

No. 837,839.

PATENTED DEC. 4, 1906.  
H. C. HOWE, F. LA BARE & J. M. PIERCE.

DISK DRILL.

APPLICATION FILED JULY 17, 1905.

2 SHEETS—SHEET 1.

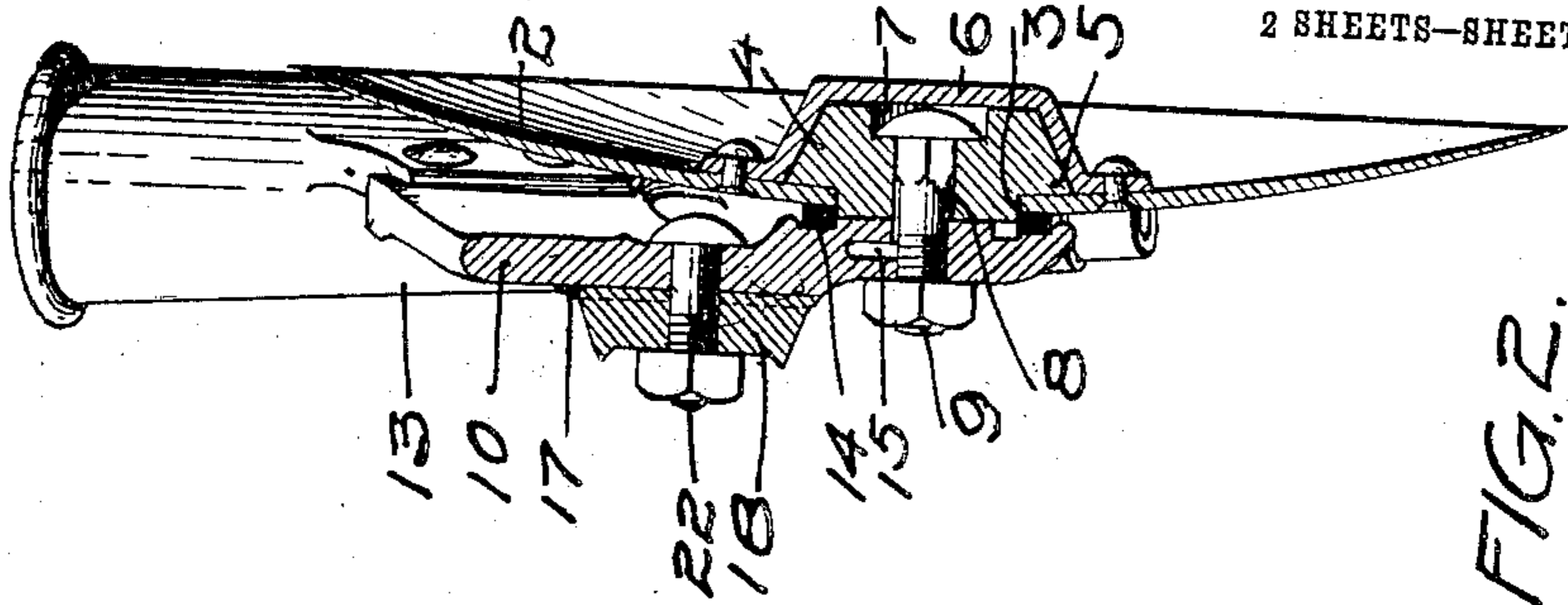


FIG. 2.  
x-x

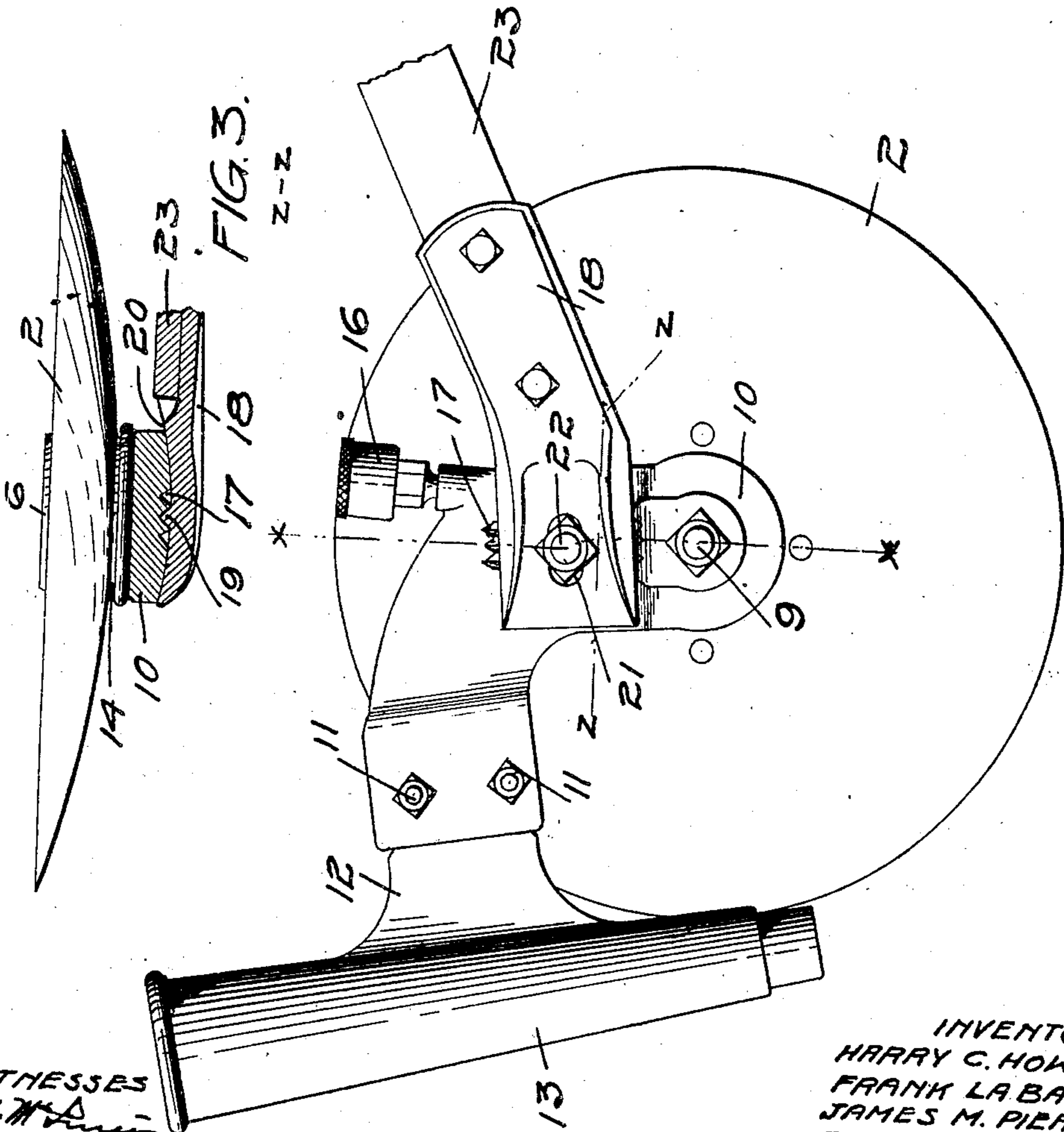


FIG. 1.

