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SEPARATOR.

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1,067,766.

Patented July 15, 1913.

2 SHEETS—SHEET 1.

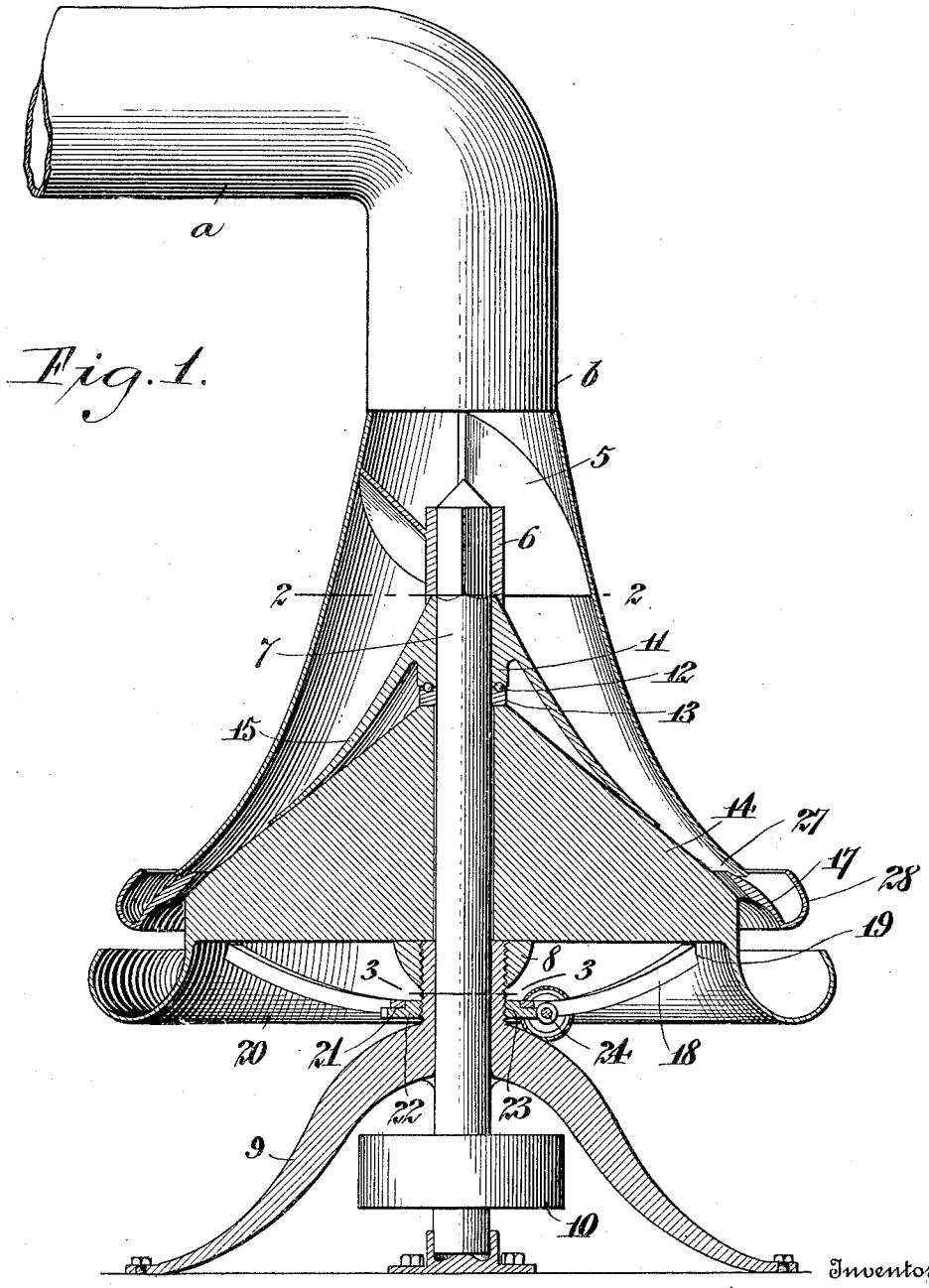


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

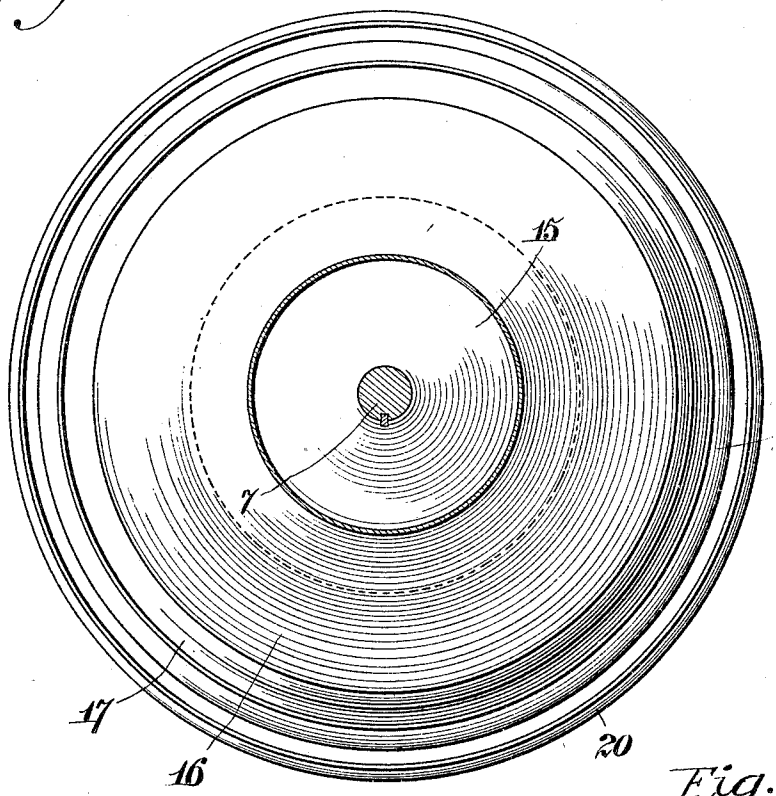


Fig. 4.

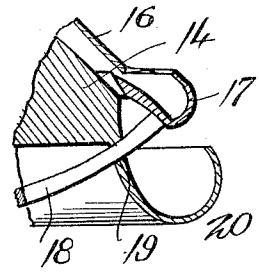
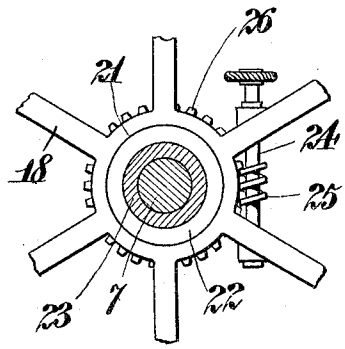


Fig. 3.



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SEPARATOR.

1,067,766. Specification of Letters Patent. Patented July 15, 1913.

Application filed August 27, 1912. Serial No. 717,350.

To all whom it may concern:

Be it known that we, JOHN RUDOLPH EMIL SIEVERS and RUSSELL P. HOWARD, citizens of the United States, residing at Butte, in the county of Silverbow and State of Montana, have invented new and useful Improvements in Separators, of which the following is a specification.

The general object of the invention is to utilize centrifugal force for separating minerals from slimes, pulps, and the like; and to this end the invention consists in certain improved constructions, arrangements, and combinations of devices which will be fully described hereinafter, and then pointed out in the claims.

Other objects will appear and be better understood from that embodiment of my invention of which the following is a specification, reference being had to the accompanying drawing forming part hereof, in which;

Figure 1 is a side elevation partly in section of the device. Fig. 2 is a sectional plan approximately on the line 2—2 of Fig. 1. Fig. 3 is a detail sectional view taken on the line 3—3 of Fig. 1. Fig. 4 is a broken view illustrating the connection between the divider and supporting arms therefor.

The pipe or conduit *a* which conveys the slimes or pulps from a suitable source of supply, has a discharge end so positioned with respect to the separator *b* as to direct the material to be separated, into the upper end of the separator *b*.

