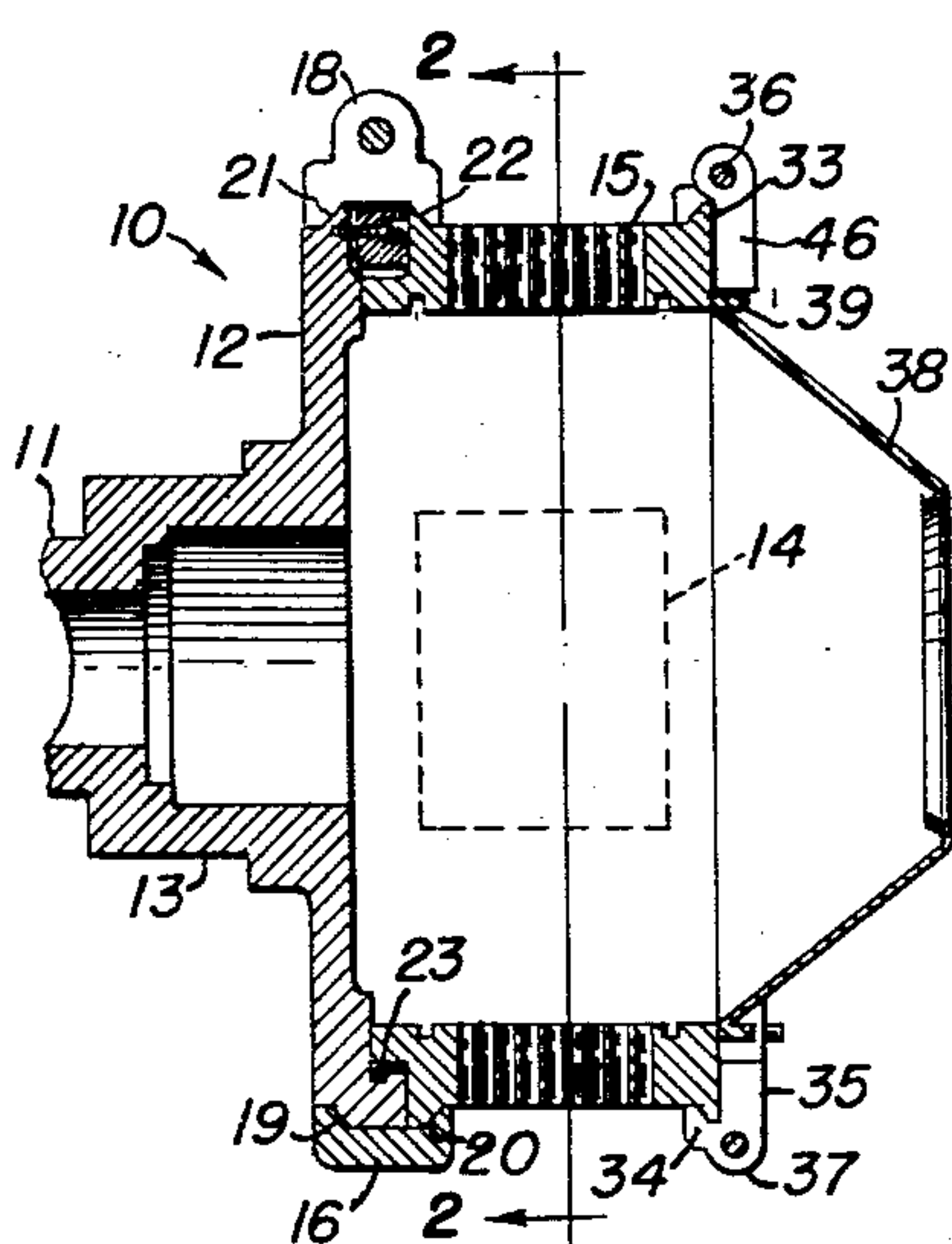


FIG. 1.