FIG. 3.  
z-z

WITNESSES  
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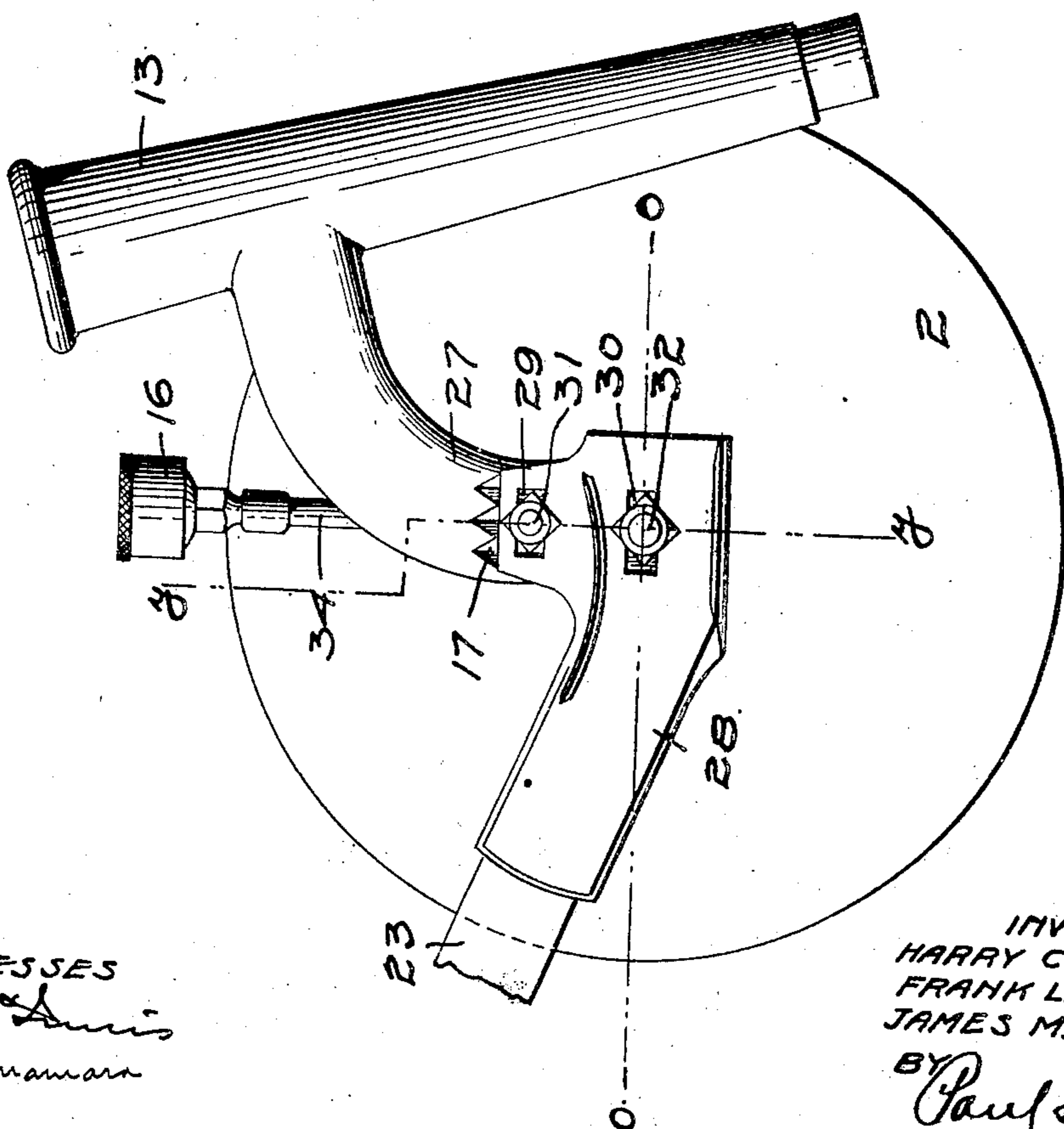
