

A. J. SANFORD.
GLASS GRINDING APPARATUS.
APPLICATION FILED MAY 2, 1904.

3 SHEETS—SHEET 1.

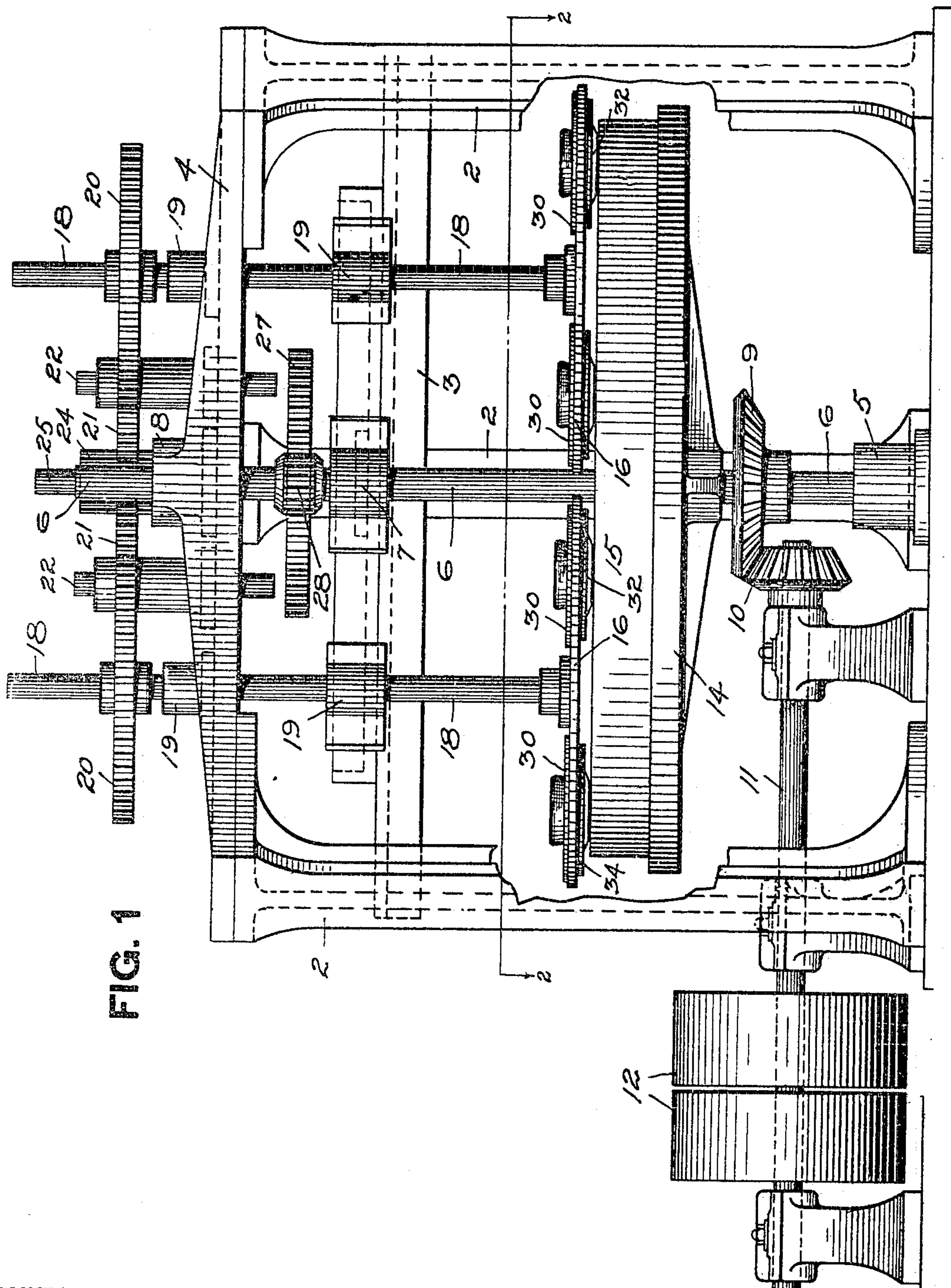


FIG. 1

WITNESSES.

