E. J. STECKLE.

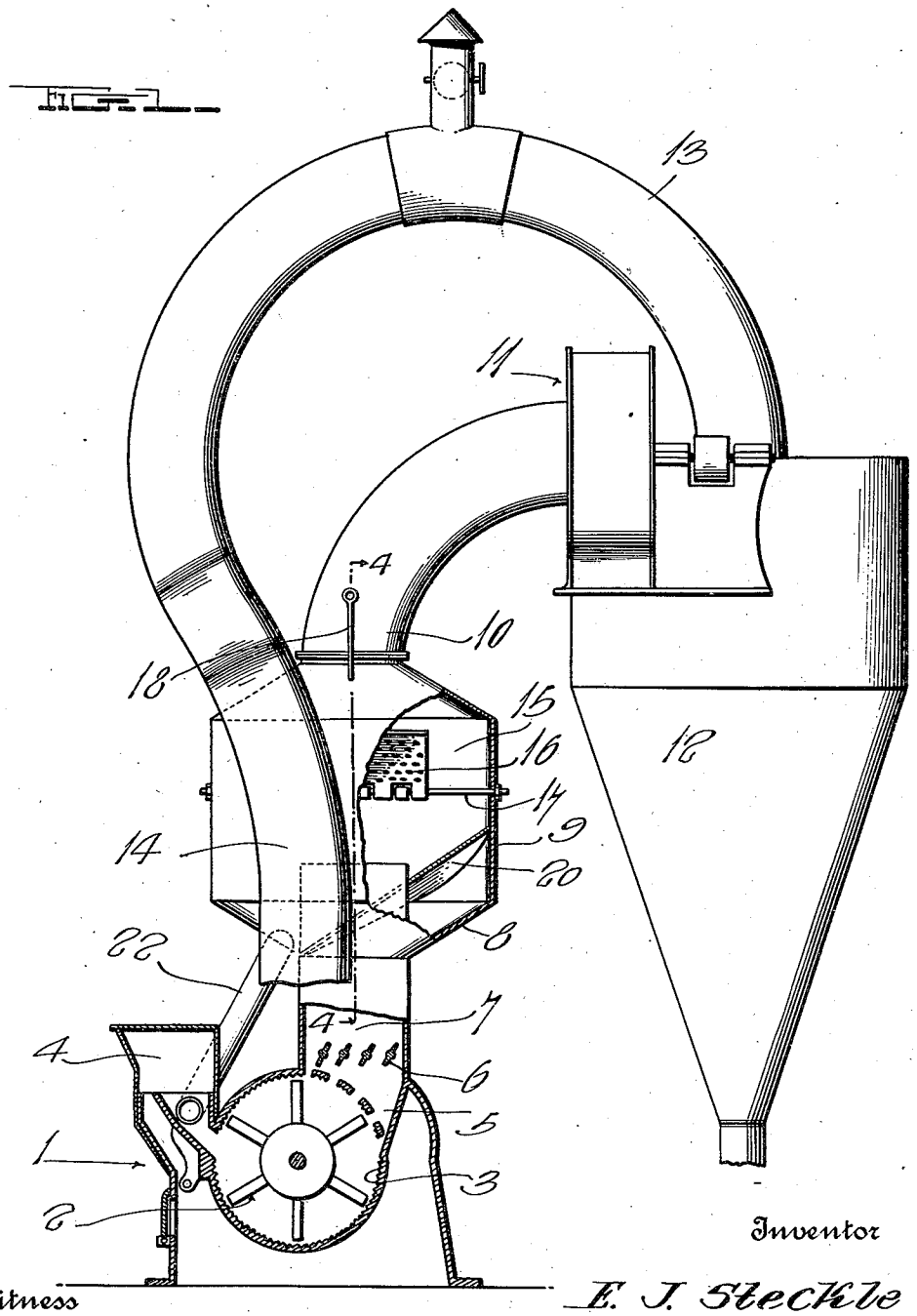
SEPARATOR FOR GRINDING MILLS.

