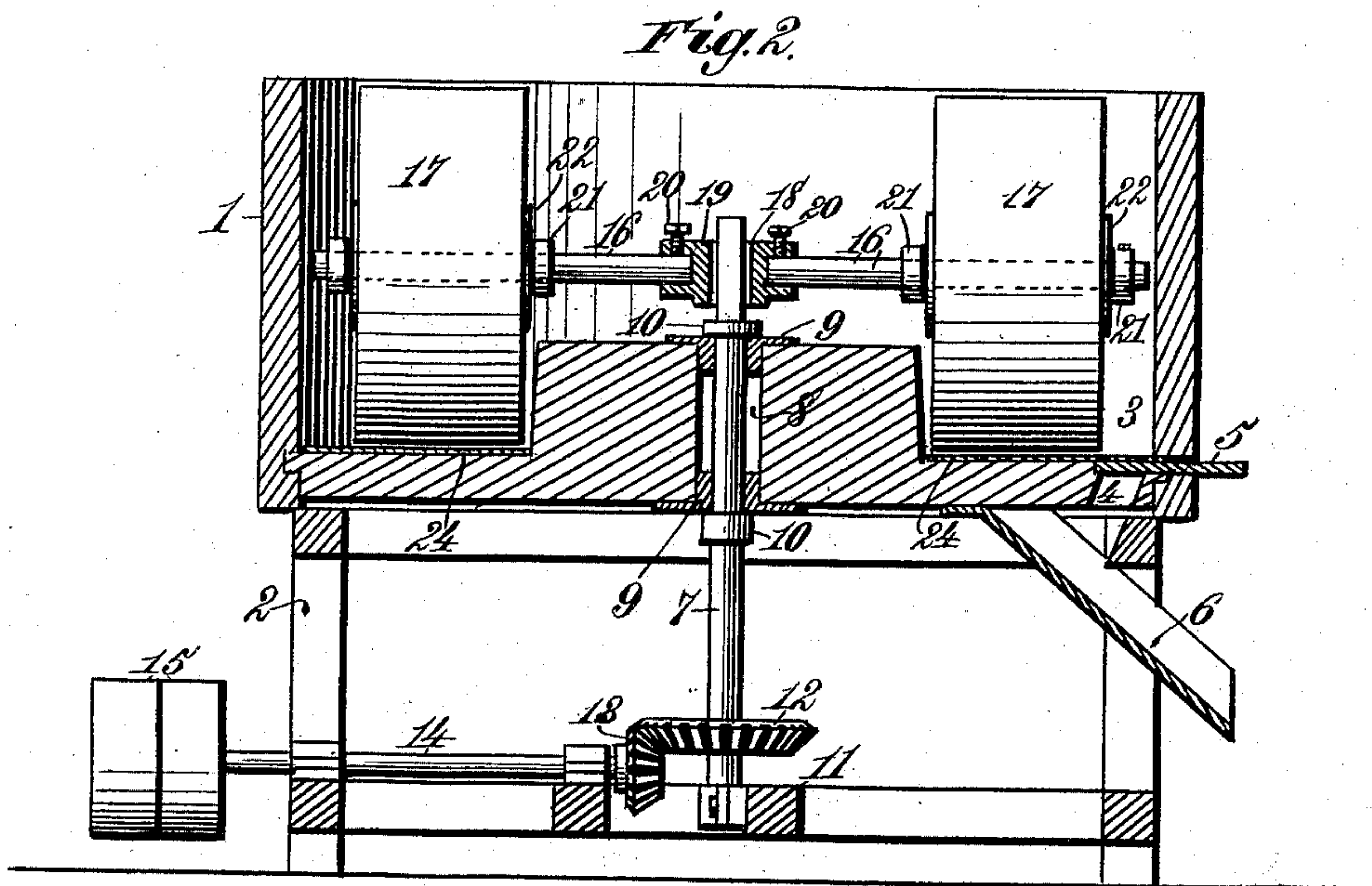
