

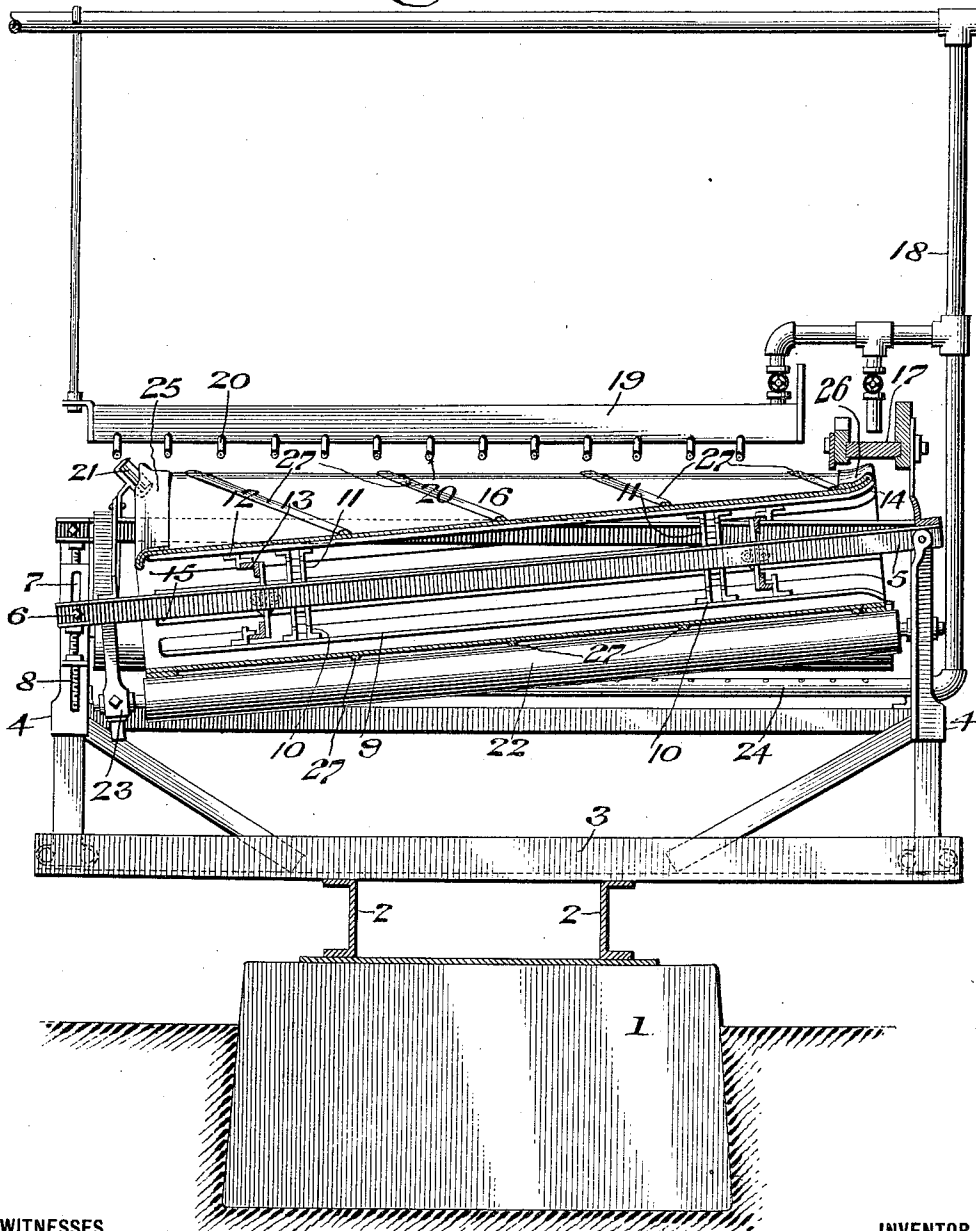
P. H. CRAVEN.
ORE CONCENTRATOR BELT.
APPLICATION FILED SEPT. 27, 1910.

