

C. J. TOMLINSON
PULVERIZER.
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1,021,906.

Patented Apr. 2, 1912.

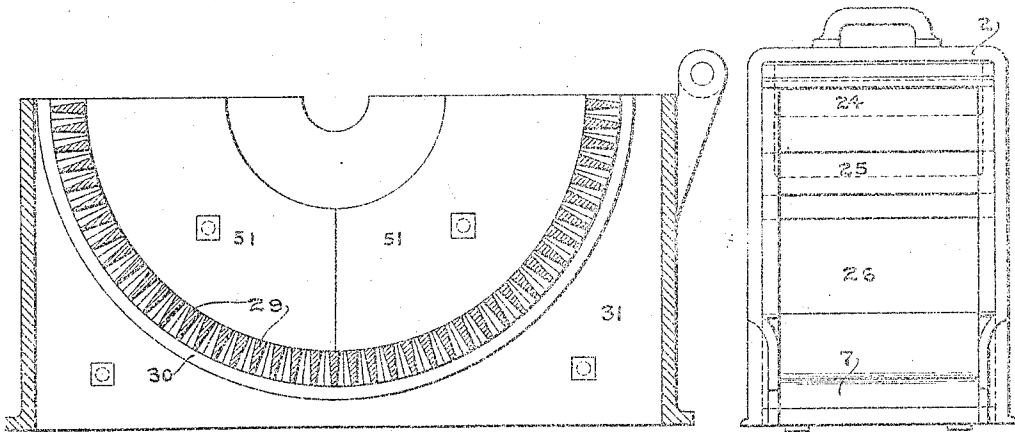
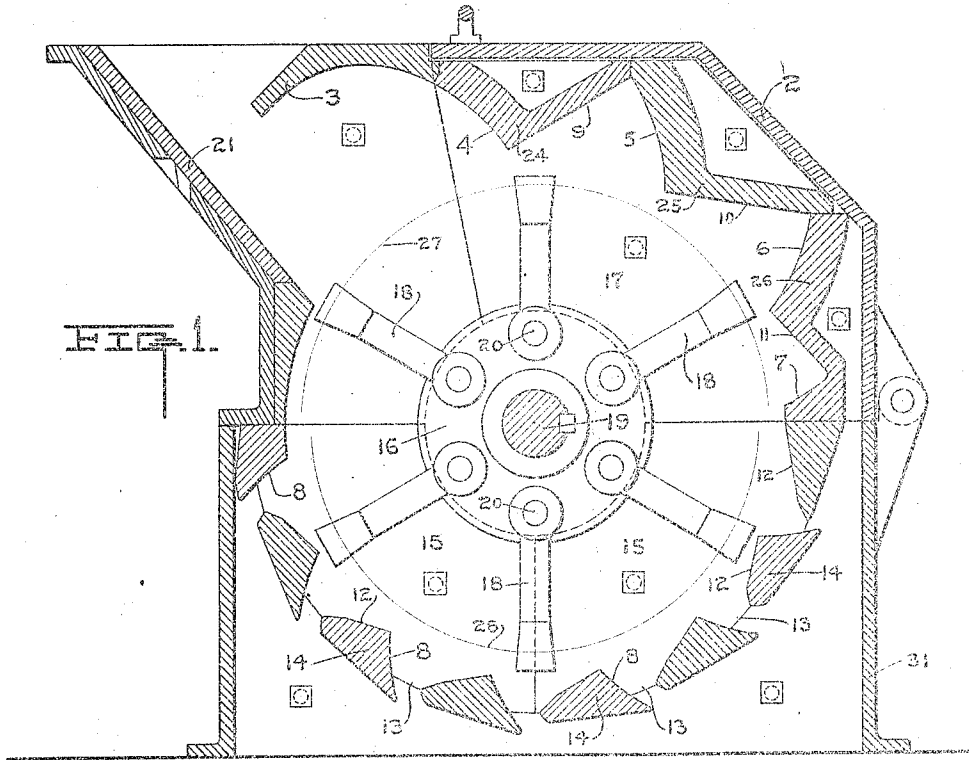


FIG. 2.

FIG. 3.

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PULVERIZER.

1,021,906.

Specification of Letters Patent.

Patented Apr. 2, 1912.

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To all whom it may concern:

Be it known that I, CLIFFORD J. TOMLINSON, a citizen of the United States, residing at West Allis, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Pulverizers, of which the following is a specification.

This invention relates to improvements in the construction of rotary impact pulverizers in which raw material is pulverized by a series of beaters or bails revolving at a high rate of speed within an inclosing casing.

The object of the invention is to provide a simple and efficient construction of rotary impact pulverizer wherein rock or other similar substances can be pulverized by a rapid succession of impacts with a series of rapidly revolving beaters and an adjacent series of stationary casing liners, the liners being so formed that they will tend to automatically return the material to the beaters after each of the successive blows.

A clear conception of an embodiment of the invention can be had by referring to the accompanying drawing forming a part of this specification, in which like reference characters designate the same parts in different views.

Figure 1 is a central vertical section through a pulverizer casing, liners and shaft. Fig. 2 is a similar section through the lower portion of a pulverizer casing showing a modified form of discharge screen. Fig. 3 is an end view of the cover portion of a pulverizer casing looking toward the lined interior thereof.

The pulverizer casing consists essentially of a base or lower portion 31, an inlet or hopper portion 1, and a cover portion 2, these three portions coacting to form a complete inclosing casing or wall. The pulverizer shaft 19 is mounted in bearings not shown, which are supported or formed on either side of the lower casing 31. The bail suspension member 16 is fixed to the shaft 19 in any suitable manner and carries a series of pivots 20 from which pivots the beaters or bails 18 are suspended.