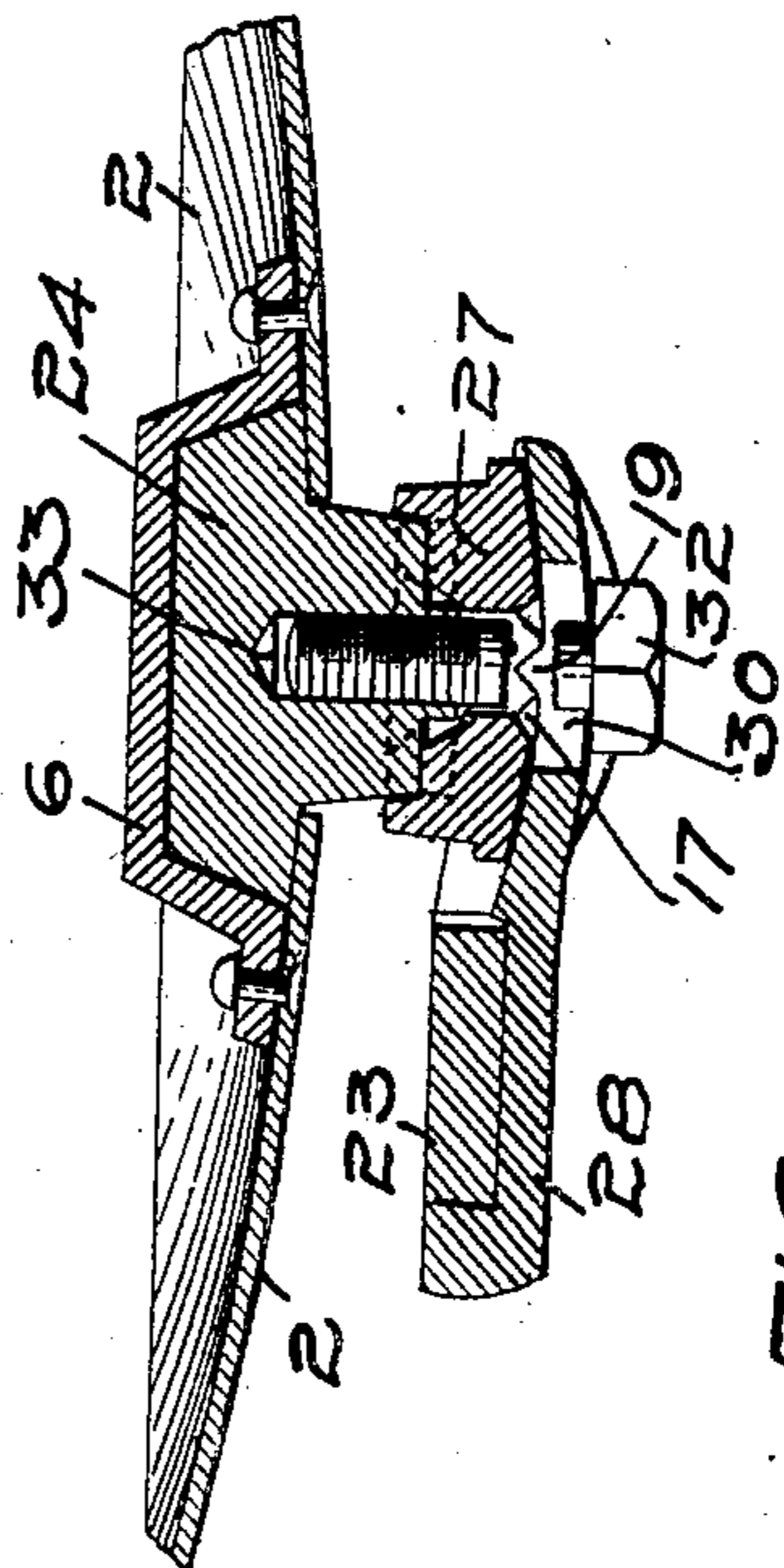
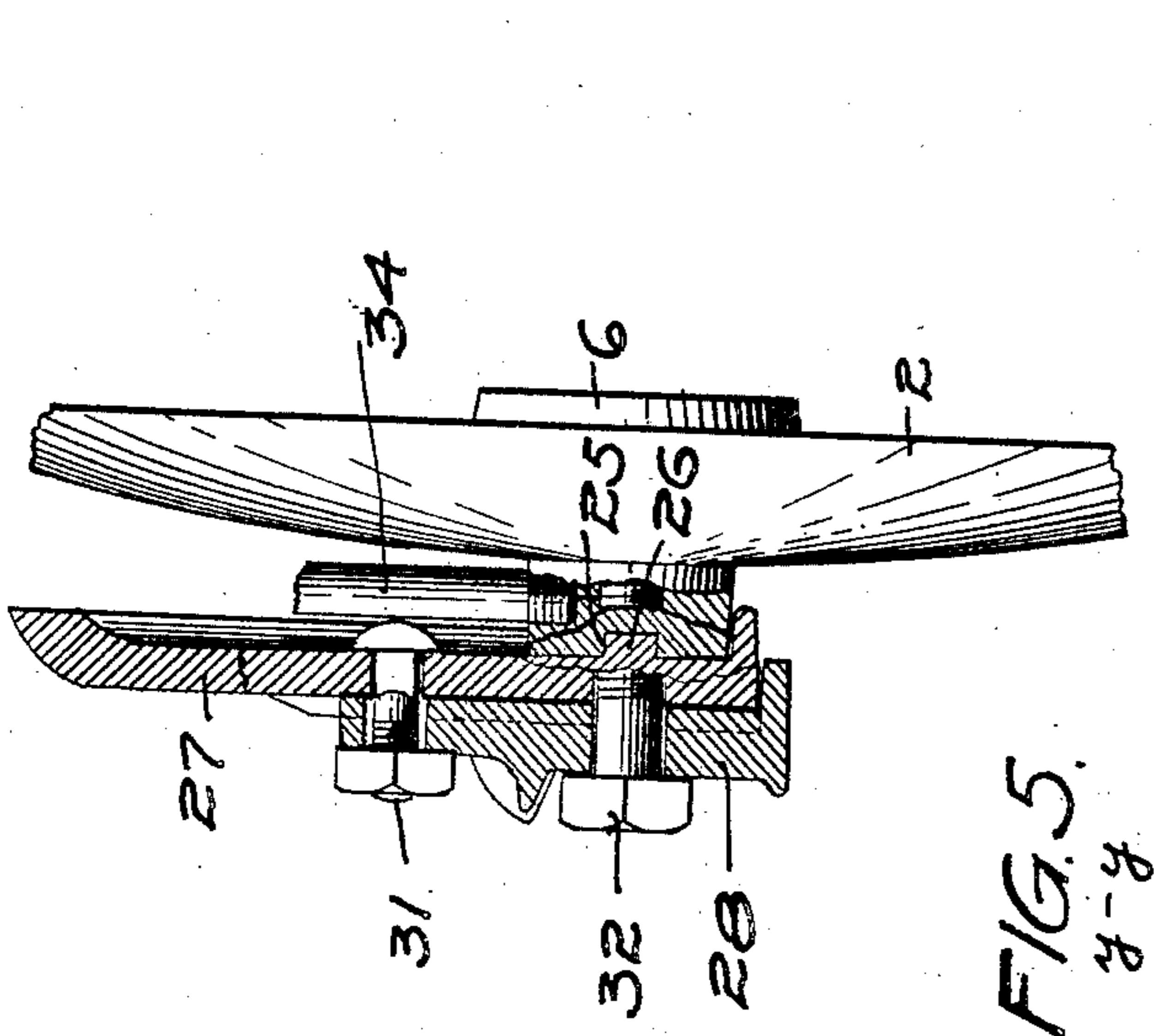
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2 SHEETS—SHEET 2.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

