

No. 641,248.

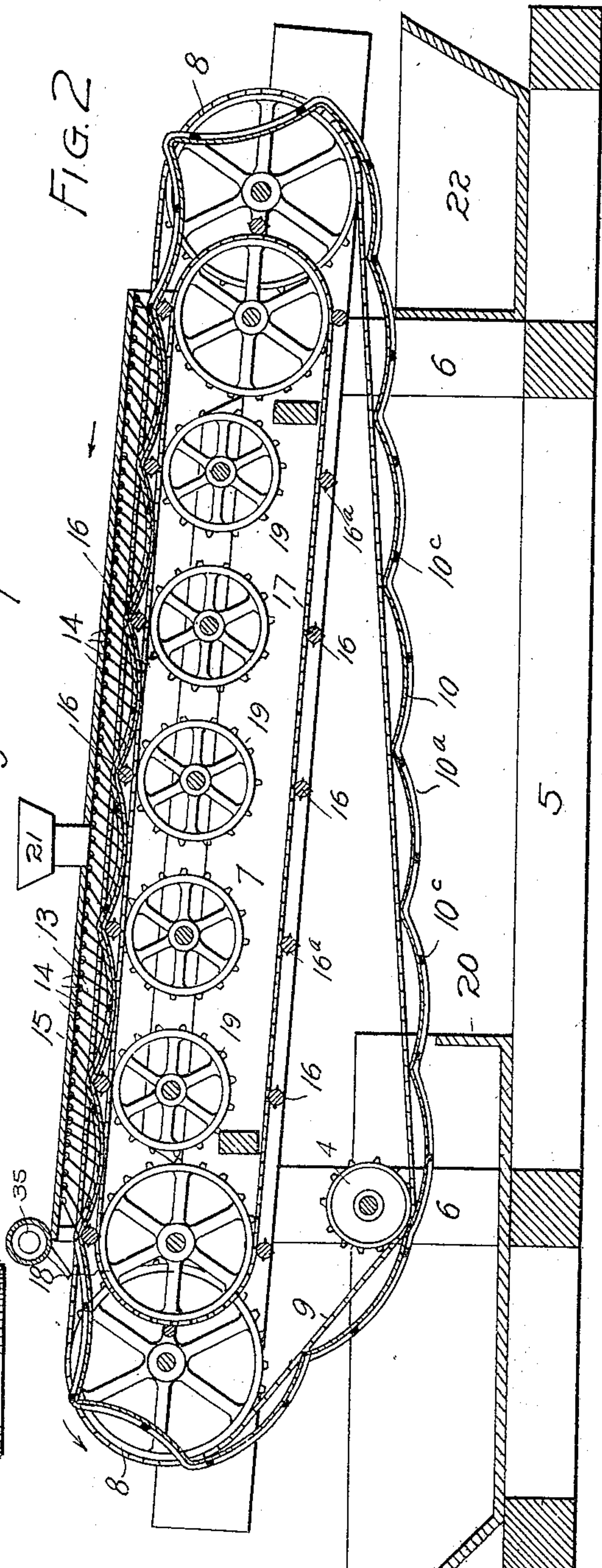
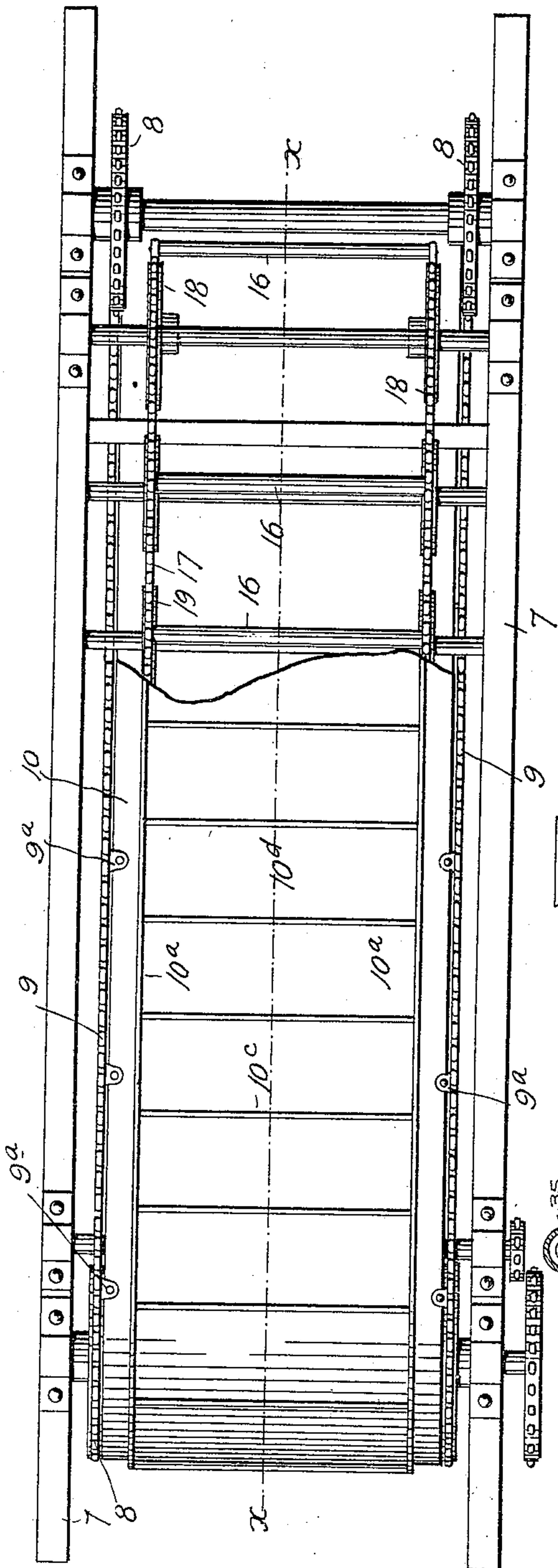
Patented Jan. 9, 1900.