1,060,536.

Patented Apr. 29, 1913.

3 SHEETS-SHEET 1.

Fig. 1.



WITNESSES

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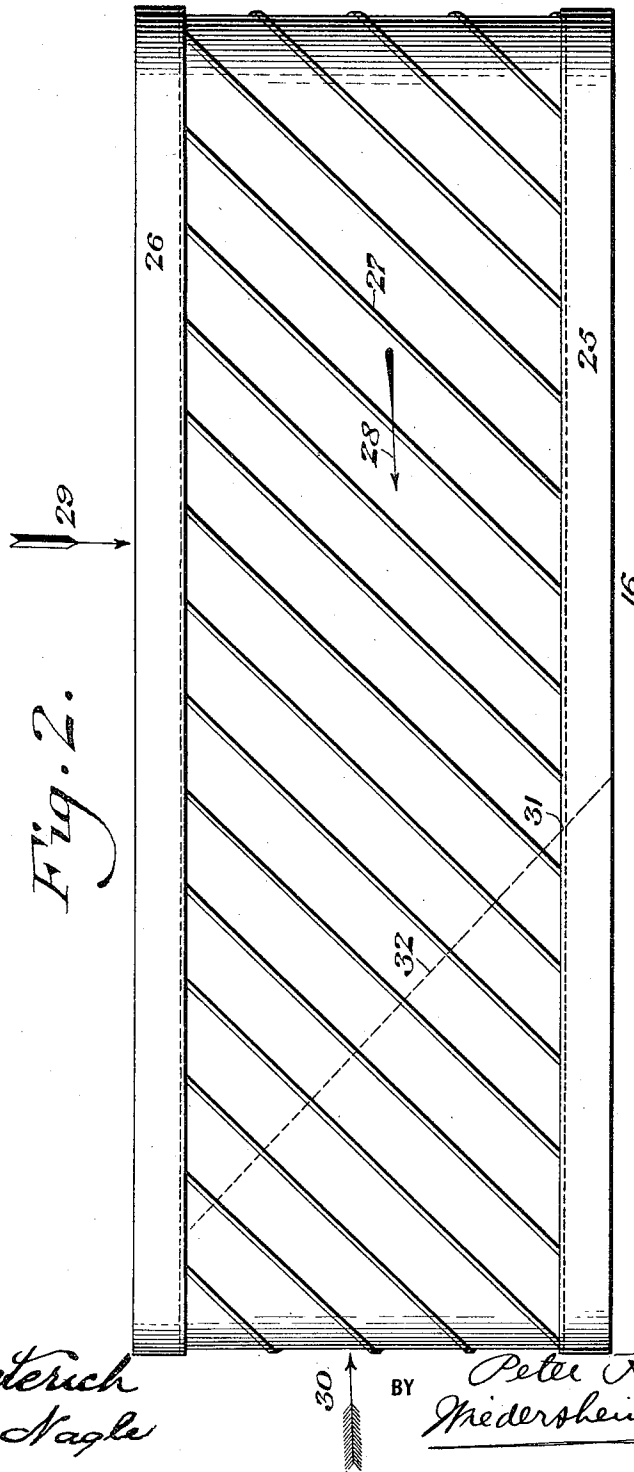
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3 SHEETS—SHEET 2.



WITNESSES

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3 SHEETS—SHEET 3.