HARRY C. HOWE, FRANK LA BARE, AND JAMES M. PIERCE, OF  
OWATONNA, MINNESOTA, ASSIGNORS TO OWATONNA MANU-  
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## DISK DRILL.

No. 837,839.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed July 17, 1905. Serial No. 270,063.

*To all whom it may concern:*

Be it known that we, HARRY C. HOWE, FRANK LA BARE, and JAMES M. PIERCE, of Owatonna, Steele county, Minnesota, have  
5 invented certain new and useful Improvements in Disk Drills, of which the following is a specification.

Our invention relates particularly to single-disk drills; and the object of our invention is to provide means for easily and quickly  
10 changing the position or angle of the disk with respect to the drag-bar and the line of draft to increase or decrease the width of the furrow.

A further object is to provide a disk and drag-bar connection which will fit snugly against the convex face of the disk and not  
15 be liable to gather refuse or become clogged as the machine moves over the field.

The invention consists generally in various constructions and combinations, all as hereinafter described, and particularly pointed  
20 out in the claims.

In the accompanying drawings, forming  
25 part of this specification, Figure 1 is a side elevation of a single-disk drill embodying our invention. Fig. 2 is a vertical sectional view on the line  $xx$  of Fig. 1. Fig. 3 is a sectional view on the line  $zz$  of Fig. 1. Fig. 4 is  
30 a side elevation of a modified construction. Fig. 5 is a sectional view on the line  $yy$  of Fig. 4. Fig. 6 is a sectional view on the line  $oo$  of Fig. 4.

In the drawings, 2 represents a concavo-convex disk having a central hole or orifice  
35 3 to receive a hub 4, which has a flange or head 5 to bear on the concave face of the disk and is concealed and held in place thereon by a cap 6, riveted or otherwise secured  
40 to the disk. The hub 4 has a recess 7 in one end communicating with a hole 8, into which a bolt 9, having its head in said recess, is inserted, the threaded end of the bolt passing  
45 through an arm 10, which extends upwardly from the center of the disk and is curved backwardly and secured by bolts 11 to a bracket 12 on the boot 13. A washer 14, of  
suitable material, is provided between the arm 10 and the convex face of the disk, in-  
50 closing the end of the hub and forming a dust and oil proof joint at that point. An oil-duct 15 leads from a cup 16 down through the arm 10 to the bolt 9 and the hub. The disk turns

