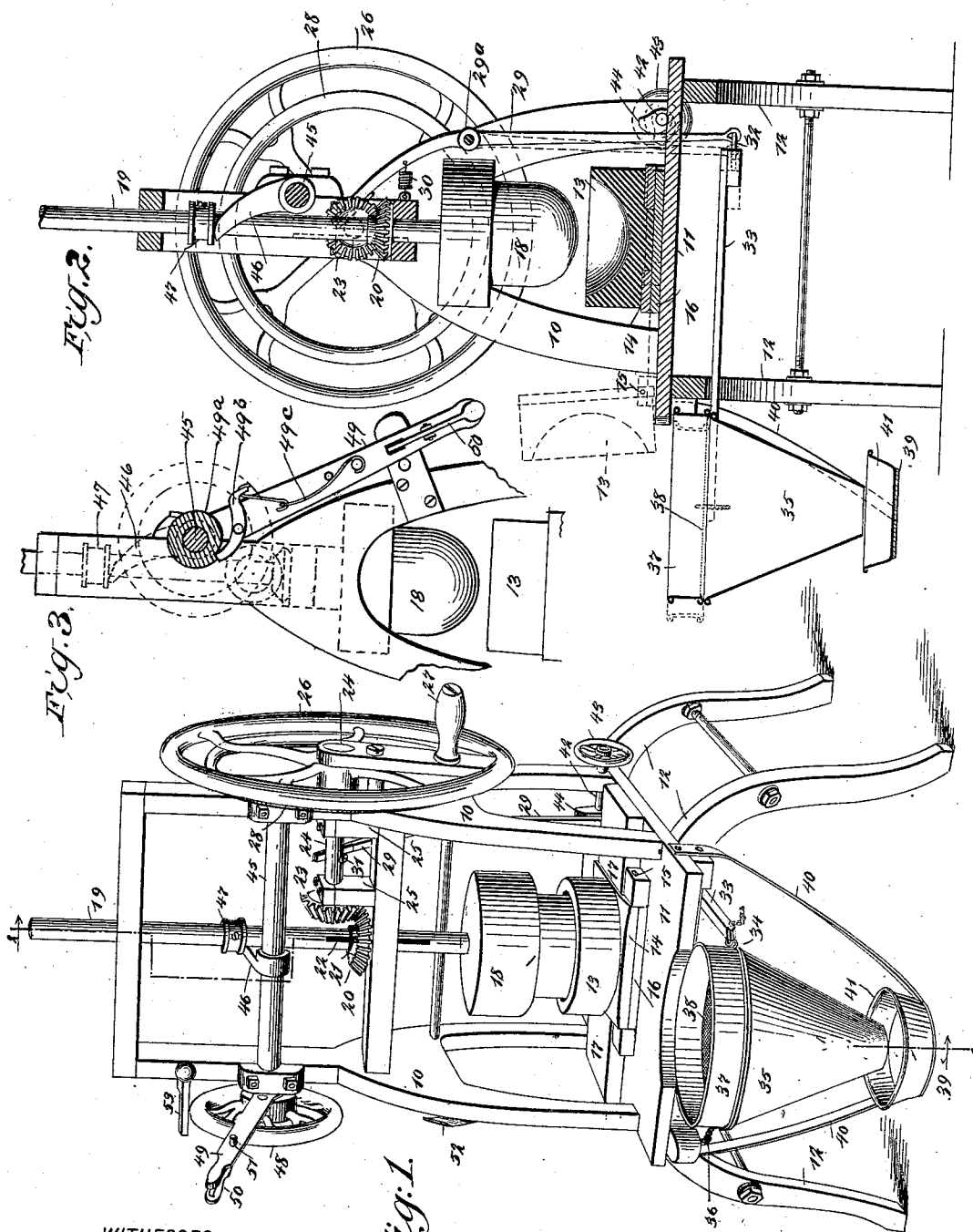


(No Model.)

J. H. TRAVER.
PULVERIZING MACHINE.

No. 512,635.

Patented Jan. 9, 1894.



WITNESSES:
John A. Rennie
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Fig. 1.

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JOHN H. TRAVER, OF ASPEN, COLORADO.

PULVERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 512,635, dated January 9, 1894.

Application filed February 24, 1893. Serial No. 463,625. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. TRAVER, of Aspen, in the county of Pitkin and State of Colorado, have invented a new and Improved
5 Pulverizing-Machine, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of pulverizing machines which are adapted to pulverize rock for assaying purposes, and which are intended to pulverize
10 the rock exceedingly fine in order that a proper assaying may be made.