APPLICATION FILED FEB. 26, 1917.

1,244,788.

Patented Oct. 30, 1917.

3 SHEETS—SHEET 1.



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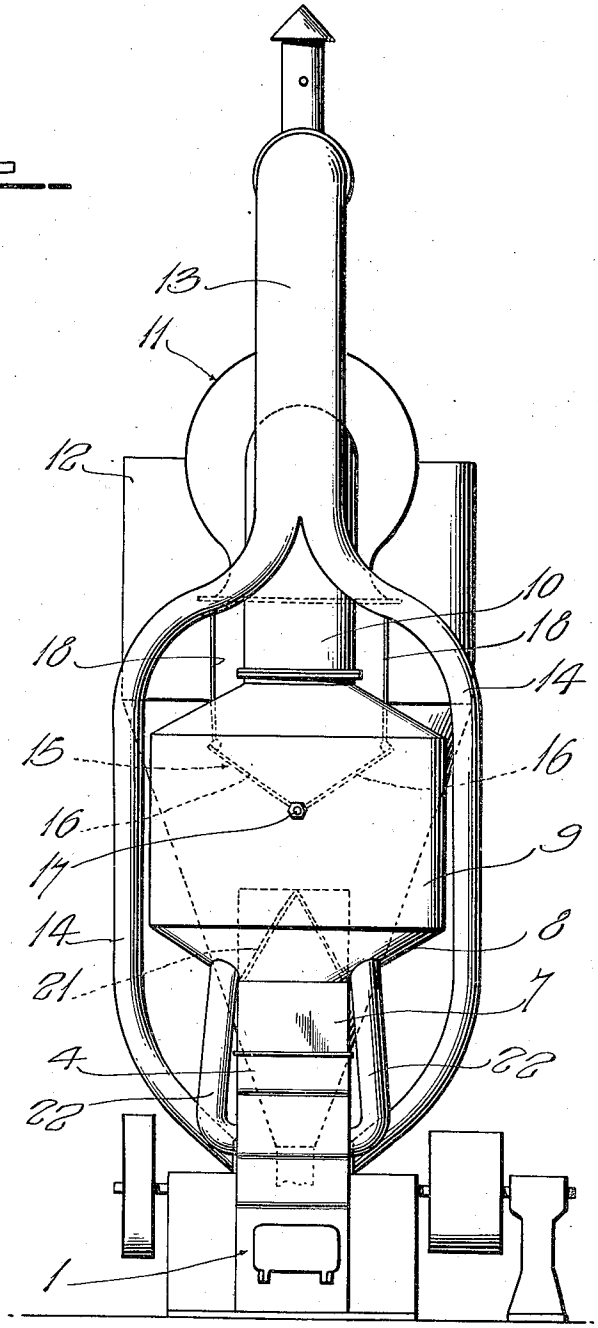
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3 SHEETS—SHEET 2.

FIG. 2



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3 SHEETS—SHEET 3.

Fig. 2.

