PORTABLE METAL AND EARTH SEPARATOR
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This invention relates to a portable metal and earth separator and to certain novel features of construction therein.

Hereinafter, the equipment used in the separation of metals from their ores and earthy impurities of lesser density, when in finally divided or pulverized form, has been either primitive, if portable, or cumbersome and unwieldy. The latter is impractical to use in small scale operations in the field at the mining site, such as in placer mining. Ordinarily, portable equipment is slow and the quantity handled is small, with efficiency of separation not too high.

An object of this invention is to provide a light, portable separator, which is efficient and easily handled by a single operator, yet separates the material in larger quantities and faster than is usually the case.

Another object of this invention is the provision of such a separator in a form which is simply constructed of common materials, easily assembled and taken apart for carrying, durable and reliable.

The further object is the provision of support means for the separator which increases its usefulness and at the same time relieves the operator of much physical labor.

Other objects and advantages of the invention will become apparent in the body of the specification and claim.

One embodiment of the invention is herein described and illustrated.

In the drawing:

Fig. 1 is an elevation of my metal and earth separator;

Fig. 2 is an elevation thereof parthly in section, along a center line;

Fig. 3 is a plan view of the separator and mount along section line 3—3 of Fig. 1, and

Fig. 4 is an end view in section, of the separator along section line 4—4 of Fig. 2.

My portable separator consists essentially of four parts: the support stand, operating spring, screening frame, and operating gear.

The support stand has a broad base 1 on the top center of which, an upwardly extending guide rod 2 of metal, such as steel, is mounted, as by threading at its lower end into the base. On the upper section of the rod 2 a closely fitting sleeve stop 3 is detachably mounted. This stop 3 is conventional and may be a section of tubing with a radially placed set screw to engage the rod 2.

A stout spring member 4 of coil spring brass or other suitable metal is mounted on the rod 2 with lower end bearing on a flanged ferrule 5, with upsetting grommet, which is slidably mounted on rod 2. This ferrule seats on stop 3. A wooden spoon 6 is mounted on rod 2, within spring 4 in order to correctly space the spring from the guide rod and align it. On top of spring 4 is seated a second ferrule 7 with grommet extending downwardly.

The operating gear consists of a tubular guide 8, connected to the screening frame 9, and handle 10. The tubular guide is threadably connected at its lower end to a flanged ferrule 11, which is fastened to a cross bar 12, which extends crosswise, midway of screening frame 9 and tilted to one side. This guide 8 extends upwardly through the screening frame passage 24 and is mounted on and slides over guide rod 2. The guide rod 8 is threaded at its upper end and is connected to a T fitting 13 with a bearing surface through it for the rod 2. Extending horizontally from the T and fixed to it is the handle 10 for the operator. Connected also, in an obvious manner, to the handle is a vertical pipe section 14 and connections ending in a pipe T 15 with suitable passage through it for guide rod 2. Upper pipe T 15 is connected to the second or upper ferrule 7 or bears against it. This assembly, Fig. 2, gives an offset section, bearing on guide rod 2 at two space points 13 and 15, which limit the up and down slide of the operating gear on guide rod 2.

Coll spring 4 is under compression, inasmuch as it carries the weight of all moving parts. The reaction of this spring is downward on flanged ferrule 5 which acts against and rests on stop 3. Vertical pipe section 14 should be somewhat less in length than necessary to keep T fitting 13 abutting upwardly against the bottom of stop 3.

