

M. S. BURDICK.
BIN.

APPLICATION FILED FEB. 25, 1904.

2 SHEETS—SHEET 1.

Fig. I.

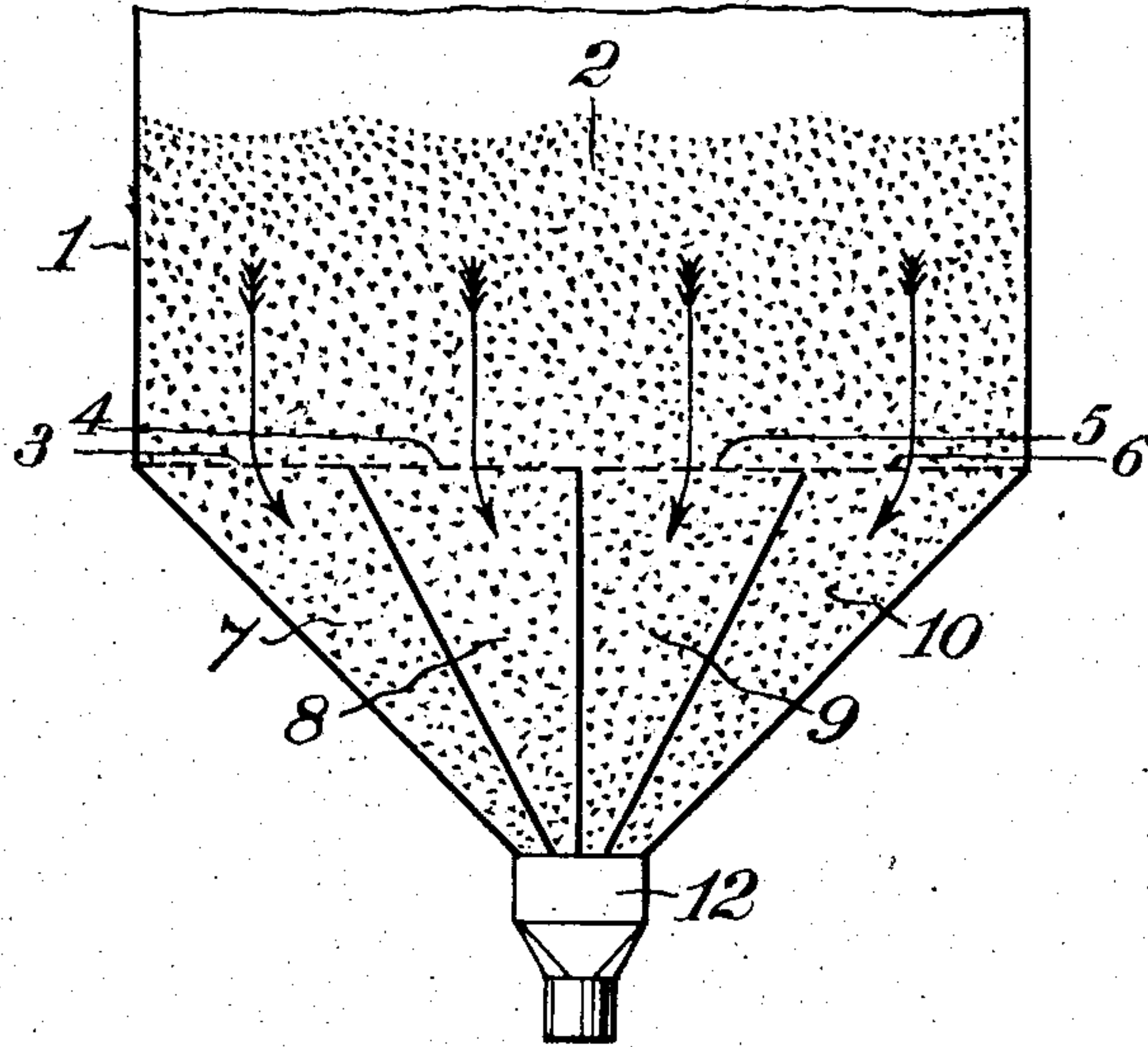
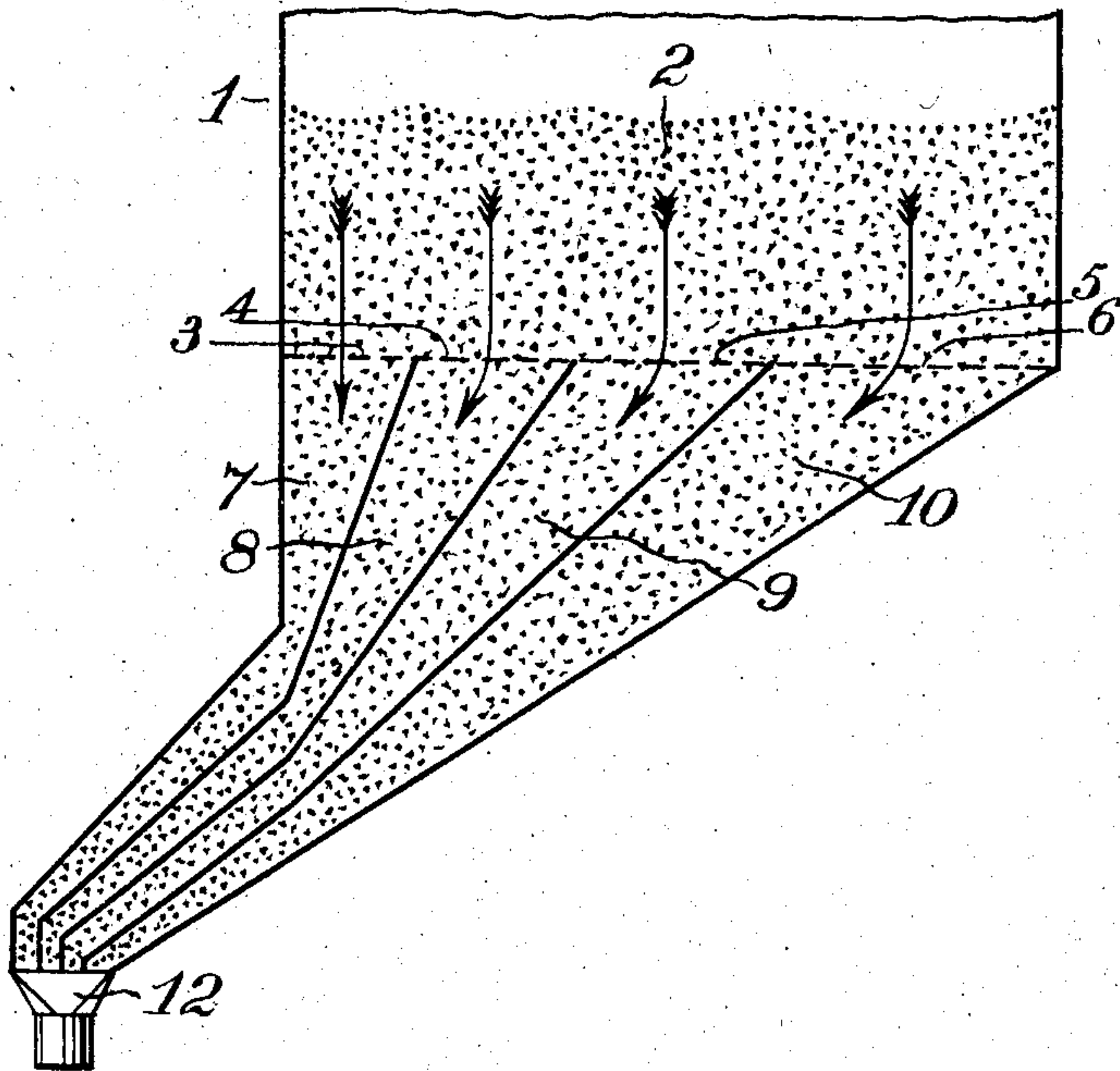


