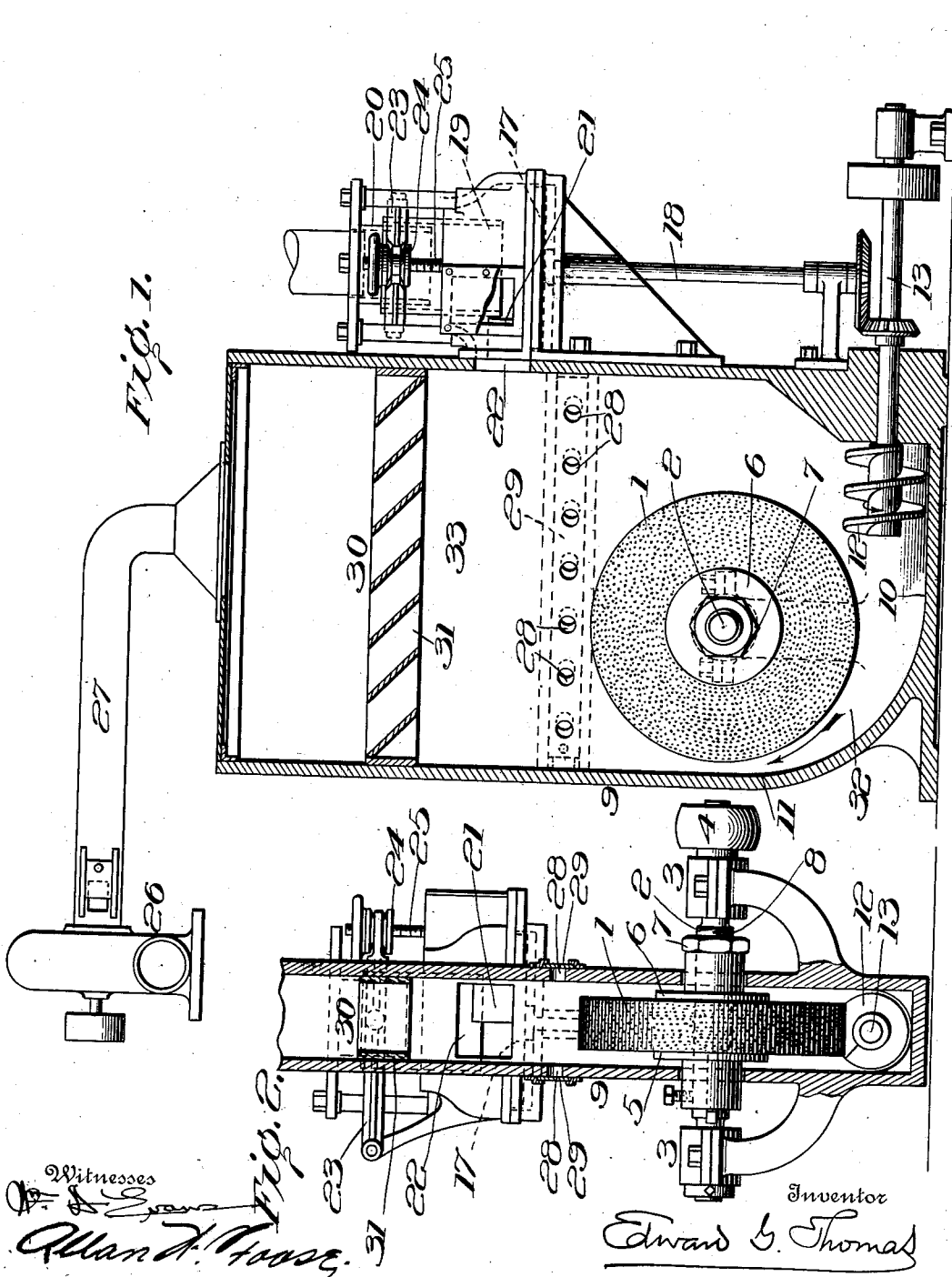


E. G. THOMAS.
PULVERIZING APPARATUS.
APPLICATION FILED JAN. 24, 1908.

1,054,881.

Patented Mar. 4, 1913.



UNITED STATES PATENT OFFICE.

EDWARD G. THOMAS, OF NEW YORK, N. Y., ASSIGNOR TO AERO PULVERIZER COMPANY,
OF NEW YORK, N. Y., A CORPORATION OF MAINE.

PULVERIZING APPARATUS.

1,054,881.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Application filed January 24, 1908. Serial No. 412,525.

To all whom it may concern:

Be it known that I, EDWARD G. THOMAS, of New York, county of New York, and State of New York, have invented and produced certain new and useful Improvements in Pulverizing Apparatus, of which the following is a specification.

My invention consists of improvements in pulverizing machinery, whereby friable materials such as coal, cereals, etc., can be reduced to fine powders.

My apparatus consists in general of a rotating wheel of an abrasive material such as emery or carborundum, revolving about a horizontal axis in a containing case, which also contains mechanism for continually agitating and forcing the material to be pulverized against the periphery and sides of the revolving wheel, in combination with means for feeding untreated material and removing the material which has been ground to the desired fineness. The wheel performs two offices: first, that of tearing the material to pieces and second, that of an elevating means for projecting the powdered material into the air in the space above the wheel, forming a dust-cloud from which the fine material may be removed by air separation, by screening or by any other separating process.

