

April 6, 1926.

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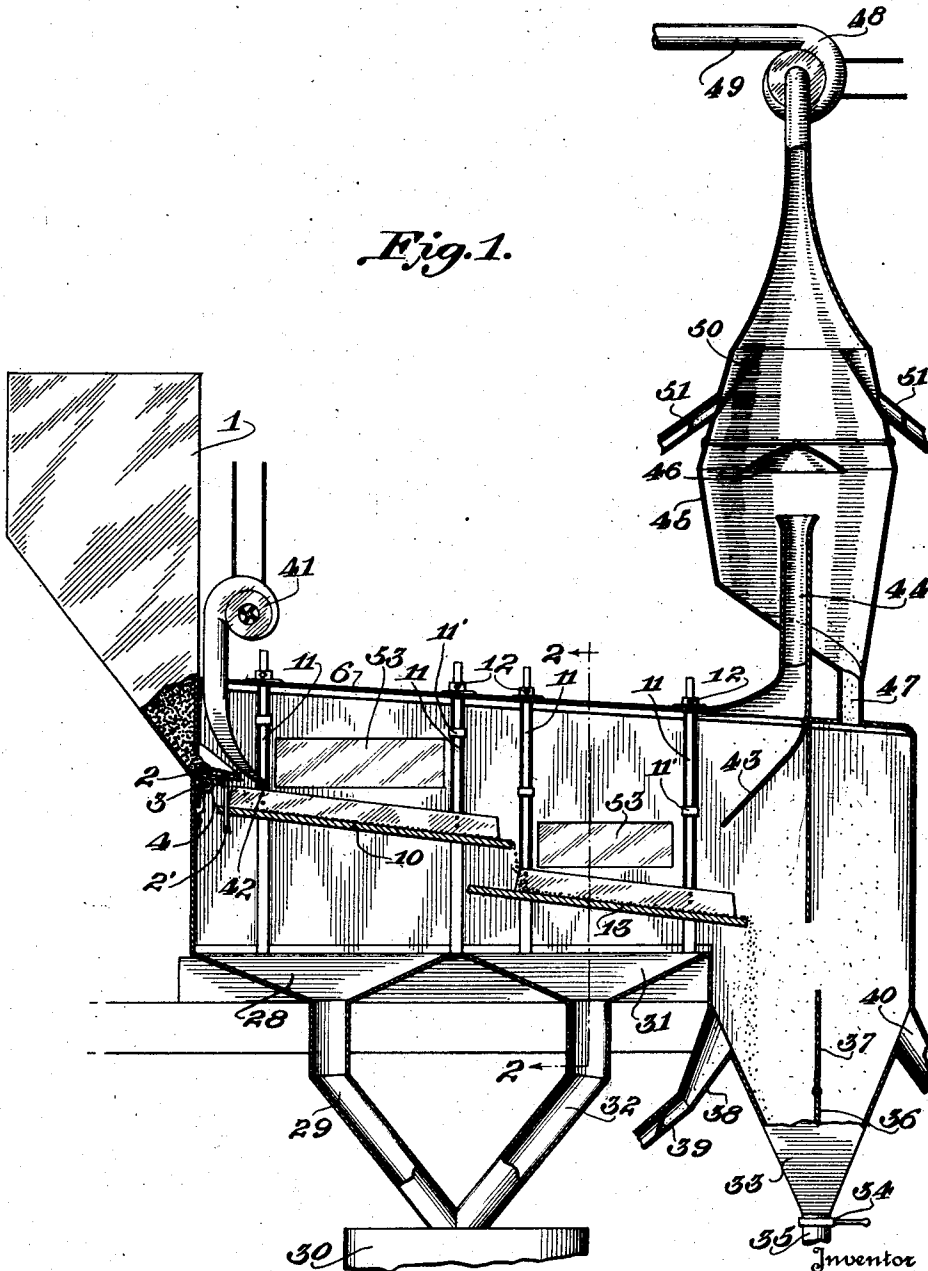
J. F. REILLY

COMBINED JIG AND ASPIRATOR

Filed March 2, 1925

2 Sheets-Sheet 1

Fig. 1.



