

No. 776,647.

PATENTED DEC. 6, 1904.

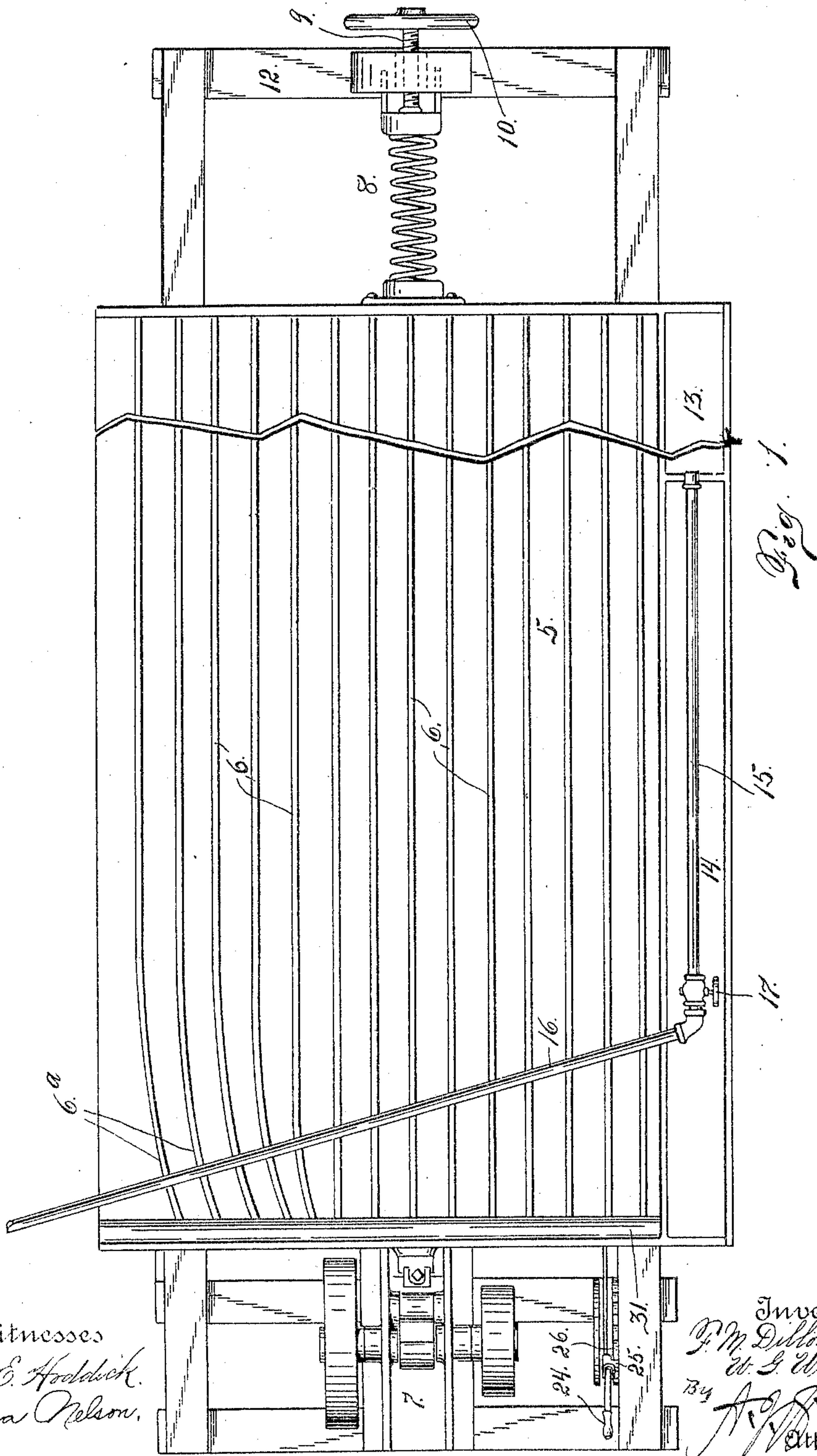
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CONCENTRATOR.

