

No. 745,705.

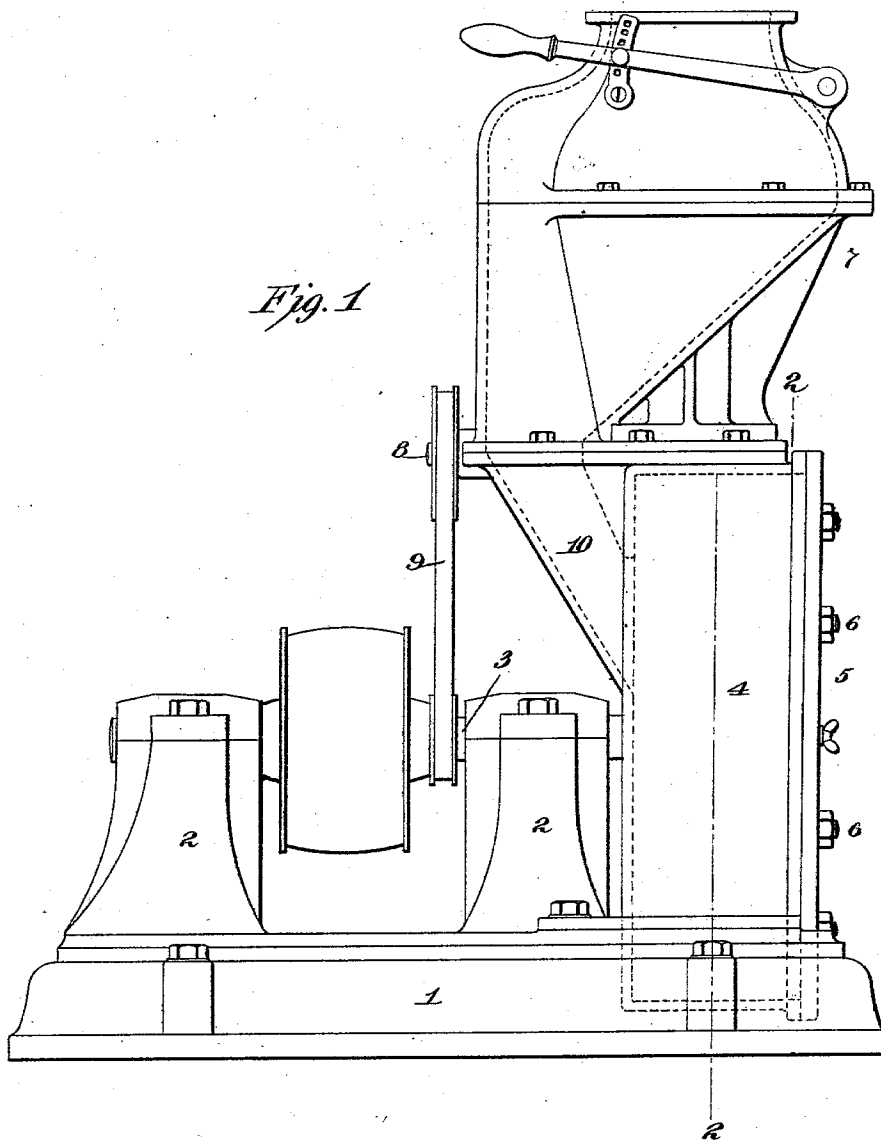
PATENTED DEC. 1, 1903.

W. M. WHEILDON.
PULVERIZER.

APPLICATION FILED AUG. 2, 1900.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