Fig. II.



Witnesses.
C. A. Brandau
Elmer Wickes

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Mark S. Burdick,
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2 SHEETS—SHEET 2.

Fig. III.

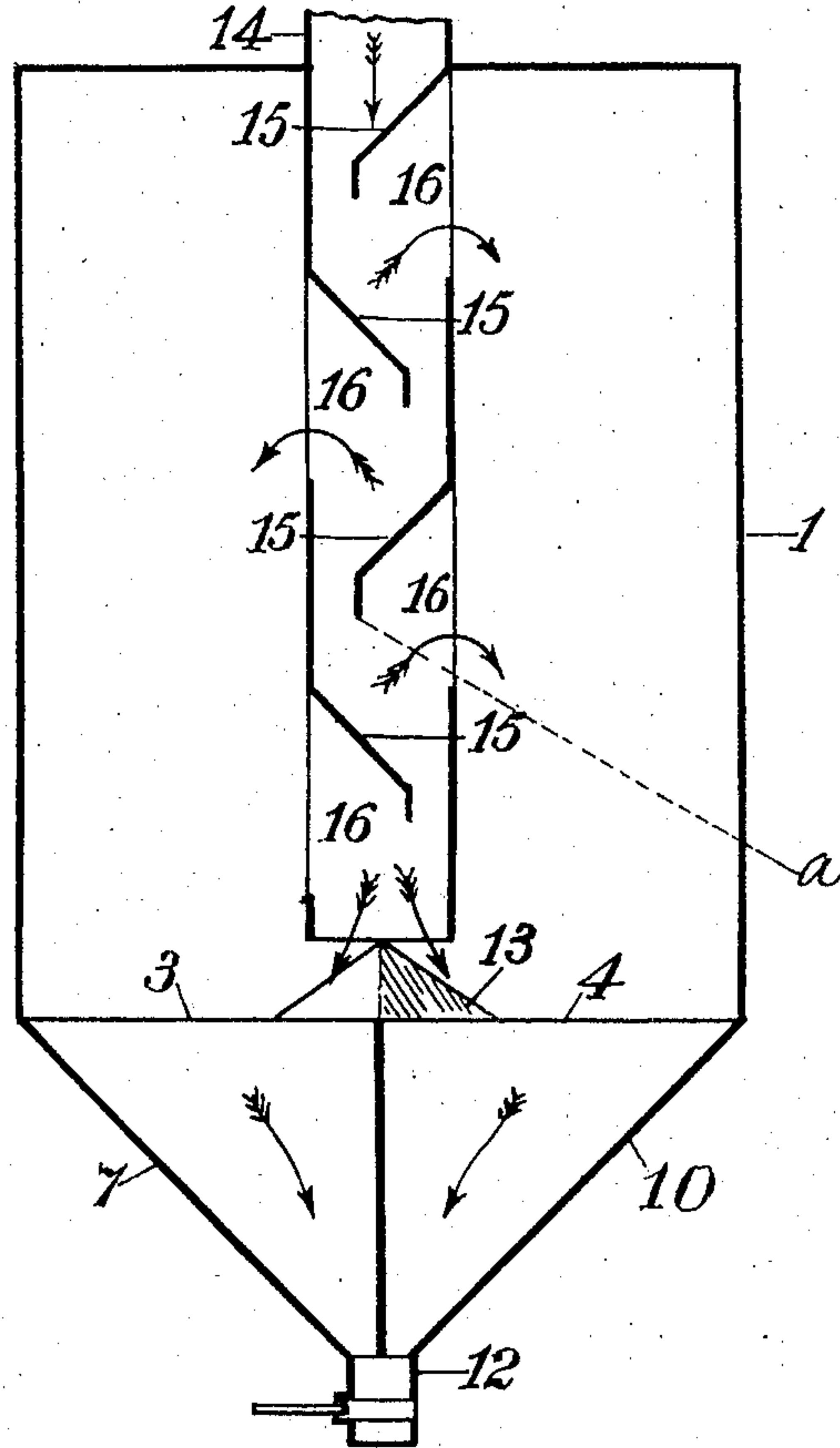
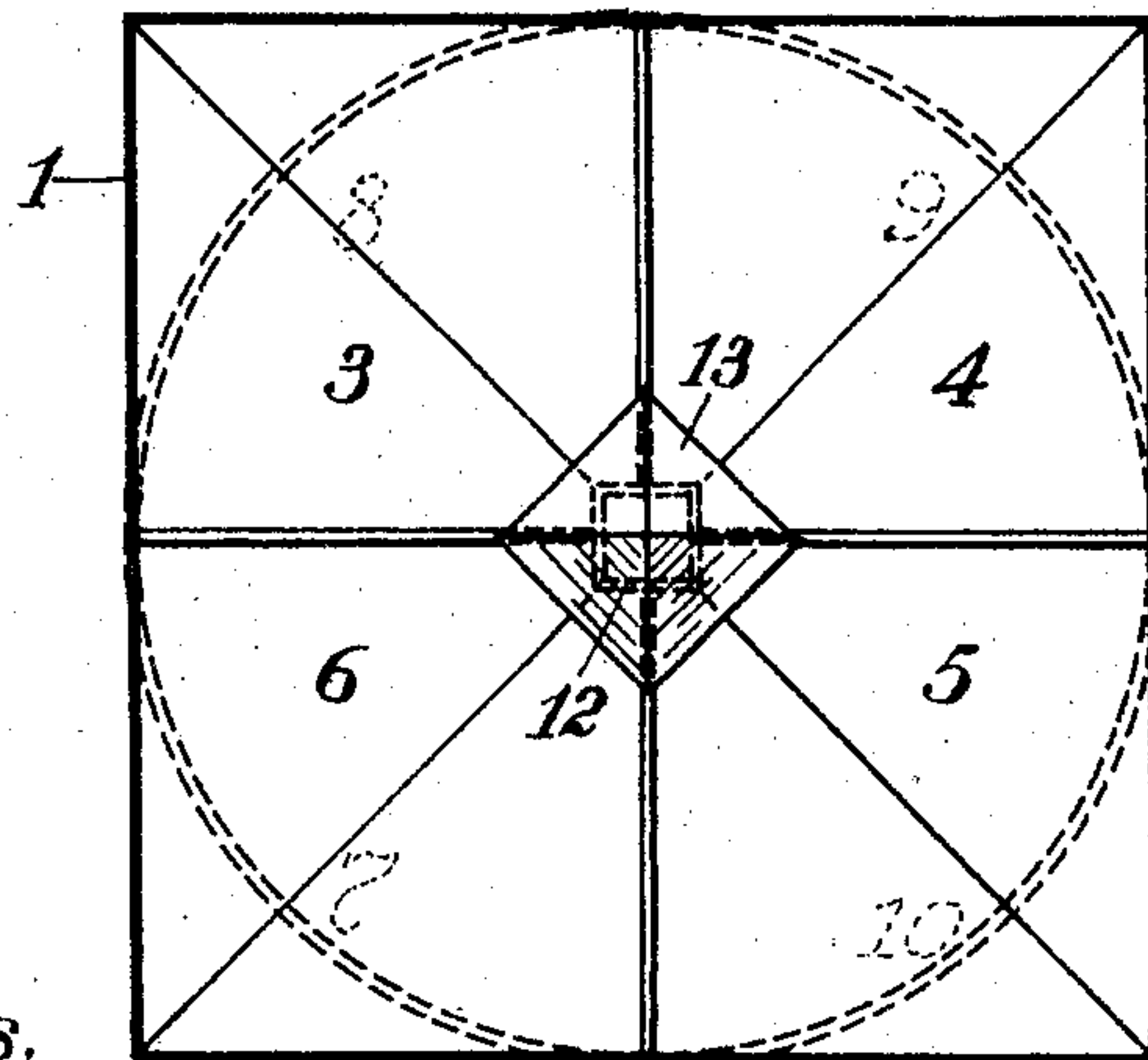