APPLICATION FILED OCT. 27, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



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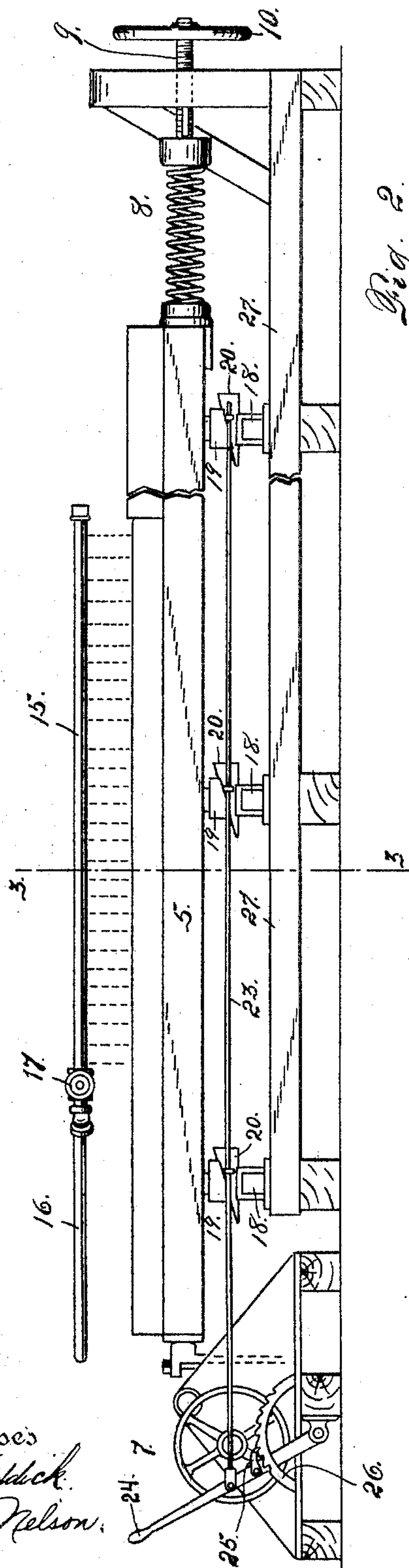


Fig. 2.