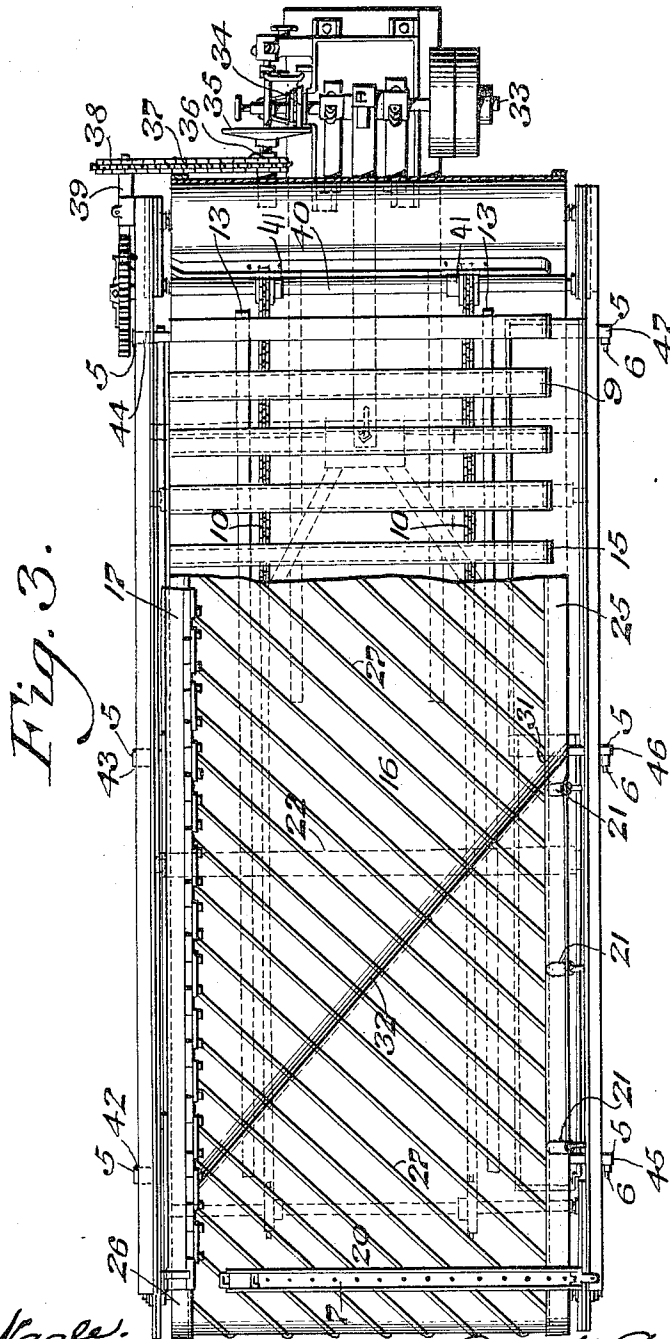


Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

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ORE-CONCENTRATOR BELT.

1,060,536.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Original application filed May 17, 1910, Serial No. 561,869. Divided and this application filed September 27, 1910. Serial No. 584,018.

To all whom it may concern:

Be it known that I, PETER H. CRAVEN, a citizen of the United States, residing at Spokane, in the county of Spokane, State of Washington, have invented a new and useful Ore-Concentrator Belt, of which the following is a specification.

In a prior application, Serial No. 561,869, filed by me on May 17, 1910, I have shown and broadly claimed a novel construction of ore concentrator, wherein the belt is constructed in such a manner that the same is reversible and wherein, if desired, longitudinal riffles may be employed, and in my present invention, which is a division of the above named pending application, I have disclosed a novel construction of concentrator belt which is provided with riffles located on the concentrator surface of the belt and extending at an angle to the longitudinal travel of the belt.

My invention consists of a novel reversible concentrator belt.

My invention further consists of a novel construction of a concentrator belt, wherein the sides of the belt are provided with longitudinally extending reinforcements and with riffles extending at an angle less than a right angle to the longitudinal travel of the belt.

