M. F. ABBÉ.

PEBBLE MILL.

APPLICATION FILED MAR. 9, 1909.

944,997. Patented Dec. 28, 1909.

Fig. 1

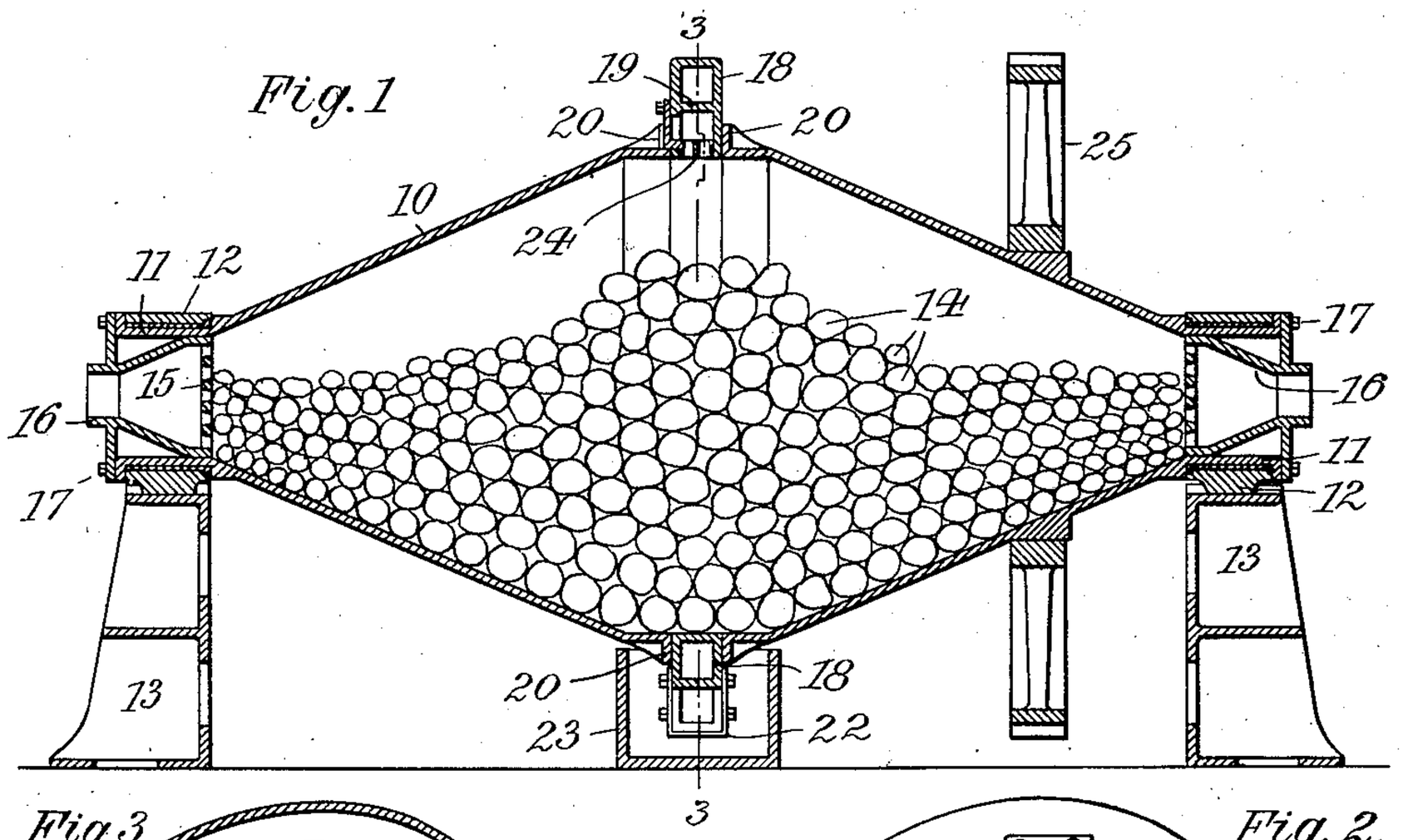


Fig. 3.