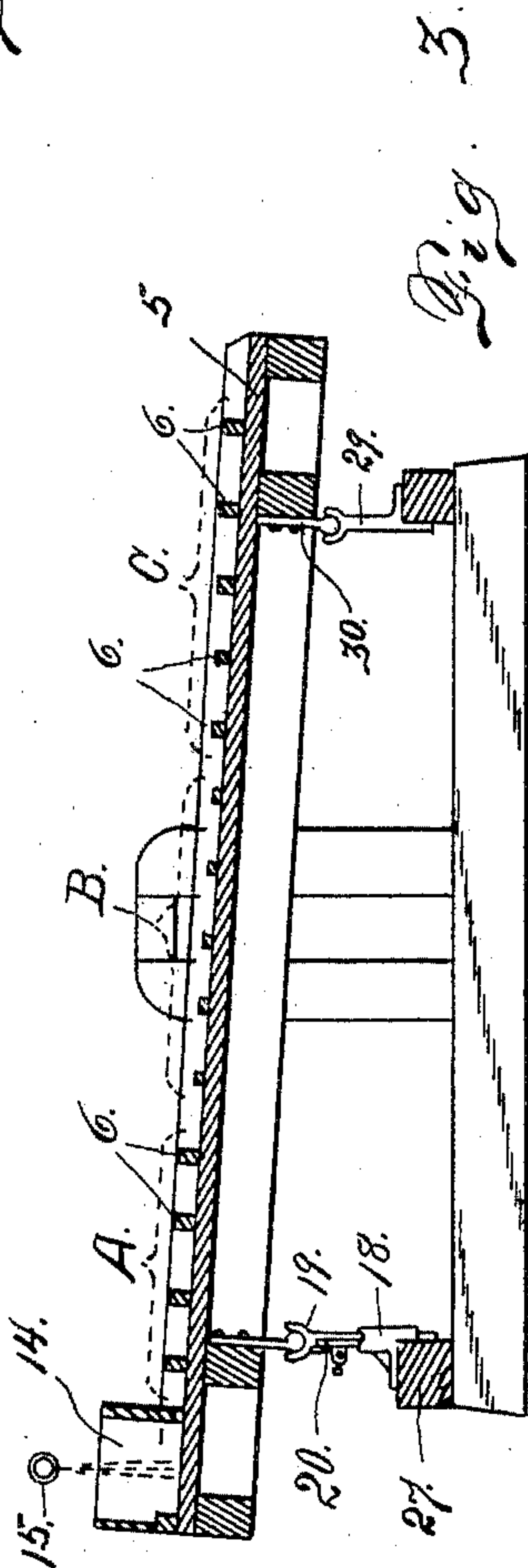


Fig. 3.



Fig. 4.