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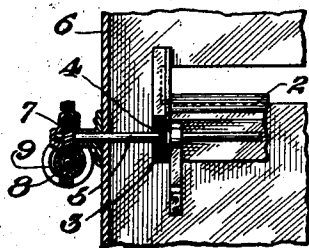
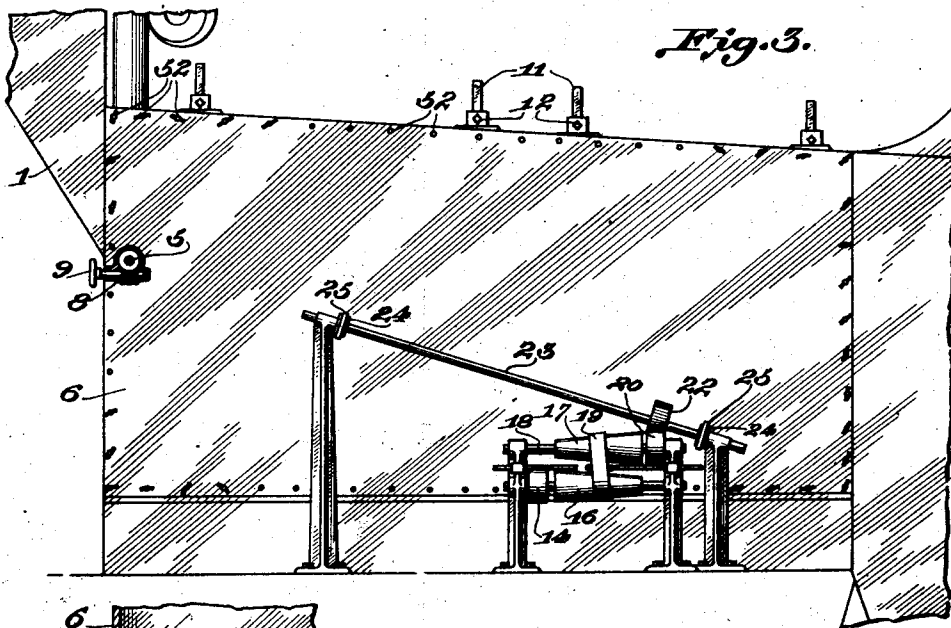
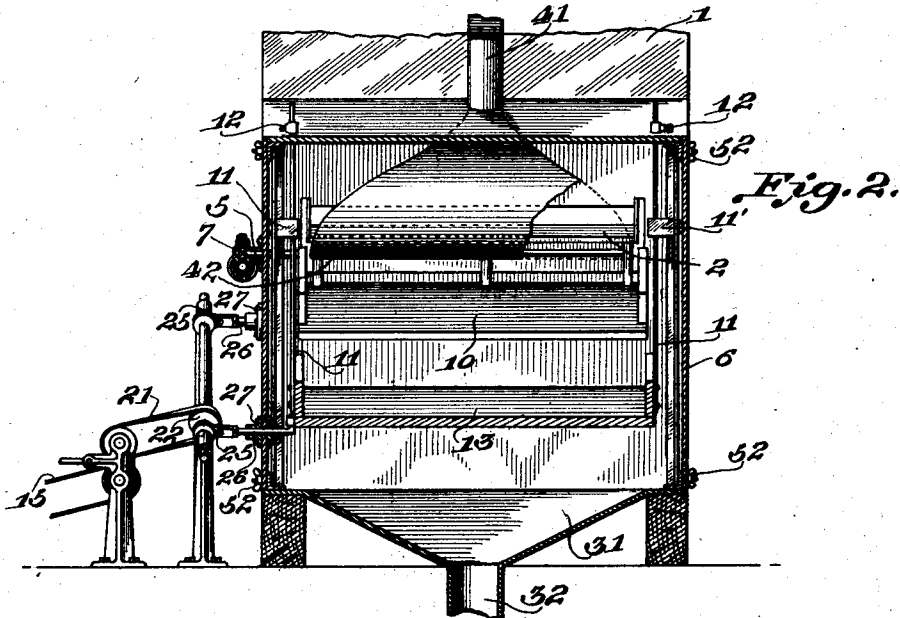
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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COMBINED JIG AND ASPIRATOR.