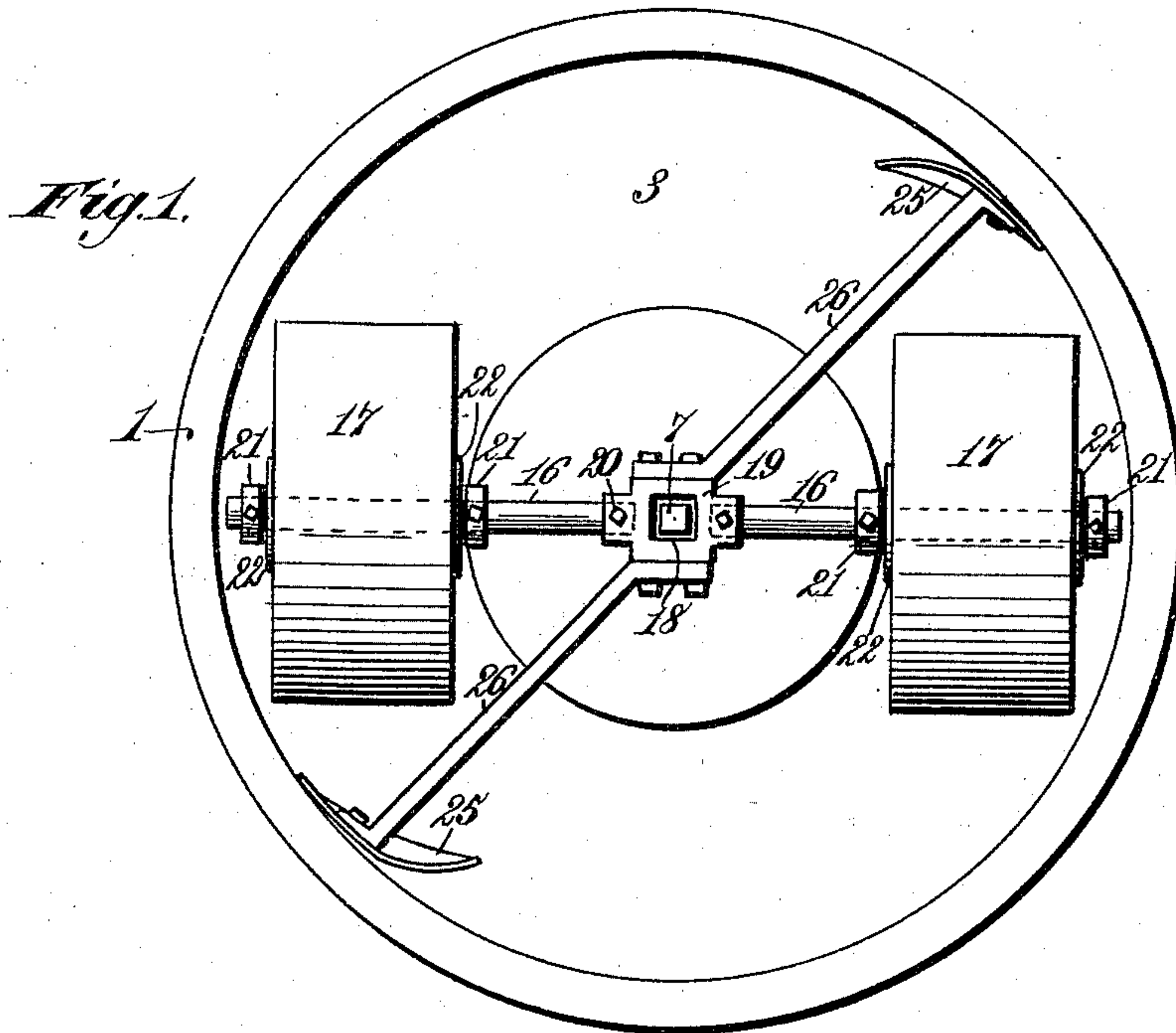