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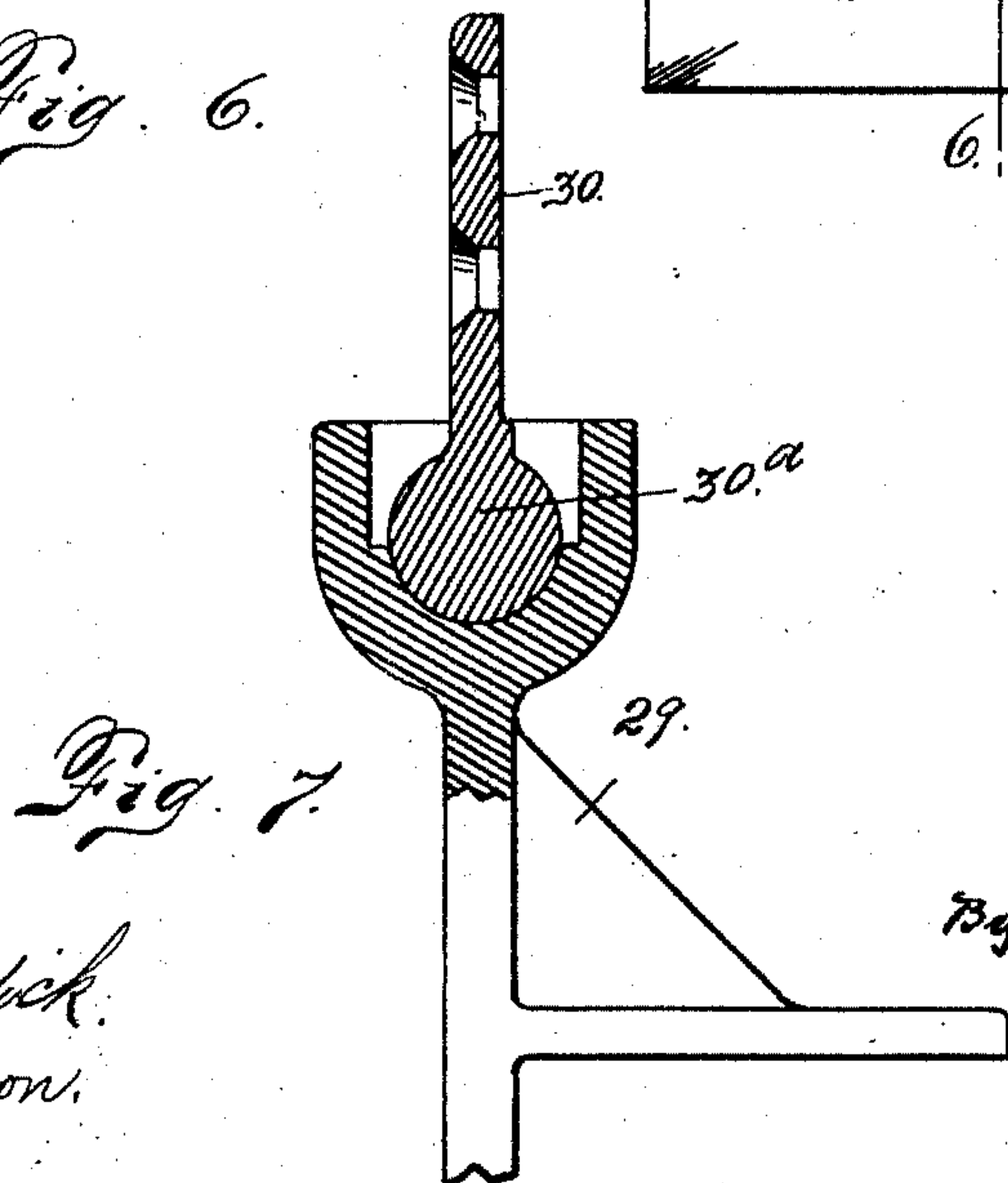
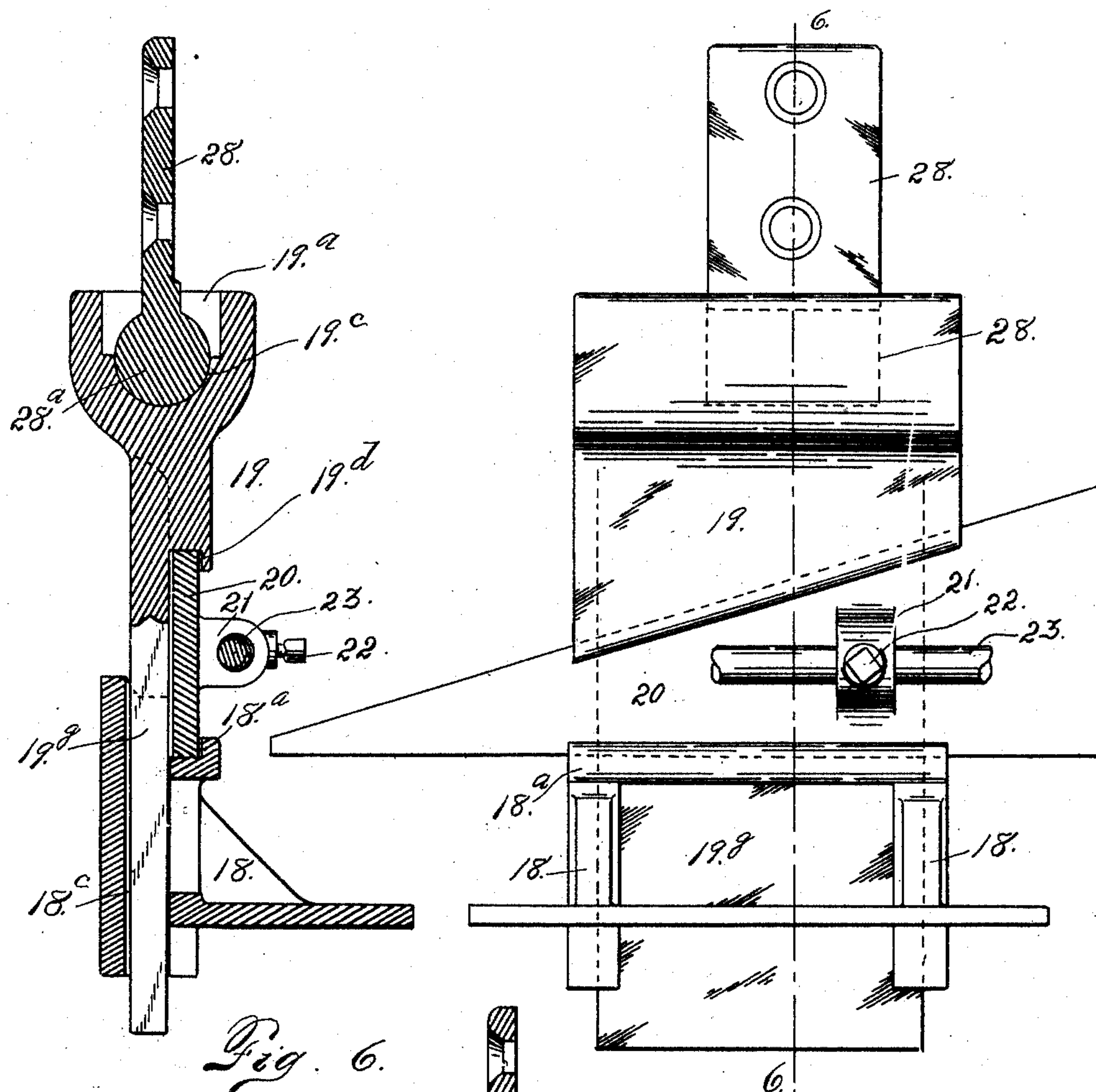
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APPLICATION FILED OCT. 27, 1902.