A. TEN WINKEL.
ORE CONCENTRATOR.

(Application filed June 26, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
G. J. O'Connell
Nellie G. Daniels

By *his* Attorney

Inventor
A. Ten Winkel
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FIG. 3

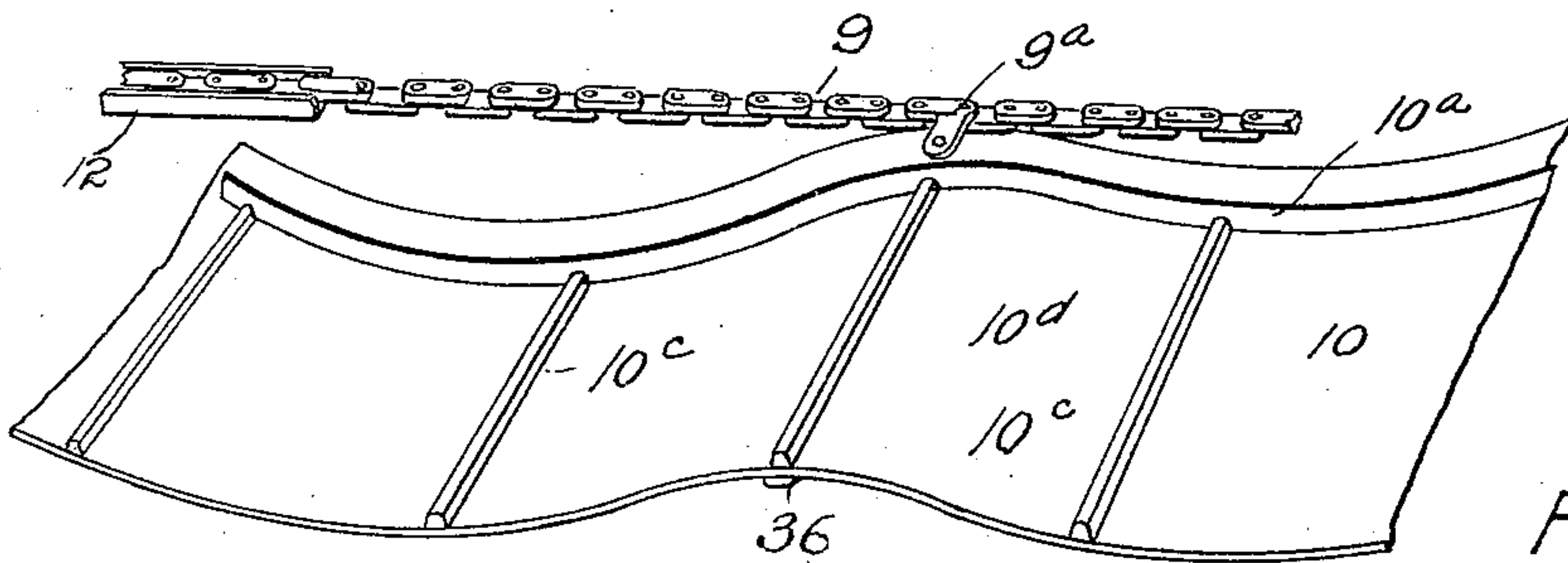
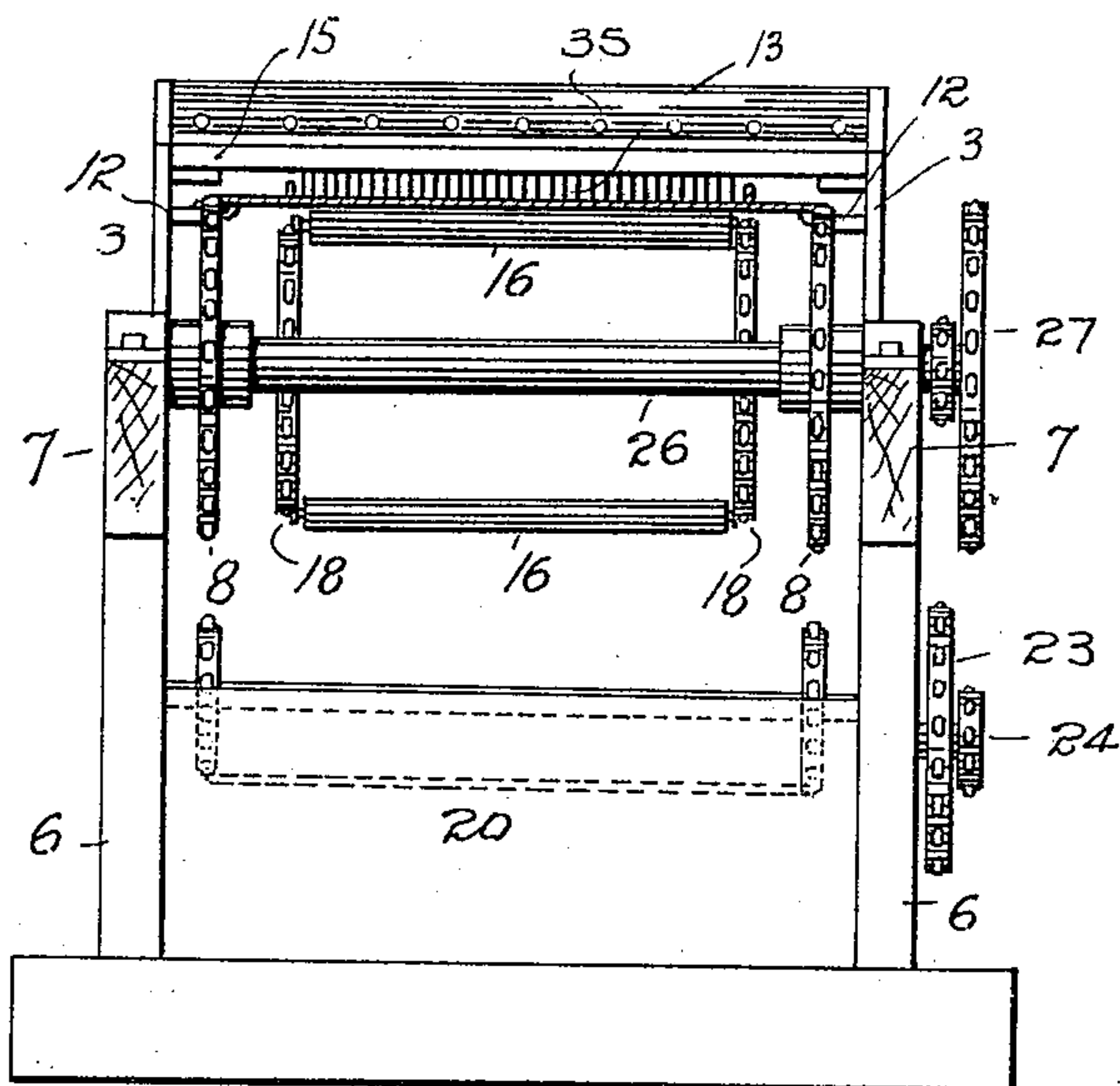


