

(No Model.)

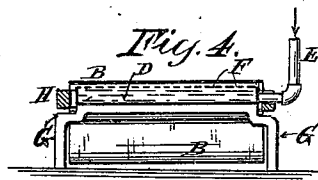
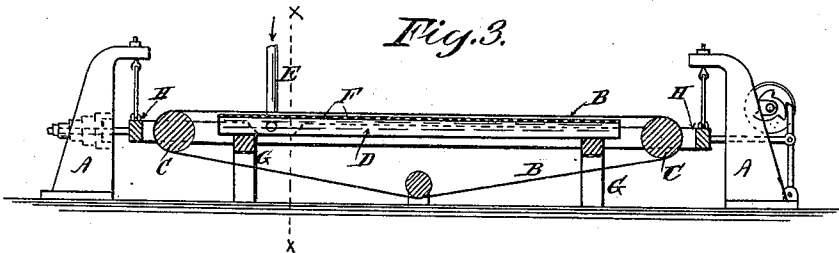
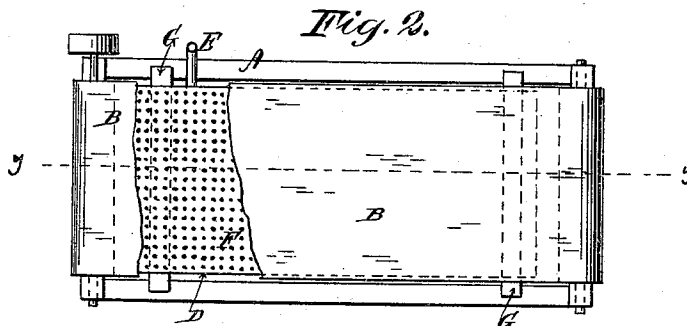
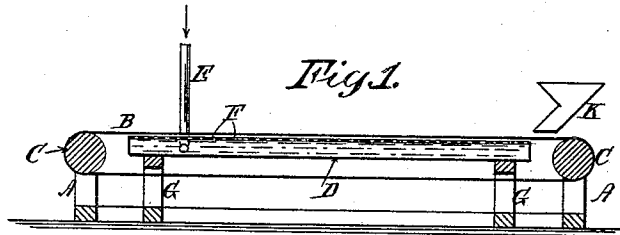
2 Sheets—Sheet 1.

F. G. CORNING.

FLUID SUPPORT FOR ORE CONCENTRATING BELTS.

No. 478,502.

Patented July 5, 1892.



WITNESSES:

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M. C. V. Corning
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INVENTOR

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(No Model.)

2 Sheets—Sheet 2.

F. G. CORNING.

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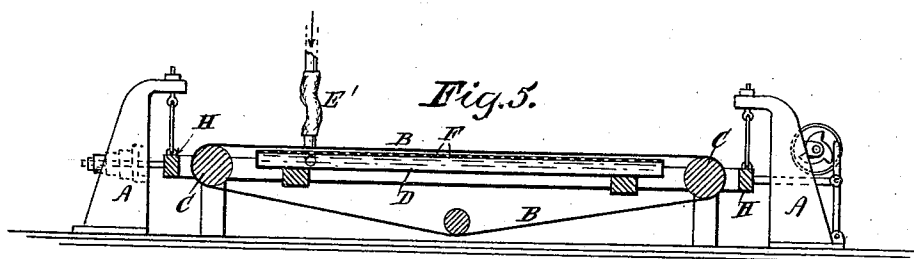


Fig. 5.

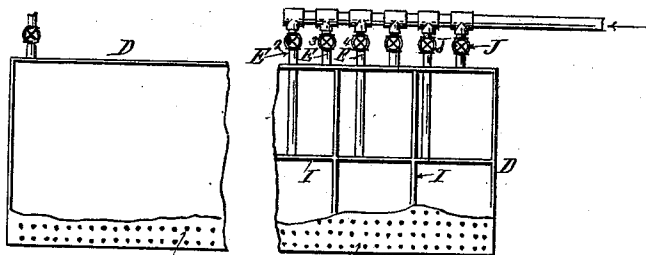


Fig. 6.

