

No. 675,799.

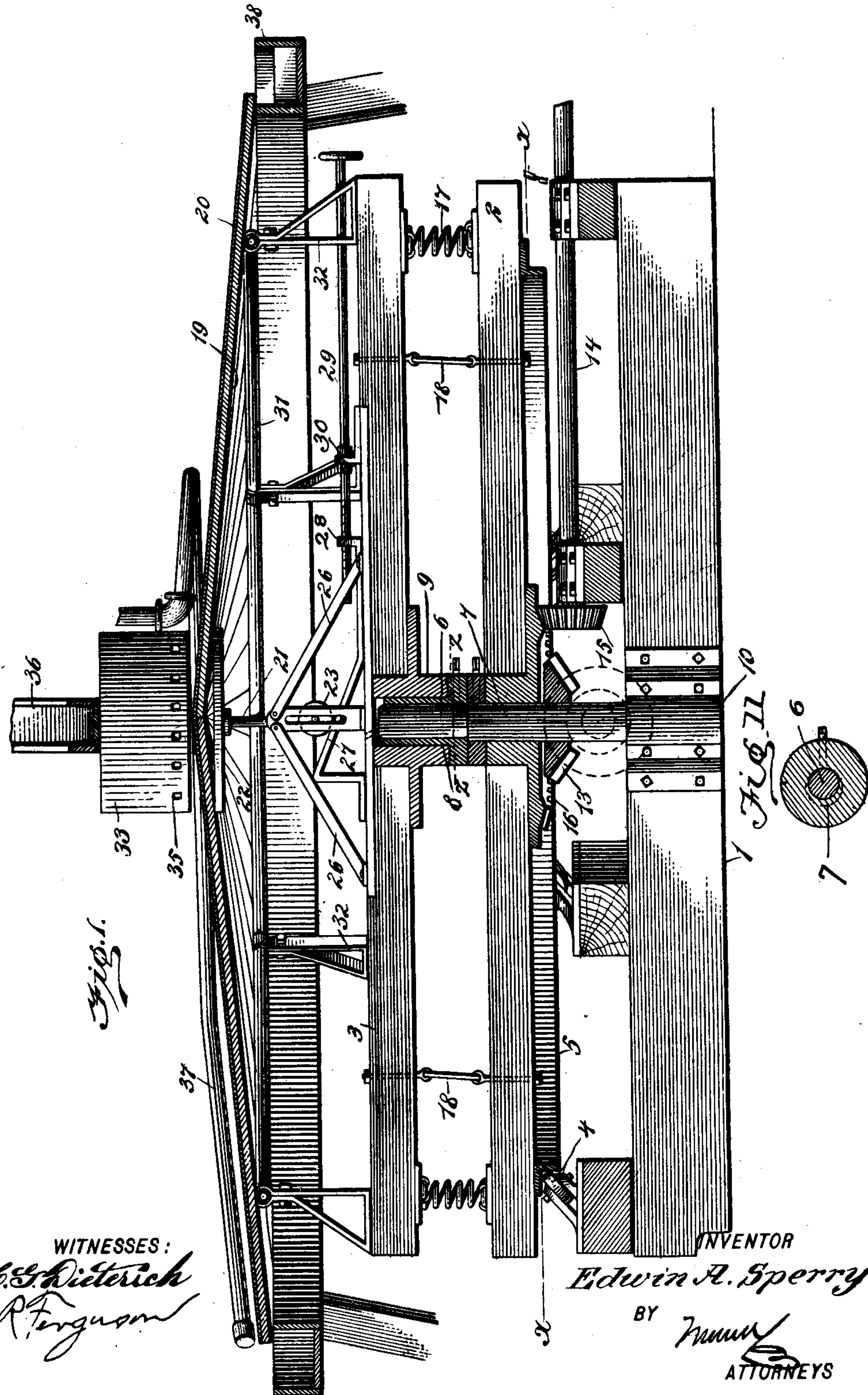
Patented June 4, 1901.

E. A. SPERRY.  
CONCENTRATOR.

(Application filed Sept. 11, 1900.)

4 Sheets—Sheet 1.

(No Model.)



WITNESSES:

*H. S. Dieterich*  
*C. R. Ferguson*

INVENTOR

*Edwin A. Sperry.*

BY

*Wm. H. Sperry*

ATTORNEYS

No. 675,799.

