(No. Model.)

W. S. SHARPNECK.

PULVERIZER.

No. 255,890. Patented Apr. 4, 1882.

Fig. 1.

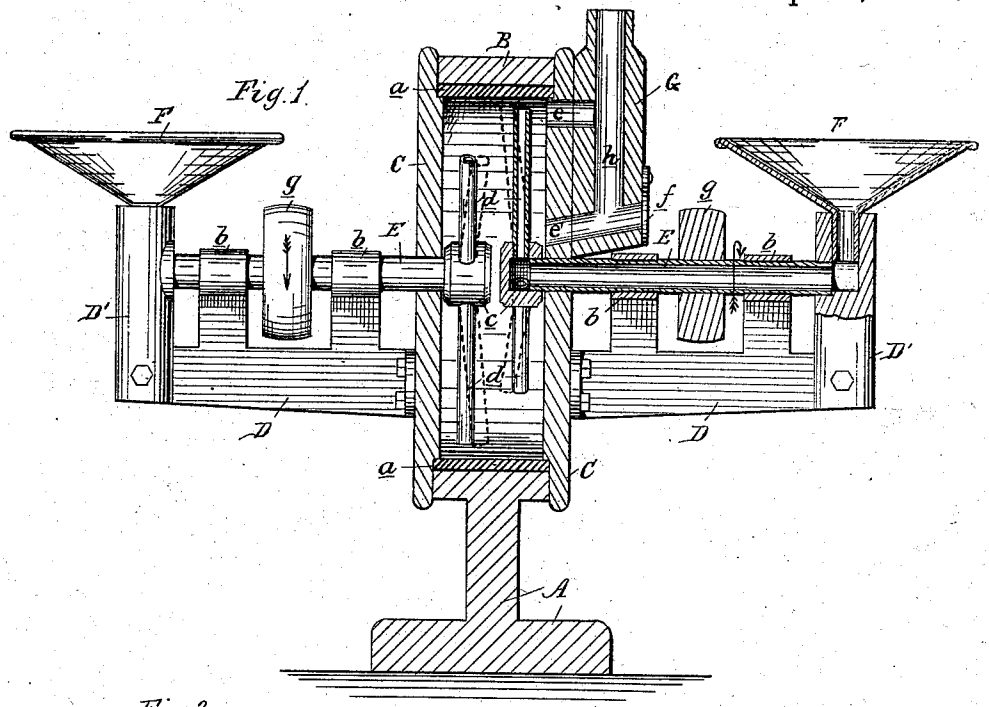


Fig. 2.

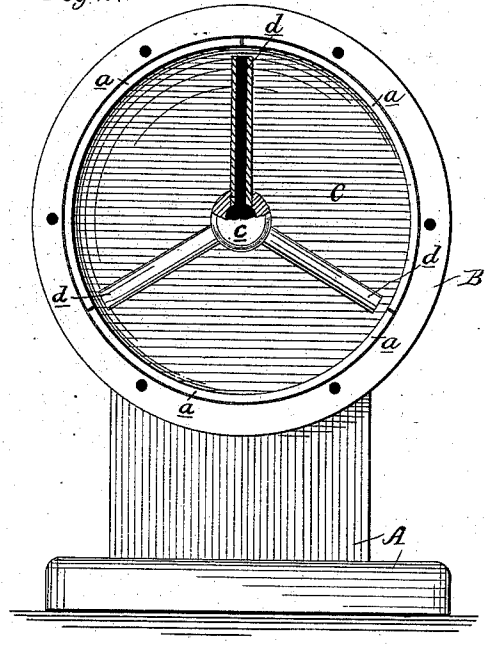
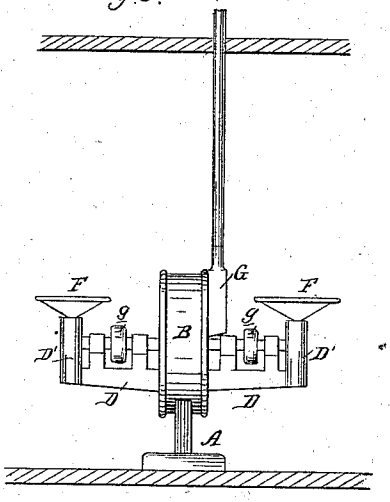


Fig. 3.



Witnesses:
A. M. Robertson
Wm. Turner.

Inventor:
Wm. S. Sharpneck
By T. J. W. Robertson
Attorney.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM S. SHARPNECK, OF BLAIR, NEBRASKA, ASSIGNOR OF ONE-HALF TO ALEXANDER MAJORS, OF SAME PLACE.

PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 255,690, dated April 4, 1882.

Application filed February 6, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. SHARPNECK, a citizen of the United States, residing at Blair, in the county of Washington and State of Nebraska, have invented certain new and useful Improvements in Pulverizers; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in that class of pulverizers in which the material is pulverized by being thrown violently against fixed or moving surfaces by centrifugal force; and it consists in the peculiar construction, combination, and operation of parts, as more fully hereinafter described and claimed.

In the drawings, Figure 1 represents a vertical partly sectional view of my pulverizer; Fig. 2, an end view, with one of the heads and its attachments removed and with one of the arms in section; and Fig. 3, a view on a smaller scale, showing the device connected with a floor above it by a pipe for elevating purposes.

