

No. 607,389.

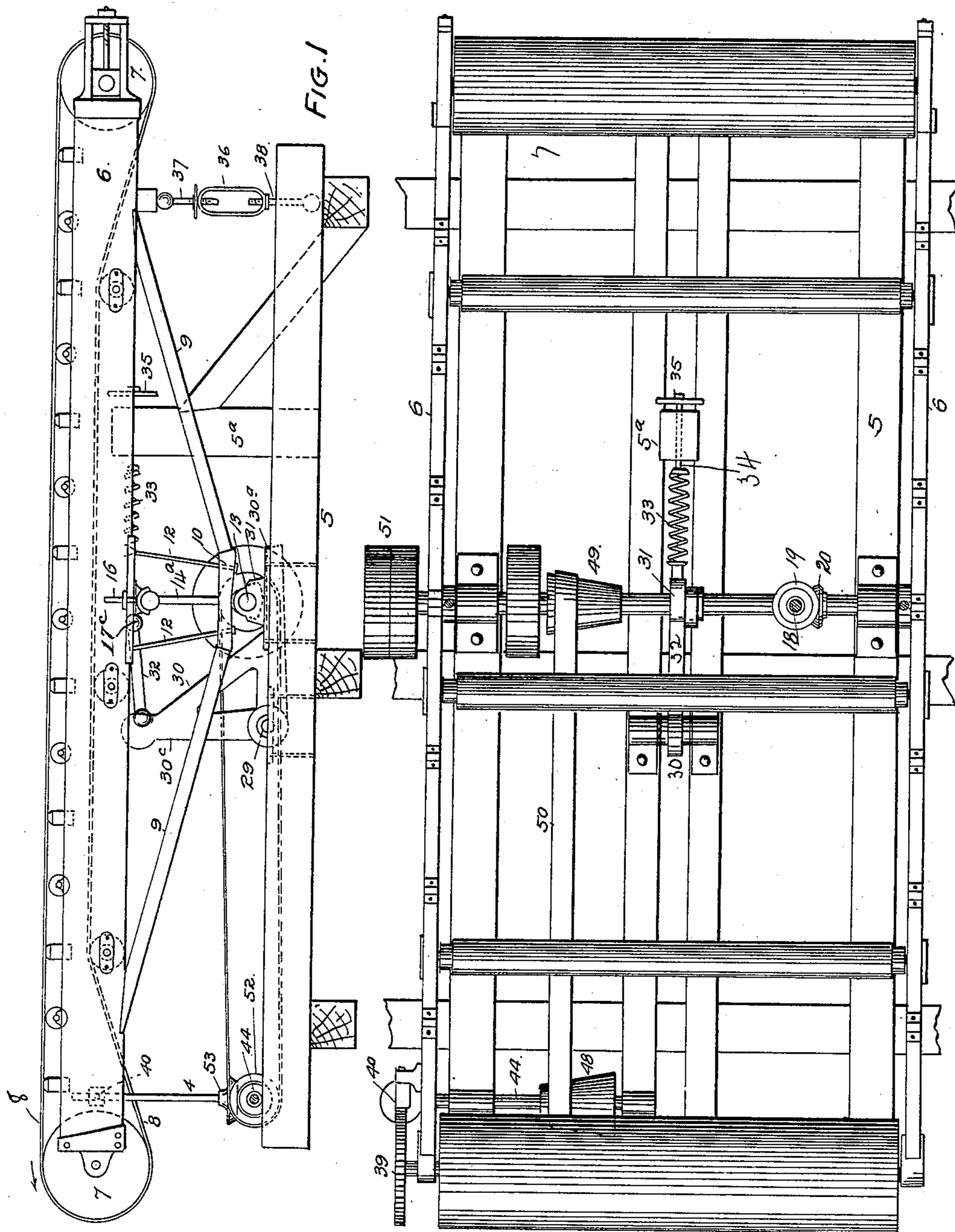
Patented July 12, 1898.

W. E. WILD.
ORE CONCENTRATOR.

(Application filed Sept. 20, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
J. J. Hauder.
Edith Himsworth.