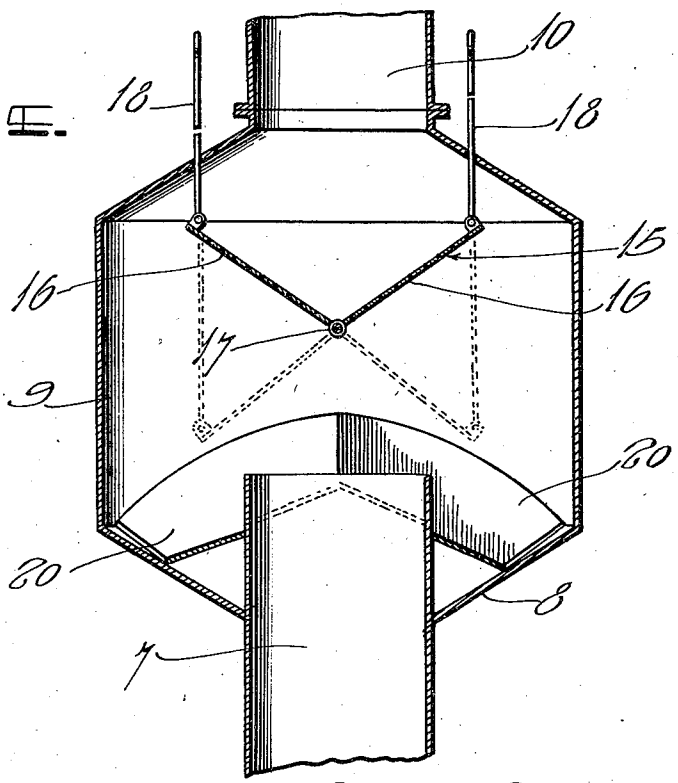
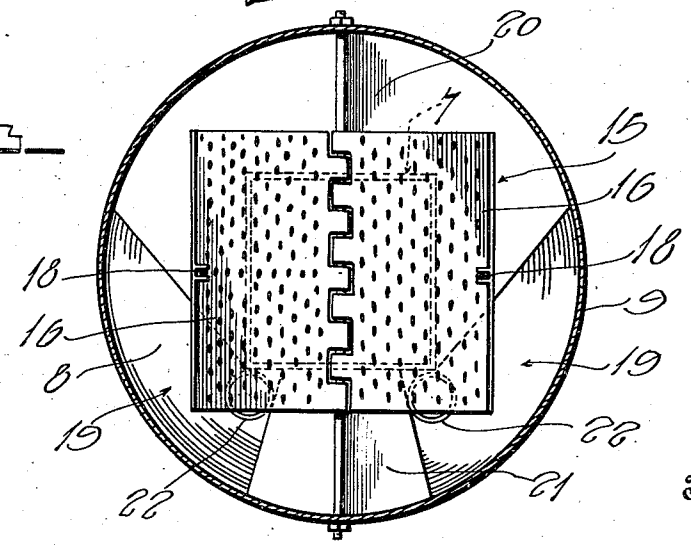


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SEPARATOR FOR GRINDING-MILLS.

1,244,788. Specification of Letters Patent. Patented Oct. 30, 1917.

Application filed February 26, 1917. Serial No. 151,079.

To all whom it may concern:

Be it known that I, EDWARD J. STECKLE, a citizen of the United States, residing at Dixon, in the county of Lee and State of Illinois, have invented certain new and useful Improvements in Separators for Grinding-Mills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the class of separators primarily used in connection with hammer mills, but it is to be understood that the improved separator is applicable to a wide range of uses and is not limited to cooperation with a mill of this type.

The object of the invention is to provide improved means for spreading the blast of air discharged from the mill into the separating chamber so as to decrease its force to permit the heavier particles of material carried thereby to drop into the bottom of said chamber for return to the mill, whereas the lighter particles will remain suspended in the air current and will be carried thereby into the usual separator which in most cases is of the well known cyclonic type.

With the foregoing general object in view, the invention resides in the novel features of construction and unique combinations of parts hereinafter fully described and claimed, the descriptive matter being supplemented by the accompanying drawings which constitute a part of this specification and in which:—

Figure 1 is a side elevation of the improved separator partly broken away and showing its application in connection with a hammer mill and cyclone separator;

Fig. 2 is a front elevation of Fig. 1;

Fig. 3 is a horizontal section cut above the deflector;

Fig. 4 is a detail vertical section on the plane of the line 4—4 of Fig. 1, showing more particularly the formation of the hoppers for collecting the heavier particles of material which fall into the lower end of the separating chamber.

In the drawings above briefly described the numeral 1 has reference to a common type of hammer mill having the usual rotating hammer 2, grinding plates 3 with which said hammer coöperates, inlet 4, and outlet 5, baffles 6 being preferably disposed across the latter in a well known manner.