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INVENTOR.

Andrew John Sanford,
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Attorneys

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3 SHEETS—SHEET 2.

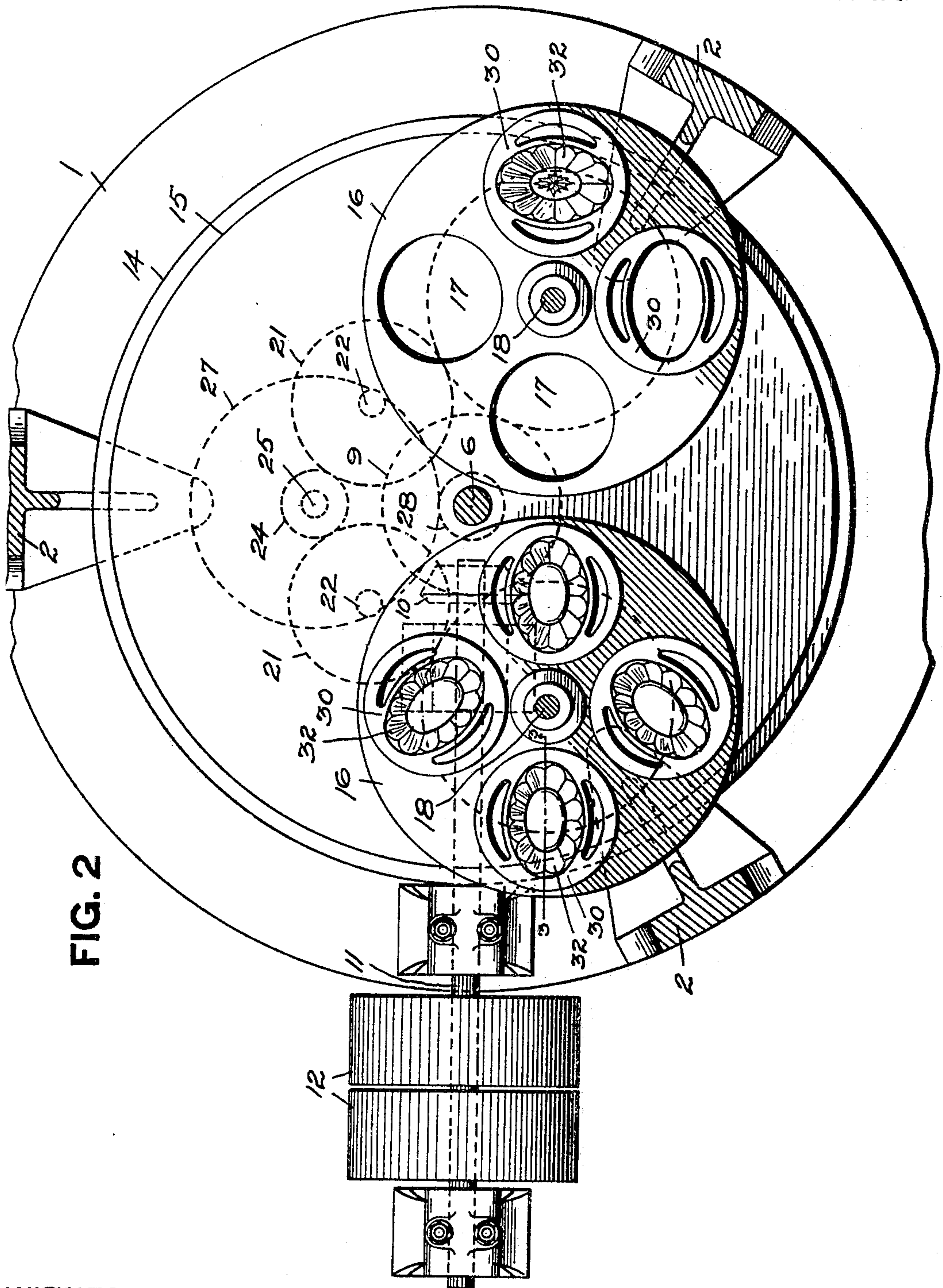


FIG. 2

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No. 799,193,

PATENTED SEPT. 12, 1905.