Jas. S. Coleman
Geo. R. Taylor

Inventor

William Maxwell Wheldon
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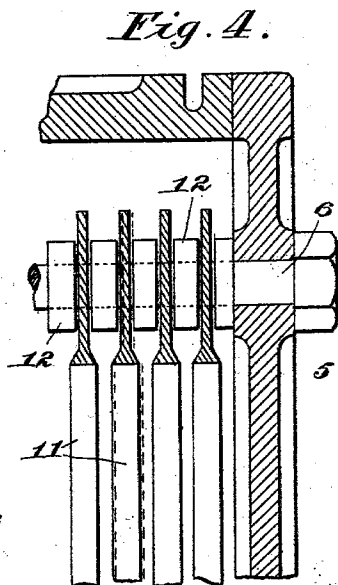
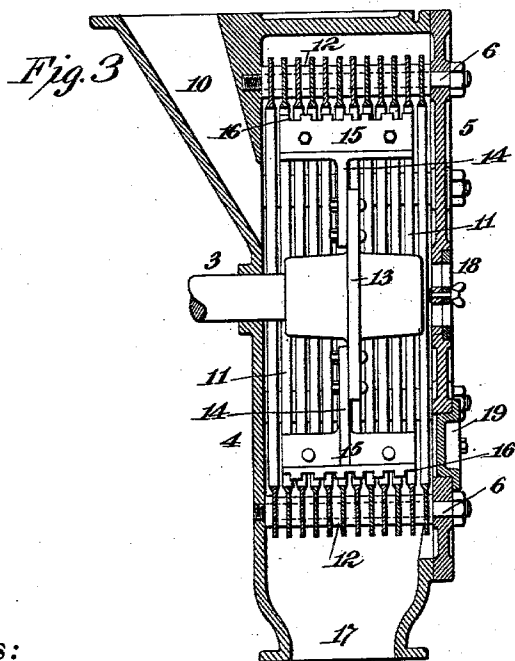
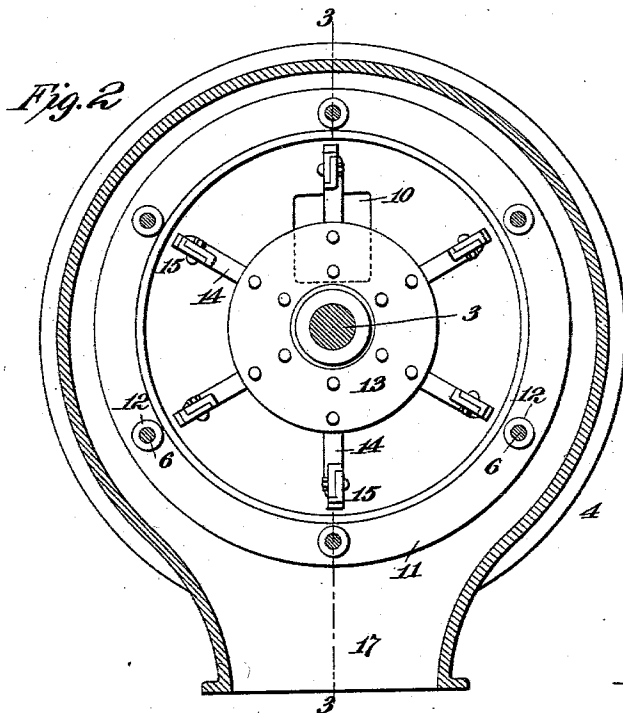
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*Jas. F. Coleman
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William Maxwell Wheldon
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UNITED STATES PATENT OFFICE.

WILLIAM MAXWELL WHEILDON, OF BOSTON, MASSACHUSETTS, ASSIGNOR
TO THE AERO PULVERIZER COMPANY, OF JERSEY CITY, NEW JERSEY,
A CORPORATION OF NEW JERSEY.

PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 745,705, dated December 1, 1903.

Application filed August 2, 1900. Serial No. 25,657. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MAXWELL WHEILDON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Pulverizers, of which the following is a description.

