

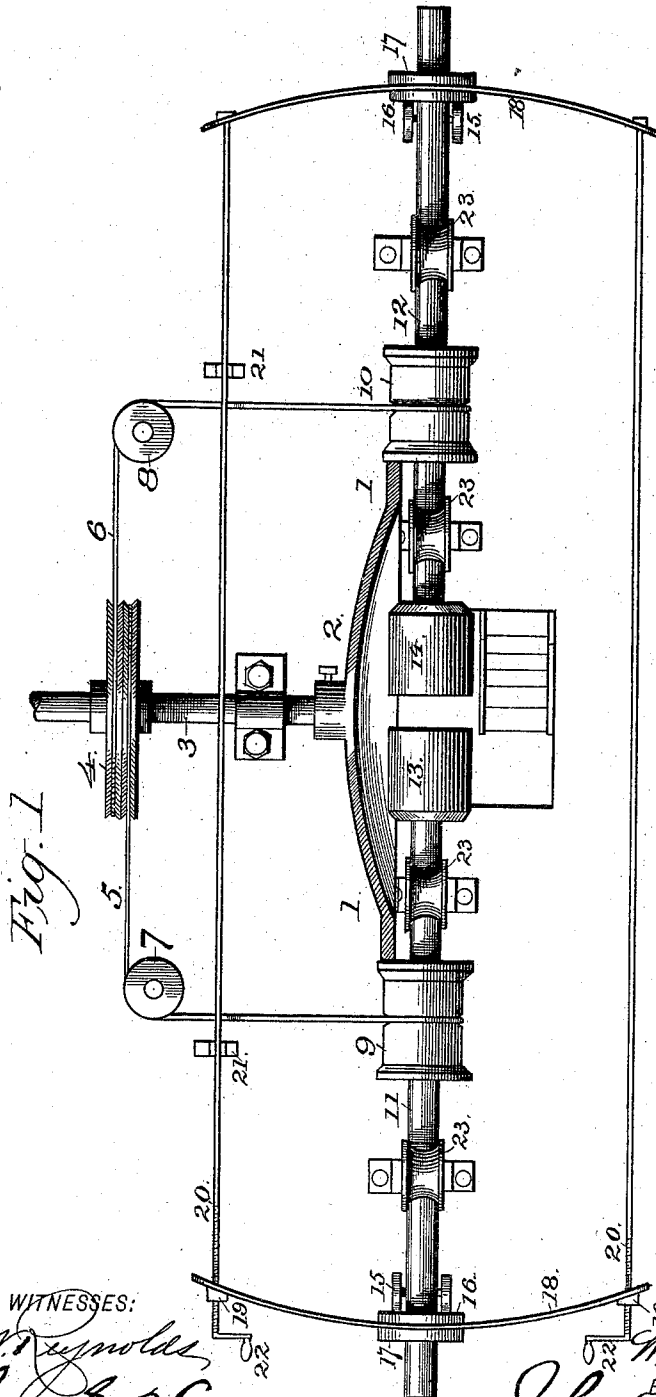
(No Model.)

2 Sheets—Sheet 1.

W. E. DOWNS.
MEANS AND MECHANISM FOR PULVERIZING.

No. 534,866.

Patented Feb. 26, 1895.



WITNESSES:

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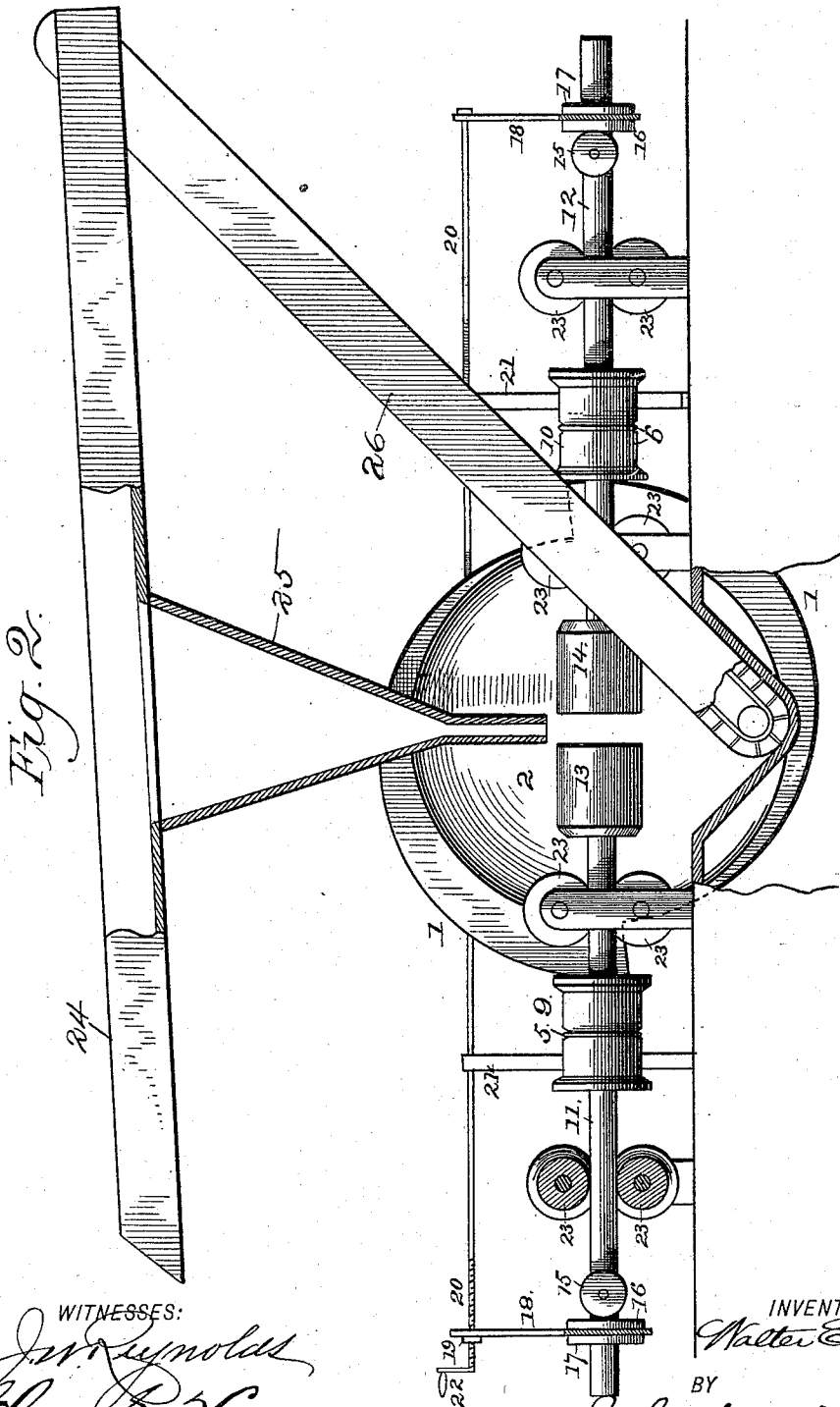
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UNITED STATES PATENT OFFICE.

WALTER E. DOWNS, OF SUTTER CREEK, CALIFORNIA.

MEANS AND MECHANISM FOR PULVERIZING.

SPECIFICATION forming part of Letters Patent No. 534,866, dated February 26, 1895.

Application filed October 10, 1893. Serial No. 487,746. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. DOWNS, a citizen of the United States, and a resident of Sutter Creek, in the county of Amador and State of California, have invented certain new and useful Improvements in Ore-Crushers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to means and mechanism for pulverizing various materials and also in instituting a uniform and equalized circulation of the material to establish a steady stream of the same and also at the same time separate the finer particles from the coarser.

With the above in view the invention consists of the construction and arrangement of the several parts which will be more fully hereinafter described and claimed, including such equivalents as the scope of the invention may contemplate.

The object of the invention is to provide positively acting mechanism for pulverizing purposes wherein the several devices are simple and effective in their nature and capable of being employed in either a horizontal, a vertical or an angular position.

In the drawings Figure 1 is a top plan view of a machine embodying the invention. Fig. 2 is a longitudinal vertical section of the same, showing the elevator and a portion of the separating mechanism employed therewith.

Similar numerals of reference are employed to indicate corresponding parts in both the views.

Referring to the drawings, the numeral 1 designates a cam, which may be of any dimension and of any general contour so long as it employs double shoulders or falls, one on each side of the periphery of the cam and diametrically opposite to each other. This cam is centrally arched or bridged, as at 2 and is connected to a shaft 3, which is the power shaft and is adapted to be driven by any suitable motive power or be connected to and operate a similar machine situated at a distance therefrom. On the said shaft 3, is a pulley 4, which is surrounded by two belts, 5 and 6, extending away in opposite directions and

passing over sheaves or pulleys 7 and 8. From the said sheaves or pulleys 7 and 8, the said belts 5 and 6 extend to and encircle belt surfaces on tappets 9 and 10, which are longitudinally disposed and adjustable upon stems 11 and 12. The said tappets 9 and 10 are engaged by the cam 1, as shown, and the said stems 11 and 12 carry at their inner ends shoes 13 and 14. The outer ends of the stems are also provided with anti-frictional wheels 15, which bear against a plate 16, bolted to another plate 17 and between which are mounted leaf or other springs 18, whose outer ends are movably attached to collars 19, adjustably mounted on screw-threaded rods 20, which have bearing in suitable supports 21, and supplied with operating hand wheels or cranks 22. The tendency of the said springs 18, is to force the shoes 13 and 14 together longitudinally, and by operating the hand wheels or cranks 22 and actuating the rods 20, the tension of the said springs against the said stems and the shoes can be regulated at will.