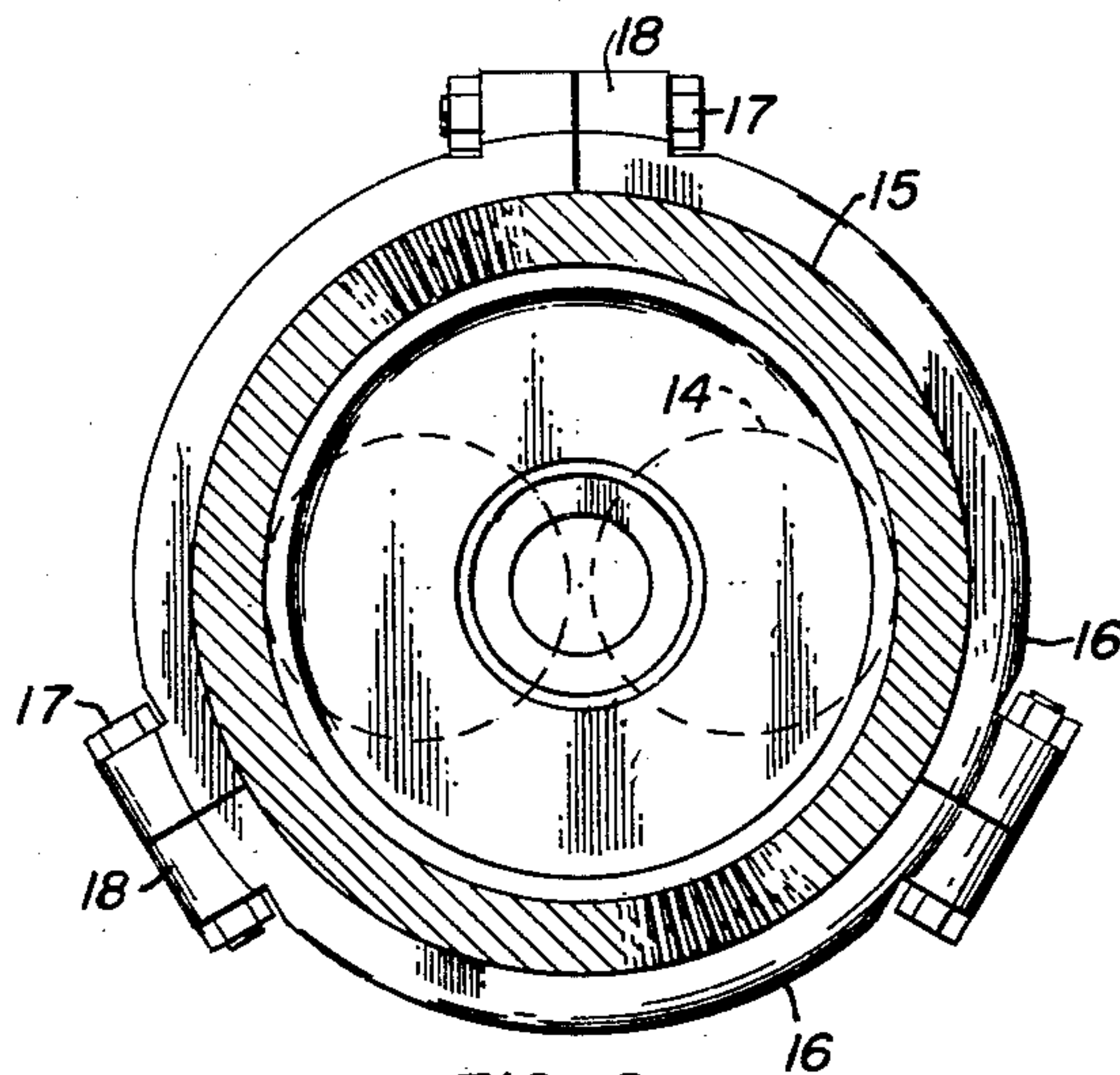


FIG. 2.

