

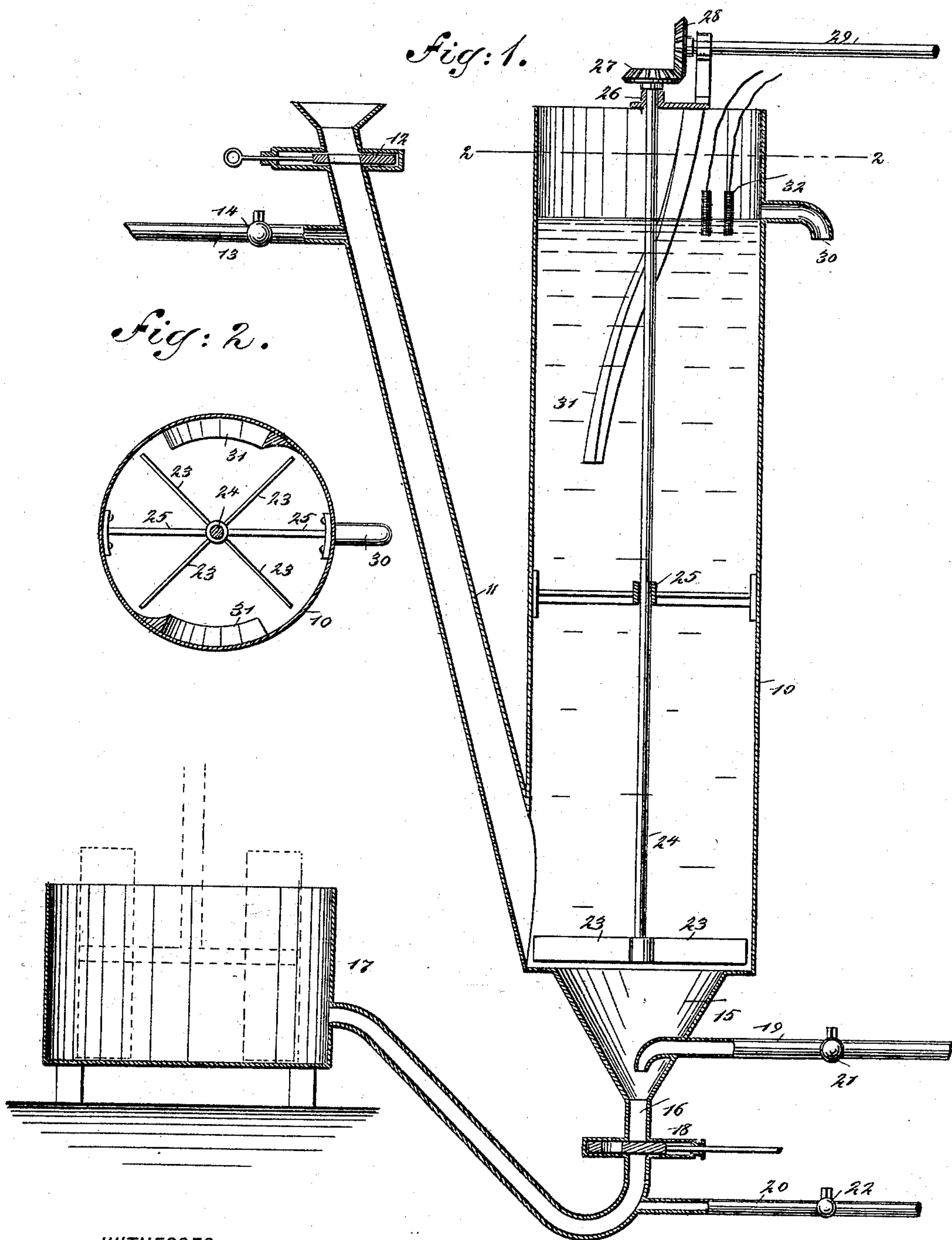
(No Model.)

W. W. GILLESPIE.

APPARATUS FOR GRADING POWDERED MATERIALS.

No. 509,728.

Patented Nov. 28, 1893.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR GRADING POWDERED MATERIALS.

SPECIFICATION forming part of Letters Patent No. 509,728, dated November 28, 1893.

Application filed February 16, 1893. Serial No. 462,556. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM W. GILLESPIE, of Stamford, in the county of Fairfield and State of Connecticut, have invented a new and Improved Apparatus for Grading Powdered Materials, of which the following is a full, clear, and exact description.

In the mechanical arts it is well known that various powdered minerals such as whiting, pyrites, gypsum, &c., are largely used and it is also known that it is necessary to obtain these materials in an exceedingly fine condition, in fact, in the form of an almost impalpable powder. To obtain this fine powder it is customary to float the powdered material in a series of tanks and in a nearly horizontal direction, the finest and commercial product being obtained from the last tank while the coarsest materials settle in the preceding tanks, from which they are removed and shoveled back into the chaser or wet-mill to be reground.

The process briefly described above is an extremely slow one, and the apparatus employed in this way occupies much room; moreover, a great deal of work is necessary to get the coarse materials back into the wet-mill.

My invention consists in certain improved details of the apparatus which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar figures of reference indicate corresponding parts in both the views.