My invention relates to improvements in pulverizers of the type wherein the pulverization of material is effected by means of paddles rotating in a pulverizing-chamber; and my object is to provide and produce a pulverizer of this kind which shall be especially adapted for relatively coarse pulverization of material. If it be desired to reduce coal or other material to particles of, say, forty mesh or under, it will be found that under ordinary conditions a considerable percentage of the material supplied to the pulverizer will be as small as that desired. With the pulverizers of this type as heretofore constructed, so far as I am aware, the entire bulk of the material has been subjected to the pulverizing devices, including the proportion of particles which are already sufficiently reduced in size. What I aim to do, primarily, is to produce a pulverizer of this type wherein the sufficiently-fine particles will be immediately directed to the discharge, whereby the pulverizing devices are required to perform their work only upon the sufficiently-large particles which require pulverization. Furthermore, as soon as the pulverized material will have reached a condition of sufficient fineness it will immediately pass to the discharge, so that the machine in no case will operate on material of the desired ultimate mesh to further reduce the same. In accomplishing this object I construct a pulverizer with a pulverizing-chamber formed of a series of preferably annular diaphragms placed side by side and sufficiently separated as to permit the passage between them of particles of the desired fineness, and I mount, preferably concentrically, on a shaft within the chamber so formed a plurality of paddles by which the material will be pulverized, such material being supplied to the pulverizing-chamber preferably at one side of the axis of the shaft, and the

pulverized material being delivered through the slots formed between the annular diaphragms and discharging into an outer casing having a discharge-opening preferably at its bottom. In order to facilitate the passage of the fine material through the slots formed between the annular diaphragms, I prefer to so support the latter as to permit of a slight play between them, whereby the diaphragms would be caused to vibrate in operation, so as to successively narrow and widen the distances between them to obviously increase the screening effect.

Another object which I have specifically in mind in designing my improved pulverizer is to secure a device wherein material may not only be pulverized, but may be subjected to heat to drive off moisture when the material is wet or damp, which object I effect by constructing a pulverizer into which only a limited air-supply will be admitted, whereby the heat generated in effecting the pulverization may result in a sufficient rise in temperature within the pulverizing-chamber as to secure the desired result.

Other and less important objects accomplished by my improved construction of pulverizer will be apparent from a detail understanding thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side view of my improved pulverizer in its preferred form; Fig. 2, a section on the line 2 2 of Fig. 1, showing the preferred construction of pulverizing-chamber and casing therefor; Fig. 3, a section on the line 3 3 of Fig. 2; and Fig. 4, a detail view of a portion of the crushing-chamber, illustrating the play between the annular diaphragms.

In all of the above views corresponding parts are represented by the same numerals of reference.

1 is a suitable base or support carrying a pair of pillow-blocks 2 2, in which is mounted the main shaft 3. Bolted to the base is the casing 4, the outer face of which is inclosed by a bonnet 5, secured in place to studs 6 6, screwed into the back wall of the casing. At the top of the casing 4 is a feed 7 for the pul-

verized material and which may be of any suitable type, that indicated being the improved feed device invented by me and described and claimed in my application for Letters Patent filed on the 26th day of June, 1900, and numbered serially 21,635. The shaft 8 of the feed device is driven from the main shaft 3 by a belt 9, as shown. Material delivered by the feeding device 7 passes to a feed-chute 10, cast with the casing, whereby such material will be delivered within the pulverizing-chamber. This chamber in the preferred embodiment of my invention is inclosed by a series of annular diaphragms 11, secured together upon the studs 6 and with washers 12 between them. Each of the diaphragms 11 is preferably shaped in cross-section, like an elongated Y, as shown, and has its widest triangular part next to the paddles. By reason of this construction it will be seen that any particles of material which will be permitted to pass between the adjacent edges of any two of the diaphragms cannot possibly afterward become wedged between the diaphragms. Preferably the diaphragms are mounted upon the studs 6 with a very slight play between them, (see Fig. 4,) so that in operation they would be permitted to vibrate slightly to facilitate the screening operation, as will be obvious. Mounted upon the end of the shaft 3, within the pulverizing chamber, is a disk 13, carrying spider-arms 14, to which are bolted the paddles 15, as is common with devices of this type, said paddles obviously turning concentrically within the pulverizing-chamber. Preferably the paddles are each provided with a plurality of teeth 16 on its upper edge, as shown.