The screening frame 9 is rectangular in shape, tilted, with upstanding sides of wood or sheet metal. An upwardly extending section 16 is fixed to the inner side of the frame wall at the bottom edge of the frame. Fixed in section 16 are V-shaped troughs 17, arranged in spaced relation with ends anchored in the two long sides of section 16. Seated on the section 16 is a screening tray 18 with side and end walls 19. Fixed to the top of the walls 19 is the screen of meshed material 20 in sections, as seen in Fig. 3, the finest being at the upper end in Fig. 2 and coarsest at the right or lower end. Tray 18 has across its bottom a corrugated catcher pan 21 fixed to the walls 19. This pan is of sheet metal and preferably galvanized. The corrugations extend in the same direction as do V-shaped troughs 17. A V-shaped trough is located below the bottom of each corrugation of pan 21. In the bottom of each corrugation is a series of holes 22, closely spaced and extending the full length of the corrugation. Between the mesh material 20 and catcher pan 21 is one or more headers 23, extending also in the same direction as the corrugations. Header 23 is fixed at its ends to walls 19 and is positioned between two adjacent corrugations and between sections of the meshed material 20.

Extending across the bottom of screening frame 9 is the beam or cross bar 12 flat and tilted upward to the right side as seen in Fig. 2. Beam 12 is fixed at its ends to side walls 16 and is located between two V-shaped troughs. At mid-length of beam 12 is the inner threaded flanged ferrule 11, which threads on the lower end of tubular guide 8. On the center line of screening frame 9 and near mid-length of pan 21 and mesh material 20 is a circular passage 24 through which extends tubular guide 8. When screening frame 9 is mounted for use it is tilted downwardly to the right as seen in Fig. 3, due to the tilting of beam 12 and the direction of passage 24.

Assembly

Screening tray 18 is seated in screening frame 9 and guide rod 2 attached to base 1 is passed upwardly through beam 12 and passage 24. Tubular guide 8, T fitting 13 and handle 10 assembled at a unit are passed over guide rod 2 and the lower end of guide 8 is threaded into
flanged ferrule 11. Screening frame 9 is resting on base 1. Stop 3 is now passed onto guide rod 2 followed by ferrule 5, spool 6, spring 4 and upper ferrule 7. Pipe 15 is then passed onto the guide rod 2 and pressed downwardly against ferrule 7 with its grommet centered in spring 4, while vertical pipe section 14 is threaded into position. Handle 10 is now raised to the desired height carrying with it all the movable parts, and the act screw on stop 3 is turned to bear tightly against guide rod 2.

Use and operation

Ore material is placed on screening tray 18, on the upper end of fine meshed section 20. The operator presses down on handle 10 as far as desired and lets it return under the pressure of the spring 4. Fitting 13 strikes stop 3 producing a sudden jar and agitation, causing the finely divided ore material to sift downwardly through the fine meshed screen 20 and the coarser particles to shift by gravity towards the lower end of the screening tray, where they will pass through coarser sections of the meshed material 20. This aggregate collects in the troughs of catcher pan 21 and passes by agitation through holes 22 into V-shaped troughs 17 below. The quick reciprocation in a vertical plane, jarring and agitating the material in the troughs causes the metal particles of greater density to quickly settle to the bottom. As the troughs 17 fill, the jarring at the upper end of the reciprocation, causes the lighter material and sand to spill over and drop below. This operation is continued until it is desired to recover the metal particles from the troughs. This is done after continuing the vertical reciprocation of the handle for a short time with no ore on meshed material 20. This causes a spilling of most of the sand and waste material from the V-shaped troughs.

The device is turned to one side over a large tub and shaken several times vigorously. The collected metal particles drop out to the bottom. The device is easily operated in a rhythmic manner due to the natural frequency of the spring. No lifting is necessary for the operator in reciprocating the screening frame 9 up and down.

One embodiment of the invention has been disclosed herein. However, various modifications of the disclosed device may be made within the scope of the appended claim.

I claim:

An ore separator comprising a base, a vertical guide carried by said base, a tubular slide on said guide, a screen structure fixed relative to said slide, a spring constantly urging said slide and screen structure upwardly, a corrugated tray below said screen structure, said tray having openings in the valleys of the corrugations thereof, and V-shaped collecting troughs below said openings.

References Cited in the file of this patent

UNITED STATES PATENTS

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