A. E. BROWN.

GATE FOR BINS AND OTHER SIMILAR RECEPTACLES.

APPLICATION FILED JUNE 15, 1908.

917,746.

Patented Apr. 13, 1909.

3 SHEETS—SHEET 1.

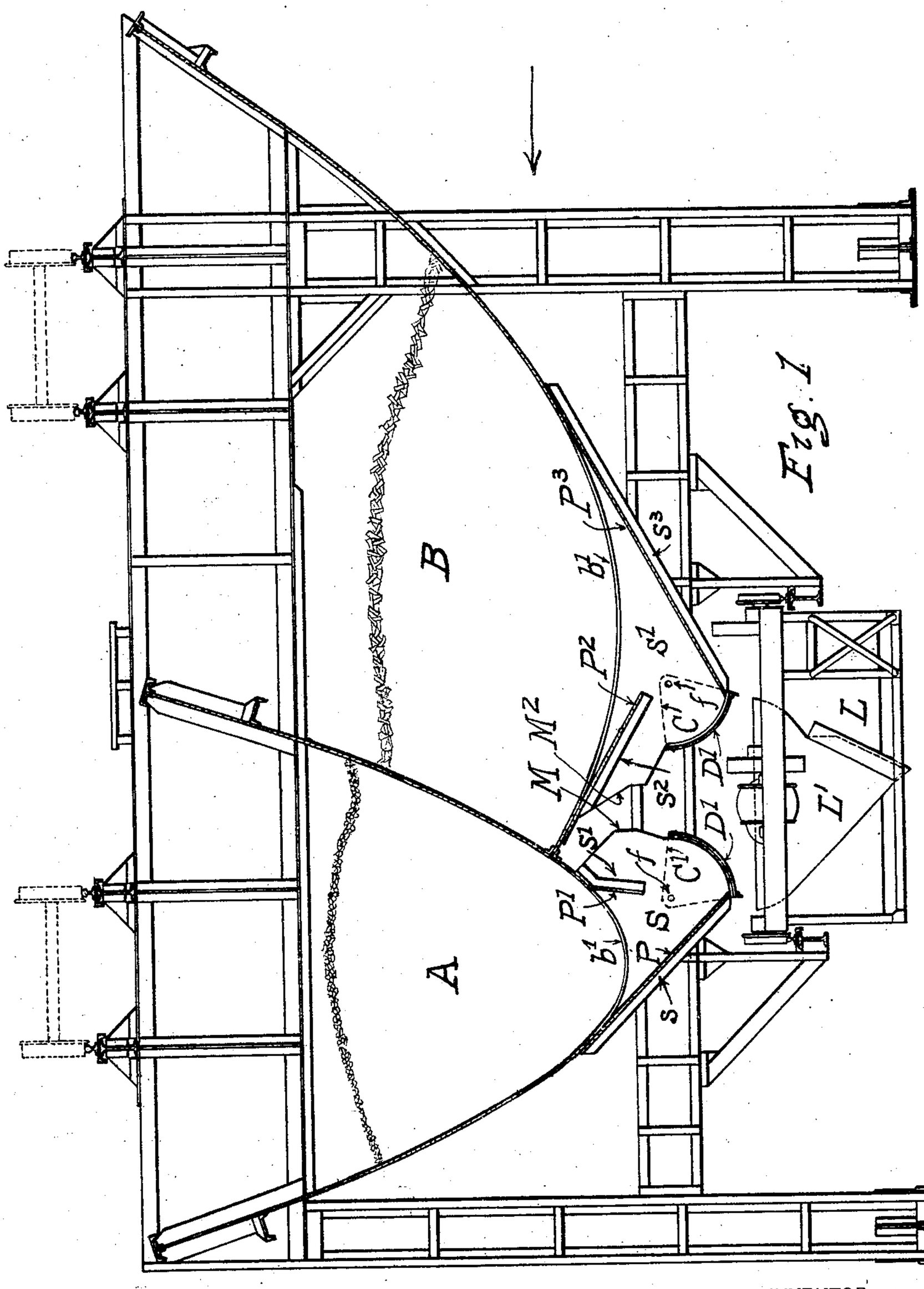

Fig. 1.