If straight-edged paddles were used, there would be danger in the pulverization of wet material of the latter forming upon the inside of the diaphragms and accumulating as a layer to prevent the passage of the pulverized material therethrough; but by forming the paddles with teeth, preferably staggered, as shown, and which work quite close to the inner faces of the diaphragms, any wet material which might tend to accumulate on the inner surfaces of the diaphragms will be kept in agitation, so as to pass between the diaphragms as soon as it may have become sufficiently dry. At the bottom of the casing 4 is a discharge-opening 17. Preferably the annular diaphragms are arranged eccentrically within the casing 4, as shown, whereby the space between said diaphragms and the casing at the bottom will be of greater area than at the top. By thus arranging the diaphragms within the casing I provide a gradually-increasing conduit, through which the material discharged through the diaphragms may pass to the discharge-opening, whereby the capacity of the conduit will correspond approximately with the delivery of the material, as will be obvious. In this way the pulverizing-chamber will discharge its product with more uniformity at all points of its

periphery than if the diaphragms were arranged concentrically within the casing. Carried in the bonnet 5, and preferably in line with the shaft 3, is a damper or air-register 18 of any suitable type arranged to be opened more or less to permit a variable amount of air to enter the pulverizing-chamber. When working on relatively dry material, only enough air requires to be admitted to the pulverizing-chamber to effect the proper feed of the material through the slots formed between the annular diaphragms, which air will escape through the discharge 17 with the pulverized material. When, however, the pulverizer is used in connection with wet or damp material, the air-supply is reduced, whereby the heat generated in the pulverizing-chamber will effect an elevation in temperature therein to rapidly and uniformly dry the material in course of pulverization. The amount of air admitted to the pulverizing-chamber in this case should be so regulated as to secure the desired temperature therein. When a reduced air-supply is thus allowed to enter the pulverizing-chamber to secure a heating effect, it will be obvious that the material in the feed-hopper 10 acts to seal the same to prevent air from entering the chamber through that source. The bonnet 5 may be provided with one or more small removable covers 19 to permit the interior of the pulverizing-chamber to be reached for cleaning when desired. It will be seen that by adopting the special construction described the bonnet 5 may be readily removed to disclose the entire interior mechanism for inspection or repair.

The operation has been generally indicated in the above description and need not be explained in full, it being sufficient to say that the material to be pulverized, entering the pulverizing-chamber through the feed-chute 10, will be acted upon by the paddles, so as to be reduced in size, the particles passing between the annular diaphragms and escaping through the discharge-opening 17. Any particles which may enter the pulverizing-chamber and which may be of sufficient fineness will pass immediately through the spaces between the diaphragms, so as not to be acted upon by the paddles.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a pulverizer of the class described, the combination of an inclosed casing, a series of rings or diaphragms mounted in said casing side by side to form a pulverizing-chamber having peripheral slots, each ring being formed with an outwardly-flaring inner face, whereby the minimum space between the rings is coincident with their inner faces, a shaft extending into said pulverizing-chamber, and a plurality of pulverizing-paddles mounted on said shaft, substantially as and for the purposes set forth.

2. In a pulverizer of the class described,

the combination of an inclosed casing, a series of rings or diaphragms mounted in said casing side by side to form a pulverizing-chamber having peripheral slots, each ring being formed with an outwardly-flaring inner face, whereby the minimum space between the rings is coincident with their inner faces, a shaft extending into said pulverizing-chamber, a plurality of pulverizing-paddles mounted on said shaft, and a conduit formed in the wall of said casing and leading into the space inclosed by the pulverizing-chamber, substantially as and for the purposes set forth.

3. In a pulverizer, the combination with a pulverizing-chamber formed by a plurality of annular rings arranged side by side with openings between them and permitting individual

vibration of said rings, of a plurality of pulverizing-paddles rotatably mounted in the chamber, substantially as set forth. 20

4. In a pulverizer, the combination with a casing, a plurality of annular rings loosely mounted within said casing so as to permit vibration of each ring, a discharge-opening in the casing, and a plurality of pulverizing-paddles rotatably mounted in the casing within said rings, substantially as set forth. 25

This specification signed and witnessed this 14th day of June, 1900.

WILLIAM MAXWELL WHEILDON.

Witnesses:

FRANK L. DYER,
JNO. R. TAYLOR.