Application filed March 2, 1925. Serial No. 12,641.

To all whom it may concern:

Be it known that I, JAMES F. REILLY, a citizen of Canada, residing at Tucson, in the county of Pima and State of Arizona, have invented certain new and useful Improvements in Combined Jigs and Aspirators, of which the following is a full, clear, and exact description.

The invention relates to a combined jig and aspirator for separating the gangue from the heavier particles of the ore and one of the objects of the invention is to provide an apparatus of this character which is simple in construction and which is easily manufactured and installed, and which will accomplish the desired function in a highly efficient manner.

It is well known that the escaping dust has a very injurious effect on the operators in a mill; and one of the objects of the present invention is to provide an apparatus in which all of the operations are effected within a closed casing so that all escape of the gangue to the atmosphere is prevented.

A further object of the invention is to provide an apparatus which will more thoroughly separate the gangue from the heavier particles than has been possible in previously known constructions; and which will automatically classify the particles according to their weight and deposit them in separate receptacles.

Other and further objects and advantages of the invention will be apparent to those skilled in the art from the following detailed description of the apparatus when taken in connection with the accompanying drawings; in which,

Figure 1 is a vertical longitudinal sectional view of the complete apparatus.

Figure 2 is a transverse sectional view taken on line 2—2 of Figure 1 and looking in the direction of the arrows.

Figure 3 is a side elevational view of a portion of the apparatus; and,

Figure 4 is a detail view of the operating mechanism for the combined chute and gate provided on the hopper.

Referring to the drawings more in detail, numeral 1 indicates a hopper in which the ore is placed. Provided at the mouth of the hopper is a combined chute and gate indicated by numeral 2. This element consists of a vertical plate constituting the gate

and an inclined plate constituting the chute. The combined gate and chute is vertically adjustable for varying the amount of crushed ore which is fed from the hopper to the separating apparatus. A simple construction for accomplishing the vertical adjustment of this combined element consists in providing the vertical plate with a rack 3 at each end thereof, and meshing with each of these racks is a pinion 4 fixed on a rotary shaft 5. This shaft extends outwardly through one wall of the casing 6 and has a worm wheel 7 mounted on its outer end; the worm wheel being engaged by worm 8 operated by hand wheel 9. As plainly indicated in the drawings, particularly Figure 4, the shaft 5 where it extends through the casing and the associated parts for rotating the shaft are all inclosed for the purpose of preventing the escape to the atmosphere of the dust within the casing 6.

Mounted within the casing 6 and below the chute 2 is a transversely reciprocable jig 10. The jig is supported by a suitable number of spring elements 11 extending upwardly through the top of the casing and adjustably mounted by means of set screws 12. For the purpose of steadying the spring elements and adding strength thereto, they are passed through blocks 11', clearly shown in Figures 1 and 2. The jig is given a rapid transverse reciprocatory movement by an apparatus to be hereinafter described.

It is also the intention to give a vibratory motion to the chute 2, and for that purpose it is provided with a depending strap 2' which is adapted to be engaged by the end of the vibratory jig 10. It will be understood, of course, that the chute 2 is loosely mounted in order that it may have a vibratory motion imparted to it.

Arranged in the casing 6 forwardly of and below the jig 10 is a second jig 13 which is also carried by a suitable number of spring members 11 which are adjustably mounted in the top of the casing by set screws 12 or the like. The jig 13 is also given a rapid transverse, reciprocatory or vibratory movement and both jigs are operated by a single mechanism which will now be described.

Numeral 14 indicates a pulley which is driven by a belt 15 from any desired source of power. This pulley 14 operates a cone pulley 16 arranged in the usual relation

with an opposite cone pulley 17 mounted on a shaft 18; the two cone pulleys being operatively connected in the well known manner by a belt 19. Also mounted on the shaft 18 is another pulley 20 carrying a belt 21 which engages a pulley 22 mounted on an inclined shaft 23. The inclined shaft 23 carries two eccentrics 24, 24 associated with eccentric straps 25, 25; and these eccentric straps are pivotally connected to links 26, 26 which are attached to the jigs 10 and 13. The links 26, 26 are mounted in bushings 27, 27 at the point where they pass through the wall of the casing 6.