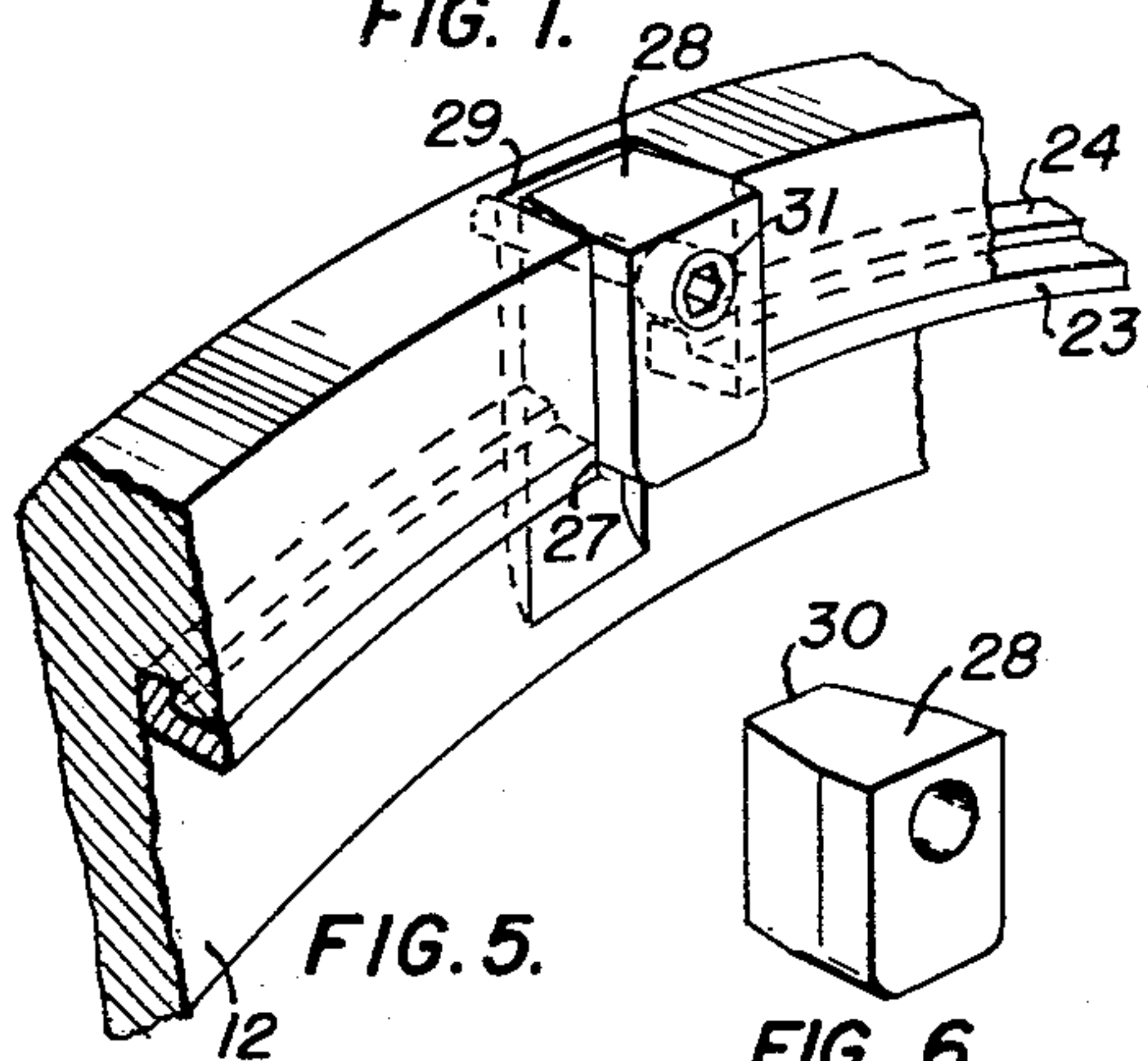


FIG. 5.

