Mar. 20, 1923.

1,449,216.

E. W. DAVIS.

CONVEYER.

FILED JAN. 9, 1922.

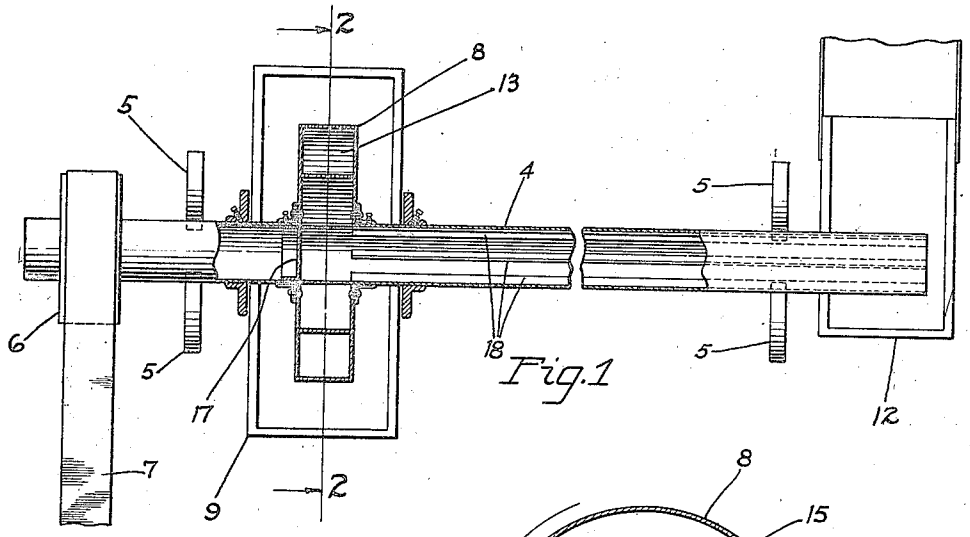


Fig. 1

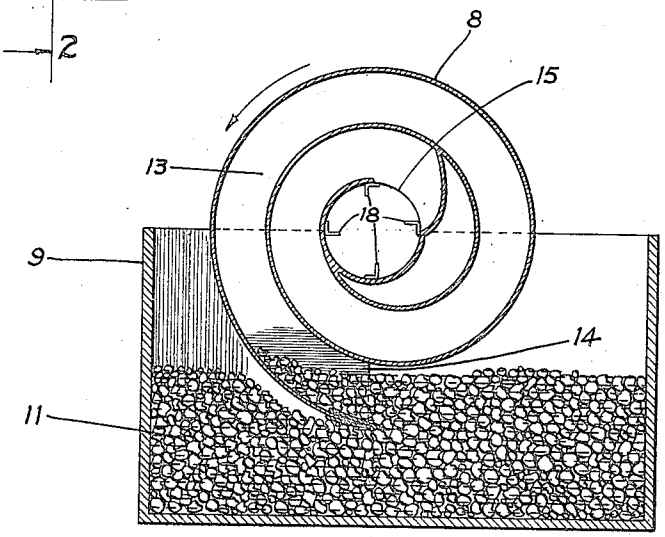


Fig. 2

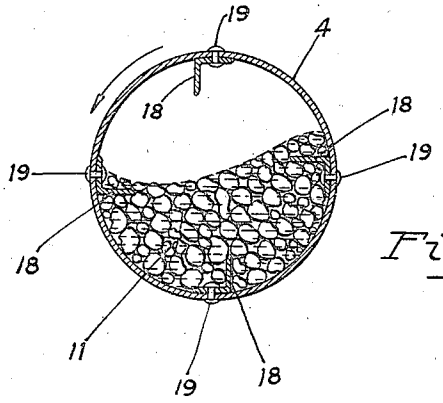


Fig. 3

Inventor
EDWARD W. DAVIS

By Paul & Paul

ATTORNEYS

Patented Mar. 20, 1923. 1,449,216

UNITED STATES PATENT OFFICE.

EDWARD W. DAVIS, OF MINNEAPOLIS, MINNESOTA.

CONVEYER.

Application filed January 9, 1922. Serial No. 527,941.

To all whom it may concern:

Be it known that I, EDWARD W. DAVIS, a citizen of the United States, resident of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Conveyers, of which the following is a specification.

This invention relates to new and useful improvements in conveyers and more particularly relates to conveyers adapted for use in handling wet ore such, for example, as are known in the mining industry as pipe launders.

It is common at present to employ a scoop or pump of the Frenier type coupled to a rotatably mounted pipe so that the wet ore is raised by the pump, discharged to the rotating pipe and thereafter terminally discharged from the pipe. The pipe may be horizontal or slightly inclined upward or downward. In practice, during rotation of the pump and conveyer and, more particularly within the conveyer, the ore tends to remain elevated on one side of the pipe. This is especially true if a sandy material is being conveyed. The water and solid materials tend to segregate, the solid material being carried upward on the rising side of the pipe out of the water, thus allowing the water to flow on the bottom of the pipe, carrying only the very lightest material with it. This segregation of the solids and the water makes it possible for the water to flow rapidly through the pipe or launder carrying very little solid material with it. On the other hand, the solids from which much of the water is drained, move slowly through the launder, due to the large amount of friction between the individual particles and between the particles and surface of the launder. It is the object of this invention to prevent the segregation of the solids and water and to keep every particle of solid material in suspension in the water; that is, completely surrounded by water at all times and not in contact with any other particles of solids, or with the surface of the launder. Under these conditions there is practically no obstruction to the flow of the thoroughly mixed water and solids and the mixture flows through the launder nearly as rapidly as though water alone were being conveyed.