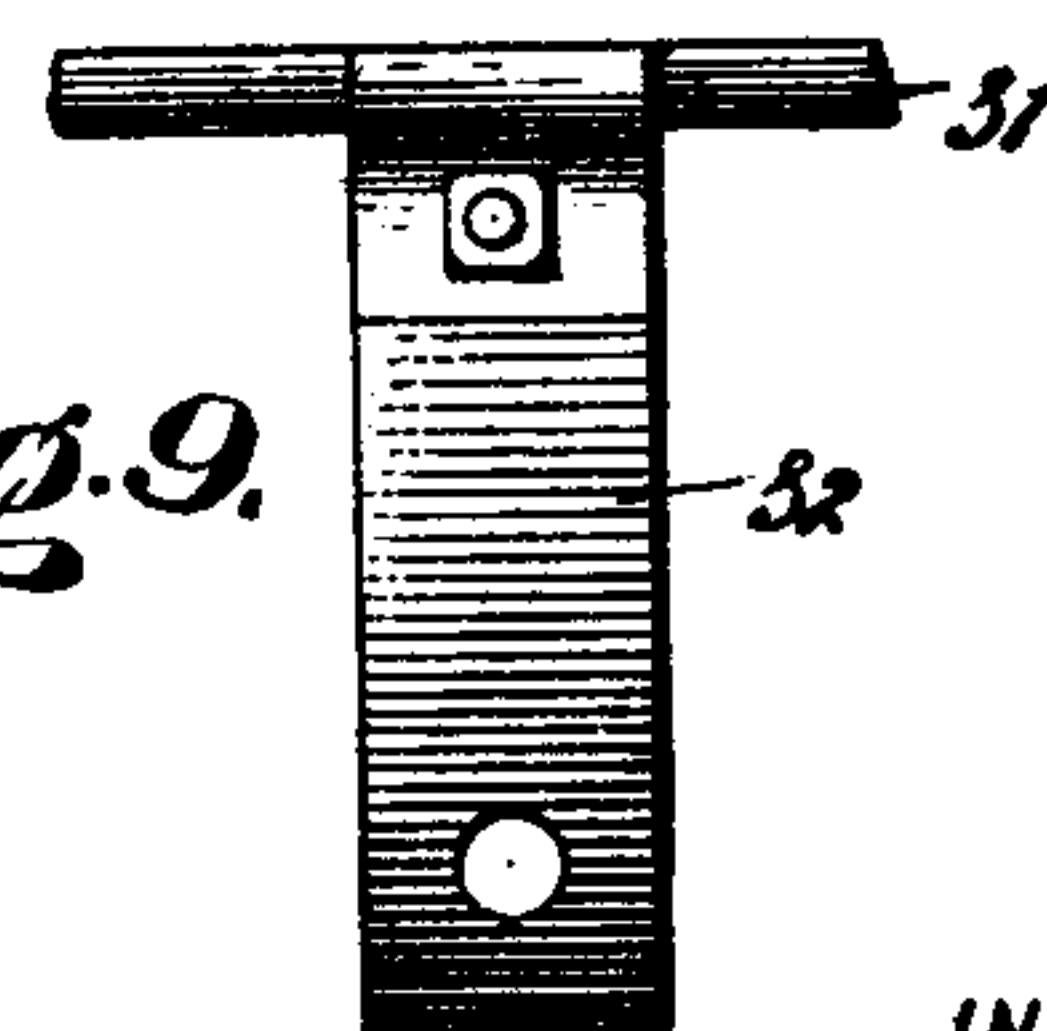
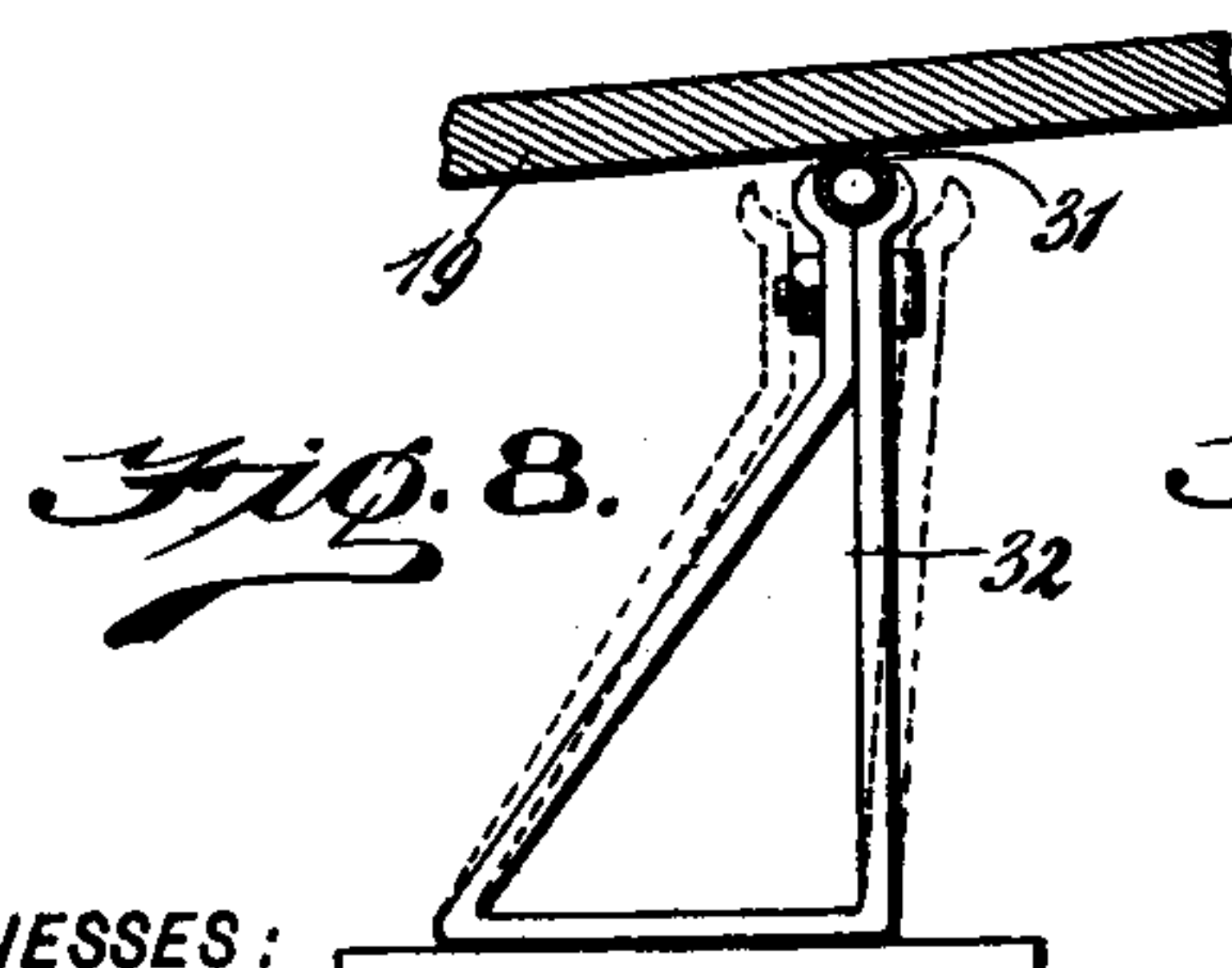