FIG. 4

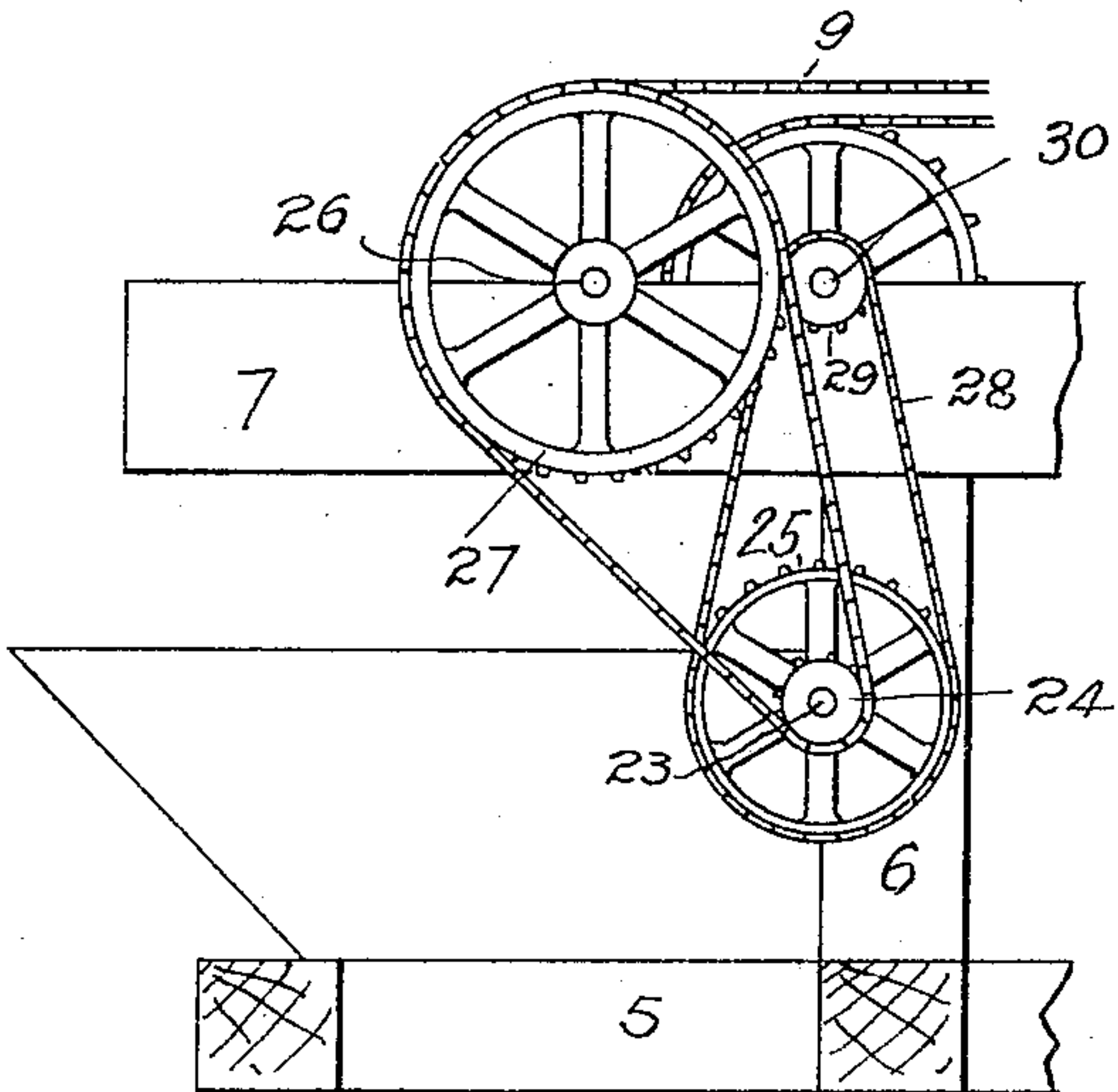


FIG. 6.