An inclined or spiral element 5 is located in the separator *b* and acts as an accelerator for the material passing into the separator from the conduit. The element 5 has its inner edge formed with or otherwise rigidly connected to a sleeve 6 which is fast upon a vertical shaft 7. A bearing 8 is provided for the shaft 7 and is carried by a base 9. A suitable connection such as by means of a pulley 10 fast on the shaft 7 and below the bearing 8, and a belt (not shown) is established with suitable means (not shown) and adapted for rotating the shaft 7. As the shaft rotates the element 5 will also rotate and thereby act as a feed or conveyer for moving the slime farther into the separator.

A sleeve 11 is fast upon the shaft 7 below the sleeve 6 and a suitable roller bearing 12 is interposed between the lower end of the sleeve 11 and a bearing collar 13 which loosely surrounds the shaft 7 and which is formed with or otherwise suitably connected to the upper end of a frusto-conical base 14 through which the shaft 7 passes loosely and which rests upon the upper end of the bearing 8. A bell shaped separator 15 flares downwardly and outwardly from the sleeve 11 and extends over approximately one-half the surface of the base 14 with its lower edge contiguous to the surface of the said base. The separator 15 is by preference cast integral with the sleeve 11 and is arranged so as to receive the material conveyed into the separator by the element 5 with which, of course, it rotates synchronously.

The outer casing 16 of the separator is bell-shaped and extends from the conduit *a* to a point a trifle above the lower base of the frusto-conical element 14. The casing 16 is held in spaced relation to the separating element 15 by means of the element 5 to the outer edge of which the said casing is formed integral or otherwise suitably connected, so that the casing 16, element 5 and separator 15, will rotate in unison on the ball bearing 12.