The vibratory motion given to the jigs by the apparatus above described will cause some of the particles of ore on the jig 10 to fall over the sides thereof into a chute 28 and be carried by a conveyer 29 to a receptacle 30. The jig 10 is, of course, downwardly inclined, and as the material is vibrated it will gradually work toward the lower end thereof where it will be fed upon a second jig 13. The ore fed to the jig 13 is subjected to the same vibratory motion and the material falling over the sides thereof will drop into a chute 31 and be carried by a conveyer 32 to the receptacle 30. The material that passes off the end of the jig 13 drops into another chute 33 which is provided in its bottom with a gate 34 which may be intermittently opened to permit the accumulated ore to drop through a conveyer 35 carrying it to any suitable receptacle (not shown). The chute 33 is divided into two parts by a vertical partition 36 and vertically and adjustably mounted above said partition 36 is a baffle 37. This baffle 37 is made adjustable to regulate the character of ore which will pass into either side of the divided chute 33. Extending from one side of the chute 33 is another chute 38 which will collect particles of ore from the jig 13 and carry them off to a suitable receptacle (not shown); the chute being provided with an ordinary flap valve 39. Extending from the opposite side of the chute 33 is another chute 40 similar in all respects to the chute 38 and it will collect and carry off to a suitable receptacle the crushed ore of another weight.

The motion which is imparted to the jigs in the manner previously described causes the very fine dust or gangue to rise from the material on the jigs, and as this gangue rises it is carried off by a gentle air furnished by a blower 41. The mouth of the conveyer indicated by numeral 42 is arranged just over the top of the jig 10, and as clearly indicated in Figure 2, this mouth extends substantially the entire width of the jig. As the gangue laden air passes on through the casing it meets an adjustable baffle 43 which divides the current into two parts. The heavier particles will pass be-

neath the baffle 43 and will drop upon either side of the baffle 37 depending on the weight of the particles.

The lighter particles will pass upwardly over the baffle 43 and through a flue 44 into a separating chamber 45. As the dust laden air passes from the flue it will strike a baffle 46 and be caused to rebound, and it will thus be given a whirling motion, whereby the heavier particles will settle. These heavier particles will pass downwardly through a passage 47 into a chute 33 where they will be accumulated. The lighter particles will continue their upward passage, and arranged at the top of the separator chamber is a suction fan 48 which will carry off these lighter particles and force them through the pipe 49 to a settling room (not shown). Any particles which settle before reaching the suction fan will be caught by the circular baffle 50 and be directed into appropriate chutes 51 to suitable collecting receptacles (not shown).

The entire side walls of the casing 6 are made removable and are held in place by clamping screws 52, as clearly shown in Figure 2. The side walls are also provided with appropriate peep windows 53.

It is believed that the operation of this apparatus will be thoroughly understood from the foregoing description, but it may be briefly described as follows:

The principal object of the invention is to separate the gangue from low grade lead and copper ores where more than 60% of the material to be separated is gangue and waste matter. Material is fed from the hopper 1 onto the chute 2 which chute is given a vibratory motion by means of the vibrating jig 10. The material is thus caused to pass from the chute on to this jig. As the jig vibrates laterally some of the material may be thrown off the sides thereof; or it may drop through holes which may be provided if desired in the bottom of the jig 10. Also the air supplied by the blower 41 may cause some of the ore to fall off the jig 10. All of these heavier particles which fall from the jig 10 will be collected in the receptacle 30 in the manner described. Material passing off the end of the jig 10 passes on to the jig 13 where it is treated in exactly the same manner, and any heavy particles falling off of this jig will also be collected in the receptacle 30 or in a separate receptacle. The particles passing off the end of the jig 13 will pass into one of the compartments of the chute 33 or into the chute 38 or 40.