Figure 1 is a broken vertical section of the entire apparatus; and Fig. 2 is a sectional plan of the tank or attenuator on the line 2—2 in Fig. 1.

An essential feature of my apparatus is the tall tank or attenuator 10, which is preferably of cylindrical shape and which is supplied with water and powdered material to be graded, through a supply pipe 11 which delivers into the lower portion of the tank or attenuator and which is controlled by a stop cock 12. A water pipe 13 controlled by a cock 14 also delivers into the supply pipe, and by this means water may be turned into the pipe so as to wash it out when necessary. The tank has a reduced hopper-like bottom 15 from the bottom of which leads a pipe 16 and this delivers into the chaser or wet-mill

17, which is not shown in detail, but which is of the usual construction. The return pipe 16, which leads from the attenuator or tank to the chaser, is controlled by a stop cock 18. A water pipe 19 delivers into the lower part of the hopper bottom 15 above the stop cock 18, and a second water pipe 20 delivers into the water pipe 16 below the stop cock 18, these pipes being controlled by valves 21 and 22, and the object of the water pipes is to enable a copious supply of water to be turned on so as to facilitate the quick and thorough return of the heavier particles to the chaser. In the bottom of the tank or attenuator is a revoluble agitator which keeps material in the tank stirred up so as to hasten the rise of the powder, and this agitator consists of revoluble horizontal radial blades 23, although other forms of agitators may be used if desired. The blades are carried by a vertical driving shaft 24 which extends centrally through the tank or attenuator and is held in suitable bearings or guides 25 and 26, and has at the upper end a bevel gear wheel 27 driven by a second gear 28 on a shaft 29. When the apparatus is used, the shaft 24 and the agitator are constantly revolved. Near the top of the tank or attenuator is an outlet pipe 30, and as only the very finest material can rise to the tank top, it will be seen that the fine and commercial product may readily be drawn. It will be understood that this outlet pipe 30 may be at different heights according to the nature of the material to be graded, as some materials rise higher than others; that is, they float easier. For instance, whiting will rise higher than pyrites or gypsum, but the height to which the material rises may be controlled in a great measure by the speed of the agitator. In opposite sides of the tank, near the top, are elongated and inclined planes or ribs 31 which facilitate the settling of the coarser materials. This is accomplished in the following way: When the agitator is set in motion the heavier particles of the powder are, by centrifugal force, thrown to the circumference of the tank and naturally come in contact with the under sides of the inclined planes which prevent such heavy particles from rising, while the very light powder is thrown out with less force and rises through the central portion of the tank and



is finally drawn off through the outlet pipe 30. Near the outlet pipe 30 and in the upper portion of the tank or attenuator is suspended an electro-magnet 32 which is connected with  
5 a suitable source of electricity, and which serves to attract any iron or metallic particles which may be mingled with the powder, and such particles are thus prevented from running out through the pipe 30 and discolor-  
10 ing the powder which is drawn off.

When the apparatus is used, the materials, which have first been powdered as finely as possible in the chaser or wet-mill, are delivered into the tank or attenuator through the  
15 pipe 11, and as the material in the attenuator is kept constantly agitated by the revolving blades 23, the powder rises in the water and that portion which is fine enough for use ascends to the top of the tank and is drawn off  
20 through the pipe 30. The coarser particles settle in the tank bottom as described, and when there is any considerable accumulation of such particles, the stop cock 18 is opened, the water turned on through the pipes 19 and  
25 20, and the heavy and relatively coarse material discharged through the pipe 16 into the chaser 17 where it is reground.

It will be seen from the above description that a supply of the finest powder may al-  
30 ways be drawn, that the apparatus is very compact, the product continuous and uniform and that the coarse material may be readily returned to the chaser to be reground. If desired the tank may be provided with more  
35 than one outlet pipe, and these may be arranged at different heights, the lower one being smaller than the higher, and in this way two grades of material may be obtained, although in practice the finest material is al-  
40 most invariably required.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The herein described grading apparatus comprising the tank provided with a rotary  
45 agitator, a supply pipe discharging into the lower portion of the tank, a valved outlet pipe leading from the bottom of the tank, a wet mill or grinder into which the outlet pipe dis-  
50 charges and a flushing mechanism for the lower end of the tank.

2. The combination with the tank having a contracted lower end and the valved outlet pipe leading from the bottom thereof, of a  
55 flushing pipe discharging downwardly into said contracted end above its valve, and a second flushing pipe below the valve, substantially as set forth.

3. A grading apparatus consisting in the vertical tank provided with a tapering lower  
60 end from which leads a valved outlet pipe, an overflow pipe or spout at the upper end of the tank, the inclines 31 on the inner side of the tank at its upper portion, an agitator within the tank, flushing pipes above and below the  
65 valve in the outlet pipe, a supply pipe discharging into the lower end of the tank and a valved water pipe connected with said supply pipe, substantially as set forth.

4. An apparatus of the kind described, com-  
70 prising a tank having an outlet pipe near the top, a valved discharge pipe opening from the bottom, flushing pipes delivering into the discharge pipe above and below the valve there-  
75 of, and an agitator within the tank, substantially as described.

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Witnesses:

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