A represents a suitable base supporting the circular case B, which is supplied with interior chilled iron sections, *a a a*. These sections are securely held in place by the heads C C, which are bolted to the case B at each side of the latter, and can be renewed when worn. To each of the heads C is bolted a bracket, D, which is provided with journal-boxes *b*, and with a hollow casting, D′.

E E are hollow shafts revolving in the boxes *b*, and provided at their inner ends with hollow hubs *c*, which carry hollow radial arms *d*. The outer ends of the hollow shafts revolve in recesses in the castings D′, which are each provided with a hopper, F, so as to give direct communication between the hoppers and the interior of the case B. To one of the heads C is secured an outlet, G, which is provided with an upper passage, *e*, and a lower inclined passage, *e′*, giving it communication with the case at the top and near the center of the same. The lower opening, *e′*, extends entirely through the outlet, and is provided with a valve, *f*, to limit its size. When in use the outlet is provided with a pipe, as shown in Fig. 3, said pipe leading to a floor or floors above or to any suitable and desired place. Motion is given to the hollow shafts by means of belts running on the pulleys *g*, and drive the latter and their shafts in opposite directions.

The operation of the machine is as follows: Motion being given to the hollow shafts so as to drive them in opposite directions at a speed of from one thousand eight hundred to three thousand revolutions to a minute, the broken ore or grain to be pulverized is placed in the hoppers E and finds its way through the hollow shafts to the hubs on their inner ends, where the rapid revolutions of said hubs and arms causes the material to be thrown forcibly through the hollow arms against the chilled sections *a*, forming the inner surface of the case B, by centrifugal force, so as to completely pulverize the material. The action of the arms causes a strong suction through the hollow shafts and a correspondingly strong blast through the upper passage, *e*, which forcibly draws the material into the case and forces it outward in a finely-pulverized condition through the outlet to a floor above or other place for further treatment. The valve *f* of the passage *e′* is used to regulate the amount of air drawn through the hollow shafts. This is accomplished by admitting a regulated quantity of air into the passage *e′*, so as to limit the amount of suction through the hollow shafts. Any portions of the material which are not pulverized (more especially when ore is being treated) is again struck by the arms and again thrown against the chilled sections, and any portions not pulverized sufficiently which may be drawn through the upper passage, *e*, will fall through the return-passage *h* and be again drawn into the lower passage by suction and again thrown against the case. To insure the last action described the lower passage is made inclined. The hoppers may be provided with any suitable valves or cut-offs for regulating the supply of ore, grain, or other material.

The machine not only pulverizes the material in a very perfect manner, but also elevates or conveys it to other places for further treatment, and is equally successful in pulverizing ore or grain, as has been proved by actual practice, the action being especially perfected by the movement of the arms in opposite directions, which not only throws the material against the walls of the case but also throws the particles against each other in their travel. From this it will be seen that the two independent sets of arms not only increases the capacity of the machine, owing to their number, but also by causing the particles to strike forcibly against each other as they pass in opposite directions.

The hollow arms of each shaft may be set inclined toward the arms of the opposite shaft, whereby the pieces of material will be more likely to strike each other as they rebound from the chilled surface; or the arms may be made so short that when inclined toward each other the pieces of ore as they issue from the arms may cross each other's paths, and thus cause some of the pieces to strike against each other, by which means much of the ore or other material may be broken up before it reaches the chilled sections. The hollow arms on each shaft may also be set at different angles to their shaft, whereby the material from each arm will strike at a different place on the chilled sections, and thus more equally distribute the material being pulverized over the surface of the casing. The inclination of the hollow arms is shown in dotted lines in Fig. 1.

In operating on some classes of materials I intend to insert screws or spiral ribs in the hollow shafts, which as they revolve will feed the material into the hubs where the centrifugal force comes into play; but for most purposes this is unnecessary, as the passage of the air as it is drawn in by the centrifugal force generated by the rotation of the arms is fully sufficient to feed in the material.

I do not limit myself to the exact construction here shown, as it may be varied without changing the spirit of my invention. For instance, a revolving disk or other instrument provided with passages or exits might be mounted on the hollow shaft in the casing and operate to produce the same results.

What I claim as new is—

1. The combination, with the case B, of the independent sets of hollow arms revolving therein in opposite directions, and means, substantially as described, for supplying the material to said arms, as and for the purpose specified.

2. The combination, with the case B and the hollow arms revolving therein, of the hollaw shafts communicating with and carrying said arms, and suitable feeding devices, substantially as and for the purpose specified.

3. The combination, with the case B, of hollow arms secured at an angle to their operating shafts and revolving within the case in opposite directions, and suitable feeding devices, substantially as and for the purpose specified.

4. The combination, in a pulverizer, of an outer case, suitable feeding devices, and a hollow revolving shaft with a revolving instrument mounted upon said shaft and provided with passages running from the passage through the hollow shaft toward the periphery of the case, substantially as described, and for the purpose specified.

5. The combination, with the case B, the hollow arms revolving therein, and the shafts E, of the brackets D, provided with the boxes *b b*, and hollow castings D′, substantially as and for the purpose specified.

6. The combination, with the case B, of the hollow arms *d*, the shafts E, the outlet G, and suitable means for feeding material and for regulating the amount of air admitted to the case, as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM S. SHARPNECK.

Witnesses:

W. T. JOHNSON,

C. H. MILLER.