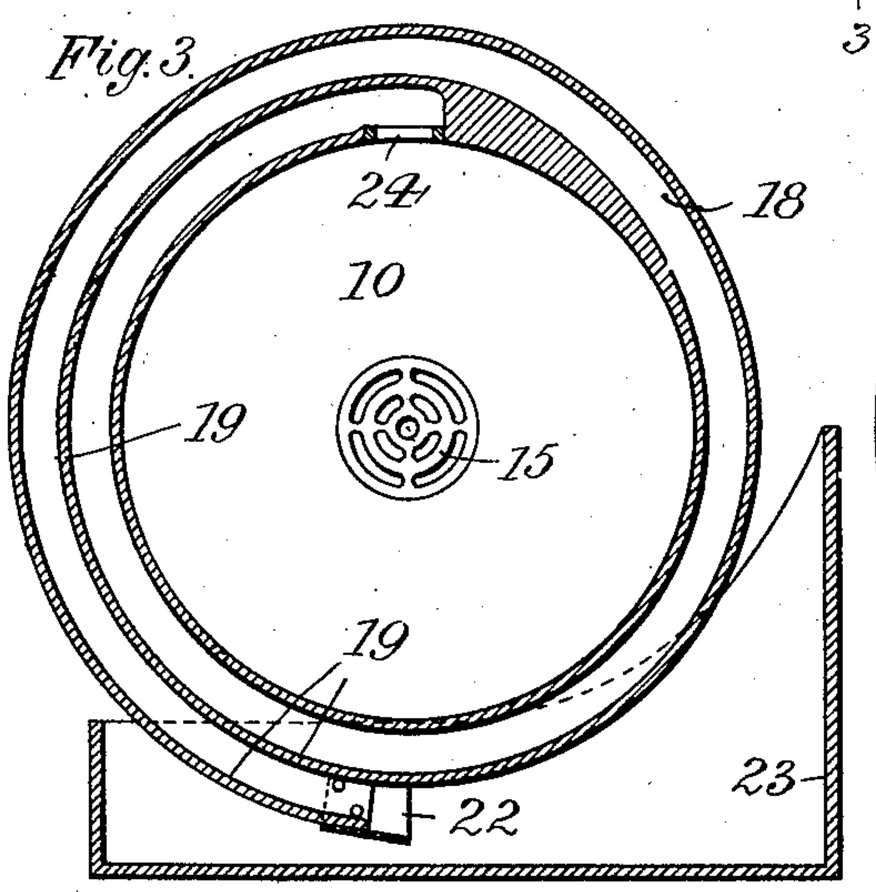


Fig. 2.