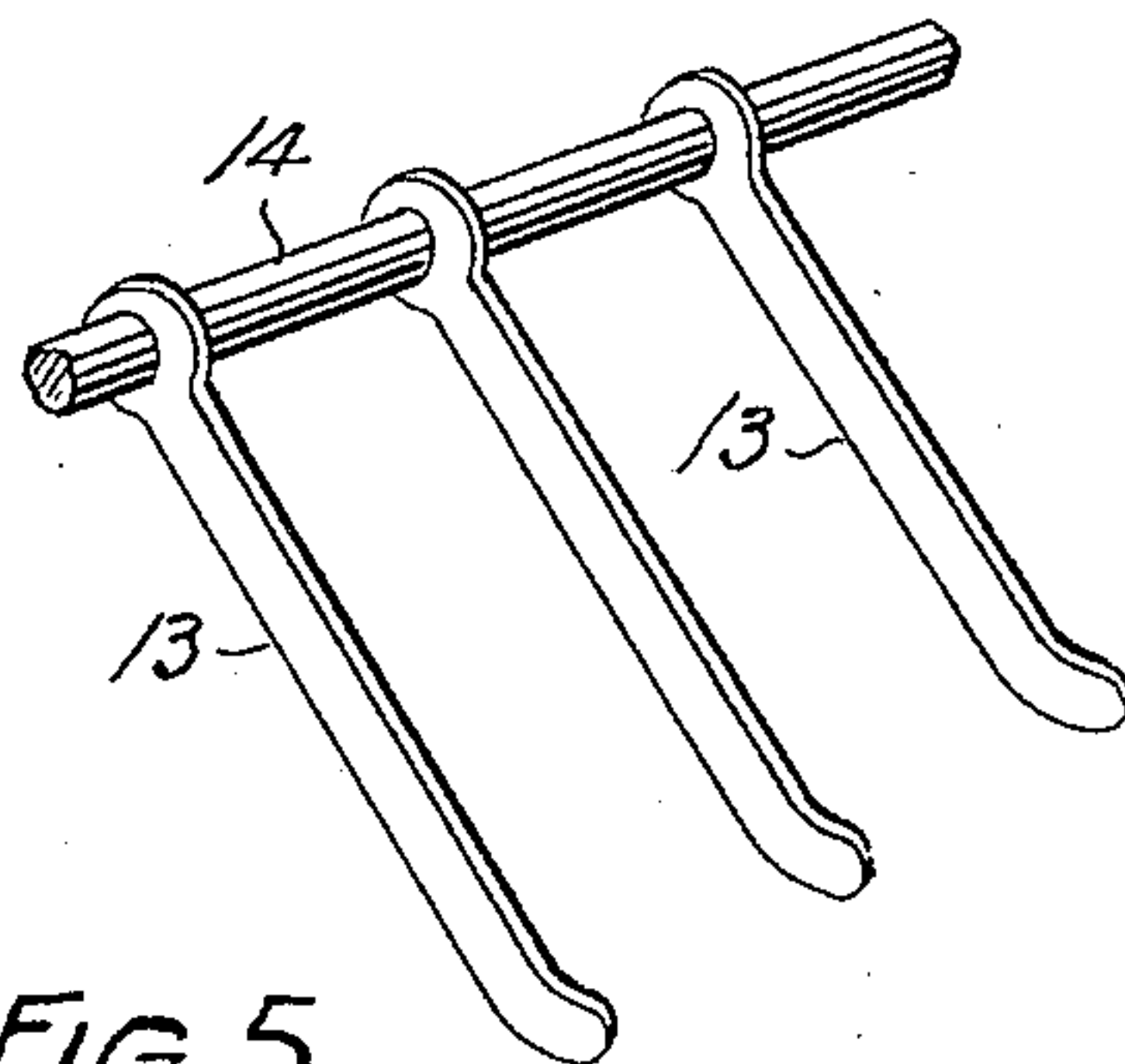


FIG. 5

Witnesses
[Signature]
Nellie H. Daniels

By *[Signature]* Attorney

Inventor
A. Ten Winkel

[Signature]

UNITED STATES PATENT OFFICE.

AUGUST TEN WINKEL, OF DENVER, COLORADO.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 641,248, dated January 9, 1900.

Application filed June 26, 1899. Serial No. 721,837. (No model.)

To all whom it may concern:

Be it known that I, AUGUST TEN WINKEL, 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 to improvements in ore-concentrators of the class set forth in Letters Patent No. 622,641, issued to me April 4, 1899. In my present construction instead of mounting the traveling flexible apron on terminal drums, as in said patent, the edges of the apron are connected at suitable intervals with chains which engage a pair of sprocket-wheels located at each extremity of the machine. Between the points of attachment to the chains the apron sags down, forming pockets or valleys in which the separation of the mineral from the gangue takes place. The agitating-rolls traveling underneath the apron are journaled in chains which engage the terminal and intermediate sprocket-wheels which form their support.

Having thus briefly outlined my present invention, I will proceed to describe the same in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a longitudinal section taken through my improved machine. Fig. 2 is a top view of the same with a portion of the apparatus removed and the apron partly broken away. Fig. 3 is an elevation of the same, the upper portion of the apron being shown in section. Fig. 4 is a fragmentary perspective view of the flexible apron shown in connection with one of the sprocket-chains and on an enlarged scale. Fig. 5 is a fragmentary perspective view of the separating-fingers which engage the flexible apron from above. Fig. 6 illustrates the operating mechanism whereby the flexible apron and the agitating-rolls are made to travel, but at different rates of speed.