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3 SHEETS—SHEET 3.

FIG. 3

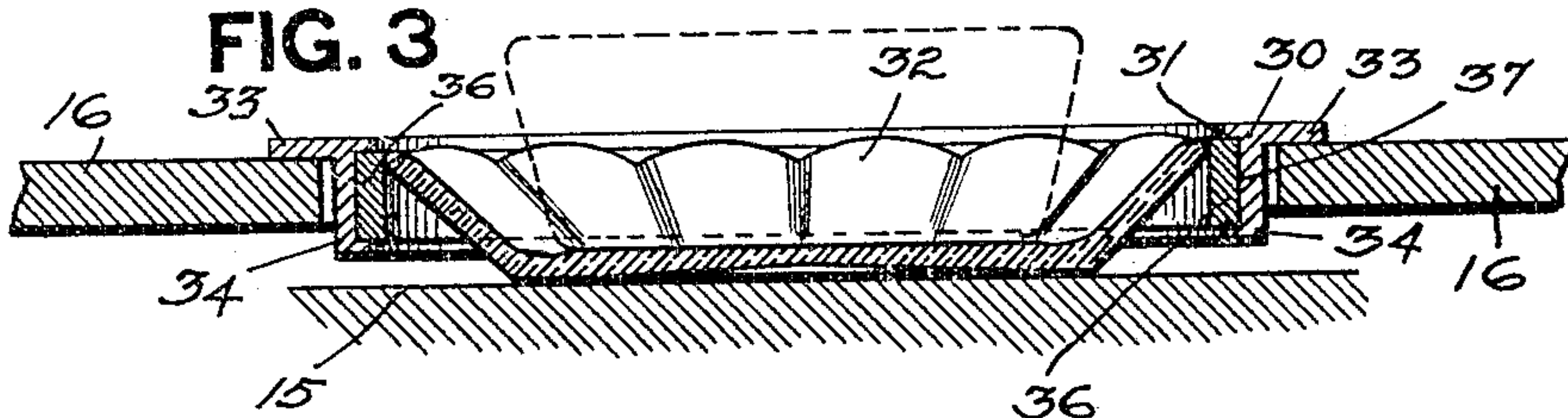


FIG. 4

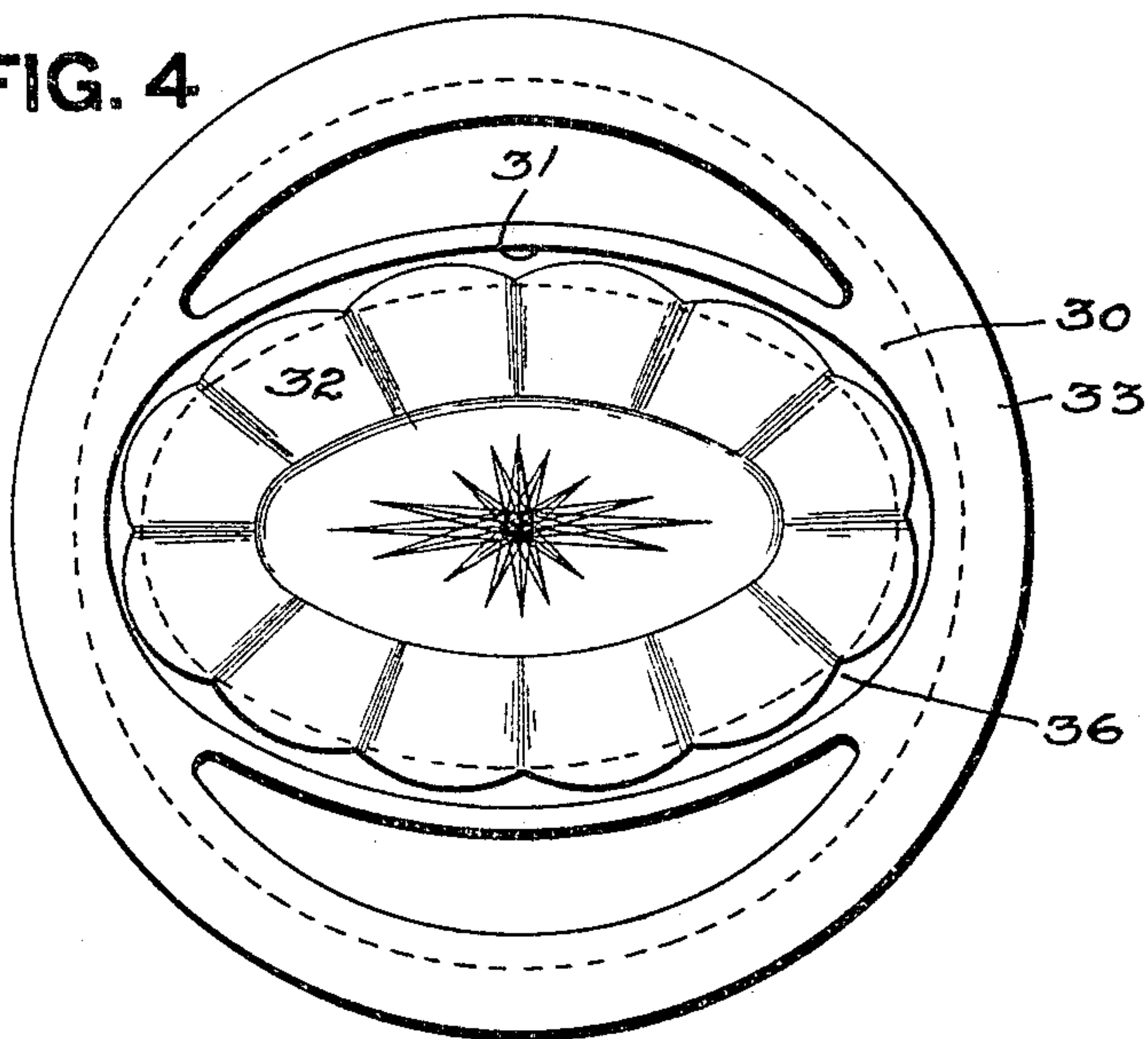