A discharge pipe 7 which is preferably square in horizontal section, rises from the outlet 5 and extends through the funnel-shaped bottom 8 of a cylindrical casing 9 whose interior constitutes the separating chamber. The upper end of the casing 9 is by preference of the cone-shape shown and an outlet pipe 10 extends from the center of said end to an appropriate fan 11 which discharges in the usual manner into the cyclone separator 12 wherein the select material is deposited. A vented return pipe 13 leads from the separator 12 and is preferably branched as shown in Fig. 2, its branches 14 discharging into the mill 1.

This arrangement causes the fan 11 to create suction through the system as well as forcing a blast of air therethrough and this continuous circulation of air causes the ground material from the mill 1 to rise through the outlet 5 and pipe 7 into the separating chamber 9 in which the improved parts cause the heavier particles to be freed from the air current, whereas the lighter or select material remains in suspension and is carried into the cyclonic separator 12.

Arranged over the upper end of the pipe 7 is a baffle 15 which is by preference formed of two sections 16 although any suitable number of such sections could be employed. Each section 16 is shown in the form of a perforated plate whose inner edge is pivotally supported on a horizontal rod 17 whose ends are supported by the circular wall of the casing 9. Adjusting rods 18 are connected at their lower ends with the free outer edges of two sections 16 and at their upper ends pass through openings in the top of chamber 9. By proper manipulation of these rods, the baffle 15 may be so adjusted as to form a tent-like hood over the pipe 7 or the shape of this hood may be varied as occasion may demand. Regardless of the exact shape imparted to the baffle 15 by adjustment of its sections 16, said baffle will serve to spread the blast of air discharged from the upper end of the pipe 7 and in so doing will decrease the force or velocity thereof momentarily. This will permit the heavier particles of ground material with which the air is laden, to drop by gravity onto the lower end 8 of the casing 9 whereas the select material will remain in suspension and will be carried to the separator 12. By adjusting the sections 16, the courses and velocity of the air currents in the casing 9

may be controlled and thus the machine is rendered adjustable for grinding different classes of material and for reducing them to any predetermined mesh.

The material collected in the casing 9 may be returned to the mill 1 in any preferred manner for re-grinding, and for illustrative purposes I have shown the lower end of said casing equipped with a pair of hoppers 19 formed by the two ridge-shaped plates 20 and 21 which are disposed in said casing, said hoppers having outlet pipes 22 discharging into the inlet 4 of the mill 1. This arrangement is preferable but it is obvious that other constructions could well be employed for obtaining the desired end, that is, returning the coarse particles to the mill for re-grinding.

From the foregoing, taken in connection with the accompanying drawings, it will be observed that although the improved separator is of simple and inexpensive nature, it will be highly efficient. For these reasons, the construction shown constitutes the preferred form of the apparatus, but it is to be understood that within the scope of the invention as claimed, numerous changes may be made without sacrificing the principal advantages.

I claim:

1. A separator comprising a separating chamber, a vertical inlet pipe extending into the lower end of said chamber and adapted to conduct a blast of air laden with ground material thereto, an outlet pipe from the upper end of said chamber in alinement with said inlet pipe, and a baffle between said inlet and outlet pipes variable to and between the shapes of a hood and an inverted hood.

2. A separator comprising a separating chamber, a vertical inlet pipe extending into the lower end of said chamber and adapted to conduct a blast of air laden with ground material thereto, an outlet pipe from the upper end of said chamber in alinement with said inlet pipe, and a baffle between said inlet and outlet pipes composed of a plurality of sections in the form of plates mounted pivotally at their inner edges for swinging below or above horizontal positions.

3. A separator comprising a separating chamber, a vertical inlet pipe extending into the lower end of said chamber and adapted to conduct a blast of air laden with ground material thereto, an outlet pipe from the upper end of said chamber in alinement with said inlet pipe, a rod extending horizontally across said chamber between the two pipes, a pair of baffle plates having eyes at their inner edges pivotally mounted on said rod for swinging above and below horizontal positions, and operating rods rising from said plates through the top of the chamber for controlling the positions of said plates.

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

EDWARD J. STECKLE.

Witnesses:
JAMES R. KELLY,
JAMES W. WATTS.