By His Attorney

FIG. 2

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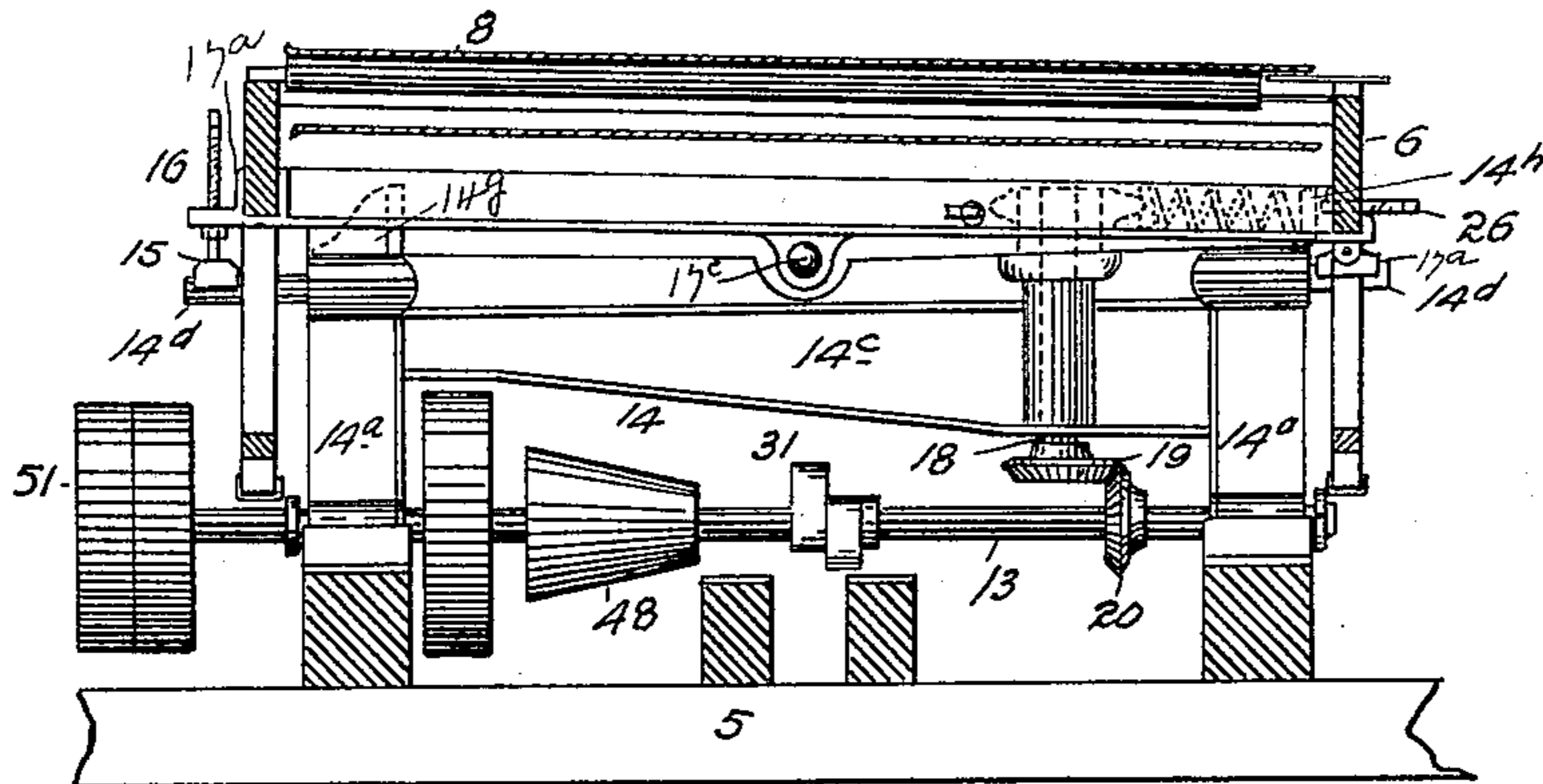