Fig. III.



Witnesses.

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UNITED STATES PATENT OFFICE.

MARK S. BURDICK, OF ALAMEDA, CALIFORNIA.

BIN.

SPECIFICATION forming part of Letters Patent No. 778,301, dated December 27, 1904.

Application filed February 25, 1904. Serial No. 195,198.

To all whom it may concern:

Be it known that I, MARK S. BURDICK, a citizen of the United States, residing at Alameda, county of Alameda, and State of California, have invented certain new and useful Improvements in Bins; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to the construction and operation of bins to contain cereals—substances such as coffee, grain, spices, and the like—that are mobile and flow at certain angles and to certain improvements in such bins.

My improvements consist in so constructing bins that the contents thereof are drawn off nearly equally from the whole area and mass in the bins, the retarding friction of surfaces being compensated as nearly as possible having reference to vertical and oblique pressure, also the resistance as an arch of such substances, thus preventing selection or assortment of the grains as to size, weight, shape, smoothness, or other quality such as destroys the homogeneity of the mass when drawn off in the usual manner or by a single outlet.

My invention also consists in means to produce or preserve a homogeneous distribution of such substances as they are placed in storing-bins.

The object of my invention is to avoid in a simple and effective manner the assorting or grading of grain, coffee, spices, and the like when these are stored or passed through and withdrawn from bins.

To these ends I construct bins as shown in the diagram herewith and forming a part of this specification.

Figure I is a sectional diagram of a bin with a central discharge-way made according to my invention; Fig. II, a similar diagram of a bin with an oblique discharge, these two constituting the common forms in practice. Fig. III is a sectional diagram of a common central discharge-bin with a charging spout or chute therein also provided with my improvements. Fig. IV is a plan view of Fig. III.

Similar numerals of reference apply to like parts in the different figures of the drawings.

Dry substances composed of grains—such as coffee, spices, and cereals of various kinds—when confined in vessels act by a law quite different from fluids, the mass when deep being sustained mainly by friction on the sides of bins having vertical or downwardly-converging walls, and the flow to a single aperture of escape produces a selection of size and weight of the grains, causing an assorting into grades that produces a variation of quality and difference in commercial value. So marked is this effect that in filling bins by a simple spout the mass is inverted, and the first to go in is the last to escape when drawn off in the usual manner. It is therefore important that the homogeneity of the substance be maintained, and while this can be easily accomplished by baffling devices and the like in filling bins it is extremely difficult to maintain such homogeneity in discharging them. To evade this impediment, I construct bins, as shown in the drawings, in which the contents are drawn equally from the whole mass or over the whole area of the bottom by separate converging outlets or passages and then combined, as shown in the several figures of the drawings.