FIG. 6

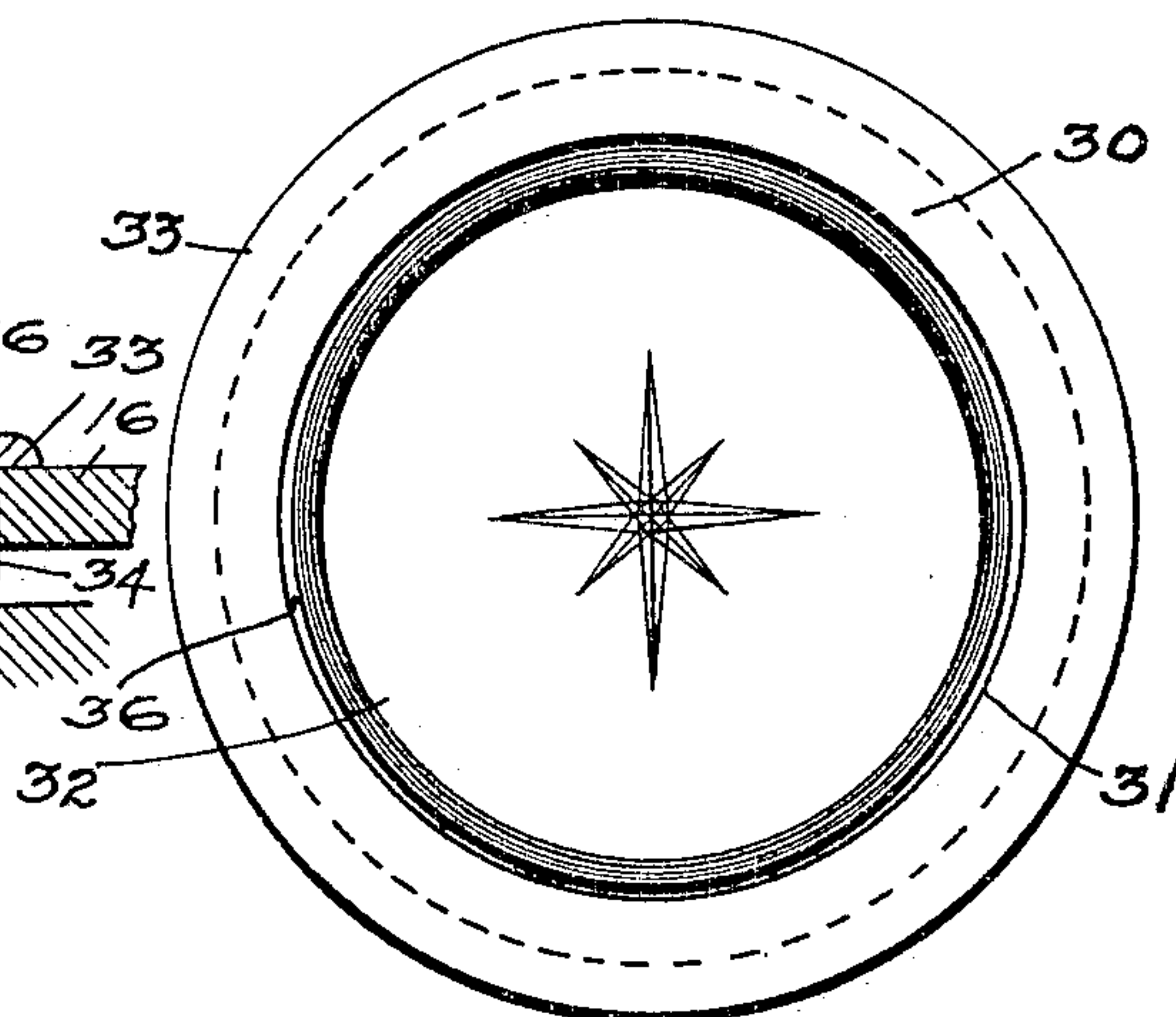
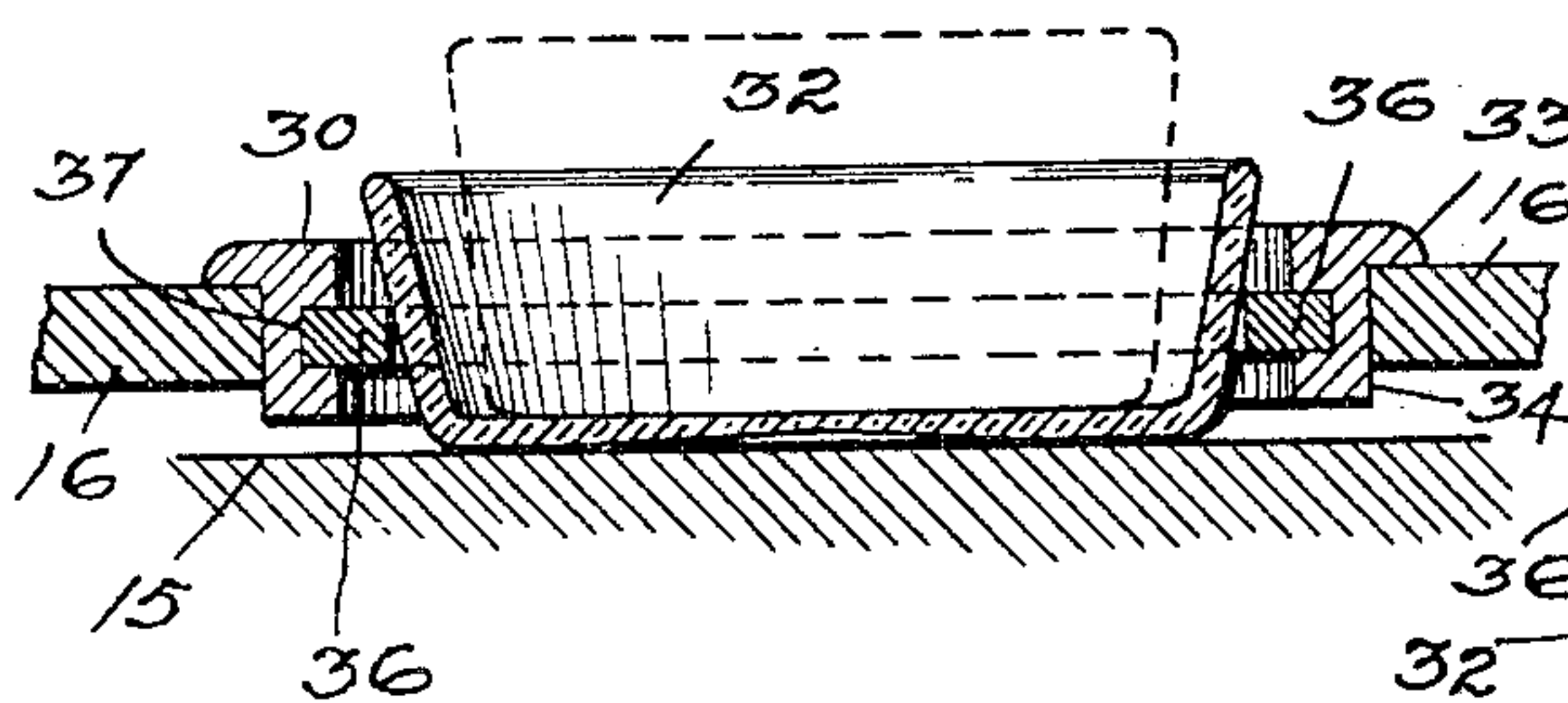