FIG. 3

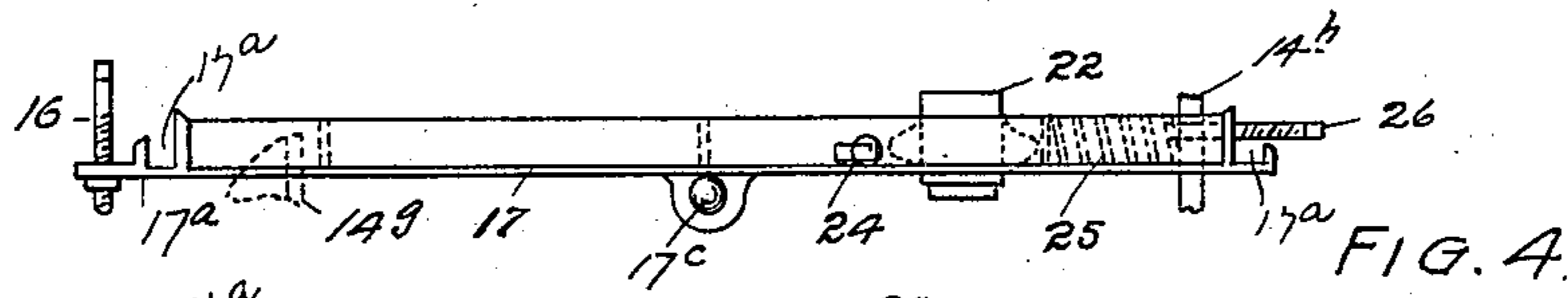


FIG. 4

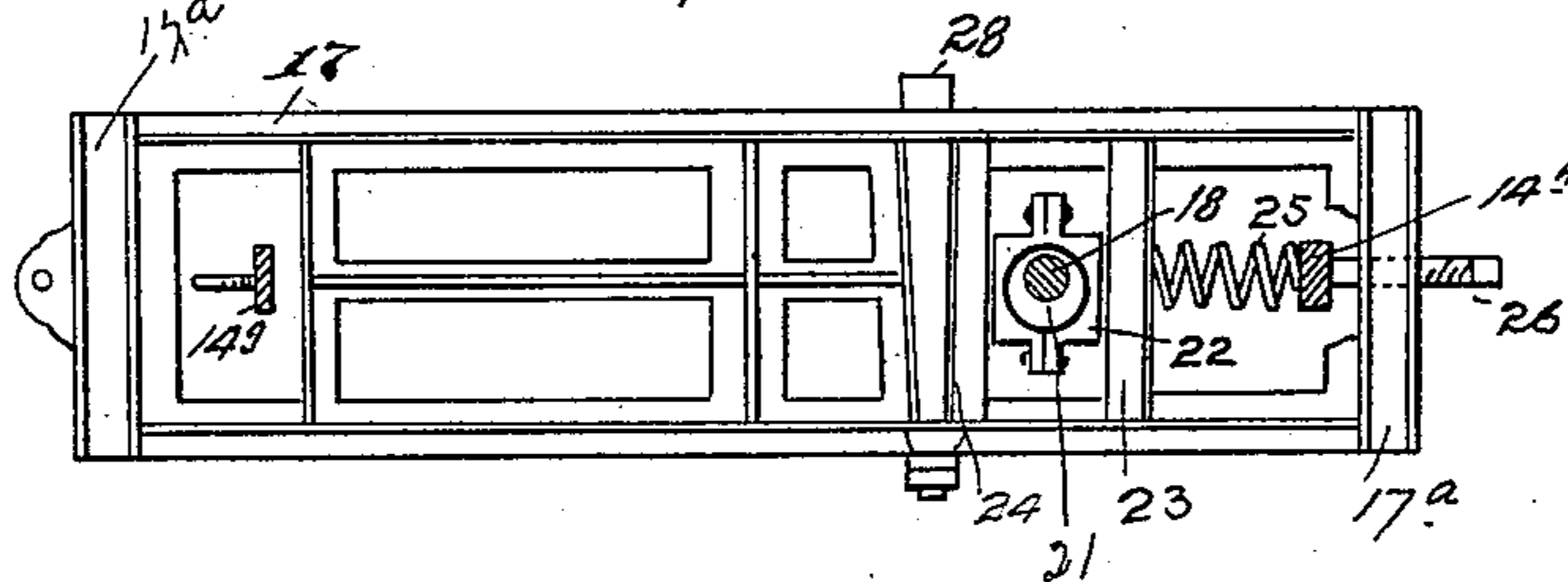


FIG. 5

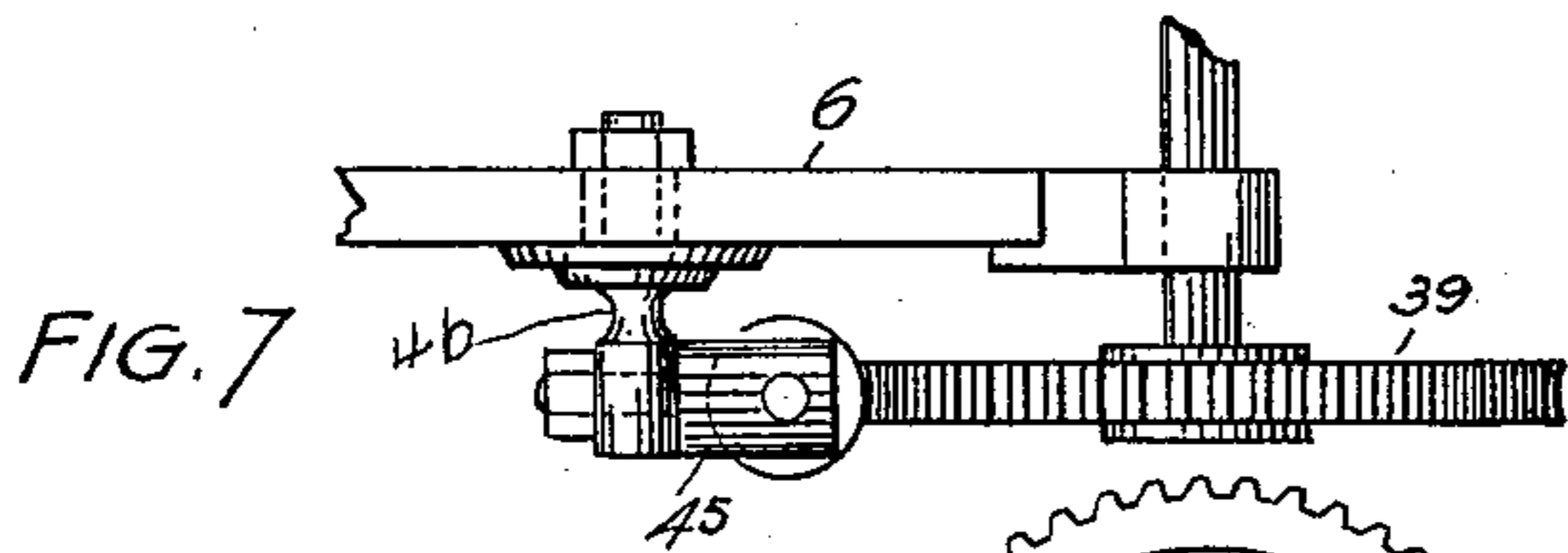


FIG. 7

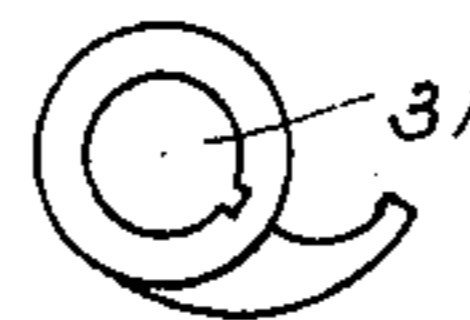


FIG. 6

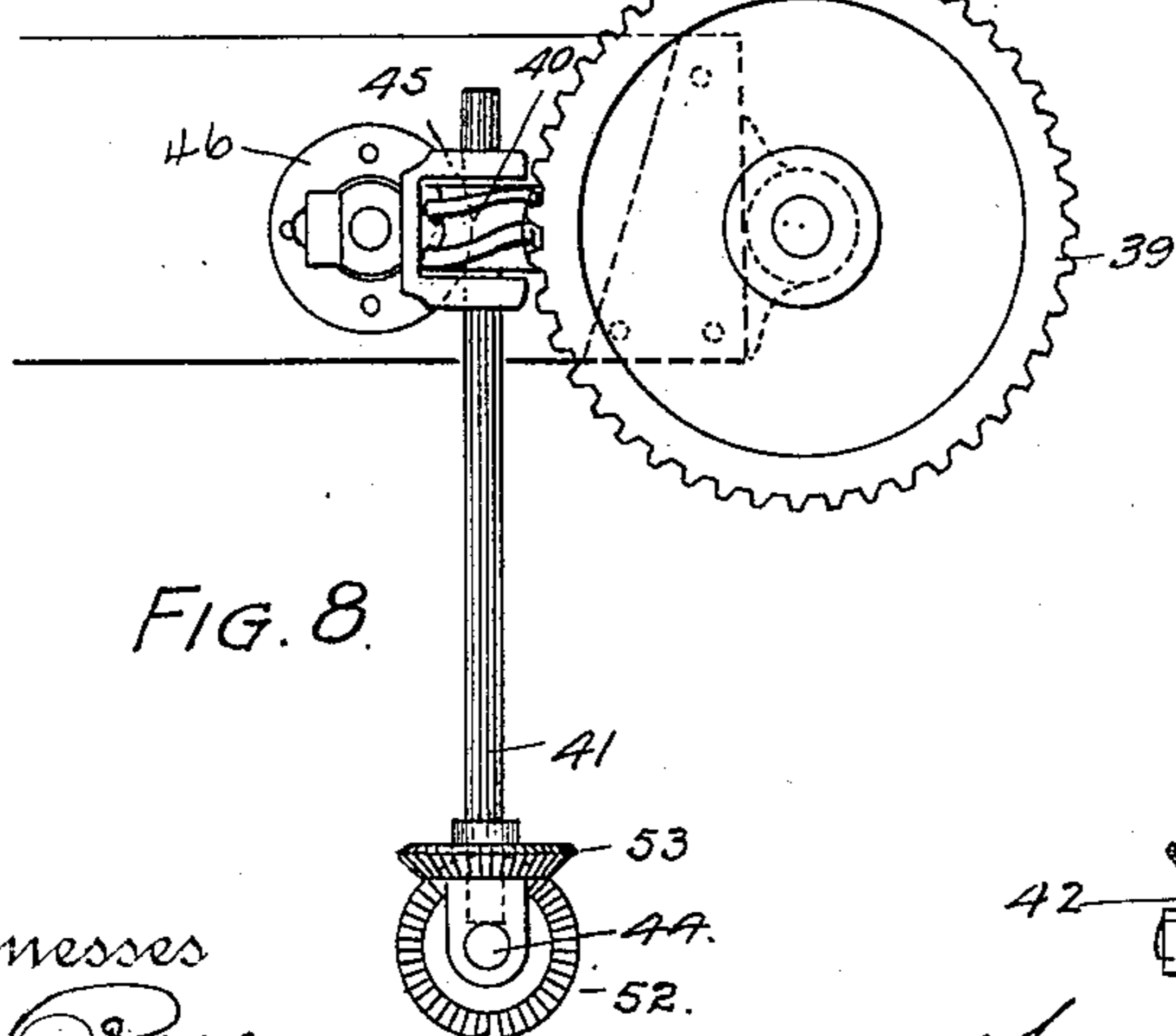


FIG. 8

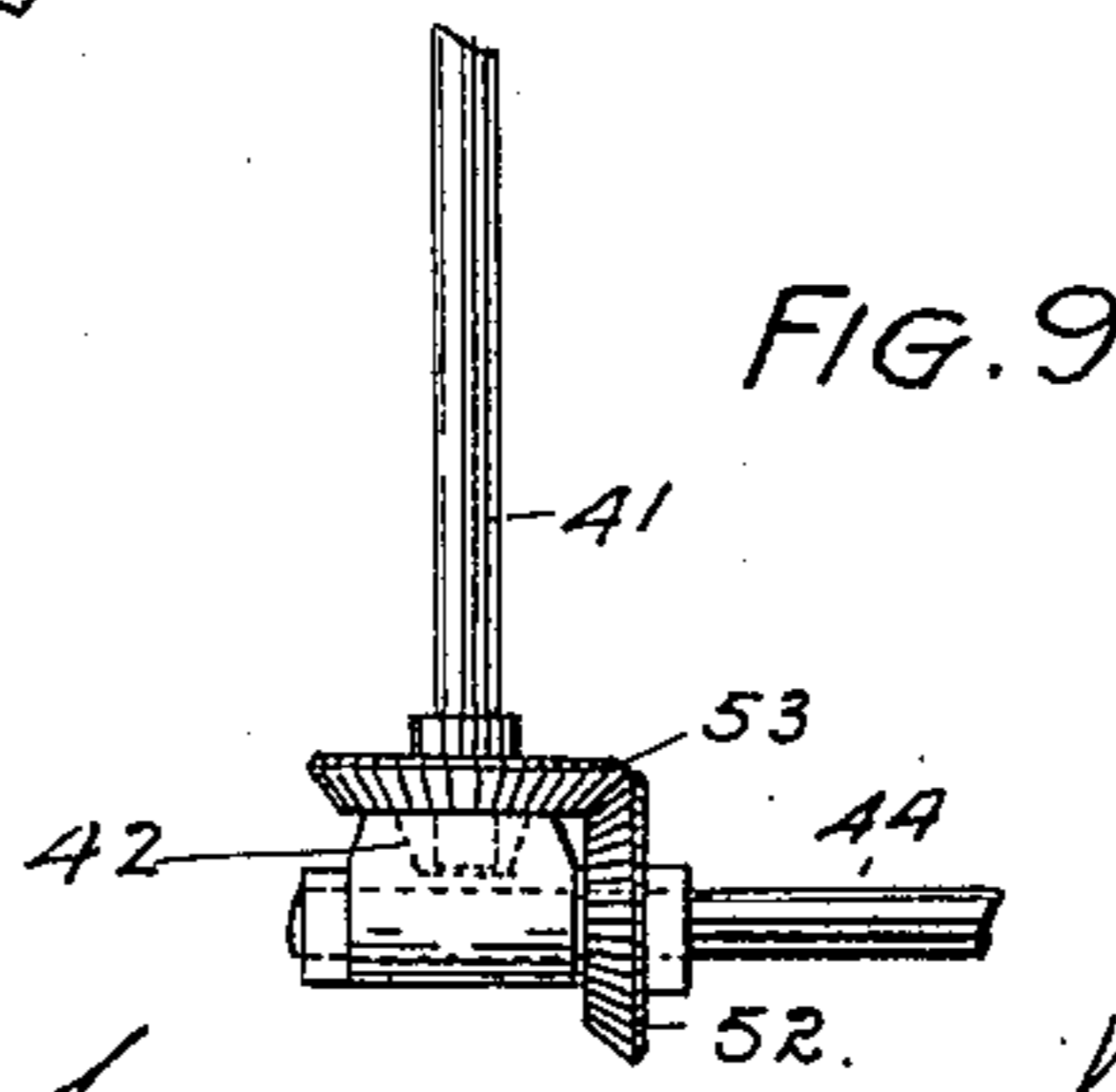


FIG. 9

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UNITED STATES PATENT OFFICE.

WILLIAM E. WILD, OF DENVER, COLORADO.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 607,389, dated July 12, 1898.

Application filed September 20, 1897. Serial No. 652,294. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. WILD, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Ore-Concentrators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates generally to improvements in ore-concentrators and specifically to means for supporting and operating concentrating belts and tables of any suitable construction.