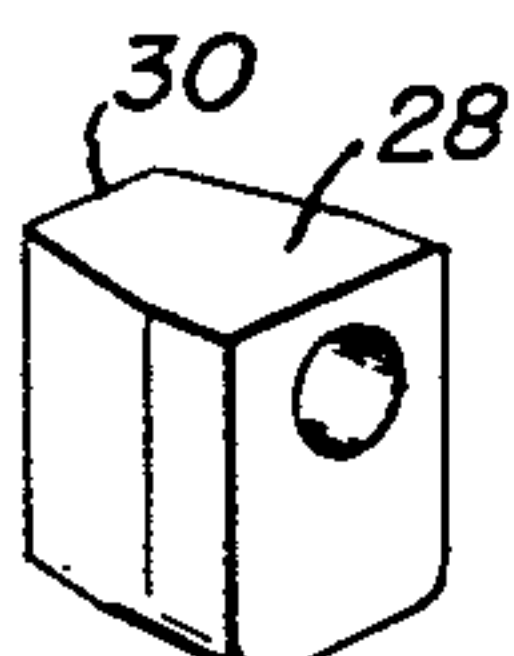


FIG. 6.

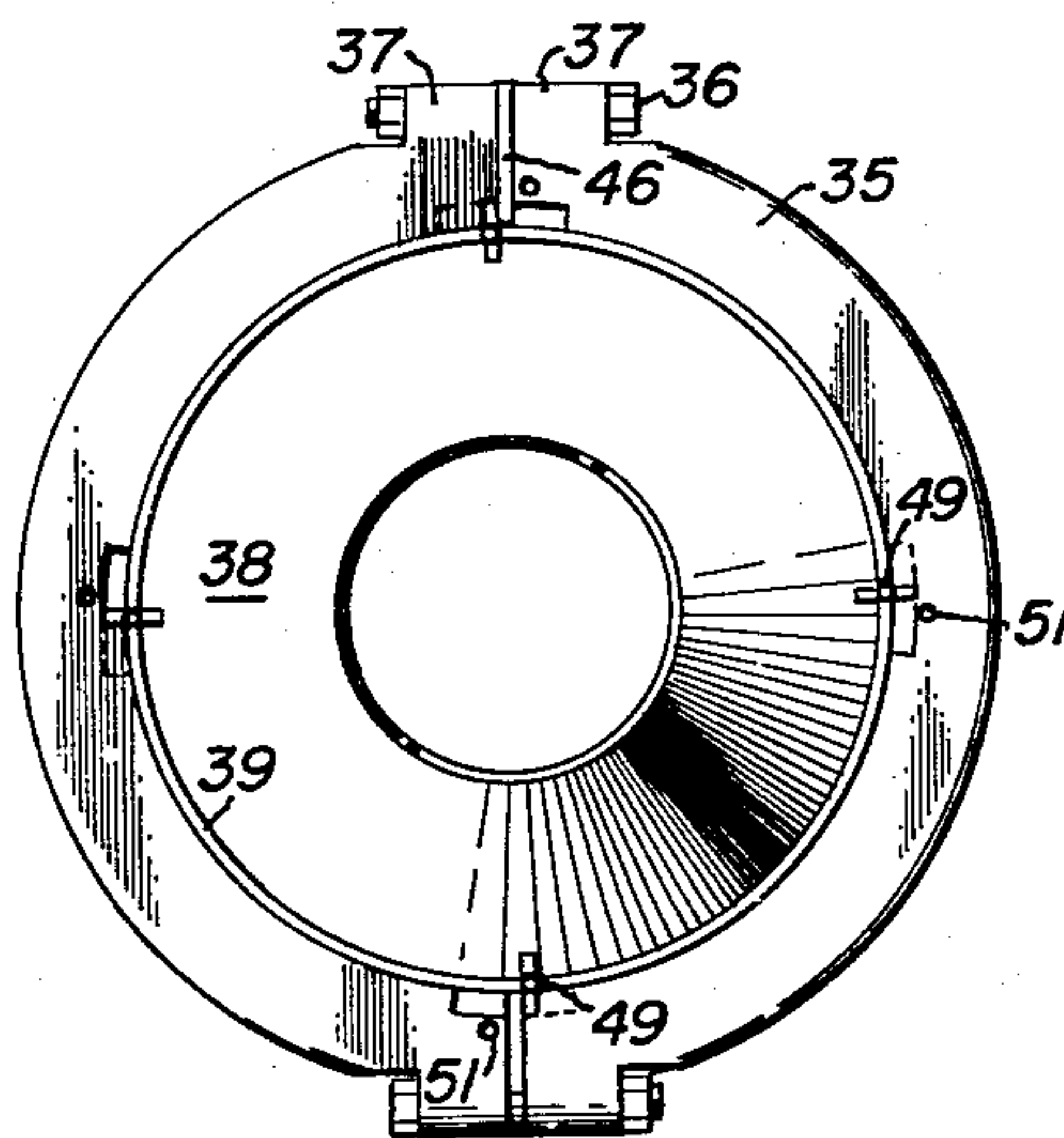


FIG. 3.