To assist in the easy operation of the stems, both in their longitudinal sliding movement as well as their rotary movement, a series of anti-frictional grooved wheels or pulleys 23 are brought to bear thereagainst, being arranged at suitable intervals and at any desired angle relatively to the said stems.

It will also be understood that the several parts will have suitable bearings or journals at such points as are necessary and other incidental features will be supplied at such points where the working of the several parts require them.

As seen in Fig. 2 a suitable feeding chute 24 which is inclined and provided with a hopper 25 is adapted to be employed in connection with the machine, as well as a lower receptacle and elevator 26 running back or returning to the said feeding chute. In this connection, it should be noted that the hopper of the feeding chute is placed in a relative position to the shoes, but it will be understood that no special form of feeding chute or elevator must necessarily be employed, further than to have an operation in the feeding chute which contemplates the production of a feed stream which may be suitably regulated and also to endeavor to, as much as possible, insure a delivery at the exit end, of the same

quantity of treated material as untreated or crude material entering the inlet end, and it will be further understood that to have the aforesaid operation the herein described mechanism for pulverizing must not necessarily be employed, though it is preferable.

In operation the cam 1 is set in motion and spreads the tappets 9 and 10 apart until the shoulders or falls of the said cam are reached, when the said tappets are forced inwardly, through the inward impelling action, of the springs 18 and again separated as the cam revolves, this movement becoming continuous. In addition to this impacting action of the shoes, they are also given a rotary movement in opposite directions by the belts 5 and 6, and consequently a combined crushing and grinding action results. The hopper of the feeding chute is so arranged as to feed the material being operated upon between the shoes, and the said shoes catch quantities of the said material and crush as well as grind the same, in the manner previously set forth. The material thus acted upon by the shoes, falls into the lower receptacle, as well as that which remains in the same condition as when delivered from the hopper of the feeding chute. The elevator then takes up both the pulverized and the unpulverized material and conveys it back to the feeding chute, where it joins or is mingled with the new supply of material being treated and introduced into the feeding chute and moves onward to the hopper. It will be understood that the stream of material fed from the hopper will in this manner be kept uniform and steady and that a continuous circulation of the said material will at all times be instituted and sustained. This operation ensues owing to the lighter particles by specific gravity seeking the upper level and when the hopper is full of the material it will be pressed forward and past the hopper opening and be delivered in a fine state from said chute.

The machine as heretofore set forth, can be arranged in series either in a vertical, an inclined or a horizontal manner, and the material acted upon be caused to pass between a series of said shoes before being carried back to the separator.

It will also be understood that the tappets adjacent to the shoes can be adjusted to take up the wear of said shoes and also that many minor changes in the construction and arrangement of the several parts might be made and substituted for those shown and described

without in the least departing from the nature or spirit of the invention.

Having thus described the invention, what is claimed as new is—

1. In a machine of the character set forth, a pair of sliding oppositely, rotatable shoes, substantially as described.

2. In a machine of the character set forth, a pair of inwardly sliding spring-actuated shoes, having a rotary movement in opposite directions, substantially as described.

3. In a machine of the character set forth, the combination of a pair of inwardly impelled shoes, having an opposite rotary movement and a cam for separating the said shoes at intervals, substantially as described.

4. In a device of the character set forth, a pair of impacting shoes, each of which has a sliding movement and an independent reverse rotary movement, said shoes being adapted to contact with each other and operate simultaneously, substantially as set forth.

5. In a device of the character set forth, the combination of a pair of inwardly sliding shoes having stems with tappets thereon, springs for impelling said shoes toward each other, and a cam having diametrically opposite projections for engaging said tappets to spread the shoes apart, substantially as described.

6. In a device of the character set forth, the combination of inwardly moving, rotatable crushing and grinding shoes, a receptacle below said crushing and grinding shoes, and an elevator extending from said receptacle back to the feeding chute substantially as described.

7. In a machine of the character set forth, the combination of sliding shoes having a rotatable movement and provided with shanks having tappets, springs for impelling said shoes inwardly toward each other, a central bridged or arched cam to permit the shoes to have free movement and provided with diametrically opposite falls to engage the tappets, and means for operating the said parts, substantially as and for the purposes specified.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WALTER E. DOWNS.

Witnesses:

CHAS. S. HYER,
AUGUSTUS P. SCHELL.