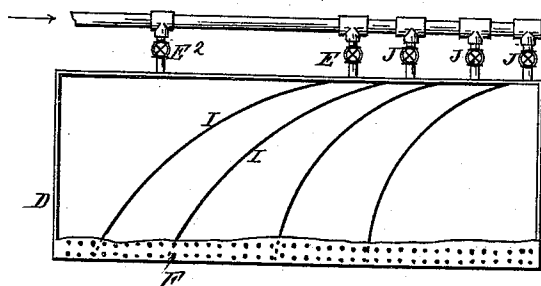


Fig. 7.

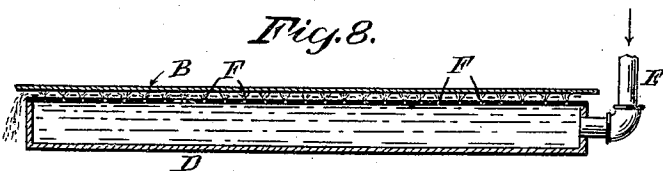


Fig. 8.

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UNITED STATES PATENT OFFICE.

FREDERICK G. CORNING, OF NEW YORK, N. Y.

FLUID-SUPPORT FOR ORE-CONCENTRATING BELTS.

SPECIFICATION forming part of Letters Patent No. 478,502, dated July 5, 1892.

Application filed August 25, 1891. Renewed June 14, 1892. Serial No. 436,645. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK G. CORNING, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Fluid-Supports for Ore-Concentrating Belts, of which the following is a specification.

My invention relates to the treatment of ore pulp upon the surface of an endless flexible apron or belt traveling upon rollers at the opposite extremities of a percussion or other frame, said belt requiring, therefore, a support at its intermediate portion such as will cause the least possible friction and maintain as nearly as possible a perfect plane surface. The pulp constituents being separated by the washing-currents into parabolic zones or other stripes or groups in the order of their specific gravity preparatory to delivering them into separate receptacles, necessarily rest with variable gravity upon different parts of the apron, according as the material is so grouped or distributed.

The full description of an apparatus wherein the pulp constituents are separated by washing into parabolic zones is set forth in my Letters Patent No. 311,231, dated January 27, 1885.

Heretofore intermediate idle-rollers have been employed beneath the ore-bearing part of the belt, or a plane table and a film of water depending for its supply upon gravity alone due to the slight inclination of the table and apron has been employed as a supporting medium. These expedients involve liability to uneven surface and uncertainty of equal or sufficient access of the sustaining water to all parts of the under side of the belt when the pulp or ores are unequally distributed in groups, as aforesaid. A heavy load of ore upon the higher side of the belt would, for instance, obstruct the flow of water designed to support the lower side thereof, thus causing great friction upon the table.

My invention consists in means hereinafter fully described, and pointed out in the appended claims, whereby the supporting fluid for the belt is introduced under pressure and in direct application beneath all parts of the belt.

My invention also provides means where-

by the pressure, and consequent supporting-power of the fluid, may be varied beneath different parts of the belt, according to the distribution of the material thereon, so as to sustain the surface evenly.

Referring to the accompanying drawings, in which similar letters of reference indicate corresponding parts throughout these several views, Figure 1 is a sectional elevation taken on line *y y*, Fig. 2, illustrating the application of my invention to a non-percussion belt-frame; Fig. 2, a plan view of Fig. 1, partly broken away to show the underlying parts; Fig. 3, a sectional elevation showing the application of my invention to a percussion belt-frame in which the fluid-distributing box is stationary; Fig. 4, a cross-section taken on line *x x*, Fig. 3; and Fig. 5, a sectional elevation showing the fluid-distributing box movable with the percussion-frame. Figs. 6 and 7 are top or plan views with a portion of the perforated top broken away. Fig. 8 is an enlarged cross-section illustrating in exaggerated proportion the distributing-box, the apron or belt, and the action of the fluid thereon.