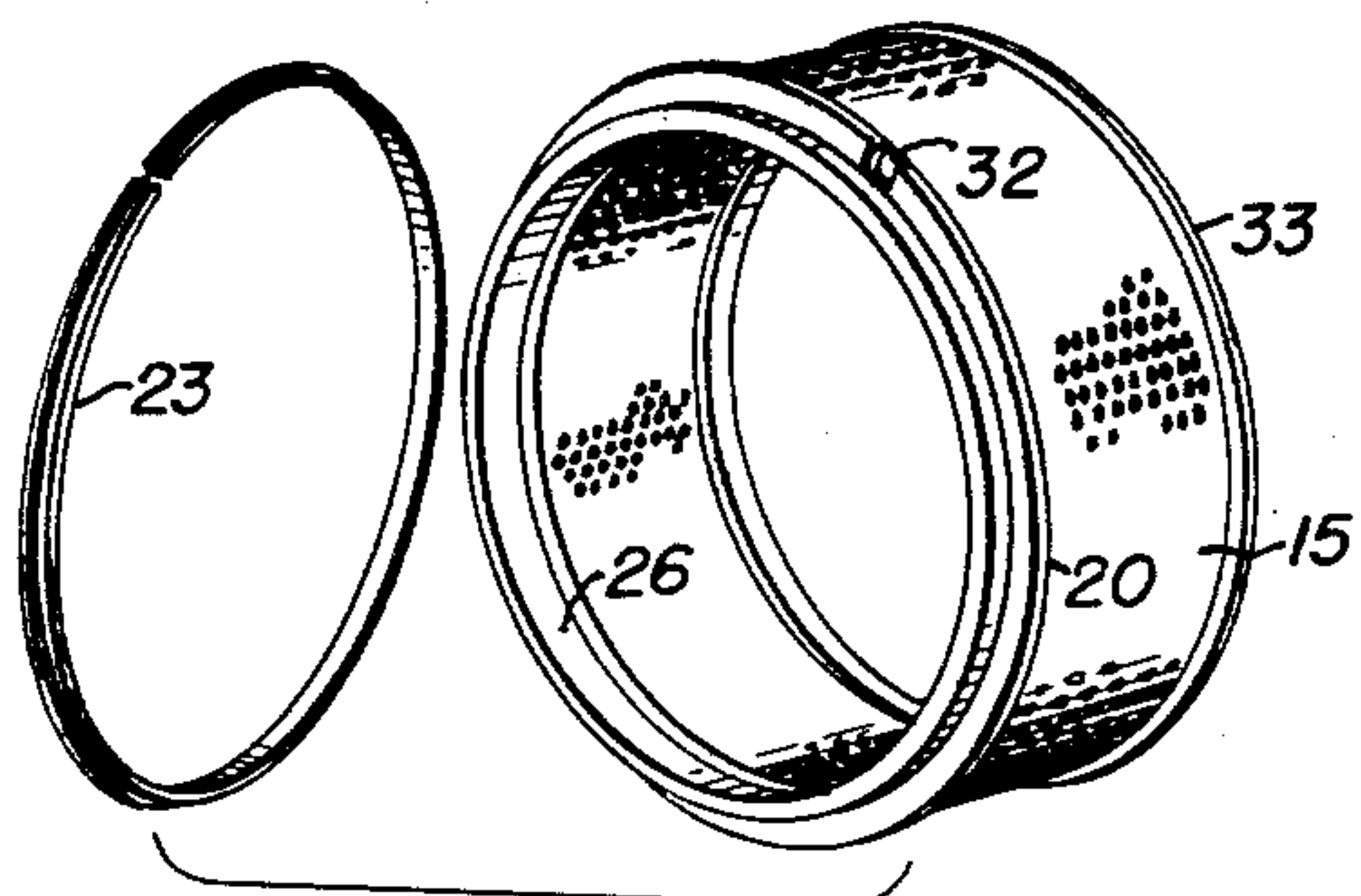


FIG. 4.