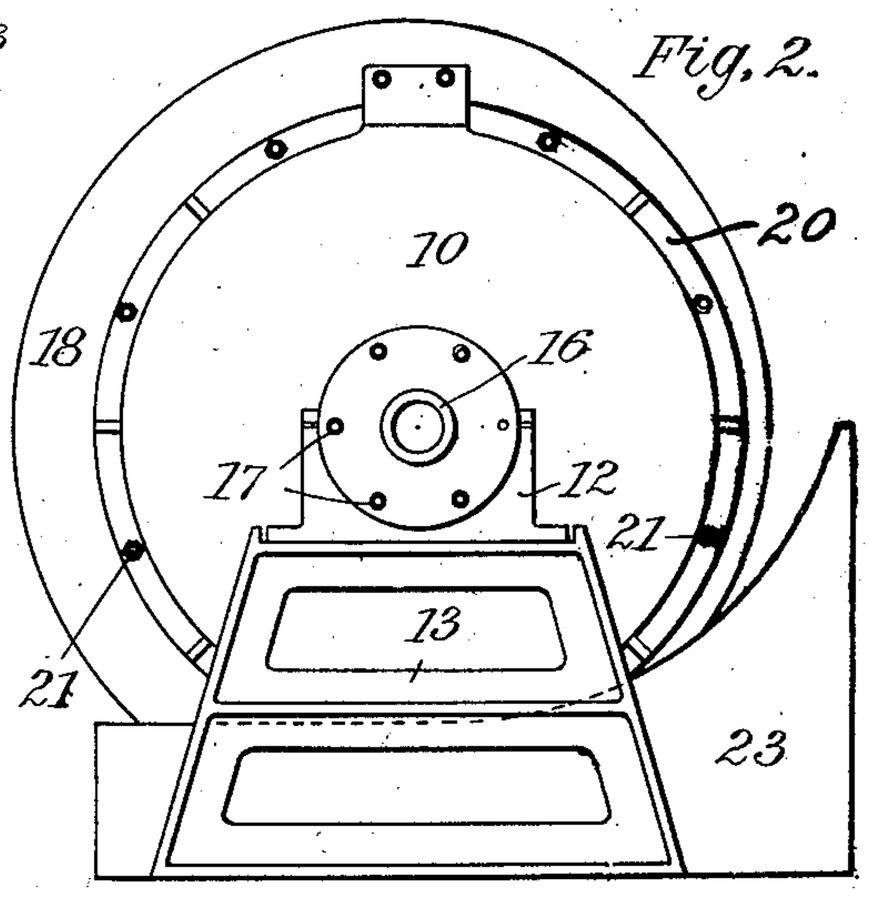
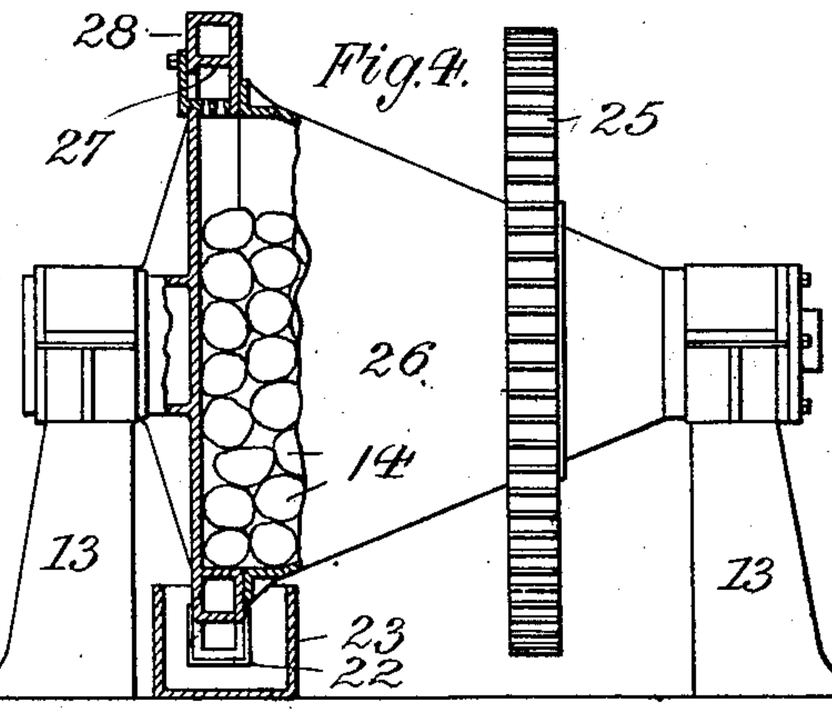


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PEBBLE-MILL.

944,997. Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed March 9, 1909. Serial No. 482,243.

To all whom it may concern:

Be it known that I, MAX F. ABBÉ, a citizen of the United States, residing at New York city, Manhattan, county and State of New York, have invented certain new and useful Improvements in Pebble-Mills, of which the following is a specification.

This invention relates to a coniform pebble mill more particularly adapted for wet grinding, and so constructed that the material to be ground is directly fed into that portion of the mill which has the greatest grinding coefficient.