In this application my improvements are shown in connection with what is known as a "belt machine," the table in this case consisting of a frame carrying a movable belt upon which the separation or concentration is effected. The term "concentrating apparatus" is employed in the claims to designate an instrumentality having the aforesaid function.

My object is to provide a device of this class which shall be simple in construction, economical in cost, reliable, durable, and efficient in use; and to these ends the invention consists of the features, arrangements, and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of a machine provided with my improvements. Fig. 2 is a top or plan view of the machine, partly in section, the belt and a portion of its supporting mechanism being removed. Fig. 3 is a cross-section of the apparatus. Fig. 4 is a side view in detail, illustrating the transverse frame upon which the belt-frame rests. Fig. 5 is a top or plan view of the same. Fig. 6 illustrates cams which may be employed in the operating mechanism. Figs. 7 and 8 are top and side views, respectively, of the worm-gear for operating the belt. Fig.

9 illustrates the lower portion of the mechanism shown in Fig. 8, viewed from a different standpoint.

Similar reference characters indicating corresponding parts in the views, let the numeral 5 designate a suitable stationary frame, and 6 the side bars of the movable frame forming the support for the belt or table, as the case may be. In the extremities of these side bars, as shown in the drawings, are journaled two drums 7, which are engaged by the endless belt or apron 8. These side bars of the belt-supporting frame are reinforced or strengthened by four inclined brace-bars 9, two on each side. The upper extremities of each pair of these bars 9 are made fast to their respective frame-bars 6 near the extremities of the latter, while the lower extremities of each pair of bars 9 engage suitable sockets formed in a centrally-located shoe 10, which is supported in place by suspension-rods 12, whose upper extremities are attached to the frame-bar 6.

Centrally journaled in the base of the stationary frame 5 is a transverse horizontal shaft 13, which is engaged by the arms 14^a of the oscillating yoke 14. The arms of this yoke are connected by the transverse body portion 14^c. The top of the yoke is provided on opposite sides with horizontal projections 14^d, upon which are slidingly mounted blocks 15. The block 15 on one side is engaged by the lower extremity of a screw 16, which passes through a threaded aperture formed in one extremity of a transverse auxiliary frame 17, upon which the side bars 6 of the belt-supporting frame rest. The opposite extremity of the transverse frame 17 is directly attached to the sliding block 15, engaging the transverse projection on the yoke. The transverse inclination of the belt-supporting frame may be regulated at will by adjusting the screw 16. The bars 6 engage sockets 17^a in the auxiliary frame, whereby as the last-named frame is moved transversely or sidewise a corresponding movement is imparted to the belt-frame. The top of the yoke on one side is provided with a vertical projection 14^e, which passes through an opening in the auxiliary frame and forms

a bumper against which the frame 17 strikes during its transverse or lateral movement, as hereinafter described.