FIG. 5



WITNESSES.

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UNITED STATES PATENT OFFICE.

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GLASS-GRINDING APPARATUS.

No. 799,193.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed May 2, 1904. Serial No. 205,951.

To all whom it may concern:

Be it known that I, ANDREW JOHN SANFORD, a resident of Newark, in the county of Licking and State of Ohio, have invented a new and useful Improvement in Glass-Grinding Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to grinding apparatus, and more especially to apparatus for grinding glassware and similar articles.

The object of my invention is to provide means whereby ordinary types of glass-grinding machines, such as tumbler-machines, may be used for grinding the glassware commonly known as "flat ware."

In the manufacture of pressed glassware the pressing and reheating process leaves on the bottom of the article more or less pronounced fins, ribs, and other projections which must be removed by grinding. In the case of tumblers and a few other practically cylindrical articles this grinding has been accomplished by means of machinery. The type of machine in most general use for this purpose comprises a horizontally-arranged stone rotated at a high speed and a disk or disks located above the stone and slowly rotated in a direction opposite the rotation of the stone, which disk or disks are provided with openings therethrough into which the tumblers or similar articles are set with their bottoms resting upon the rapidly-rotating stone. The disks hold the tumblers from being carried around by the stone and also carry them slowly in the opposite direction, the combined effect of the stone and disks imparting rotation to the tumblers. While such machines have been in quite general use for grinding tumblers and a few other practically cylindrical articles, they have been found unadapted for grinding flat ware, such as plates and other low flat dishes. This is due to the fact that the disks of such machines are comparatively thin, so that only a shallow bearing is presented, against which the edges of the article must rest. As the latter are low and flat, they are liable to slip underneath the disk between the same and the grinding-stone, and this results in either breaking the article or at least grinding it so irregularly that it has to be discarded. This liability is increased by the fact that the top surface of the stone is seldom, if ever, true, as it generally wears away irregularly, and as a consequence the article rises and falls slightly during the grinding

process, and the thin disks have not a bearing-surface of sufficient height to permit of any appreciable rise and fall of the article. For these reasons grinding-machines of the character described have never been adapted for grinding flat ware, and such ware has heretofore been ground only by holding it by hand against the sides of vertically-rotating stones. This work is quite tedious and slow, and the labor incident thereto adds considerably to the cost.

The object of my invention is to provide an improved holder to cooperate with the disk of a grinding-machine of the character described and which is to be used in the grinding of flat articles to prevent the difficulties just referred to.

To this end the invention consists in providing a supplemental ring which is to be set into an opening or openings in the disk and which is provided with a bearing-surface of sufficient height to permit the article to freely rise and fall due to unevenness of the stone, and also has a portion projecting downwardly into close proximity to the grinding-stone, so as to prevent flat articles from getting underneath the disk and between the same and the stone.

