L. N. MORSCHER.

GRADER.

APPLICATION FILED OCT. 19, 1908.

965,140.

Patented July 19, 1910.

Fig. 1.

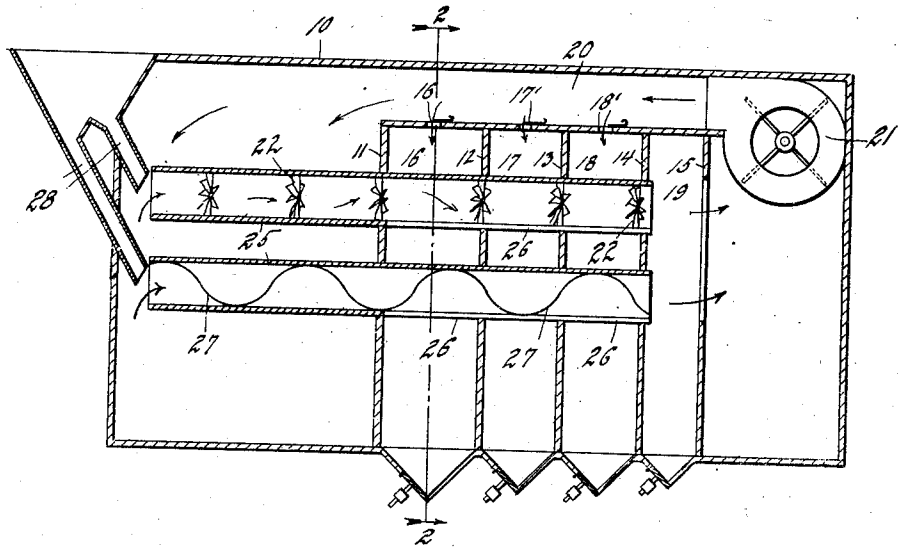
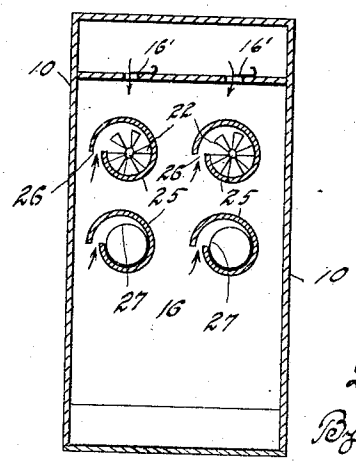


Fig. 2.



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UNITED STATES PATENT OFFICE.

LAWRENCE N. MORSCHER, OF LAWRENCE, KANSAS, ASSIGNOR TO WILLIAM J. EHRSAM, OF ENTERPRISE, KANSAS, AND LAWRENCE N. MORSCHER, OF LAWRENCE, KANSAS, COTRUSTEES.

GRADER.

965,140. Specification of Letters Patent. Patented July 19, 1910.

Application filed October 19, 1908. Serial No. 458,557.

To all whom it may concern:

Be it known that I, LAWRENCE N. MORSCHER, a citizen of the United States, residing at Lawrence, in the county of Douglas and State of Kansas, have invented certain new and useful Improvements in Graders, of which the following is a specification.

The object of my invention is to produce an apparatus for separating particles into different grades.

The accompanying drawings illustrate diagrammatically an embodiment of my invention, Figure 1 being a longitudinal section and Fig. 2 a section on line 2 2 of Fig. 1, no attempt however, having been made to illustrate proportions of parts for the reason that relative proportion depends very largely upon the character of material to be operated on. The drawings, however, illustrate fully and completely the theory of the invention in such manner as to enable anyone familiar with the laws of projectiles to practice the invention.

In the drawings, 10 indicates a main casing, in which are arranged several partitions 11, 12 13, 14 and 15, thus forming a series of collecting chambers 16, 17, 18 and 19 into which lead valved openings 16′, 17′, 18′ respectively, said openings communicating with an air duct 20 leading from a fan 21. The eye of fan 21 communicates with the final end of the interior of casing 10 while the duct 20 communicates with the initial end. Extending through the several partitions 11, 12, 13 and 14 are a multiplicity of tubes 25 slit longitudinally at 26 to afford communication between the interior of each tube and the chambers 16, 17 and 18. Each tube, at its initial end, is complete for a portion of its initial length and mounted in that portion as well as in the slitted portion, I mount deflectors 22, or a helical vane 27, to produce a helical movement of the particle-laden fluid stream through each tube. The initial end of each tube communicates with the discharge end of duct 20 and leading into the initial end of each tube 25 is a feed chute 28.

The operation is as follows: The fan 21 creates fluid currents, in the directions indicated by the arrows, helically through each tube and inwardly from each chamber 16, 17, and 18 through slit 26. When a stream of particles is delivered to the initial end of one of the tubes, said particles become first mixed with the fluid current and then, by centrifugal action, are thrown to the wall of the tube, traversing said tube in a helical path until the slit 26 opposite chamber 16 is reached, whereupon the particles tend to pass out through slit 26 in a trajectory sheet which is substantially tangential to the tube, the velocity of ejection being so high, relative to the possible free falling velocity of the particles, that the action of gravity will not, for the short time of possible action, materially affect the trajectory. At the same time the fluid current is entering the slit 26 and therefore traversing transversely the trajectory sheet so that particles of less than a given mass are deflected from their normal trajectory by the incoming fluid current and carried back into the tube where they proceed, at an augmented velocity, due to the increase of volume of fluid current, to the next chamber 17 where the operation is repeated. The discharge end of each tube 25 opens into a dead air chamber from which the fluid current passes freely to the fan while the remaining particles are deposited in the collecting chamber 19.

I claim as my invention:

1. In an apparatus of the class described, a substantially cylindrical tube having a portion of the wall displaced outwardly to form a longitudinal slit, means for establishing a helical particle-laden fluid current through said tube with a direction of rotation toward the direction of wall displacement, and for establishing a deflecting fluid current inwardly through said slit.

2. The combination, of a plurality of collecting chambers, a substantially cylindrical tube extending through said several chambers and having a portion of the wall displaced outwardly to form a longitudinal slit, and means for establishing a helical particle-laden fluid current through said tube with a direction of rotation toward the direction of wall displacement, and for establishing a fluid current in each of said chambers and therefrom into the tube through the said slits.

3. In an apparatus of the class described, a substantially cylindrical tube having a portion of the wall displaced outwardly to form a longitudinal slit, a helical deflector arranged within said tube but out of contact with the upwardly displaced portion of

the wall adjacent one side of the slit, and means for producing a particle laden fluid current through said tube and a deflecting fluid current inwardly through said slit.

4. The combination, of a plurality of collecting chambers, a substantially cylindrical tube extending through said several chambers and having a portion of the wall of said tube in each chamber displaced outwardly to form a longitudinal slit opening into each chamber, a helical deflector arranged within said tube and out of contact with the outwardly displaced portion of the wall of the tube adjacent one side of the slit, and means for establishing a fluid current through said tube and a fluid current in each of said chambers and therefrom into the tube through the slits.

In witness whereof, I, have hereunto set my hand and seal at Indianapolis, Indiana, this sixth day of October, A. D. one thousand nine hundred and eight.

LAWRENCE N. MORSCHER. [L. S]

Witnesses:

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