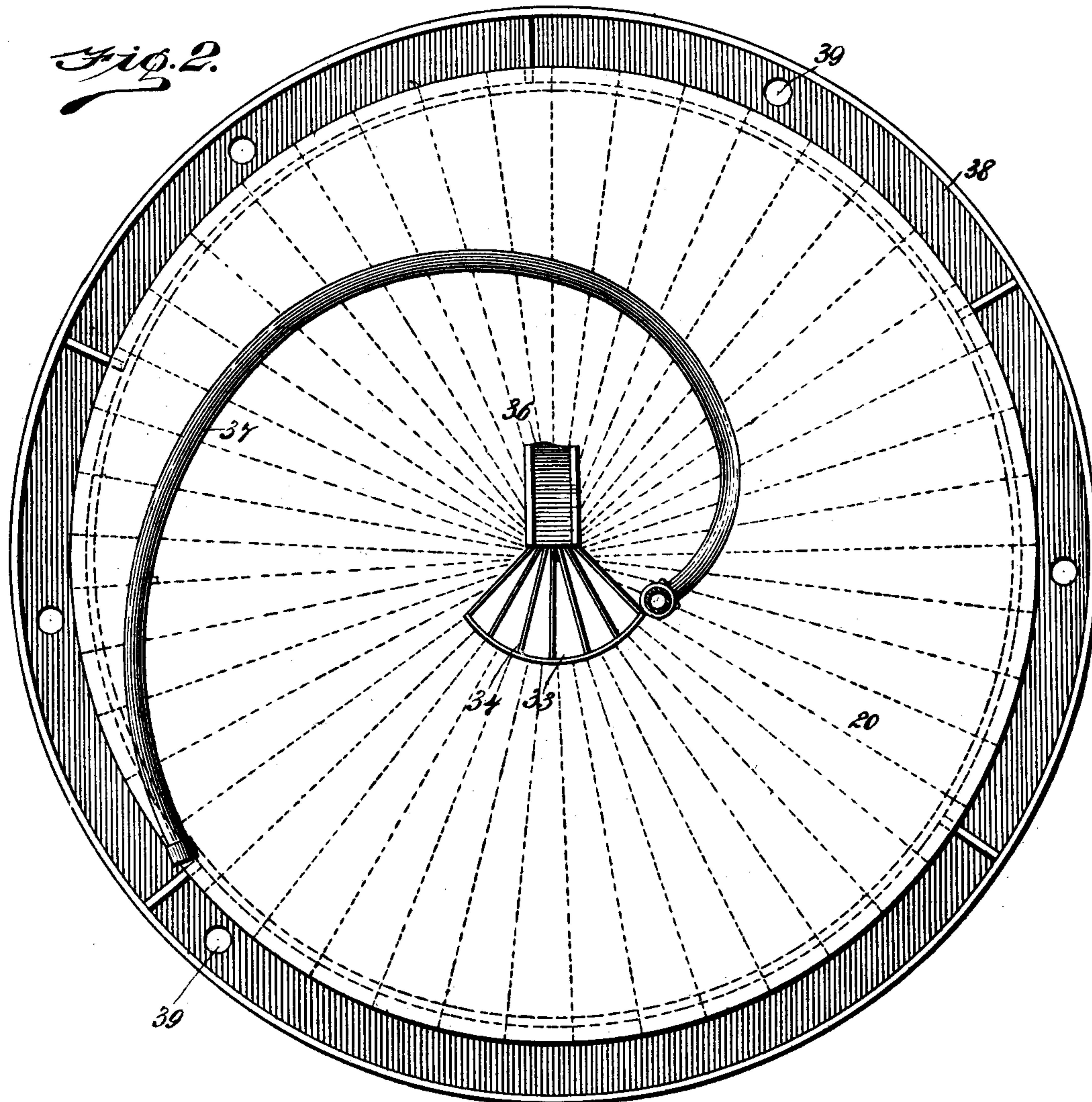
Patented June 4, 1901.