A divider 17 is directed into the space between the lower portions of the casing 16 and base 14 and is carried by arms 18 which are directed through slots 19 in the wall of a trough 20 depending from the base 14 and underlying the divider 17. Mortised portions 21 in the inner ends of the arms 18 bear on a mortised collar 22 which is screwed onto a threaded portion 23 at the middle portion of the bearing 8. A shaft 24 is journaled in one of the arms 18 and carries a worm pinion 25 which meshes with worm teeth 26 on the collar 22 so that when the shaft 24 is turned the collar 22 will be turned and thereby effect the adjustment of the divider 17 in the space 27 which as shown in Fig. 1, is tapered by virtue of the shapes of the casing 16 and separator 15. A trough 28 is at the outer and lower end of the divider and above the trough 20 so that the substances divided by the divider 17 will pass into the troughs 28 and 20.

In using the device the pulley 10 is driven at a relatively high speed so that material fed to the lower end portion of the separator 15 will be moved outwardly by centrifugal

force, the heavier bodies moving farther outward than the lighter and impinging on the casing 16, while the lighter bodies falling onto the base 14 will be moved by gravity into the trough 20. The heavier bodies, however, on account of being surrounded by a film of liquid, will, upon impingement on the casing 16, move downwardly over the surface thereof and into the trough 28, the divider 17 in this instance serving to prevent the falling of any of the heavier substances into the trough 20 and also preventing the lighter substances rolling on the base 14, from moving outwardly and mixing with the heavier substances.

It will be understood that the element 5 serves to place in motion all of the slimes or other material fed into the separator and will have a tendency to place a certain degree of pressure upon the liquids undergoing treatment, owing to the fact that the outlet adjacent the lower end of the base 14 is much smaller than the inlet adjacent the element 5 and the latter tends to draw the liquids into the separator and whirl them as fast as the separator 15 is traveling thus preventing the grinding of the heavier particles in suspension on the periphery of the outer casing 16. It is to be also understood that as many of the dividers 17 may be used as required, each separator having an independent adjusting mechanism operating independently of the mechanisms for the other separators.

What is claimed as new is:

1. A centrifugal separator for ores and the like comprising a fixed base, a shaft rotatably mounted in said base, a substantially bell-shaped element secured to the shaft and arranged over the base, an outer casing surrounding and spaced from the base and bell-shaped element, said bell shaped element terminating at its lower edge above the lower portion of the base and having such terminal edge in coincidence with and forming a continuation of the surface of the base, and an element for feeding the material to be separated onto the bell shaped element and secured to the shaft and the outer casing.

2. A centrifugal separator for ores and the like comprising a fixed base, a shaft rotatably mounted in said base, a substantially bell-shaped element secured to the shaft and arranged over the base, an outer casing surrounding and spaced from the base and bell-shaped element, said bell shaped element terminating at its lower edge above the lower portion of the base and having such terminal edge in coincidence with and forming a continuation of the surface of the base, an element for feeding the material to be separated onto the bell-shaped element and secured to the shaft and the outer casing, a trough or receptacle arranged below the outer casing, a second trough or receptacle depending from the base, and a divider directed into the space between the outer receptacle and the base, for the purpose set forth.

3. A centrifugal separator for ores and the like comprising a fixed base, a shaft rotatably mounted in said base, a substantially bell-shaped element secured to the shaft and arranged over the base, an outer casing surrounding and spaced from the base and bell-shaped element, said bell shaped element terminating at its lower edge above the lower portion of the base and having such terminal edge in coincidence with and forming a continuation of the surface of the base, an element for feeding the material to be separated onto the bell-shaped element and secured to the shaft and the outer casing, a trough or receptacle arranged below the outer casing, a second trough or receptacle depending from the base, a divider directed into the space between the outer casing and the base, and means for adjusting the divider for the purpose set forth.

4. A centrifugal separator comprising a base, a shaft rotatably mounted therein, a casing surrounding the base and fixed to operate with the shaft, the lower edge of the casing being disposed in spaced relation with the contiguous surface of the base, a trough carried by and disposed outwardly from and below the lower edge of the base and an element interposed between the base and casing adjacent the lower edge of the latter said element including a divider and a trough carried by said divider.

5. A centrifugal separator comprising a base, a shaft rotatably mounted therein, a casing surrounding the base and fixed to operate with the shaft, the lower edge of the casing being disposed in spaced relation with the contiguous surface of the base, a trough carried by and disposed outwardly from and below the lower edge of the base and an element interposed between the base and casing adjacent the lower edge of the latter said element including a divider and a trough carried by said divider, and means operative below the base for adjusting the divider to and from the casing wall.

6. A centrifugal separator comprising a base, a shaft rotatably mounted therein, a casing surrounding the base and fixed to operate with the shaft, the lower edge of the casing being disposed in spaced relation with the contiguous surface of the base, a trough carried by and disposed outwardly from and below the lower edge of the base and an element interposed between the base and casing adjacent the lower edge of the latter said element including a divider and a trough carried by said divider, a support for the shaft and an exterior shaft bearing

carried by the support, an interiorly threaded ring coöperating with said portion of the bearing means for turning said ring to move same longitudinally of the bearing, a second ring mounted for independent rotary movement with respect to the first mentioned ring and arms carried by said second ring and supporting the divider, whereby in the adjustment of said first mentioned ring longitudinally of the bearing the divider is adjusted with respect to the casing wall.

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

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."