Similar reference characters indicating corresponding parts in the views, let the numeral 5 designate a base, upon which are mounted uprights or posts 6, supporting the upper longitudinal bars 7, one on each side. On these bars 7 are journaled two pairs of sprocket-wheels 8, one pair being located at each end of the machine and engaged by chains 9, to which is attached the endless flexible apron 10, composed of rubber or other suitable material impervious to water, provided with longitudinal rubber flanges 10^a and crossstrips or riffles 10^c. The flanges prevent the pulp from running over the sides of the apron and the riffles have a tendency to prevent the concentrates from flowing downward with the gangue toward the foot or tail of the machine. The chains 9 intermediate the end sprockets are supported by horizontal longitudinal ledges 12, one on each side of the machine. The ledges are attached to upright bars 3, whose lower extremities are secured to the side bars 7. The chains 9 are provided with lugs 9^a, suitably separated, and to which is attached the apron 10. Between the transverse lines connecting the said lugs or points of attachment on opposite sides of the apron the latter sags downward while traveling toward the head or left-hand extremity of the machine, (see Figs. 1 and 2,) forming pockets or valleys 10^d of suitable depth, enough slack being left in the apron between these lines for the purpose. Into these valleys or pockets project fingers 13, whose upper extremities are hinged to rods 14, attached to a suitable stationary support 15. These fingers assist in the separation of the metals from the gangue as the apron travels beneath them. Engaging the apron 10 underneath are transverse agitating-rolls 16, whose extremities are journaled in chains 17, which engage the large terminal sprocket-wheels 18 and are supported by the smaller intermediate sprocket-wheels 19. All of these sprocket-wheels are journaled in the side bars 7 of the frame. The agitating-rolls 16 are fluted longitudinally or provided with ribs 16^a to facilitate the agitation of the material on the apron.