E. A. SPERRY.  
CONCENTRATOR.

(Application filed Sept. 11, 1900.)

4 Sheets—Sheet 2.

(No Model.)



WITNESSES:

*H. G. Dieterich*  
*C. R. Ferguson*

INVENTOR

*Edwin A. Sperry.*

BY

*Munn*  
ATTORNEYS



No. 675,799.

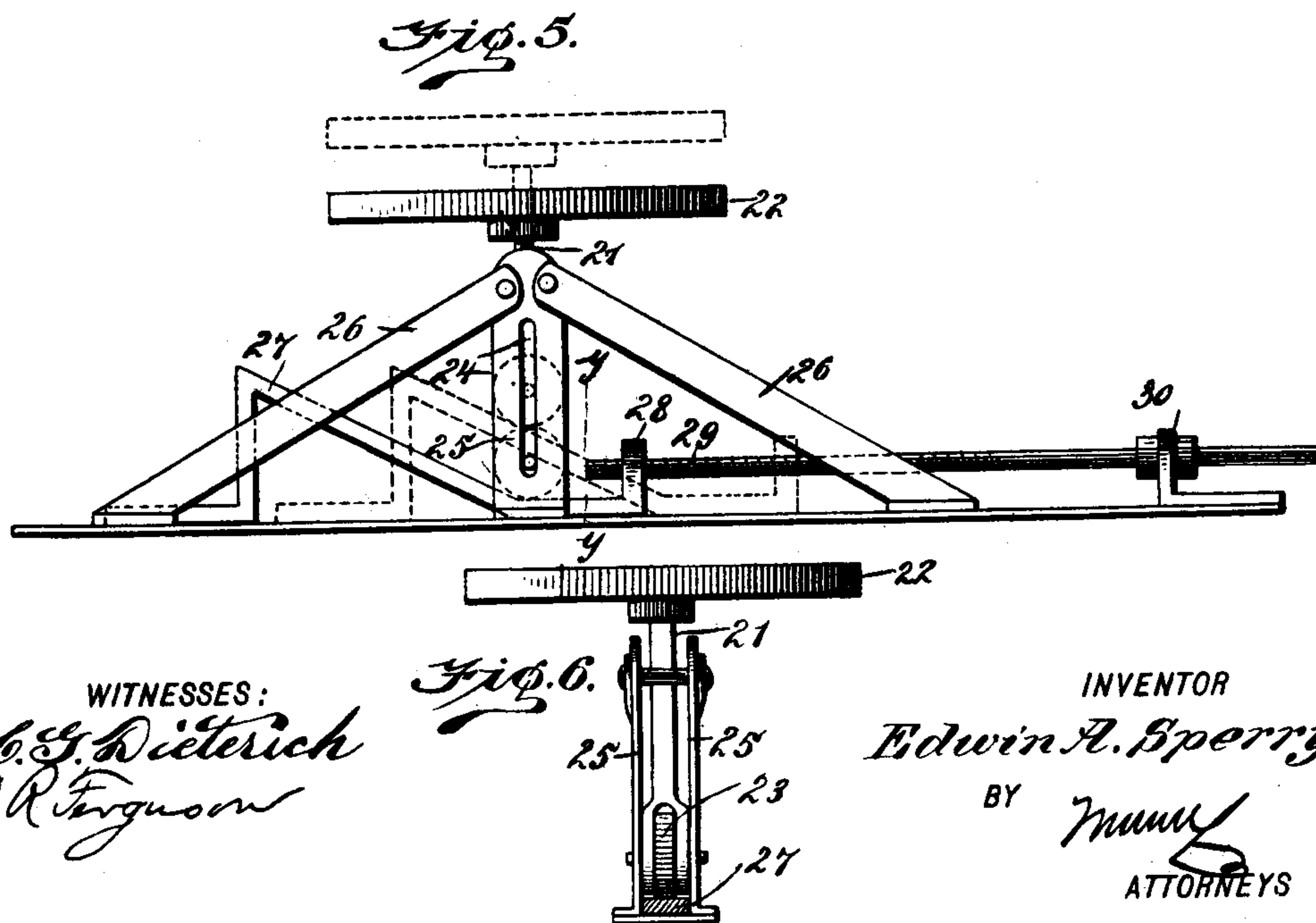
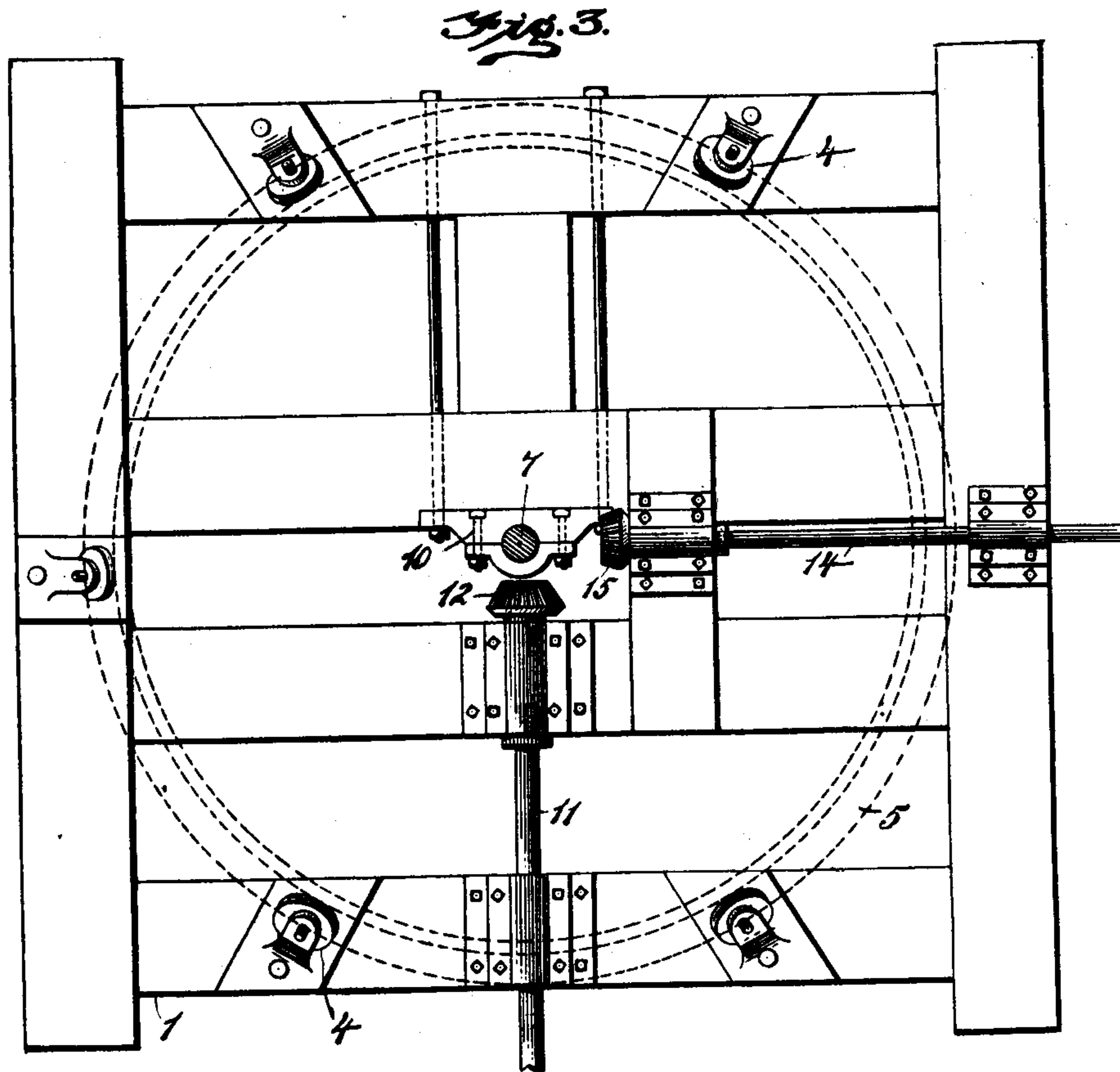
Patented June 4, 1901.