In a prior pending application, Serial No. 561,868, filed May 17, 1910, for method of and apparatus for concentrating ores, I have described and broadly claimed a novel method and apparatus for concentrating ores in conjunction with which my present type of concentrating belt is especially adapted to be employed, although, as is evident, it is not limited to use with such type of concentrating device but may be employed to advantage in connection with many other types of concentrator mechanism.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating my invention I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same in practice will give satisfactory and advantageous results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged

and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a sectional elevation of one type of concentrating apparatus, in conjunction with which a concentrator belt, embodying my invention, is employed. Fig. 2 represents a plan view of an ore concentrator belt embodying my invention. Fig. 3 represents a plan view of the concentrating apparatus.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings: Referring to the ore concentrator seen in Fig. 1, as illustrating one type of an ore concentrating device, 1 designates the supporting base on which are suitably mounted channel beams 2, which latter carry the frame-work 3. The frame-work 3 is provided with brackets 4, said brackets on one side of the machine having pivoted thereto bars 5 of the frame-work, the opposite ends of the bars being provided with a bolt 6 which passes through a slot 7 in such brackets, the height of the adjustable end of the bar being determined by means of the set screw 8 carried by the brackets 4 in proximity thereto.

9 designates a slatted belt provided with a plurality of sprocket chains 10 which contact with sprocket wheels 11 suitably mounted in the frame-work of the machine. Each of the slats of the slatted belt 9 is preferably provided with a bracket 12 which contacts with a stationary guide 13 to maintain the same in the proper horizontal plane on the upper stretch of the slatted belt and the guide 13 is adapted to engage the underface of the bracket 12 on the return stretch of the belt to prevent undue sagging of the same. The ends of the slats on the high side of the slatted belt are preferably deflected upwardly, as indicated at 14, while the opposite ends of the slats are preferably rounded, as indicated at 15.

16 designates my novel ore concentrator belt which passes over end rollers suitably journaled in the frame of the machine. The concentrator belt 16 is also loosely mounted on the slatted belt 9 and the longitudinal travel of the concentrator belt is caused by its frictional engagement with the slats of the slatted belt.

17 designates a distributing box of any desired type located along the upper side of the machine above the concentrator belt and to which water is fed through a conduit 18, said conduit also supplying the washer box 19 extending preferably longitudinally of the machine and from which the wash water is discharged through the ports 20 in a reverse direction to the longitudinal travel of the belt.

Owing to the rounded ends 15 of the slatted belt the lower edge of the concentrator belt, after passing over the end rollers, is deflected over such edge to form a vertical dripping edge, as will be clearly understood by reference to Fig. 1, and there will be no drip as the belt approaches the pulley on which it is mounted, owing to the provision of rollers 21, which latter also prevent the wash water flowing over the side of the belt when the latter is traveling through a transversely and longitudinally inclined plane, as will be clearly understood from the description of the operation of the concentrator.

22 designates a roller adjustably mounted in brackets 23, said roller engaging the concentrator belt and preventing the same from becoming too slack and also to give the same an upward inclination. The water is sprayed from the conduit 24 in order to remove the concentrate from the belt 16.

As most clearly seen in Fig. 2, my novel reversible concentrator belt 16 consists of an endless belt formed of any suitable material. The sides of the concentrator belt are provided with longitudinally extending reinforcements 25 and 26, which, if desired, may be of the same width in order that the belt may be readily reversed, so that the pulp and wash water will flow over either the longitudinally extending reinforcements 25 or the longitudinally extending reinforcements 26. The reinforcements 25 and 26 may be formed in any suitable manner, but in the present instance I have shown them as being formed by deflecting a portion of the outer edge of the belt upon itself and suitably securing the same together, whereby an additional thickness of material is formed at the outer edges of the belt, the same preferably being of uniform thickness throughout and of uniform width.

The concentrating surface of the belt is provided with a desired number of riffles 27 which are angularly inclined at an angle less than a right angle with respect to the longitudinal travel of the belt, as indicated by the arrow 28. In order to illustrate one form of my invention, I have shown the riffle 27 as extending preferably completely across the concentrating surface of the belt from the reinforcements 26 to the reinforcements 25.

33 designates the driving shaft provided

with a friction wheel 34 cooperating with a friction disk 35 which drives the sprocket wheel 36 with which cooperates a sprocket chain 37. Said chain 37 drives a sprocket wheel 38 on a shaft 39 operatively connected with the shaft 40 on which latter sprocket wheels 41 are mounted around which pass the sprocket chains 10.