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DIE ASSEMBLY FOR PELLET MILLS

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Filed Nov. 27, 1959, Ser. No. 855,815

3 Claims. (Cl. 18—12)

This invention relates to pellet mills of the type wherein a cylindrical extrusion die rotates about a horizontal axis.

An object of the invention is to provide means for quickly and conveniently replacing dies and feeder cones mounted on a drive plate.

A particular object is to provide a circular renewable retaining bushing between the drive plate and the die for securing the latter against radial displacement and also lending to quick and convenient replacement of the die.

Another object is to provide means for quickly removing and replacing the feed cone when access to the rollers within the die is necessary.

Another object is to provide a die clamp which will secure the die against both lateral and radial thrusts, thus reducing die breakage.

A further object is to provide, in addition to the above referred to bushing, locking means for securing the die and drive plate against relative turning movement, thus eliminating the use of bolts for that purpose, which bolts were subject to shearing.

These and other objects will become apparent from the following description and accompanying drawing, wherein:

FIGURE 1 is a sectional view taken along the axis of a pellet mill die assembly embodying the features of the invention.

FIGURE 2 is a transverse sectional view taken on line 2—2 of FIGURE 1.

FIGURE 3 is an end elevation of FIGURE 1 showing the feed cone in place.

FIGURE 4 is an exploded perspective view of the die and retaining bushing.

FIGURE 5 is an enlarged broken perspective view of a portion of the drive plate and retaining bushing, together with locking means therefor.

FIGURE 6 is a perspective view of the locking wedge comprising a part of the locking means illustrated in FIGURE 5.

FIGURE 7 is an enlarged broken perspective view of a part of the mechanism for detachably securing the feed cone in place.

FIGURE 8 is a broken elevation of a portion of the cone and cone clamp, together with the application of a wrench for securing these two parts.

FIGURE 9 is an inside elevation of the feed cone.

FIGURE 10 is an enlarged broken perspective view of the drive plate, retaining bushing and one of radial die knock out holes in the face of the drive plate.

FIGURE 11 is a broken transverse sectional view of the assembled die and drive plate, together with the application of a tool for engaging and separating these parts, and

FIGURE 12 is a perspective view of the wrench first illustrated in connection with FIGURE 8.

In the drawings, the numeral 10 generally designates a die assembly mounted on a driven tubular shaft or quill 11 and circular drive plate 12 integral therewith. The hub 13 between the quill 11 and drive plate 12 is enlarged to receive a bearing, not shown, which, in turn, supports die rollers 14, indicated by means of dotted lines in FIGURES 1 and 2. The cylindrical extrusion die 15 is secured around the face of the drive plate 12 by means of a circular die clamp 16 which is divided into at least three segments and joined by bolts 17 extending through in-

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tegral clamp bosses 18. The peripheries 19 and 20 of the drive plate 12 and die 15 are beveled at 45° to engage corresponding bevels 21 and 22 at the inner peripheries of die clamp 16.

5 A feature of the invention is directed to a circular retaining bushing 23 having a rim 24 therearound for engaging a correspondingly shaped projection 25 on the face of the drive plate 12. There is a corresponding circular projection 26 on the face of the die 15 for engaging the inner cylindrical surface of the bushing 23. (See FIGURE 11.) The bushing 23 is transversely divided at 27 to receive a combined wedge and locking key 28 therebetween. The drive plate 12 is recessed at 29 to receive the tapered end 30 of the wedge 28, the latter being secured in place by a headed bolt 31 which passes through a drilled opening through said wedge. The wedge 28 is a size so that the base end thereof always projects from the face of the drive plate 12 where it is snugly received in a key slot 32 in the face of the die 15.