In the accompanying drawing: Figure 1 is a longitudinal section of my improved pebble mill; Fig. 2 an end view thereof; Fig. 3 a vertical cross section on line 3—3, Fig. 1, and Fig. 4 a side view, partly in section, of a modification of the mill.

The shell or barrel 10, forming the grinding chamber of the mill, is composed of two frusto-conical sections joined at their base, so that the shell tapers from the center toward both ends. These ends terminate in hollow trunnions 11, turning in bearings 12 of standards 13. Shell 10 contains pebbles, balls or similar grinding bodies 14 which are confined within the grinding chamber by grates 15 formed on discharge nozzles 16. These nozzles are fitted into trunnions 11 and are bolted thereto, as at 17.

As described in a companion application filed on even date herewith, pebbles 14 will so arrange themselves automatically during the operation of the mill, that they will pile up at that portion thereof which has the greatest diameter. Furthermore, as the pebbles are usually of different sizes, the larger pebbles will here gather, while the pebbles will gradually diminish in size toward nozzles 16. Thus, with the construction shown in Fig. 1, the largest pebbles will be heaped up at the center of the mill to exercise the greatest grinding force, such force gradually diminishing toward the discharge nozzles.

In order to directly feed the material to be ground to that portion of the mill which attacks the same most effectively, the center of shell 10, *i. e.*, that portion thereof which has the greatest diameter is provided with a peripheral inlet opening communicating with a casing 18 that encompasses the grinding chamber. This casing incloses a helical conveyer 19, the convolutes of which gradually decrease in radius and are maintained in vertical juxtaposition. Casing 18 encompasses shell 10 at its greatest diameter and is fitted between a pair of flanges 20 of shell 10, to which it is bolted, as at 21.

The outer convolute of conveyer 19 is provided with a replaceable scoop or mouthpiece 22 which dips into a trough 23 arranged below casing 18 and containing the material to be ground. The inner convolute of the conveyer communicates with the peripheral inlet opening of the shell which contains a removable grate 24, through which the material to be ground is admitted to the grinding chamber, while the escape of pebbles 14 is prevented.

When the mill is rotated by a gear wheel 25 and a suitable power-shaft, (not shown), the material to be ground will, by conveyer 19, be carried to the center of the mill, to be here subjected to the most intense grinding action, while the, more or less, comminuted particles will undergo a further reduction as they are forced toward discharge nozzles 16. In this way the grinding capacity of the mill is fully utilized with a minimum expenditure of power.

In Fig. 4, the shell 26 of the mill is of frusto-conical form, so that it is widest, not at the center, but at one of its ends. Here too the material to be ground is fed to the grinding chamber through a helical conveyer 27, inclosed within a casing 28 which is fitted to the widest portion of the shell, so that the grinding capacity of the mill is fully utilized.

I claim:

1. A pebble mill comprising a coniform shell having a peripheral inlet opening at the widest portion thereof, a pair of supporting bearings, means for axially rotating the shell, grinding bodies inclosed within the shell, a casing encompassing the shell at the widest portion thereof, a spiral conveyer within the casing and communicating with the inlet opening, and a trough into which said conveyer is adapted to dip.

2. A pebble mill comprising a coniform shell having a peripheral inlet opening at the widest portion thereof, a pair of trunnions, one of which is hollow, means for axially rotating the shell, grinding bodies inclosed within the shell, a casing encompassing the shell at the widest portion thereof, a spiral conveyer within the casing and

communicating with the inlet opening, and a trough into which said conveyer is adapted to dip.

3. A pebble mill comprising a coniform axially rotatable shell having a peripheral inlet opening at its widest portion, grinding means inclosed within the shell, and a spiral conveyer encompassing the shell at its widest portion and communicating with the peripheral inlet opening.

Signed by me at New York city, (Manhattan,) N. Y., this 8th day of March, 1909.

MAX F. ABBÉ.

Witnesses:

FRANK BRIESEN,

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