E. A. SPERRY.  
CONCENTRATOR.

(Application filed Sept. 11, 1900.)

4 Sheets—Sheet 3.

(No Model.)



WITNESSES:

*H. G. Dieterich*  
*C. R. Ferguson*

INVENTOR

*Edwin A. Sperry*

BY

*Mumford*  
ATTORNEYS

No. 675,799.

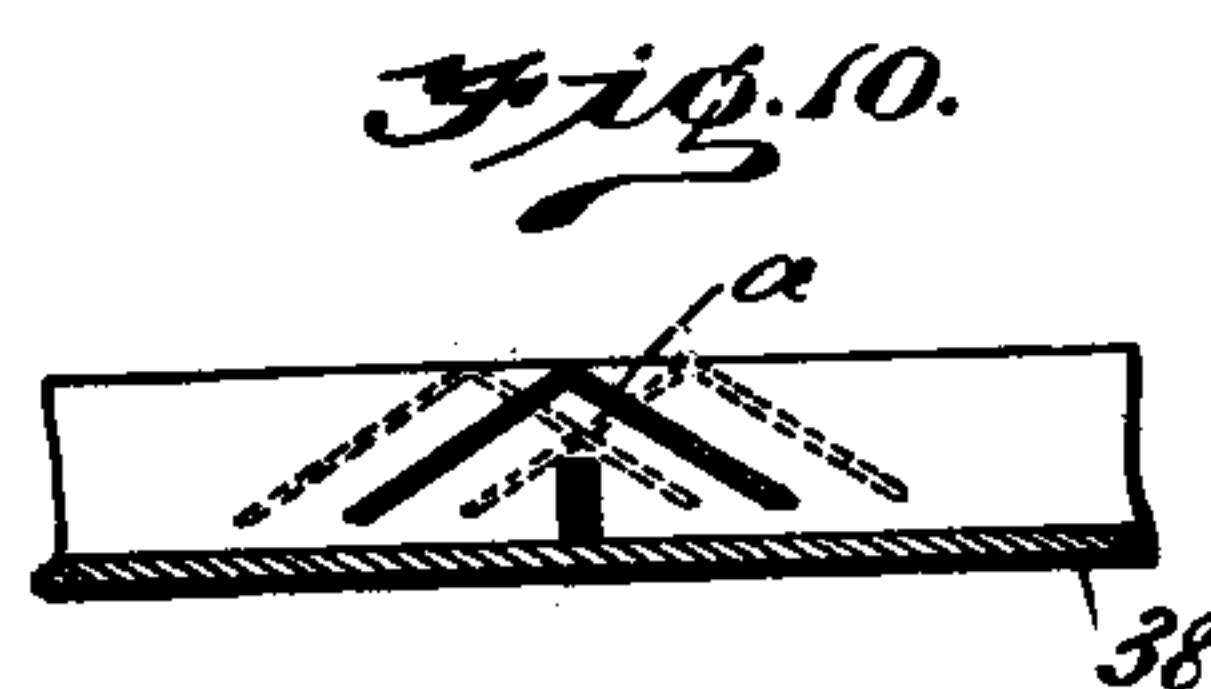
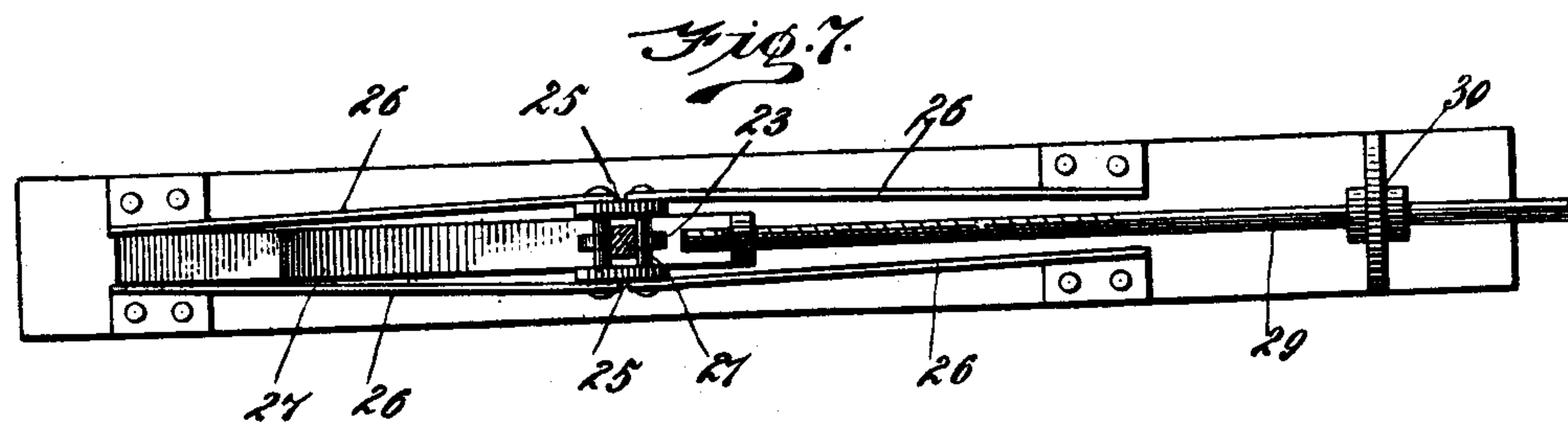
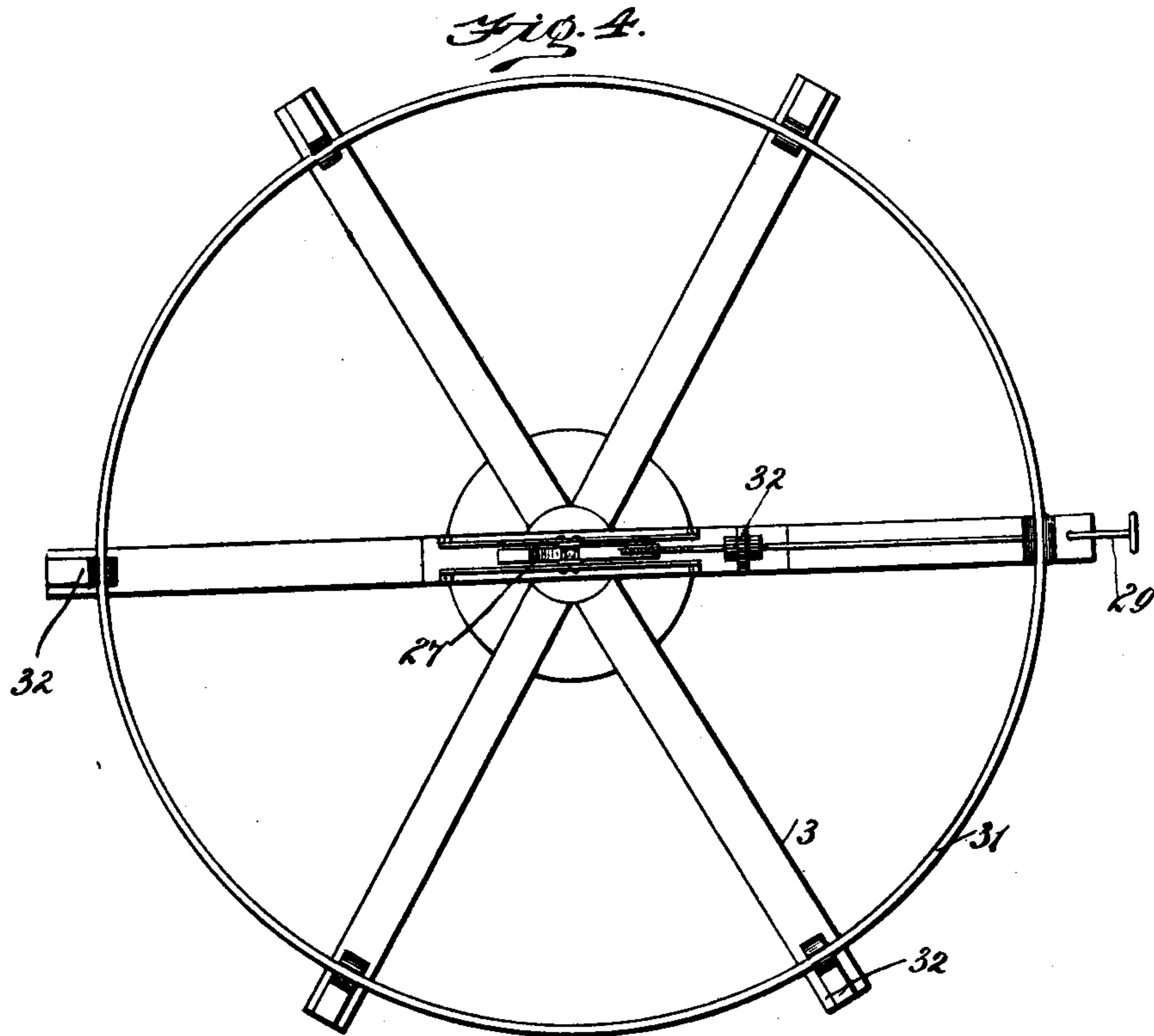
Patented June 4, 1901.