(No Model.)

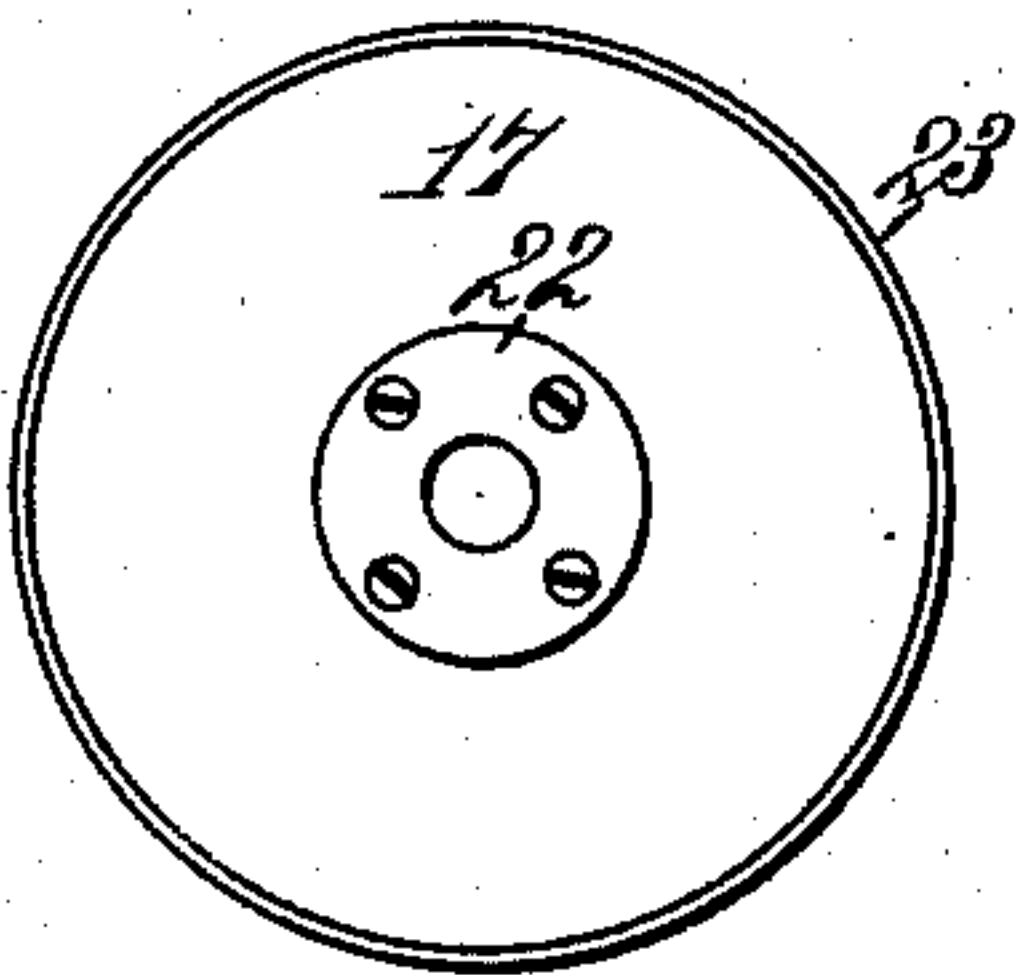
R. W. TRAYLOR.
METHOD OF GRINDING MICA.

No. 533,384.

Patented Jan. 29, 1895.



Witnesses. Fig. 3.
Phot Engr.
G. W. Rea,



Inventor.
Robert W. Traylor.
By James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

ROBERT W. TRAYLOR, OF RICHMOND, VIRGINIA.

METHOD OF GRINDING MICA.

SPECIFICATION forming part of Letters Patent No. 533,384, dated January 29, 1895.

Application filed October 4, 1894. Serial No. 524,905. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. TRAYLOR, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented new and useful Improvements in Methods of Grinding Mica, of which the following is a specification.