This novel invention comprehends the provision of means inwardly projecting from the pipe to engage the material during conveyance so that segregation of the solids and fluids is prevented. The form here shown comprises ribs formed of angle irons longitudinally extending and inwardly projecting in the pipe so that the ore and water are constantly mixed. The ore particles and water are thus kept sufficiently agitated so that the ore particles are substantially surrounded constantly by a film of water with the attendant minimizing of friction and resultant forward movement of the ore to be conveyed.

The object therefore of this invention is to provide an improved conveyer.

Other objects of the invention will more fully appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the drawings there has been disclosed a structure designed to carry out the objects of the invention but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a view in plan and partially in section of the novel conveyer;

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1; and

Figure 3 is a vertical sectional view through the conveyer showing the enforced movement of the conveyed material both solid and fluid.

In this selected embodiment of the invention, the conveyer is shown as including an elongated hollow member such as the pipe 4 which is adapted to have fed thereinto the material to be conveyed. A simple mode of rotatably mounting the pipe 4 is by way of the adjacent pairs of wheels or disks 5 which are suitably borne as idlers. The pipe is rotatably driven by means of a pulley 6 fast on the pipe periphery and engageable by a belt 7 driven from any suitable source of power not necessary to be shown. While the pipe is here shown as rotatably supported adjacent its opposed ends, it is to be understood that idlers may be intermediately positioned as may be desired.

On the left of Figure 1 and in Figure 2 there has been shown a convenient form of

pump 8 and box 9 from which the material 11 is removed by the pump and deposited within the pipe, while on the right of Figure 1 is indicated a box 12 into which the pipe terminally discharges the conveyed material.

A pump of the type here shown broadly comprises a valveless helicoidal passage 13 having a receiving mouth 14 at its outer periphery and an inner discharge opening 15 adjacent its axis. Upon rotary movement of the pump, material is scooped by the mouth and, inwardly passing, constantly seeks the lowest level of the successive convolutions until discharged into the opening into the pipe interior. Pumps of this type have been found useful for raising gritty water, sand and water and ore and water as they are devoid of valves or similar surfaces wearing one on another. As such pumps are old, the pump here shown has been more or less conventionally represented. However, it may be pointed out that the pump is mounted fast on the pipe 4 and inwardly opens into an opening in the pipe while a headplate 17 is fitted within the pipe to prevent the pumped or scooped material from passing in any other direction than toward the discharge box 12.

The means for preventing segregation of the solids and fluids are shown as agitators in the form of angle irons 18 which are secured, as by rivets 19, at one side to the pipe while their other sides inwardly project within the pipe interior. These inwardly projecting sides longitudinally extend along the pipe and are preferably in substantial parallelism with the axis of the pipe.

These angle irons function to raise the wet material with the rising portion of the rotating pipe and thereafter to drop the material into the water which tends more or less to remain in the bottom of the pipe. The result is that the partial drying of the particles of the material is prevented and each particle is substantially constantly surrounded with a film of water so that the material readily travels through the pipe without the disadvantageous packing or clogging.

While a spiral type of pump is shown in the drawing, this invention is not restricted to this particular device. Any pump or other device that will supply the pulp to the launder at a slight pressure will produce a satisfactory operation, and if the pipe is given a slight downward slope toward the discharge end, no pump or other device is necessary. It is then only necessary to feed the pulp to be conveyed into the upper end of the launder.

In the illustration, only one pump and one point of the discharge is shown. In practice, several pumps may be placed at intervals along the launder, and any number of points of discharge may be provided by making openings in the side of the launder. The mixture of the pulp will flow in either direction through the launder and the solids will not settle and clog the launder even if all the discharge points are closed.

It is desired to point out especially the difference between this method of conveying and method in which spiral conveyers rotate within a stationary pipe or trough, or rotate with the pipe. If the spiral conveyer is used within the pipe, in place of the agitators shown, the sand and water segregate and the sand is pushed forward in contact with the surface of the pipe and the spiral, thus causing much wear on the pipe and the spiral, and also requiring much power to overcome the friction. These spirals also offer an obstruction to the rapid natural flow of the pulp, which is not the case with the agitators as shown. In addition to this, it is possible to cause the pulp to flow in either direction through the pipe when provided with agitators, which condition cannot be accomplished if spirals are used.

While the preceding disclosure has considered the conveying of solids and water only, it may be pointed out that this launder is suitable for the conveying of any fluid or semi-fluid mass.

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

1. A device of the character described comprising means for producing a pressure head on solid particles mixed with sufficient fluid to partially float the solids, a long rotary tube for conveying the mixture and means inwardly projecting from the periphery of said tube, said means extending in substantial parallelism with the tube, said last mentioned means, as the tube rotates, keeping the solid particles mixed with the fluid to partially float the solid particles whereby the materials are forced through the conveying means with a minimum of friction.

2. A device for raising and conveying a mixture of solid and liquid materials comprising a rotary pump for raising the materials to produce a pressure head, a cylindrical rotary tube for rotating with said pump and conveying away the materials, said tube being provided with inwardly projecting strips extending in substantial parallelism with the tube to prevent segregation of the liquid and solid materials whereby the solid material is partially floated through the tube with a minimum of friction as the tube rotates.

3. A device of the character described comprising a long cylindrical rotary conveyer tube carrying at one end a valveless helicoidal pump for pumping material into the tube, said tube also having within it angle bars extending in substantial parallel-

ism with the tube from the pump to the end of the tube, said bars being substantially straight from end to end as described.

4. A device of the character described comprising a long rotary conveyer tube of substantially the same size from end to end, said tube being journaled at either end and carrying near one end a valveless helicoidal pump for pumping material from below the tube into the same, said tube also having within it substantially straight angle bars extending from the pump substantially to the end of the tube as described.

In witness whereof, I have hereunto set my hand this 30th day of December, 1921.

EDWARD W. DAVIS.