E. A. SPERRY.  
CONCENTRATOR.

Application filed Sept. 11, 1900.)

4 Sheets—Sheet 4.

(No Model.)



WITNESSES:

*H. G. Dieterich*  
*C. R. Ferguson*

INVENTOR

*Edwin A. Sperry.*

BY

*Munn*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

EDWIN A. SPERRY, OF BIWABIK, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SPERRY VANNING-BUDDLE COMPANY, OF COLORADO.

## CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 675,799, dated June 4, 1901.

Application filed September 11, 1900. Serial No. 29,645. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN A. SPERRY, a citizen of the United States, and a resident of Biwabik, in the county of St. Louis and State of Minnesota, have invented a new and Improved Concentrator, of which the following is a full, clear, and exact description.

This invention relates to improvements in machines for the concentration of ore-tailings or other material in which a separation of particles of different specific gravity is required; and the object is to provide a machine of this character that shall be of simple construction and by means of which the values may be rapidly and completely separated from the ore.

I will describe a concentrator embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation of a concentrator embodying my invention. Fig. 2 is a top plan view. Fig. 3 is a section on the line  $x x$  of Fig. 1. Fig. 4 is a plan view with the table removed. Fig. 5 is a side elevation of the table-lifting device. Fig. 6 is a section on the line  $y y$  of Fig. 5. Fig. 7 is a plan view of the table-lifting device. Fig. 8 is a side view of a track-supporting standard employed. Fig. 9 is a front view thereof. Fig. 10 is a view of a movable saddle for adjusting the point of division, and Fig. 11 is a section on the line  $z z$  of Fig. 1.

Referring to the drawings, 1 designates a stationary base-frame upon which are mounted to rotate an intermediate frame 2 and an upper frame 3. Rollers 4 are supported in brackets on the lower frame and engage with an angle-iron track 5, attached to the under side of the intermediate frame 2. It is designed that while the upper frame 3 rotates with the intermediate frame 2 the said upper frame, which carries the table to be hereinafter described, shall have an eccentric and vanning motion. For this purpose the upper frame 3 is mounted on an eccentric portion 6

of a shaft 7. The degree of eccentric movement may be regulated by means of an eccentric sleeve 8, secured to the eccentric portion 6 of the shaft by means of a bolt or the like and engaging with the hub 9 of said upper frame. The shaft 7 extends down through the intermediate frame 2 and has a step-bearing in a boxing 10, attached to the lower frame. Motion is imparted to the shaft from a driving-shaft 11, having a bevel-pinion 12 engaging with a bevel-pinion 13, attached to the shaft 7, and rotary motion is imparted to the two frames from a driving-shaft 14, having a bevel-pinion 15 engaging with a bevel-gear 16, attached to the intermediate frame. The gearing for rotating the two frames—that is, the upper and intermediate frames—is so related to the gearing for rotating the shaft that the shaft shall have a faster motion than the two frames. In other words, when the machine is in operation the vanning motion imparted to the table supported by the rotary frames will be faster than the rotary motion. The frames 2 and 3 are connected at suitable points by springs 17, and the two frames are held in parallelism by links 18, engaging with eyebolts attached to the two frames, as plainly indicated in the drawings.