In the body 14^c of the yoke is journaled a vertical shaft 18, having a gear 19 made fast to its lower extremity and meshing with a gear 20 on the main shaft 13. The upper extremity of the shaft 18 is provided with an eccentric 21, inclosed by a two-part sliding casing 22, located between two transverse guide-bars 23 and 24, forming a part of the auxiliary frame 17. Located in an aperture formed in the frame 17 and engaging the sliding casing 22 on one side is a wedge-shaped key 28, having one extremity threaded to engage a nut. The function of this nut is to take up lost motion resulting from the wear of the eccentric and its sliding casing 22. A coil-spring 25 engages the guide-bar 23 at one extremity, while its opposite extremity engages a stop carried by a tension-screw 26, which passes through a threaded aperture formed in a projection 14^h on the yoke 14. This eccentric mechanism imparts the transverse or lateral movement to the auxiliary frame and the belt-frame resting thereon.

When the shaft 13 is rotated, the vertical shaft 18 is also actuated and the auxiliary frame moved transversely, as heretofore explained. As this frame is moved toward the right, referring to Fig. 3, the spring 25 is compressed, and as the frame is moved in the opposite direction it is caused to strike against the bumper 14^s on the yoke. Instead of the eccentric it is evident a cam may be attached to the upper extremity of the shaft 18. In this case the key 28 may be dispensed with, since the bar 23 of the auxiliary frame will be held against the cam by the spring 25.

The means for imparting the longitudinal movement to the belt-frame or table will now be described in detail. Centrally fulcrumed, as shown at 29, on the base of the stationary frame 5 is a rocking device 30, having the shape and function of a bell-crank lever. This lever occupies a vertical position. Its lower arm 30^a projects below the shaft 13 and is engaged by a cam 31, fast on the said shaft. This cam, as shown in the drawings, is double, its cam-arms being of unequal length and lying in different planes. The cam is adjustable longitudinally on the shaft 13, so that either cam-arm may be made to engage the lever 30, as desired, and according to the movement required in treating different classes of ore. The upper extremity 30^c of the lever 30 is provided with a socket which is engaged by the ball extremity of a straight arm 32, whose opposite extremity, which is of similar shape, engages a socket 17^c, formed in a depending projection of the auxiliary frame 17. At a point on the frame 17 directly opposite the socket 17^c a coil-spring 33 engages the frame. The opposite extremity of this spring engages a stop carried by a ten-

sion-screw 34, whose opposite extremity is provided with a hand-wheel 35. This tension-screw engages a threaded aperture formed in an upright beam or post 5^a of the stationary frame. The cam 31 engages the lower arm of the lever 30 every time the shaft 13 makes a revolution. As this cam engages the said arm of the lever the upright arm 30^c of the lever is driven forward or to the right, referring to Figs. 1 and 2. This movement of the lever forces the straight arm 32 against the auxiliary frame 17 and moves the belt-carrying frame or table forward or in a corresponding direction. During this movement the spring 33 is compressed. Hence as soon as the cam 31 releases the lever the spring 33 recoils and throws the belt-frame or table in the opposite direction. Since the belt-frame is supported by the yoke 14, the latter is oscillated during the longitudinal movement of the belt-frame. The longitudinal inclination of the belt-frame is controlled by a turn-buckle 36, engaging the threaded extremities of two bolts 37 and 38, attached to the belt-frame and the stationary frame, respectively. The lateral inclination of the table is controlled by the screw 16, as heretofore explained.

The belt 8 is actuated by a worm-gear which will now be described. To the protruding journal of the drum 7 at the head of the machine is attached a gear-wheel 39, which is engaged by a worm wheel or pinion 40, fast on the upper extremity of a vertical shaft 41. The lower extremity of this shaft 41 engages a socket 42, forming a step 43, movably mounted on the horizontal shaft 44 to permit the necessary movement of the belt-frame. The upper extremity of the vertical shaft 41 is journaled in a keeper 45, supported by a bracket 46, mounted on one of the adjacent side bars 6 of the belt-frame. The bracket-bearing is loose in the frame-bar to permit the necessary movement of the frame. The horizontal shaft 44 is journaled in the base of the stationary frame and carries a cone-pulley 48, which is connected with a similar pulley 49, fast on the shaft 13, by a belt 50. The outer extremity of the shaft 44 is provided with a gear 52, which meshes with a similar gear 53, fast on the lower extremity of the shaft 41. Hence the rotation of the shaft 13 imparts the movement to the belt on its frame and also both the side and longitudinal movements to the belt-frame through the medium of the mechanism heretofore described.