The invention also consists in certain details of construction, such as providing the ring with an oblong opening for receiving oblong articles and also in providing the same with a cushioning-ring for preventing the edge of the article from being injured.

In the accompanying drawings, Figure 1 is a side elevation of a machine having my invention applied thereto. Fig. 2 is a horizontal section on the line 2 2, Fig. 1. Fig. 3 is a vertical section on the line 3 3, Fig. 2, on an enlarged scale. Fig. 4 is a plan view of the holding-ring on an enlarged scale. Fig. 5 is a vertical sectional view showing a modification, and Fig. 6 is a plan view of the ring shown in Fig. 5.

My invention is applicable to any type of grinding-machine having a rotating stone and a disk cooperating therewith and provided with openings therethrough for receiving the article to be ground. In Figs. 1 and 2 is shown one type of such machine, this having, however, been selected largely for purposes of illustration, and it will be understood that any other suitable machine may be used instead.

The grinding-machine shown comprises a suitable base 1, having erected thereupon a frame comprising standards 2 and cross-frames

or spiders 3 and 4. On the base 1 is provided a suitable bearing 5, in which is stepped the lower end of a vertical shaft 6, whose upper end is guided in suitable bearings 7 and 8, secured, respectively, to the horizontal frames 3 and 4. The shaft 6 will be driven by any suitable mechanism, such as having secured thereon a bevel-gear 9, meshing with a similar gear 10 on the horizontal shaft 11, which is provided with belt-pulleys 12. Also secured to the shaft 6 is a table 14, to the top of which is secured the stone 15, which may be either a disk of metal or a natural or artificial stone, as is now the custom.

Coöperating with the upper surface of the stone 15 are one or more disks 16, two such disks being shown, and which are provided with one or more openings 17, four such openings being shown in each disk extending through said disks and in which the articles to be ground are placed with their lower faces resting on the upper face of the stone 15. The disks 16 are slowly rotated and preferably in a direction contrary to the rotation of the stone 15. Any suitable mechanism for this purpose may be employed. In the drawings the said disks are shown secured to the lower ends of shafts 18, which are mounted in suitable bearings 19 in the cross-frames 3 and 4 and which have secured to their upper ends spur-gears 20. Each of these gears meshes with an idle gear 21, mounted on a stub-shaft 22, mounted in the top cross-frame 4. The idle gears 21 in turn mesh with a pinion 24, secured to the upper end of a vertical counter-shaft 25, mounted in suitable bearings in the cross-frames 3 and 4, and having secured near its lower end a spur-gear 27, which meshes with a pinion 28, secured to the vertical shaft 6. The rotation of the shaft 6 carries the stone 15 with it in one direction and through the gearing just described imparts a slow rotary motion to the disks 16 and in a direction opposite to that of the stone 15. Any other well-known type of grinding-machine might be used in place of the one described. In use the articles to be ground are placed in the openings 17 of the disks 16, with their bottom faces in contact with the grinding-stone 15.

My invention relates to the means for holding flat ware in the disks 16. The disks 16 are quite thin, so that in the grinding of very flat articles, such as plates and other flat dishes, said articles are liable to slip underneath this disk between the same and the grinding-stone. If the disk is placed so close to the stone that this is not possible, the edge of the article will project entirely above the opening, and as a consequence the disk 16 will bear against the sloping bottom portion of the plate or other article, and thus lift the same out of contact with the stone. To obviate this, I provide a supplemental ring or holder 30, adapted to be inserted in the opening 17 of the disk and having an internal wall 31 of sufficient height to

insure at all times a bearing for the edge of the flat article, such as the plate 32, as the latter rises and falls, due to unevenness of the stone, and also projecting sufficiently close to the grinding-stone to prevent the article from slipping between the disk and said stone. This ring 30 will be provided with a horizontal flange 33, which rests upon the disk 16 and prevents the ring from falling into contact with the stone 15, and has the downwardly-projecting flange 34, which projects into such close proximity to the stone 15 that the article 31 cannot slip underneath the same. The internal wall 31 of this ring is of such height that the edge of the plate can never project above the same, and as a consequence cannot be lifted out of contact with the grinding-stone.