The object of my invention is to produce a simple machine of this kind which may be
15 operated either by hand or other power, which is provided with a movable screen and funnel adapted to screen the crushed material, which has a mortar and pestle for grinding purposes and has the mortar arranged so that it may
20 be conveniently tipped to deposit its load on the screen, which is constructed in such a way that the pestle may be easily raised when necessary, and which has means for conveniently throwing the screen shaker in and out
25 of gear.

To this end my invention consists in certain features of construction and combinations of parts, as will be hereinafter described and claimed.

30 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of the machine embodying my invention, showing the
35 several parts in position for use. Fig. 2 is a vertical section on the line 2—2 in Fig. 1 and with the pestle raised, and Fig. 3 is a side elevation, partly in section, showing in detail
40 the connection between the lifting lever and the pestle shaft.

The machine is provided with an upper frame 10 carried on a base 11, and this is supported on a lower frame 12, although the two
45 frames and the base may be made one if desired. On the base 11 is a mortar 13 strong enough to withstand the strain to which it is subjected and this is carried on a sliding base 14 which is hinged, as shown at 15, to a slide
50 16 held to move back and forth in a slideway 17, this arrangement enabling the mortar to be pushed forward to the front portion of the

machines so that it may be conveniently tipped over and dumped. Above the mortar is a heavy pestle 18 which has a smooth lower
55 portion shaped to fit snugly in the mortar, the pestle being made smooth as it is necessary to grind the rock exceedingly fine.

The pestle 18 is carried by a vertical shaft 19 which turns in suitable bearings in the
60 frame 10 and the shaft is turned by a bevel gear wheel 20 which has its set screw 21 held in a longitudinal keyway 22 in the shaft so that the shaft may slide through the gear when the pestle 18 is to be raised. The gear
65 wheel 20 is driven by a gear wheel 23 on the driving shaft 24, which shaft is mounted in suitable bearings 25 and is provided at its outer end with a balance wheel 26 having a crank 27 by which it may be turned and hav-
70 ing also on its inner side a rim wheel or flange 28 to which a belt may be applied if desired. It will be seen then that by turning the shaft 24 the shaft 19 and pestle 18 will be also turned and the material in the mortar 13 pul-
75 verized.

On the back portion of the machine is a nearly vertical lever 29 which is fulcrumed near the center, as shown at 29^a in Fig. 2, and the upper end of this lever is pulled forward
80 by a spring 30 which holds said upper end against the driving shaft 24 and in the path of a boss or screw 31 on the shaft. Consequently the rotating of the shaft causes the boss to strike and move the lever in one di-
85 rection and the spring 30 pulls it back in the opposite direction.

The lever moves in a slot in the base 11, as indicated in Fig. 2, and its lower end is connected by a link 32 with the horizontally
90 moving shaker arm 33 which extends forward beneath the base 11 and is connected by a link 34 with the funnel 35, the opposite side of the funnel being supported by a chain 36, or its equivalent, which is secured to the main
95 frame. The funnel has at its upper end a screen 38 which is held in a suitable receptacle 37, and beneath the funnel is a nearly cylindrical holder 39 supported by arms 40 extending upward to the base 11, and the
100 holder is adapted to carry a pan 41 which receives the screened material dropped from the funnel 35.

It will be seen from the above description

that the rotating of the driving shaft will cause the funnel and screen to be shaken so that all the fine material will drop through the machine and into the sample pan.