The concentrator-table consists of a number of strips of wood 19 or the like placed closely together and forming a circular table. Attached to the upper side of the strips forming the table is a covering 20, of any suitable material—such, for instance, as rubber, linoleum, or the like. The object in making the table of the several strips is to provide for the adjustment of its pitch from its center outward, so that the material may be washed off the same with greater or less speed, as required. As a means for causing the said adjustments of the table I employ a lifting-rod 21, having a disk 22 at its top, which engages the under side of the table at its center, as indicated in Fig. 1. Mounted in the lower end of the lifting-rod 21 is a roller 23, having its journals extended into slots 24 in guide-plates 25, attached to the frame 3. These guide-plates are supported by inclined braces 26, and movable between the guide-plates and underneath the roller



23 is an inclined lifter 27. At one end this lifter 27 has an upward extension 28, provided with a tapped hole in which a screw-rod 29 engages. The said screw-rod extends  
 5 outward through a bearing 30 and has a hand-wheel at the outer side of the machine. Obviously by rotating the screw-rod 29 the incline 27 will be moved underneath the roller 23, causing said roller, and consequently the  
 10 rod 21, to move up or down, depending upon the direction in which the screw-rod is rotated, and this obviously will cause the pitch adjustments of the table.

The table is supported near its outer edge  
 15 by a circular rail 31, supported by standards 32, connected to the frame 3. These standards consist of strips of metal, the two ends of which are provided with yoke-sections to engage with the rail, and for engaging the rail  
 20 therewith the two members or sections of a standard may be separated or sprung away from each other, as indicated by the dotted lines in Fig. 8, and then when moved together may be tightly clamped to the rail by means  
 25 of a bolt.

Arranged above the table at the center is a distributing-box 33, formed in the segment of a circle and provided with a series of partitions 34, dividing it into a series of compartments, and each compartment has an outlet  
 30 35 for discharging onto the table-top. The crushed ore or other material is fed to the distributing-box through a chute 36. A spray-pipe 37 extends over the top of the table, and it is provided at its under side with  
 35 perforations through which the water discharges. The material discharged from the table falls into a circular receiving-trough 38, provided at intervals with partitions dividing the said trough into several sections, and  
 40 each section has an outlet 39, which may be normally closed by a plug or the like.

In operation the material to be treated is mixed with water and delivered on the surface of the table from the distributing-box.  
 45 By adjusting the conical pitch of the table-top the ore-pulp or other material is allowed to flow down toward the edge of the table, while the vanning or agitating motion, together with the action of the water mixed  
 50 with the pulp, gives the particles an opportunity to separate according to the specific gravity of each, the heavier particles settling on the table-top, while the lighter particles  
 55 remain on the top of said heavier particles. The revolving motion of the table moves the material so deposited on the table, and the spray from the pipe 37 will wash off the upper and lighter portions of the material deposited and leave the heavier portions or values  
 60 on the surface of the table and which in turn are washed off into suitable receptacles.

I divide the trough 38 into compartments, as I find by experience that the components  
 65 of the material deposited on the table—such

as silica or sand, zinc, iron, copper, and lead—having varying degrees of specific gravity, will separate and discharge in streaks and fall each one into its particular compartment, and to regulate the points of division  
 70 I may employ in connection with the partitions the saddles *a*, (shown in Fig. 10,) which are shiftable over the fixed partitions.

Having thus described my invention, I claim as new and desire to secure by Letters  
 75 Patent—

1. In a concentrator, a base, an intermediate frame, and an upper frame, a shaft on which the intermediate frame is mounted to rotate, the said shaft having an eccentric portion on which the upper frame is mounted, a  
 80 gearing for rotating the intermediate frame on the shaft, a gearing for rotating the shaft, and a table supported on the upper frame, the said two frames and the table being rotated  
 85 together, substantially as specified.

2. In a concentrator, a circular table consisting of a number of separate strips extending from the center outward, a cover of rubber or the like on said strips, a lifting-rod, a  
 90 disk on said lifting-rod engaging with the under side of said strips near the center, a roller carried by said rod, a guide for the rod, an inclined plate for engaging with the roller, and a screw-rod for adjusting said plate, substantially as specified.  
 95

3. In a concentrator, a base-frame, an intermediate frame and an upper frame, spring-yielding connections between the intermediate and the upper frames, a shaft extended  
 100 through the intermediate frame and having an eccentric portion on which the upper frame is mounted, means for rotating said shaft, means for rotating the two frames above the base-frame, and a table supported on the upper frame, substantially as specified.  
 105

4. In a concentrator, a base-frame, an intermediate frame, an upper frame, spring-yielding connections between the intermediate and upper frames, means for holding the  
 110 said intermediate and upper frames in parallelism, means for rotating the said intermediate and upper frames, means for causing an eccentric motion of the upper frame, and a table supported on the upper frame, substantially as specified.  
 115

5. In a concentrator, a rotating and vanning frame, a circular supporting bar or rod mounted on said frame, a table supported by and slidable on said bar or rod, a delivery-  
 120 box above the center of the table, and a spray-pipe over the table, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN A. SPERRY.

Witnesses:

C. W. STARK,  
 W. W. BROWNE.