The advantages to be secured by my improvements are,—rapid pulverizing for the amount of power used and simplicity of mechanism. An important application of the machine is the pulverizing of coal for use as fuel in the manufacture of cement, in reverberatory furnaces and in other uses where a very high temperature is required and where it is desirable to economize through the more perfect combustion attained when coal is burned in a powdered form.

This specification is accompanied by drawings which form a part hereof and upon which reference numerals are used to designate the parts referred to by these numerals in the text of the specification.

In the drawings Figure 1 is a side elevation and Fig. 2 a front elevation of a preferred form of my apparatus.

In these figures, 1 is an abrasive wheel secured to a shaft 2, supported in boxes 3 and driven by means of pulley 4. The wheel is mounted between flanges 5 and 6. Flange 5 is firmly secured to shaft 2 by a key and

set-screw. Flange 6 slides upon shaft 2 but may be firmly pressed against wheel 1 by a nut 7, running upon a thread 8, cut upon shaft 2. Surrounding wheel 1 is a case 9, comprising a grinding chamber 32 at its lower end and a separating chamber 33 in its upper portion. Its inner surface is so shaped from a point 10 beneath the wheel to a point 11, approximately at the height of shaft 2, that the space included between the inner surface of the casing and the surface of the wheel is of continually decreasing section in the direction of the rotation of the wheel. A screw 12 on shaft 13 is journaled at the bottom of casing 9 and by its rotation serves to agitate and force the material to be pulverized into the space between the surface of the wheel and the inner surface of chamber 9. Because the space into which the material is forced continuously diminishes in area, the material will be pushed against the surface of the wheel with a pressure sufficient for its rapid abrasion. The wheel 1, by its rapid rotation will carry the material abraded by it beyond the point where the material in process is last in contact with it, and will then throw the material in various upward directions by virtue of the centrifugal force imparted by its rapid rotation, thus forming in the space within the casing 9 and above the wheel 1, a dust-cloud composed of particles of varying sizes, from which it is the duty of other elements of my invention to extract the particles of the desired fineness and deliver them from the machine.

A feeding apparatus of any character which will give a uniform flow of raw material to the machine can be used to keep up the supply of material within the casing 9, but I prefer to use the construction indicated in Figs. 1 and 2; which consists of a rotating table 17, attached to and driven by a vertical shaft 18, which in turn is driven through bevel gears from shaft 13. Over table 17 is a vertically movable sleeve 19, through which material is delivered by a tube 20, communicating with bins or hoppers in which the raw material is stored. A stationary scraper 21, projecting over the upper surface of the table continually removes the material brought to it by the rotation of table 17 and causes it to fall into casing 9 through opening 22 in the side of the casing to a point where it can be en-

gaged by the screw 12 and fed into the working space beneath wheel 1. The sleeve 19 is supported by a yoke 23, which may be adjusted in position by nut 24 on a screwed rod 25. By motion of nut 24, the yoke 23, and sleeve 19, may be raised or lowered, thus controlling the amount of material delivered through the lower end of sleeve 19 to table 17.

10 For the collection of the fine material from the dust-cloud at the upper part of the casing any separating device common to the art may be employed, but I prefer to use
15 an air current, passing substantially vertically through the casing and of carefully adjusted force, so that it will have strength to move upward only particles of the desired size, permitting all others to fall
20 downward into the lower part of chamber 9 for re-treatment. As illustrated in Figs. 1 and 2 my separating device consists of an exhaust fan 26, of which the exhaust side is connected by suitable piping 27, with the upper part of casing 9.
25 At the lower part of chamber 9 inlet openings 28, are provided, which may be adjusted in size by dampers 29 arranged to slide across said openings, their purpose being to regulate the quantity of air permitted
30 to enter and pass through casing 9. As particles larger than the desired size may be thrown by the wheel to a point where the air current in combination with their velocity will be sufficient to carry them out of
35 chamber 9, I have arranged a series of baffles 30, in the upper part of the chamber, so located that all the material thrown up by the wheel 1, must strike these baffles and is thereby prevented from direct passage to
40 the air outlet. The baffles 30, are preferably mounted in a frame 31, which is adjustably supported in case 9 so that the baffles 30 may be moved to various locations within said case. A further control of the air current
45 through the machine is provided by an

opening in the exhaust pipe 27 leading to the atmosphere through which the fan may draw a portion of its air supply, thus varying the amount which will be drawn through the casing 9.

The operation of the parts shown in the drawings is therefore as follows:—The material to be pulverized is fed into the feed tube 20 and passes to the rotating table 17. Scraper 21 removes it from this table and 55 delivers it into the interior of casing 9. A worm 12, forces it against the abrading wheel 1 which tears it to pieces and throws the particles into the air space above the wheel. The air current produced by the exhaust fan 26 removes the particles of the desired fineness and delivers them for their appropriate use elsewhere, while the coarser particles in the dust cloud, being too heavy to be carried away by the air current, fall 65 again to the bottom of casing 9 and are again forced against the abrading wheel for further attrition.

Having thus fully described my invention, I claim and desire to secure by Letters 70 Patent of the United States:

In a pulverizer, a closed casing having an inlet opening and an outlet opening, an abrasive wheel within said casing and mounted to rotate in a vertical plane, the 75 inner surface of the casing adjacent to the wheel being so shaped from a point underneath the wheel to a point approximately the height of the shaft of the wheel that the space between that portion of the casing and the surface of the wheel continually decreases in the direction of the rotation of the wheel, means for forcibly supplying material to the wheel, and means connected to the outlet opening for exhausting the finely 85 divided material from the casing.

EDWARD G. THOMAS.

Witnesses:

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