A pair of idler-wheels 4, mounted on the forward posts 6, engage the chains 9 and guide the apron 10 into a tank 20, containing water. Into this tank the concentrates caught by the

apron are discharged as the apron passes downward.

In the operation of the machine the agitating-rolls 16 and the apron 10 travel in the direction indicated by the arrows in Fig. 1, while the water and gangue, or tailings, travel by gravity in the opposite direction, the head of the machine being sufficiently elevated above the foot to give the desired slope or inclination for the purpose. (See Fig. 1.)

The material to be treated is fed in the form of pulp into a hopper 21 and passes thence through an opening formed in the finger-supporting board 15 to the flexible apron, where it collects in the pockets 10^a of the slowly-moving apron 10. In these pockets the mineral is separated from the gangue through the combined action of the agitator 16 and the fingers 13. The mineral, after separation, by virtue of its superior gravity and being assisted by the riffles 10^c maintains its position in the bottom of the valleys or pockets 10^a and is carried forward and upward by the apron and thence downward into the tank 20, as heretofore explained. The gangue being lighter or of less specific gravity is carried downward with the water in the direction opposite the travel of the apron and discharged into a tailings-tank 22 at the tail of the machine.

The movement of the apron 10 and the agitators 16 at different rates of speed, as heretofore explained, is imparted from a shaft 23, to which are made fast a small sprocket-wheel 24 and a larger sprocket-wheel 25. The small sprocket-wheel 24 is connected with a larger sprocket-wheel 27, fast on a shaft 26, carrying the front wheels 8 at the head of the machine. The larger sprocket-wheel 25 is connected by a chain 28 with a smaller sprocket 29, fast on a shaft 30, carrying the wheels 18, engaged by the agitator-chain 17. The shaft 23 may be operated from any suitable motor.

The machine is supplied with water from a transverse perforated pipe 35, mounted above the head thereof. Strengthening-strips 36 are applied to the under surface of the apron on transverse lines connecting the opposite points where the apron is attached to the chains. These strips determine the length of the pockets and separate the adjacent pockets from each other.

Having thus described my invention, what I claim is—

1. In an ore-concentrator, the combination with a suitable frame, provided with sprocket-wheels at both extremities, and chains engaging said wheels, of an endless apron, attached to said chains at suitable intervals, and left sufficiently slack to form pockets, transverse strips extending between the points where the apron is attached to the chains and defining the length of the pockets, the mechanism being so arranged that the mineral is carried upward with the apron, and the gangue downward by the flow of the water.

2. In an ore-concentrator, the combination of a suitable frame, end sprocket-wheels, chains mounted thereon, an endless, traveling apron impervious to water, attached to said chains in a manner to form pockets or valleys in the apron, the frame being provided with longitudinal, side ledges, upon which the apron-chains are supported between the terminal sprockets, sprocket-wheels mounted on the frame between the apron-sprockets, chains mounted on said wheels, agitating-rollers attached to the last-named chains and engaging the apron underneath, a stationary support mounted above the apron, depending fingers hinged to said support and engaging the apron from above, and means for propelling the apron and agitators in the same direction, but at different rates of speed.

3. In an ore-concentrator the combination with a suitable frame provided with sprocket-wheels at both extremities and chains engaging said wheels, of an endless apron impervious to water, attached to said chains at suitable intervals and left sufficiently slack to form pockets, transverse riffles attached to said apron, each pocket having a riffle at each extremity and one or more intermediate riffles, the mechanism being so arranged that the mineral is carried upward with the apron and the gangue downward by the flow of the water.

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

AUGUST TEN WINKEL.

Witnesses:

A. J. O'BRIEN,
NELLIE G. DANIELS.