1 represents the retaining-walls of the bins, which are in this case assumed to be vertical and the bins of rectangular form, 2 the contents, and 3, 4, 5, and 6 outlets that occupy practically the whole area of the bottom of the bin. The respective areas of these outlets in the case of an oblique discharge are unequal, as shown in Fig. II, and require careful computation to secure the best results. Where the discharge-spouts converge obliquely to a common discharge-way located eccentrically with respect to the bin, as in Fig. II, they form different angles with the vertical, and consequently deliver at different rates of speed and volume. For example, chute 7, Fig. II, being the shorter as well as the most nearly vertical of the set, is subject to the most rapid discharge and is therefore furnished with a correspondingly small area of opening 3 to supply it, while chute 10, being the longer as well as the most oblique in course, has the proportionally larger area of opening 6. These outlets are also modified in

area with respect to the angular and vertical pressures and the resulting friction on the surfaces.

In the drawings, 1 represents vertical walls 5 of the bins, 2 the contents thereof, and 3, 4, 5, and 6 are apertures or outlets through the bottoms of the bins occupying practically their whole area.

7, 8, 9, and 10 are spouts or chutes leading 10 from the openings 3 4 5 6, converging on all sides and connecting to a common receiver and discharge-way 12, where the material 2 is withdrawn in the same condition as to its homogeneity as it was when deposited in the bins 15 or even improved in mixture.

In the case of circular metallic bins, as indicated by dotted lines in Fig. IV, the bottom passages become sectors in their section, but otherwise act the same as in the rectangular 20 construction.

When either quadrangular or sector outlets are employed, as in Figs. III and IV, I place, by preference, over the inner or acute corners of the apertures 3, 4, 5, and 6 a pyramidal 25 deflecting-cap 13, that in greater or less degree balances or compensates the friction of the substances on the outer and angular surfaces of the spouts 7, 8, 9, and 10.

It will be understood that in practice different 30 arrangement of parts and their modification is necessary to meet the exigencies of erection and use, the main object being to cause the contents of the bins to sink as a mass uniformly through a plurality of separated 35 issues in the bottom, also as far as possible be subject to equal frictional retardation at all points.

As in charging of bins by a sheer fall of the substances from the top to the bottom 40 the heavier substances fall more rapidly, producing an irregularity or want of homogeneity in the contents, this my improved method of discharging cannot remove. Hence I provide when required, especially in deep bins, devices, as shown in Fig. III, to disperse the 45 substances uniformly therein.

14 is a spout or conduit through which the substance enters the bin, falling successively on the baffling-shelves 15 until the several 50 spouts at the bottom are filled, then flowing alternately out at each side through apertures

16, approximately on the dotted line *a*, thus filling the bin without concussion of the grains and with tolerable uniformity as to grade or size and quality. 55

The chute or spout 14 can be rectangular or oblong in section, as required, and the baffling devices can be varied as to number and consequent angle as the nature of the substances and their mobility will require. 60

Having thus explained the nature and objects of my invention and the manner of applying the same in practice, what I claim as new, and desire to secure by Letters Patent, is— 65

1. A bin for granular substances having a plurality of openings in its bottom, inclined spouts or chutes leading downward from said openings at different angles and converging to a common point of discharge, said openings 70 being proportional in area to the length and obliquity of said inclined spouts, whereby the rate and volume of discharge is approximately equalized among the several spouts, substantially as specified. 75

2. A bin for granular substances having a charging-conduit therein through which said substances enter the bin, provided in its interior with inclined baffling-plates to deflect the incoming material, and with lateral discharge- 80 openings in its sides alternating with said baffling-plates, whereby the material is distributed laterally and equally throughout the bin as it fills, substantially as specified.

3. A bin for granular substances having a 85 charging-conduit therein through which said substances enter the bin, provided in its interior with inclined baffling-plates to deflect the incoming material, and with lateral discharge-openings in its sides alternating with said 90 baffling-plates; a plurality of openings in the bottom of the bin meeting beneath said conduit, and a pyramidal deflecting-cap covering the junction of said openings, substantially as and for the purpose specified. 95

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARK S. BURDICK.

Witnesses:

ALFRED A. ENQUIST,
ELMER WICKES.