NO MODEL.

3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

FREDERICK M. DILLON AND WYLIE G. WILSON, OF DENVER, COLORADO.

## CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 776,647, dated December 6, 1904.

Application filed October 27, 1902. Serial No. 129,044. (No model.)

*To all whom it may concern:*

Be it known that we, FREDERICK M. DILLON, a citizen of the United States of America, and WYLIE G. WILSON, a subject of the King of Great Britain, both residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Concentrators; and we 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 letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in ore-concentrators, our object being to provide apparatus of this class which shall be comparatively simple in construction, economical in cost, reliable, durable, and thoroughly practicable 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 top or plan view of our improved apparatus. Fig. 2 is a side elevation of the same. Fig. 3 is a cross-section taken on the line 3 3, Fig. 2. Fig. 4 is a detail view of one of the riffles. Fig. 5 is a side view in detail of a device employed in regulating the transverse inclination of the table. Fig. 6 is a section taken on the line 6 6, Fig. 5. Fig. 7 is a detail view, partly in section, of a supporting-bracket which coöperates with the construction shown in Figs. 5 and 6. In Figs. 5, 6, and 7 the parts are shown on a larger scale than in the other views.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a concentrating-table which when in operation has a longitudinal reciprocation or vibration having a tendency to carry the material from the head or right-hand extremity of the table (see Figs. 1 and 2) to the opposite or tail end of the table. This table is provided with longitudinal riffles 6, which are of the same general construction, but are arranged in groups of dif-

ferent heights. These groups are for convenience designated A, B, and C, respectively. The group A, as shown in the drawings, consists of a number of parallel riffles arranged upon the uppermost portion of the transversely-inclined surface of the table. The riffles of the group A are all of the same height or approximately of the same height preferably. The riffles of the group B are located at the central portion of the table and are preferably all of the same or approximately of the same height, being of a less height than the group A. The riffles of the group C are arranged along the lower portion of the inclined table-surface. These riffles are of varying height, the riffle of least height occupying the most elevated position of the group and the other riffles increasing in height toward the lower or gangue discharge edge of the table, the riffle of the greatest height occupying the lowermost position. The riffles of the group C are curved or inclined at their rear extremities, which are directed slightly upwardly in the direction of the upper edge of the table, as shown at 6<sup>a</sup>.

Mounted at the tail of the table is a suitable operating device 7, adapted to impart the longitudinal movement in one direction, while the movement in the opposite direction is imparted by a coil-spring 8, which, as shown in the drawings, is located at the head of the table or the extremity opposite that where the operating mechanism 7 is located. The tension of the spring 8 is controlled by a screw 9, operated by a hand-wheel 10, the screw being threaded in an end bar 12 of the frame.

Mounted above the upper edge of the table near its head is a feed-box 13, into which the pulp is discharged and from which it passes to the concentrating-surface of the table. Extending rearwardly from the feed-box is a wash-water trough 14, which receives its supply of water from a perforated pipe 15, provided with a branch 16, which extends diagonally across the rear portion of the table. The pipe 14 is provided with a valve 17 for regulating the supply of water to the pipe 16.