20 The outer periphery 33 of the die 15 is also beveled at 45° to engage a correspondingly beveled inner periphery 34 of a feed cone retaining clamp 35 which is divided into at least two segments and secured by bolts 36 through bosses 37 at the ends thereof. The feed cone 38 has an outwardly projecting rim 39 therearound, and which rim includes L-shaped lateral projections 40 adapted to be received within corresponding recesses 41 in the clamp's inner periphery. As shown in FIGURE 7, that portion 42 of the recess 41 in one end of a segment of the clamp 35 is wide enough to receive the L-shaped projection 40, and the adjoining segment is offset and recessed, as at 43, to receive the outwardly extending and laterally extending sides 44 and 45 of the said projection. A latch 46 is pivotally mounted on the bolt 36 between bosses 37, and which latch is of a length so as to engage the outwardly extending side 44 when the projection is fully received in the recess 41 and rotated therein. The latches 46 are secured in their locking positions by tightening the bolts 36. To facilitate the rotation of the projections 40 in recesses 41, a wrench 47, such as illustrated in FIGURES 8 and 12, may be provided. The wrench 47 includes a recess 48 in the end thereof adapted to engage a cylindrical lug 49 on each L-shaped projection 40, and a cylindrical projection 50 inwardly of the wrench recess 48, and which last referred to projection 50 is adapted to be received in a circular opening 51 in each segment of the clamp 35. It is to be noted in FIGURE 3 that the latches 46 are provided only between segments of the clamp 35, and that the last described cylindrical lugs 49 and circular openings 51 may be provided for applying the wrench 47.

50 As shown in FIGURES 10 and 11, radial knockout slots 52 may be provided in the periphery and face of the drive plate 12 whereby a wedge type tool 53 may be applied for removing the die 15 after the die clamp 16 has been removed.

55 In view of the foregoing description, it will be apparent that the described die assembly is capable of being readily assembled and disassembled. It will also be apparent that the retaining bushing 23 is capable of being expanded by tightening the bolt 31 and forcing the wedge 28 between the bushing ends 27. Thus, in the event of wear, the bushing 23 may be expanded to take up any slack between the drive plate 12 and die 15.

60 The feed cone 38 may be readily removed without removing the die 15 by loosening the bolts 36 in the cone clamp 35, pivotally removing the latches 46 from their engagement with the projections 40 on the cone 38 and rotating the cone in a direction so that the cone projections may be lifted from the undercut recesses 41 in the cone clamp. The described wrench 47 may be used for carrying out the last described operation.

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The invention is not limited to the construction herein shown and described, but may be made in many ways within the scope of the appended claims.

What is claimed is:

1. In a pellet mill die assembly, a circular drive plate, a cylindrical extrusion die positioned against the face of said drive plate, circular projections around and on opposing faces of said drive plate and said die, the projection on said die face being of a smaller diameter than the diameter of the projection on said drive plate whereby one said projection is adapted to be received within the other, an expansible bushing received between said projections, said expansible bushing is transversely divided, and a wedge threadedly secured to said drive plate and positioned between the division in said bushing.

2. In a pellet mill die assembly including a cylindrical extrusion die supported on a drive plate, a feed cone positioned against the face of said die opposite said drive plate, a segmental clamp around the adjoining peripheries of said die and said cone, L-shaped projections on the periphery of said cone adapted to engage correspondingly shaped recesses in said clamp at the ends of the segments thereof, and latches pivotally mounted between the segments of said clamp and positioned to engage said L-shaped projections.

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3. In a pellet mill die assembly, a circular drive plate, a cylindrical extrusion die positioned against the face of said drive plate, circular projections around and on opposing faces of said drive plate and said die, the projection on said die face being of a smaller diameter than the diameter of the projection on said drive plate whereby one said projection is adapted to be received within the other, an expansible bushing received between said projections, said expansible bushing being transversely divided, a wedge threadedly secured to said drive plate and positioned between the division in said bushing, beveled peripheries around adjacent edges of said drive plate and said die and a clamp having beveled peripheries at the inner edge diameters thereof engaging the beveled peripheries of said drive plate and said die.

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