While the material is being agitated on the jigs 10 and 13 the gangue will rise therefrom and be carried off by a light air furnished by the blower 41. As shown in Figure 1, the mouth of the blower is arranged directly over the top of the jig 10,

and as shown in Figure 2, the mouth of the blower is of substantially the same width as the jig. The gangue laden air will pass on to the baffle 43 where the heavier particles will pass downwardly for collection while the lighter particles will pass upwardly through the flue 44 into the separating chamber 45, where the heavier particles will be further divided out in the manner described, and the lightest particles will be carried on through the pipe 49 to a settling room (not shown).

It is to be particularly noted that every element in this apparatus is inclosed, and that the construction is such that it is impossible for any of the dust to escape from the apparatus into the mill, and this prevention of the escape of dust is one of the very material features of this invention.

In accordance with the patent statutes I have described what I now believe to be the best embodiment of the invention, but I do not wish to be understood thereby as limiting myself or the scope of the invention, as many changes and modifications may be made without departing from the spirit of the invention; all such I aim to include in the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A combined jig and aspirator including a hopper and a vibratory jig, a blower adapted to supply air under slight pressure over the jig for carrying off the gangue, the mouth of said blower being arranged forward of the hopper and just over the jig and of substantially the same width as the jig, and a casing enclosing the apparatus.

2. A combined jig and aspirator including a hopper and a vibratory jig, a blower adapted to supply air under slight pressure over the jig for carrying off the gangue, the mouth of said blower being arranged forward of the hopper and just over the jig and of substantially the same width as the jig, and means for dividing the gangue laden air into two streams, and a casing enclosing the apparatus.

3. A combined jig and aspirator including a hopper and a vibratory jig, a blower adapted to supply air under slight pressure over the jig for carrying off the gangue, the mouth of the blower being arranged forward of the hopper and just over the jig and of substantially the same width as the jig, means for dividing the gangue laden air into two streams, a separator receiving one of said streams, means in said separator for dividing out the heavier particles, and a suction fan carrying off the lighter particles, and a casing enclosing the apparatus.

4. A combined jig and aspirator including a hopper, a jig arranged below the hopper, a second jig arranged below the first mentioned jig, an operating means common

to both jigs for vibrating them, and a blower adapted to deliver air under slight pressure over the jigs, the mouth of said blower arranged forward of the hopper.

5. A combined jig and aspirator including a hopper, a chute arranged beneath the hopper, means for vertically adjusting the chute, a jig arranged beneath the chute, an operative connection between the chute and jig, a second jig arranged below the first mentioned jig, means common to both jigs for vibrating them, and a blower for supplying air under slight pressure over the jigs, the mouth of said blower being arranged forward of the hopper.

6. A combined jig and aspirator including a hopper, a chute arranged beneath the hopper, means for vertically adjusting the chute, a jig arranged beneath the chute, an operative connection between the chute and jig, a second jig arranged below the first mentioned jig, means common to both jigs for vibrating them, a blower for supplying air under slight pressure over the jigs, the mouth of said blower being arranged forward of the hopper, and a casing enclosing the parts to prevent escape of the gangue to the atmosphere.

7. A combined jig and aspirator including a hopper, a casing, a vibratory jig arranged in said casing, a blower supplying air under slight pressure over said jig and carrying off the gangue, the mouth of said blower being arranged forward of the hopper, a baffle dividing the gangue laden air into two streams, a collecting receptacle to which one of said streams is fed, and a separator to which the other of said streams is fed.

8. A combined jig and aspirator including a casing, a vibratory jig arranged in said casing, a blower supplying air under slight pressure over said jig and carrying off the gangue, a baffle dividing the gangue laden air into two streams, a collecting receptacle to which one of said streams is fed, and a separator to which the other of said streams is fed, means provided in said separator for returning the heavier particles to the collecting receptacle, a suction fan cooperating with the separator for carrying off the lightest particles, and a chute associated with the separator for carrying off particles of intermediate weight.

9. A combined jig and aspirator including a casing, a vibratory jig arranged in said casing, a blower supplying a light air over said jig and carrying off the gangue, a baffle dividing the gangue laden air into two streams, a collecting receptacle to which one of said streams is fed, and a separator to which the other of said streams is fed, and means provided in said separator for returning the heavier particles to the collecting receptacle.

JAMES F. REILLY.