The framework carrying the slotted belt 9 has six points of support as at 42, 43 and 44 on the upper side and 45, 46, and 47 on the lower side. The points of support 42, 43 and 44 maintain the upper side of the belt at a uniform height. The point of support 45 maintains the belt at such point in a lower horizontal plane than at 42, 43 and 44. The points of support at 46 and 47 are of the same height but are in a lower horizontal plane than at 45. The result of this is that the belt travels through the ore concentrating zone in a transversely inclined plane and through the ore washing zone in a gradually diminishing transversely inclined plane and a gradually increasing longitudinally inclined plane.

The belt may be constructed of any suitable material and is ordinarily constructed of a desired fabric, such as, for example, canvas, but if for any reason, such as the rapid deterioration of the canvas, owing to the action of the acid water flowing across the belt, this belt may be made of an acid-resisting material, such as rubber or of a composition. In this event, to get the same surface on a rubber or composition belt as is obtained on canvas, it would be necessary to resort to riffling, and in the present instance, I have preferred to show the riffling as extending angularly to the direction of travel of the belt.

In the operation, the pulp or ore passes to the belt from the distributor box 17 in the direction of the arrow 29, flows transversely across the belt until it comes in contact with the flow of wash water which is fed to the belt, in a direction reverse to the forward travel of the belt, as indicated by arrow 30, so that when it reaches a predetermined point, as 31, the wash water will come in contact with the pulp and ore and the flow of wash water will converge with the pulp water along the diagonally extending line 32, it being understood that the water, together with the wash from the ore, passes over the lower reinforcement 25. After the belt passes over the rollers 21, it comes into engagement with the slatted endless belt which forms the supporting means for the same, the outer portion of the longitudinally extending reinforcement or riffle 25 extending over the ends of the slats, as indicated in Fig. 1, and forming a dripping edge, so that the drip water is not carried back by capillary means into the working parts of the machine.

The construction shown in Fig. 1 operates in the same manner as that of my co-pending application for method and apparatus for concentrating ores to which I have hereinbefore referred, the machine being constructed in such a manner that the concentrating belt during its passage through the ore dressing zone will travel in a transversely inclined plane and then into the ore washing zone, during which time it will pass through a transversely and longitudinally inclined plane, the line 32 indicating the dividing line between the two zones.

The reinforcements 25 and 26 serve to stiffen the belt and retain the same in proper alinement, but in some cases other means may be employed for this purpose, and one or both of these reinforcements may be dispensed with, without departing from my invention.

It will now be apparent that I have devised a novel and useful construction of an ore concentrator belt which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which in practice will give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

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

1. In an ore concentrator, a concentrator belt having a plurality of riffles on its con-

centrating surface and extending at an angle less than a right angle to the longitudinal axis of the belt, and means for supporting the belt to cause its travel through the ore concentrating zone to be in a plane having only transverse inclination and through the ore washing zone to be in a plane decreasing transversely and increasing longitudinally.

2. In an ore concentrator, a belt having at its edges longitudinally extending reinforcements and provided on its concentrating surface with riffles extending from one reinforcement to the other at an acute angle to the longitudinal axis of the belt, and means for supporting the belt to cause its travel through the ore concentrating zone to be in a plane having only a transverse inclination and through the ore washing zone in a plane having both transverse and longitudinal inclinations.

3. In an ore concentrator, a belt having the concentrator surface at the marginal edges provided with raised portions of substantially uniform width and thickness throughout the length of the belt and provided with riffles extending at an acute angle to the longitudinal axis of the belt, and means for supporting the belt to cause its travel through the ore concentrating zone to be in a plane having only transverse inclination and through the ore washing zone in a plane having both transverse and longitudinal inclinations.

PETER H. CRAVEN.

Witnesses:

WADE HAMPTON,
J. S. HARRISON.