My invention relates to a method of grinding mica and has for its object to effect a speedy, thorough, cleanly and uniform grinding or pulverizing action, whereby the expense of production will be largely reduced and the quality of the mica powder improved for its various purposes in the arts.

The invention consists in a method of grinding mica, or reducing it to a pulverulent condition, which consists in subjecting fragments and pieces of mica to a pressure and twisting action between elastic surfaces, such as the rubber-covered runner and bed of an edge-runner mill, whereby the grasp of the opposing elastic surfaces and the torsional action of the runner in performing its circuit, will detach the laminæ of mica from each other and cause the material to be quickly and economically pulverized.

In the annexed drawings illustrating the invention—Figure 1, is a plan of an apparatus adapted to the practice of my improved method of grinding mica and comprising a tank and a number of broad surfaced grinding wheels or runners mounted therein; each of which may be followed by a scraper. Fig. 2, is a sectional elevation of the grinding apparatus. Fig. 3, is a side elevation of one of the grinding wheels.

Referring to the drawings, the numeral 1 designates a tank that is preferably circular and may be supported on a stand 2 of any suitable character. In the bottom of the tank 1, at or near its periphery, is a circular channel or runway 3 extended entirely around the tank and of sufficient depth to hold the fragments of mica and the required quantity of water for making a slush. At a suitable point in the bottom of the channel or runway 3 is an exit opening 4, Fig. 2, controlled by a slide 5 and communicating with a spout 6 through which the water and ground material held in suspension may be run off to a suitable receptacle as required.

The tank 1 may be constructed from wood

or metal as preferred and the central portion of its bottom is preferably of considerable thickness or otherwise so constructed as to form the inner wall of the circular runway. A vertical shaft 7 is passed through a central opening 8 in the tank bottom and this opening is provided at top and bottom with flanged sockets 9 that are extended part way into said opening and serve as bearings or stuffing boxes for the shaft. On the shaft 7, above and below the tank bottom are collars or shoulders 10 to assist in supporting the shaft and prevent endwise movement. The lower end of the shaft 7 may also be stepped in a cross bar 11 of the supporting stand, if preferred. For the purpose of rotating the shaft 7 it may be provided, preferably at its lower end with a bevel gear 12 meshing with a bevel pinion 13 on a shaft 14 having pulleys 15 for applying and controlling power. It is obvious, however, that power may be applied by any suitable means to either end of the shaft.

The rotary vertical shaft 7 is arranged to carry a number of radial and horizontally extended arms or shafts 16 on which the grinding wheels 17 are loosely mounted. As shown in Figs. 1 and 2 the upper end of the shaft 17 may be squared to enter a square vertical opening 18 in a socketed sleeve 19 placed on the said square end of the shaft. At suitable points on the periphery of the sleeve 19 are sockets to receive the ends of the radial arms 16 which may be secured to said sleeve by set screws 20, or otherwise. Although I have only shown two of these radial arms 16 and grinding wheels 17 mounted thereon I would have it understood that any suitable number may be employed, as required, or as may be found most desirable.

The grinding wheels or runners 17 are made with very broad rims, say eighteen to twenty-four inches, and are so mounted on the arms or shafts 16 as to travel in a circular path in the circular channel or runway 3 provided in the bottom of the tank. They are also loosely mounted on the arms or shafts 16 so as to be capable of rotating thereon. The diameter of each wheel is such that when it is mounted in the apparatus and resting on the material in the runway 3 the sleeve 19, to which the radial arms 16 are attached, will not bear onto the shoulder or collar 10 of the shaft 7

but will be supported clear of and above the same. By making the opening 18 sufficiently large and imparting a slight taper to its upper and lower ends, as shown in Fig. 2, either wheel 17 will be permitted to yield slightly in passing over any larger lumps of the material placed in the tank. Each grinding wheel or runner 17 may be held from end-wise movement on its shaft or supporting arm 16 by nuts or collars 21 on each side, and a wear plate or disk 22, Fig. 3, may be secured to each side of the wheel adjacent to said collar or nut, if desired.