A represents the stationary frame of the machine; B, the endless belt or apron, and C the rollers at the extremities of the frame for supporting said belt.

D is the distributing-box, supplied with fluid under pressure from the pipe E and provided with a perforated surface F, through which the fluid issues in jets that impinge on the under surface of the belt. The distributing-box D is supported in Figs. 1 and 2 upon a stationary frame G, also as applied to the percussion-frame H, carrying the belt B. In Figs. 3 and 4 the box D is supported upon a stationary frame G, and Fig. 5 represents the said distributing-box as supported in the percussion-frame H, moving with it.

The box or reservoir D is supplied with fluid through the pipe E from any suitable source—such as a pump or elevated tank in the instance of the use of water as a supporting medium or by means of a blower in the instance of air. The pipe E in Fig. 5 is provided with a flexible section or suitable equivalent E' to admit of the reciprocating motions of the reservoir D.

The distributing-box D may be constructed

as of a single compartment, as indicated at the left-hand portion of Fig. 6; but in order to provide for variable force of the sustaining-jets at different parts of the perforated surface F, I may subdivide the distributor D interiorly by partitions I, variously arranged, as indicated in the right-hand portion of Fig. 6 or in Fig. 7; or the said distributor may be constructed of separate sections, each being independently supplied. In the divisional construction of the distributor D each compartment is provided with an independent-supply pipe or branch E² E³ E⁴, &c., of the pipe E, controlled by different valves J J, &c., to regulate the flow and consequent pressure.

The combined effect of the travel of the apron B and lateral wash of the water fed thereon with the ore pulp from the hopper K and other points is usually that of separating the metalliferous particles of different grades or kind and the tailings into parabolic zones or stripes, as indicated in said patent, No. 311,231, and in order to conform the zones of variable sustaining force in the jets beneath the apron to such distribution of the weight of the material upon it I may divide the distributor D interiorly into correspondingly-shaped sections, as indicated in Fig. 7, each parabolic section having its own supply-pipe and valve for regulating pressure in such proportion as to sustain the surface of the apron evenly.

A feature of my invention consists in that the percussion-frame, Figs. 3 and 4, may be relieved of the usual weight of the apron-supporting rolls or a water-table, the positive introduction of the sustaining fluid by the jets throughout admitting of the reciprocatory motion of the apron or belt B above them without undue friction, especially when air is used.

In operation the interposed film of fluid is maintained between the entire adjacent surfaces of the apron B and the distributor D, acting in its transitional confinement as a

support, and in the case of liquid it flows off in a sheet into a suitable trough or receptacle.

The mode of introduction of the fluid by jets enlarges the function thereof by reason of the mechanical energy or thrust of the said jets themselves against the apron, and such sustaining action can be regulated at will by the instrumentalities hereinbefore described.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with an ore-concentrating belt, a fluid-pressure reservoir beneath it, having outlets directed toward the under surface of the belt, for the purposes described.

2. In an ore-concentrator, the combination of a flexible apron or belt and a fluid-distributor for maintaining the same, formed of a perforated plane surface underlying the said apron, and means for introducing through said perforations a fluid under pressure, for the purposes described.

3. In an ore-concentrator, the combination of an endless apron or belt, rollers whereon the belt is revolved and intermediate to said rollers, a fluid-distributing box having a plane perforated surface adjacent the belt, and means for supplying said distributor with fluid under pressure.

4. In an ore-concentrator, the combination of a flexible apron or belt, a plane table beneath the belt, and perforations through the surface of the table for supplying a film of fluid beneath the same and the belt.

5. The combination, with a flexible apron or belt for washing and separating ore pulp, of a perforated fluid-distributor beneath the belt, provided with interior subdivisions and independently-controlled supply-pipes for each said subdivision, substantially as and for the purposes set forth.

FREDERICK G. CORNING.

Witnesses:

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