To operate the machine, a pulley 51 on the shaft 13 is connected with any suitable motor. As the shaft 13 is rotated the lateral movement is imparted to the belt-frame through the medium of the shaft 18, the gears 19 and 20, the eccentric 21, and the auxiliary frame 17. The longitudinal movement is imparted to the belt-frame through the medium of the cam 31, the lever 30, the arm 32, the auxiliary frame 17, and the spring 33. The belt is

moved on its frame in the direction indicated by the arrow (see Fig. 1) to carry the concentrates over the head of the table through the medium of the pulleys 48 and 49, the shafts 41 and 44, gears 52 and 53, the worm-wheel 40, and a gear 49.

Having thus described my invention, what I claim is—

1. In a concentrator, the combination with the stationary frame, of a yoke mounted thereon, an auxiliary frame slidingly mounted on said yoke, a concentrating-apparatus frame mounted on the auxiliary frame, a horizontal shaft journaled in the stationary frame, a vertical shaft journaled in the yoke, gears connecting the horizontal and vertical shafts, and an eccentric fast on the vertical shaft and engaging the auxiliary frame, whereby as the said shafts are rotated, a lateral or transverse movement is imparted to the frame of the concentrating apparatus.

2. The combination with the stationary frame, of the horizontal shaft journaled therein, the oscillatory yoke mounted on the stationary frame, the auxiliary frame slidingly mounted on the yoke, a concentrating-apparatus frame mounted on the auxiliary frame, suitable means for imparting the lateral movement to the frame of the concentrating apparatus, comprising a vertical shaft journaled in the yoke, gears connecting the horizontal and vertical shafts, an eccentric fast on the vertical shaft and engaging the auxiliary frame, and means for imparting to the frame of the concentrating apparatus the longitudinal movement, comprising a cam on the horizontal shaft, a bell-crank lever fulcrumed on the stationary frame, one arm of the lever projecting into the path of the cam on the horizontal shaft, and an arm interposed between the other arm of the lever and the auxiliary frame, and a spring engaging the auxiliary frame and cooperating with the lever.

3. In a concentrator, the combination with the stationary frame, of an upright yoke mounted thereon, a horizontal shaft journaled in the said frame, an auxiliary frame slidingly mounted on the yoke, a concentrating-apparatus frame mounted on the auxiliary frame, and suitable means cooperating with the horizontal shaft for imparting the lateral movement to the frame of the concentrating apparatus as the shaft is rotated, comprising

a vertical shaft journaled in the yoke, gears connecting the horizontal and vertical shafts, and an eccentric fast on the upper extremity of the vertical shaft and engaging the auxiliary frame.

4. In a concentrator, the combination with the stationary frame, of the oscillatory yoke mounted thereon, a horizontal shaft journaled in said frame, an auxiliary frame slidingly mounted on the yoke, a concentrating-apparatus frame mounted on the auxiliary frame, and suitable means cooperating with the said shaft, whereby the longitudinal movement is imparted to the frame of the concentrating-table as the shaft is rotated, comprising a bell-crank lever fulcrumed on the stationary frame, a cam mounted on the horizontal shaft and engaging one arm of the said lever which projects beneath the shaft, an arm interposed between the upright arm of the bell-crank lever and the auxiliary frame, the said arm having ball extremities engaging counterpart sockets formed in the engaged parts, and a spring cooperating with the lever and having its tension so regulated as to hold the said interposed arm in place.

5. In a concentrator, the combination with the stationary frame, the upright yoke mounted thereon, the auxiliary frame mounted on the yoke, the concentrating-apparatus frame mounted on the auxiliary frame, the yoke being provided with a projection passing through an opening in the auxiliary frame and forming a bumper which the auxiliary frame engages as the lateral movement is imparted, a horizontal shaft journaled in the stationary frame, and means cooperating with the horizontal shaft for imparting the lateral movement to the frame of the concentrating apparatus as the shaft is rotated, whereby the auxiliary frame is caused to engage the bumper on the yoke, said means comprising a vertical shaft, gears connecting the horizontal and vertical shafts, and an eccentric fast on the upper extremity of the vertical shaft and engaging the auxiliary frame.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM E. WILD.

Witnesses:

C. A. WINDER,
M. T. HUNTER.