The ring externally will be circular so as to fit into the opening 17 of the disk and to turn freely therein. When circular articles are to be ground, the inner wall of the ring will be of a similar shape and the articles will naturally turn or rotate therein so that the ring itself need not necessarily rotate in the disk. Ob- long articles, however, are liable to bear at two points against the ring, and thus be held against rotation. With such articles I prefer to make the opening of the ring oblong, as shown in Fig. 4, to fit the article to be ground, while the exterior of the ring is circular. As a consequence in use the ring, together with the article held therein, will rotate in the disk 16.

In grinding articles on machines of this character there is always a tendency of the particles of stone flying and getting in between the ring and the article, and if the latter is provided with sharp vertical edges the latter are liable to be marred by reason of the grinding action of the particles of stone. To overcome this difficulty, as well as to prevent injuring the edges of the article from other causes, I provide a suitable cushioning-ring 36, which may be of leather, rubber, or other yielding material and which preferably will be set in an annular groove 37 formed on the inner face of the ring. This cushion may be of considerable width vertically, as shown in Fig. 3, and thus form a soft seat for the edge of the article, or it may be narrow, as shown in Fig. 5, so that it will prevent the particles of stone from flying upwardly. It also provides a soft yielding surface, so that no grinding effect occurs, even if the particles of stone should lodge between the same and the article. In this way I avoid marring the edges of the article being ground.

The operation of my improvement will be readily understood from the foregoing description. The rings described may be made of any desired internal shape and of a size and depth to meet any special conditions.

What I claim is—

1. In apparatus for grinding flat ware, the

combination with a rotating stone, of a disk
coöperating therewith and provided with an
opening therethrough adapted to receive the
article to be ground, and a ring rotatably held
5 in the opening in said disk and projecting be-
low the same into close proximity to the stone.

2. In apparatus for grinding flat ware, the
combination with a rotating stone, of a disk
coöperating therewith and provided with an
10 opening therethrough for receiving the arti-
cle to be ground, and a ring rotatably held in
the opening in said disk and having a flange
resting on said disk and a portion projecting
downwardly into close proximity to the stone.

15 3. In apparatus for grinding flat ware, the
combination with a rotating stone, of a disk
coöperating therewith and provided with an
opening therethrough for receiving the article
to be ground, and a ring rotatably held in the
20 opening in said disk and projecting below the
same into close proximity to said stone, said
ring having a circular exterior and being pro-
vided with an oblong opening therethrough.

4. In apparatus for grinding flat ware, the
25 combination with a rotating stone, of a disk
coöperating therewith and provided with an
opening therethrough for receiving the article
to be ground, a ring rotatably held in the
opening in said disk and projecting below the
30 same into close proximity to the stone, said
ring having a circular exterior and having an
oblong opening therethrough and being pro-
vided with a flange adapted to rest on said disk.

5. In apparatus for grinding flat ware, the

combination with a rotating stone, of a disk 35
coöperating therewith and provided with an
opening therethrough for receiving the article
to be ground, a ring rotatably held in the
opening in said disk and projecting below the
same into close proximity to the stone, and a 40
cushion secured to the inner face of said ring.

6. In apparatus for grinding flat ware, the
combination of a rotating stone, of a disk co-
operating therewith and provided with an
opening therethrough for receiving the article 45
to be ground, a ring rotatably held in the
opening in the disk and projecting below the
same into close proximity to the stone, said
ring being provided with an annular groove
on its inner face, and cushioning material in 50
said groove.

7. In apparatus for grinding flat ware, the
combination with a rotating stone, of a disk
coöperating therewith and provided with an
opening therethrough for receiving the article 55
to be ground, a ring rotatably held in the
opening in the disk and provided with a flange
adapted to rest on said disk and a portion pro-
jecting below the disk into proximity to the
grinding-stone, and cushioning material se- 60
cured to the inner face of said ring.

In testimony whereof I, the said ANDREW
JOHN SANFORD, have hereunto set my hand.

A. JOHN SANFORD.

Witnesses:

CHAS. S. KING,
CARL NORPELL.