The grinding wheels or runners 17 may be made of either wood or metal, as preferred. It is desirable that the broad rim or tread of each wheel should present a yielding surface of some material that will not be liable to abrasion and consequent mixture of extraneous material with the substance that is being ground and which will be sufficiently elastic to have a grasping action on the mica. I, therefore, secure to the broad tread of each runner or grinding wheel 17 a yielding covering 23, Fig. 3, preferably composed of india-rubber, or a compound of canvas and rubber. Such material will provide a yielding and elastic surface and will not be liable to become abraded and mixed with the mica being ground and I thus keep the ground mica free from abraded wood, that might become mixed with the mica if unprotected wooden grinding wheels were employed, and from rust that would be liable to rub off from metal wheels. In this way the operation of grinding can be conducted in a cleanly manner and without contamination of the ground mica. A wooden grinding wheel having a yielding and non abrasive protecting covering 23 will be usually preferred but a similarly covered metal wheel may be substituted, if desired. In the bottom of the tank runway 3 I place a similar yielding covering 24 composed of canvas, rubber or other suitable material that will not be liable to become abraded and mixed with the pulp or slush in the tank.

The elastic covering on the runner or grinding wheel serves, in connection with the similar covering on the bed of the machine, the important purpose of exerting a grasp on the fragments of mica between the opposed surfaces of the bed and runner, whereby the pressure exerted by the combined opposing surfaces and the twisting or torsional action of the runner in performing its circuit will detach the laminae of mica from each other and greatly facilitate a uniform reduction of the material to a powdered state.

At the rear of each broad rimmed grinding wheel 17 is a scraper 25 supported by an arm 26 of the sleeve 19 on the vertical rotary shaft 7 and so adapted and arranged as to scrape the material from the outer side of the runway 3 and throw it in the path of the following wheel.

The fragments of mica to be ground are placed in the circular tank channel or runway 3 together with a sufficient quantity of water to form a slush and the vertical shaft 7 is then set in rotation. The movement of the shaft 7 causes the grinding wheels 17 to travel in a circular path and at the same time they will rotate on the radial arms 16 carried by the said vertical shaft. In thus rotating on their horizontal shafts 16 and around the vertical shaft 7 the broad rimmed grinding wheels or runners 17 will have a partially dragging or sliding movement conjointly with their rolling action on the fragments of mica; and thus between the grasping pressure exerted by the elastic or rubber covered surfaces of the bed and runner and the torsional action of the said runner the laminae of mica will be torn apart and quickly pulverized. At the same time the scrapers 25, running along the lower portion of the channel or runway 3, will throw the slush from the periphery of said channel or runway inward and into the path of the following grinding wheel and in this way also the slush in the tank will be thoroughly subjected to an effective and speedy grinding action. In passing over any larger lumps of material the wheels 17, owing to the manner in which they are mounted, will be permitted to yield slightly in an upward direction and will immediately drop again to normal position. It will thus be seen that by means of these broad rimmed grinding wheels and the manner in which they are operated the fragments of mica will be rapidly and thoroughly reduced to a uniformly powdered condition. From time to time the slush in the tank may be wholly or partly drawn off and its place supplied by more water and fragments of mica, while the operation of the runners or grinding wheels is continued as before.

The slush drawn off from the tank may be filtered to obtain the mica powder held in suspension and this may then be dried and further treated or used in any desired manner.

What I claim as my invention is—

The herein described method of grinding mica, which consists in subjecting fragments of mica to a pressure and twisting action between the elastic covered runner and bed of an edge-runner mill, whereby the grasp of the elastic surfaces and the torsional action of the runner, in performing its circuit, will detach the laminae of mica from each other and reduce them to a pulverized state, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

ROBERT W. TRAYLOR. [L. S.]

Witnesses:

JAMES L. NORRIS,
S. A. TERRY.