The means for regulating the transverse inclination of the table will now be described. Arranged longitudinally underneath the up-



per portion of the table is a number of devices each composed of three parts—namely, a stationary bracket 18, a vertically-movable member 19, and an interposed wedge 20, provided with an ear 21, in which is threaded a set-bolt 22, whose inner extremity bears against a connecting-rod 23, whereby the rod may be attached to the various wedges. One extremity of this rod is connected with a lever 24, provided with a locking-dog 25, engaging a ratchet-quadrant 26. By the movement of this rod all the wedges 20 may be simultaneously shifted. In the upper portion of the member 19 is formed a socket 19<sup>a</sup>, open at the top and provided with a curved bottom 19<sup>c</sup>. This part 19 is provided with an inclined groove 19<sup>d</sup>, which is engaged by the upper inclined edge of the wedge 20. The lower edge of this wedge is straight and engages a groove or way 18<sup>a</sup>, formed in the upper portion of the bracket 18. The part 19 is provided with a plate 19<sup>e</sup>, which occupies a position in a different vertical inclined plane from the wedge and parallel with the latter. This plate 19<sup>e</sup> passes through an opening 18<sup>c</sup>, formed in the bracket 18, and is adapted to move freely therein. The bracket 18 is secured to a suitable stationary support 27, located beneath the table. The socket 19<sup>a</sup> of the device is engaged by a foot 28, attached to the table and having a rounded lower extremity 28<sup>a</sup>, which engages the bottom of the socket. By moving the rod 23 and shifting the wedges 20 it is evident that the upper portion of the table may be raised and lowered at will and its transverse inclination increased or diminished at pleasure. Underneath the lower portion of the table is located a number of stationary brackets 29, whose upper extremities are provided with curved sockets, each of which is engaged by the foot or lower rounded extremity 30<sup>a</sup> of a depending plate 30, attached to the concentrating-table. The feet 28<sup>a</sup> and 30<sup>a</sup> are free to turn in the sockets which they respectively engage as the inclination of the table is changed. These feet also move freely longitudinally in the sockets to permit the longitudinal reciprocation or vibratory movement of the table.

When the apparatus is in use, the longitudinal vibration is imparted through the instrumentality of the mechanism 7 and the spring 8, which cooperate to produce the desired result. The material to be treated is fed in the form of pulp from the box 13 to the upper portion of the riffled concentrating-surface near the head of the table, where the riffles are of greatest height or depth. The group A of riffles receives the pulp first and catch the heaviest portion of the mineral values, which are carried by the riffles under the influence of the vibratory movement of the table rearwardly and discharged into a trough 31, extending transversely across the rear extremity of the table, while the gangue and

lighter mineral values are carried transversely downwardly over the riffles of the group A. The riffles of the group B are of less depth or height than those of the group A. The mineral values which reach the group B are more nearly of the same specific gravity as the gangue than the heavier mineral values caught by the group A. Hence the separation of the values from the gangue is more difficult. We therefore make the riffles of the group B of less height than those of the group A in order that the wash-water may act more effectively upon the said material. Hence the result is that the group B catches another grade of concentrates, while the gangue, still further impoverished of its mineral values, is carried to the group C, whose individual riffles increase in height to the lower edge of the table, where the gangue is discharged. This arrangement of the riffles of the group C is especially calculated to effect the final separation of the values from the gangue. The material which reaches this riffle group is still more nearly of uniform specific gravity—that is to say, the mineral values still more nearly approach the gangue considered from a standpoint of specific gravity. Hence the difficulty of effecting the separation is correspondingly increased. The arrangement of the riffles of this group whereby they increase in height from the uppermost transversely downwardly is calculated to retain the material for a longer time on the table and give the wash-water a better opportunity to effect the separation. The mineral values naturally assume the lowest position under the influence of the vibratory action of the table and are gradually working rearwardly into the trough 31, while the gangue, which forms the upper stratum of the material, is continually working downwardly over the lower or gangue-discharge edge of the table. The curved rear extremities of the riffles of this group retard the rearward travel of the concentrates, and thus allow the wash-water to effect a clean separation of the mineral values from the gangue.