The inlet or hopper portion 1 of the casing is provided with an inclined liner 21 and a second liner 3 which is so directed toward the liner 21 as to partially choke or

restrict the hopper opening. The liner 3 is held in place by flat side liners coacting against the vertical sides of the inlet portion 1 of the casing.

The liners 24, 25, 26, are inserted or mounted in the cover portion 2 of the casing and are held in place by side liners 17 coacting with the vertical side surfaces of the cover portion 2, see Figs. 1 and 3. Involute surfaces 4, 5, 6, 7, which are formed about a cylindrical surface represented by the line 27 as a generating surface, are formed on the liners 24, 25, 26. Surfaces 9, 10, 11, which are substantially tangent to the cylindrical surface represented by the line 27, intersect the successive involute surfaces 4, 5, 6, 7, respectively.

The screen bars 14 each have an involute surface 8 generated about the cylindrical surface represented by the line 28, and a second surface substantially tangent to the same cylindrical surface. Discharge openings 13 exist between successive screen bars 14. The screen bars are retained in position by flat side liners 15 which coact with vertical side walls of the lower casing 31 and closely fit the ends of the bars 14.

The screen bar 14 may be replaced, if desired, by a series of plain screen bars 29, see Fig. 2. The bars 29 rest upon two inwardly projecting circular ledges 30 formed one on each of the opposite vertical side walls of the lower casing 31, and are held in place by means of the flat side liners 51. The bars 29 have enlarged end portions, so that with a series of bars in normal position, the end portions only of adjacent bars coact, forming discharge passages between successive bars.

During the operation of the pulverizer, material to be pulverized is admitted through the hopper opening of the inlet portion 1 of the casing and slides by gravity down the liner 21 to the interior of the casing. The shaft 19 is given a rapid rotation carrying with it the suspension member 16 and bails 18. The end portions of the bails 18 traverse a circular path within which the cylindrical surfaces represented by the lines 27, 28, lie. As the material is precipitated into the path of the bails 18, it is thrown by impact with the beaters against the involute surfaces 4, 5, 6, 7, of the liners 24, 25, 26, and against the involute surfaces 8 of the

screen bars 14. It is a well known law that if a perfectly elastic body is thrown along a tangent to the generating surface and against an involute surface, the body so thrown will be returned directly to the point from which it was first thrown. With this principle in mind it will be seen that as the material is thrown by the bails 18 against the involute surfaces of the liners and screen bars in a direction substantially tangent to the generating surfaces of the involutes, the tendency will be for the involute surfaces to return the material to the position from which it was thrown. Since the ordinary material thrown into a pulverizer is not perfectly elastic, however, the material will not in reality be returned to precisely the position from which it was thrown but will probably be advanced slightly along the path of the rapidly revolving bails 18 instead. However, as the material is returned to the path of the rapidly revolving bails, it is again thrown by the reaction due to the impact with the bails against an involute surface of one of the stationary liners of the adjacent wall. The exact surface against which the material is thrown depends upon its angular advancement after its preceding return to the path of the bails. Thus the material is continually and successively subjected to a series of impacts with the bails and involute surfaces 4, 5, 6, 7, 8, until it is eventually reduced to a fine powder, after which the dust particles can be withdrawn from within the casing through the openings 13 by the aid of a fan or other suitable means.

It should be noted that the tangent surfaces 9, 10, 11, 12, serve to prevent the material which is being thrown outward, from avoiding impact with the involute surfaces. The line 3 which projects toward or approaches the liner 21, prevents material admitted to the machine from being returned through the inlet hopper. It has also been found in constructing a machine with the liner 3 as shown, that a continuous even feed of material to the pulverizing chamber is obtained. By constructing the machine as disclosed in Figs. 1 and 3, it will also be noted that the device is entirely an impact machine, no grinding of the material between the ends of the bails and screen bars being permissible.

It should be understood that it is not desired to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

It is claimed and desired to secure by Letters Patent,—

1. In a pulverizer, a casing, a beater mounted to traverse a circular path within said casing, and an inserted liner within said casing adjacent the path of said beater, said liner having a surface generated substantially involute to, and a second surface substantially tangent to, said beater path.

2. In a pulverizer, a beater mounted to traverse a circular path, a wall portion having adjacent said beater path an involute impact surface and a second wall portion having adjacent said beater path a surface tangent to said path.

3. In a pulverizer, a beater mounted to traverse a circular path, and a wall adjacent said beater path having a series of surfaces involute to and a second series of surfaces tangent to said beater path, some of the portions of said wall bearing the individual involute and tangent surfaces being spaced apart.

4. In a pulverizer, a beater mounted to traverse a circular path, and a wall adjacent said beater path having a series of surfaces involute to said beater path, and having a second series of surfaces tangent to said beater path, said individual surfaces of one series alternating with individual surfaces of the other series, and some of the portions of said wall bearing pairs of different surfaces being spaced apart.

5. In a pulverizer, a beater mounted to traverse a circular path, and a wall having adjacent said beater path at least two involute impact surfaces, said surfaces being located so that tangents to one portion of said beater path impact on the one involute surface and tangents of an immediately adjacent portion of said beater path impact on the second involute surface.

6. In a pulverizer, a beater mounted to traverse a circular path, and a wall comprising spaced bars each having adjacent said beater path an involute impact surface, said surfaces of successive bars being so located that tangents to one portion of said beater path impact on the involute surface of one bar, and tangents to an immediately adjacent portion of said beater path impact on the involute surface of another bar.

In testimony whereof, the signature of the inventor is affixed hereto in the presence of two witnesses.

CLIFFORD J. TOMLINSON.

Witnesses:

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