freely on the hub, and the hub is locked se-  
curely on the arm 10 by means of the bolt. 55  
The arm 10 is provided above its point of connection to the hub with a series of vertical grooves 17. A casting 18 is provided with a vertical rib 19 to fit said grooves. On each side  
60 of the said grooves convex or rounded surfaces 20 are formed on the arm 10, and the casting 18 is curved to fit said surfaces, and the relative positions of the disk and casting will depend upon which groove the rib 19 is fitted into. A slot 21 is provided in the casting 18, through  
65 which a bolt 22 passes and secures the casting and arm together. The drag-bar 23 is bolted to the casting 18 in the usual way. Whenever it is desired to change the angle of the  
70 socket with respect to the draft-line, the bolt 22 is loosened and the casting adjusted on the arm and the rib fitted into one of the grooves according to the angle desired for the disk. The casting and drag-bar, it will be noted,  
75 are above the center of the disk, and consequently a considerable distance from the ground and out of the path of refuse and lumps of dirt which might clog and interfere  
80 with the operation of the machine. Furthermore, where the draft connection is above the disk-hub there is a greater clearness between one disk and the contiguous one, and consequently but little danger of clogging  
85 between the disks when the machine is operating in a wet or clay soil.

In Fig. 4 we have shown a modification in the manner of connecting the drag-bar to the disk, which consists in providing a hub 24,  
secured to the concave side of the disk in the manner above described and having a slot  
90 25 in its end to receive lugs 26 on the arm 27, which in this case we have shown formed integrally with the boot. A drag-bar casting has a rib similar to the one described to fit into vertical grooves in the arm 27 and be  
95 adjusted therein to vary the angle of the disk with respect to the draft-line. The casting has slots 29 and 30 to receive bolts 31 and 32, the former passing through the casting 28 and the arm 27 and the latter  
100 through the casting and arm into a socket 33 in the hub 24, securing the parts rigidly together. A pipe 34 leads into the hub 24 to deliver oil to the bearing. This draft connection is a little nearer the ground than the  
105 one shown in Fig. 1 and occupies more space

between the disks, but forms a very rigid and substantial mounting for the disk and the center draft as well.

We claim as our invention—

- 5 1. In a single-disk drill, the combination, with a boot provided with an arm having a convex surface and a series of vertical grooves therein, of a disk mounted on said arm, and a drag-bar having a vertical rib to  
10 enter one of said grooves and adjustably secured to said arm between the center of said disk and its periphery, substantially as described.
2. In a single-disk drill, the combination,  
15 with a boot provided with a forwardly-extending downwardly-curved arm having a convex surface, of a disk mounted on the lower end of said arm, and a drag-bar having a concave surface to fit the surface of said  
20 arm and adjustably secured thereto, substantially as described.
3. In a single-disk drill, the combination, with a boot having a forwardly-extending downwardly-curved arm provided with a  
25 concave surface and a series of vertical grooves therein, of a disk mounted on the lower end of said arm, a drag-bar having a concave surface to fit the surface of said arm, and a vertical rib to enter the grooves there-  
30 in and adjustably secured to said arm.
4. The combination, with a boot provided with a forwardly-extending arm, of a concavo-convex disk having a central orifice and a hub projecting therethrough, said hub hav-  
35 ing a head on the concave side of said disk and a cap covering the same, a bolt passing through said hub and arm and rigidly securing them together, and said arm having a

convex surface and a drag-bar adjustably secured on said surface, substantially as de- 40 scribed.

5. The combination, with a boot having a forwardly-extending downwardly-curved arm, of a concavo-convex disk having a hub  
45 mounted on said arm, a drag-bar secured to said arm above the level of said hub and between it and the top of said disk, said disk and arm being adjustable about a vertical axis through the connection between said arm and said bar.

6. The combination, with a boot provided with a forwardly-extending downwardly-curved arm having a convex surface, of a concavo-convex disk provided with a central orifice and a hub secured to the lower end of  
55 said arm, and a drag-bar having a concave surface and adjustably secured to said arm between the center of said hub and the periphery of said disk, substantially as described. 60

In witness whereof we have hereunto set our hands, HOWE and LA BARE at Minneapolis, Minnesota, this 10th day of July, 1905, and PIERCE at Owatonna this 11th day of July, 1905.

HARRY C. HOWE.  
FRANK LA BARE.  
JAMES M. PIERCE.

Witnesses as to signatures of Howe and La Bare:

RICHARD PAUL,  
C. MACNAMARA.

Witnesses as to signature of Pierce:

F. C. KINYON,  
W. W. HASTINGS.