Having thus described our invention, what we claim is—

1. A transversely-inclined concentrating-table having a longitudinal vibration whose tendency is to cause the material to travel thereon from the head toward the tail of the table, the said table having longitudinal riffles arranged in groups of varying height, the highest group being located upon the upper portion of the transversely-inclined surface, the lowest group being centrally located on said surface, and the third group on the lowest portion of the table.

2. A transversely-inclined concentrating-table having a longitudinal vibration whose tendency is to cause the material to travel thereon from the head toward the tail of the table, the said table having longitudinal riffles arranged in groups of varying height, the



highest group being located upon the upper portion of the transversely-inclined surface, the lowest group being centrally located on said surface, and the third group on the lowest portion of the table, the riffles of the last-named group varying in height, the uppermost being the lowest and the others increasing in height toward the lower edge of the table, the concentrating-surface of the table lying in a uniform plane which the lower edges of the riffles engage, substantially as described.

3. A transversely-inclined concentrating-table having a longitudinal vibration whose tendency is to cause the material to travel thereon from the head toward the tail of the table, the said table having longitudinal riffles disposed in transverse groups of varying height, the uppermost group being of uniform height, the next group of uniform height but of less height than the uppermost group, and the third group located on the lower portion of the table and varying in height, the uppermost riffle of this group being lowest and the other riffles increasing in height toward the lower edge of the table, the lower edges of the riffles all lying in a uniform plane corresponding with the plane of the concentrating-surface of the table.

4. The combination with a concentrating-table, of means for regulating the transverse inclination of said table comprising brackets located beneath the table, each bracket having a horizontal way formed in its upper edge and a vertical opening in a different vertical plane from the said way, a movable member having an open socket formed in its upper extremity and provided with an inclined way below, and lying in the plane of the horizontal way of the bracket, an adjustable, wedge-shaped device engaging said ways, the movable member having a plate lying in a different plane from the wedge and extending downwardly and passing through the opening in the bracket which forms a guide for the movable member, there being a movable member for each bracket, the table having feet engaging the sockets in the tops of the movable members, substantially as described.

5. The combination with a concentrating-table, of means for regulating its transverse inclination comprising a stationary bracket part having a way formed in its upper edge and a vertical opening in a different vertical plane from the said way, a movable member having an open socket formed in its upper extremity and provided with a way lying in a plane of the way of the bracket, an adjustable wedge-shaped device engaging said ways, the movable member having a depending plate lying in a different plane from the

wedge and passing through the opening in the bracket which forms a guide for the said member during adjustment, the table having a foot which engages the socket in the top of the movable member.

6. The combination with a concentrating-table, of a number of brackets arranged longitudinally under one side of the table, each bracket having a horizontal way and provided with an opening lying in a different plane from the way, a vertically-movable member for each bracket, each movable member having an open socket in its upper extremity, and being provided with an inclined way below, and lying in the plane of the horizontal way of the bracket, an adjustable wedge engaging the ways of each bracket and movable member, the latter having a depending plate occupying a different plane from the wedge and passing through the opening in the bracket which forms a guide for the said member during adjustment, a rod connected with all of the wedges, and a lever connected with the rod for adjusting purposes, substantially as described.

7. A transversely-inclined concentrating-table having a vibratory movement whose tendency is to carry the material longitudinally thereon from the head toward the tail of the table, the said table having riffles extending lengthwise thereof and arranged in groups distinguished by their difference in height, the bottoms of the riffles lying in the same plane, the lowermost group having their rear extremities curved or directed upwardly in the inclined plane of the table, substantially as described.

8. A transversely-inclined concentrating-table having a longitudinal vibration whose tendency is to cause the material to travel thereon from the head toward the tail of the table, the said table having longitudinal riffles arranged in groups of varying height, the highest group being located upon the upper portion of the transversely-inclined surface, the lowest group being centrally located on said surface, and the third group on the lowest portion of the table, the riffles of the last-named group varying in height, the uppermost being the lowest and the others increasing in height toward the lower edge of the table.

In testimony whereof we affix our signatures in presence of two witnesses.

FREDERICK M. DILLON.  
WYLIE G. WILSON.

Witnesses:

DENA NELSON,  
A. J. O'BRIEN.