5 If it is not necessary to use the shaker; that is, if the mortar and pestle are being used for grinding only, the shaking mechanism may be thrown out of gear, and to this end a shaft 42 is journaled in the lower portion of the 10 frame 10 and behind the lever 29, the shaft having at its outer end a hand wheel 43 and on its inner end a cam 44 which may be turned against the lever 29, thus throwing the lower end of said lever forward and moving its 15 upper end backward out of the path of the boss or screw 31. Above and parallel with the shaft 24 is a shaft 45 on which is an arm 46, the free end of which extends beneath a collar 47 on the pestle shaft 19, and the shaft is provided 20 at one end with a suitable hand wheel 48 and with a laterally extending lever 49 which, by being moved downward, turns the shaft 45 so as to throw the arm 46 upward and this movement causes the collar 47 and shaft 19 25 to be raised so as to lift the pestle from the mortar. The shaft 45 may be turned by either the hand wheel 48 or by the lever 49 and may be turned by the hand wheel independently of the lever, as the lever is journaled loosely on the shaft, see Fig. 3, and ad- 30 jacent to the fulcrumed end of the lever is a ratchet wheel 49^a having a single tooth which is adapted to engage a pawl 49^b pivoted on the lever, this pawl being held in place by a spring 49^c. It will thus be seen that when the lever 35 is thrown down the ratchet wheel will be engaged by the pawl and the shaft 45 and arm 36 turned so as to lift the pestle. The lever 49 has a latch lever 50 of the customary kind, fulcrumed near its free end, and a pin 51 on 40 the latch lever projects through the lever 49 and is adapted to enter a perforation in the plate 52, which is secured to the lower portion of the frame 10, and by depressing the lever 45 49 and placing the pin 51 in engagement with the plate, the arm 46 will be held in an elevated position, as shown in Fig. 2, thus holding the pestle 18 above the mortar 13 so that the latter may be emptied or filled conveniently. It will also be understood that the 50 lever 49 may be operated so as to raise the shaft 19 slightly, in case it is necessary to remove the pestle somewhat from the bottom of the latter. On the frame 10 and extending 55 outward over the wheel 48 and into the path of the lever 49 is a stop arm 53, which prevents the lever 49 from being thrown over too far.

When the lever 49, ratchet wheel 49^a and 60 pawl 49^b are in the position shown in Fig. 3, the arm 46 will be in position to hold up the pestle, but if it is desired to throw the arm 46 from beneath the collar 47 so as to drop the pestle, it may be done by means of the hand 65 wheel 48, and the hand wheel may be turned

until the arm again comes in contact with the collar 47 and the ratchet wheel into engagement with the pawl 49^b. When the machine is to be used for grinding, however, the lever 49 is released and raised. 70

When the machine is used the pestle 18 is raised as described, a charge of rock to be crushed is placed in the mortar, and the driving shaft 24 turned, the shaking mechanism for operating the screen being meanwhile 75 thrown out of gear in the manner described above. After the charge has been ground the pestle 18 is raised by throwing down the lever 49 and the mortar is pushed forward into the position shown by dotted lines in Fig. 2, and 80 tipped to throw its load upon the screen 38. If more material is to be ground, the mortar is recharged and again placed in position and the pestle is dropped again into the mortar. The cam 44 is thrown out of engagement with 85 the lever 29, and the revolution of the driving shaft oscillates the said lever and shakes the screen and funnel so as to carry the fine material downward through the screen and into the sample pan. 90

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

1. A pulverizing machine, comprising a mortar hinged to a slide, a revoluble pestle 95 held to turn in the mortar, and a lever mechanism for raising the pestle, substantially as described.

2. A pulverizing machine, comprising a revoluble and vertically moving pestle, a lever 100 mechanism for lifting the pestle, means for holding the pestle in a raised position, a mortar arranged beneath the pestle and adapted to slide out of the path of the pestle, and a shaking screen adapted to receive the ground 105 material from the mortar, substantially as described.

3. In a pulverizing machine, the combination of the mortar, the pestle held to turn in the mortar, the vertical shaft arranged to 110 carry the pestle and adapted to move vertically in its bearings, the shaft having a longitudinal keyway therein, a driving gear secured to the shaft and having a set screw projecting into the keyway of the shaft, driv- 115 ing mechanism connected with the gear, a lifting shaft journaled at right angles to the pestle shaft, a lever mechanism for turning the lifting shaft, and means, as a collar on the pestle shaft and the arm on the lifting 120 shaft, for raising the pestle, substantially as described.

4. The combination of the pulverizing machine with the tilting mortar, the revoluble 125 pestle held to turn in the mortar, the shaking screen adapted to receive material from the mortar, the driving shaft adapted to revolve the pestle, an oscillating lever moved by the driving shaft, an operative connection 130 between the oscillating lever and the shaking

screen, and means for throwing the shaking mechanism in and out of gear, substantially as described.

5 The combination, with the pestle shaft, a second shaft at right angles to the pestle shaft and means for raising the pestle shaft by the turning of the second shaft, of a ratchet wheel on the second shaft, a lever loosely

journaled on the second shaft, a pawl on the lever to engage the ratchet wheel, and a fastening device to fix the position of the lever, substantially as described.

JOHN H. TRAVER.

Witnesses:

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CEASER GARRETT.