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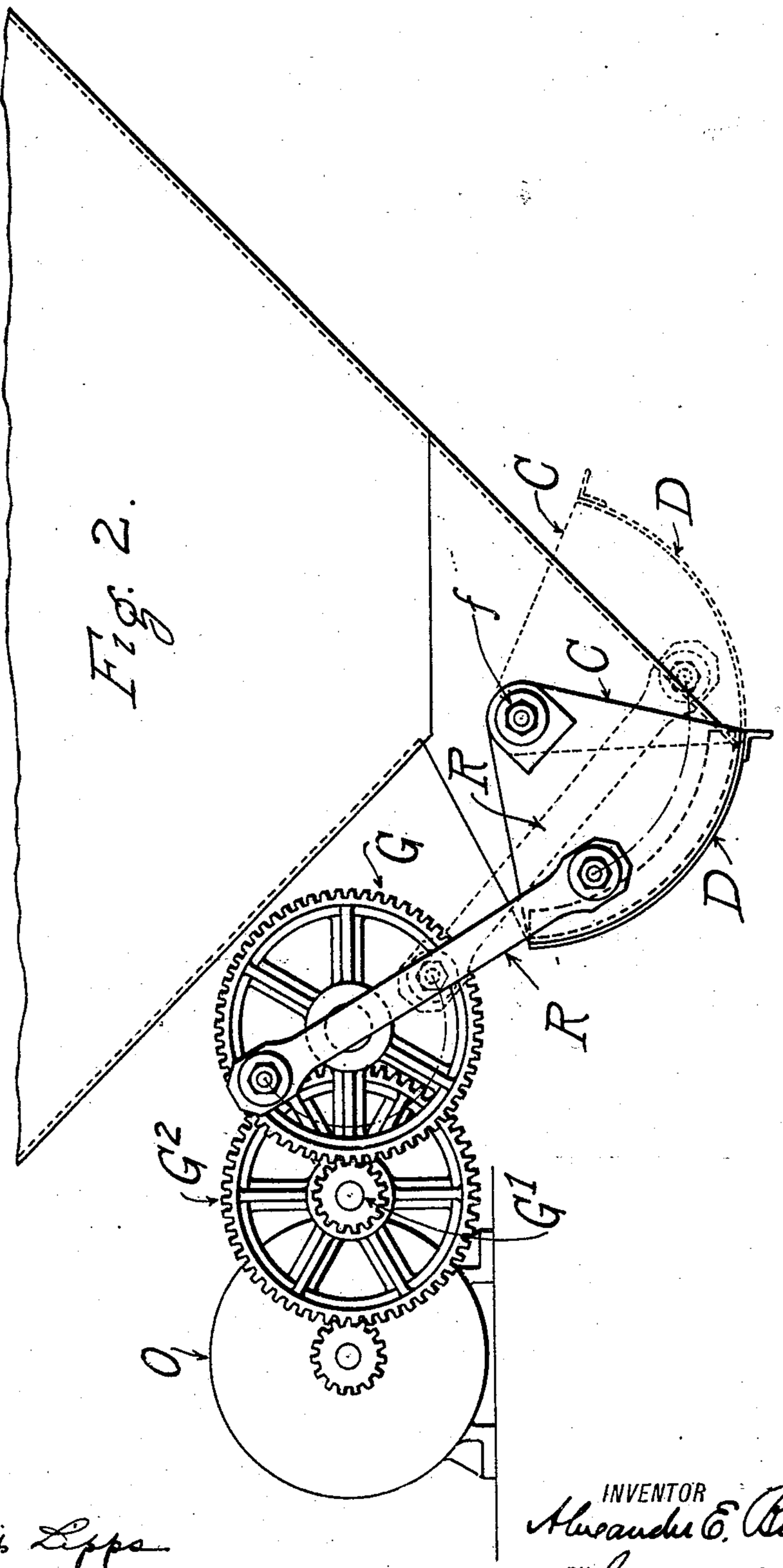
3 SHEETS—SHEET 2.

Fig. 2.



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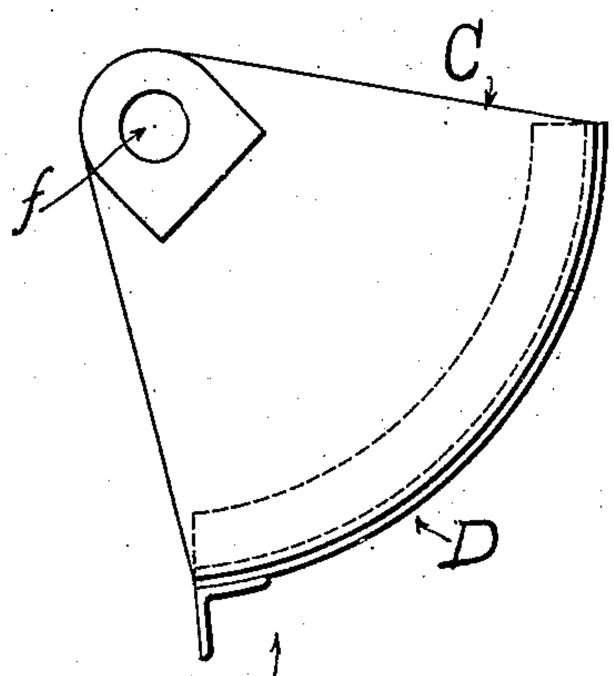

Fig. 3.

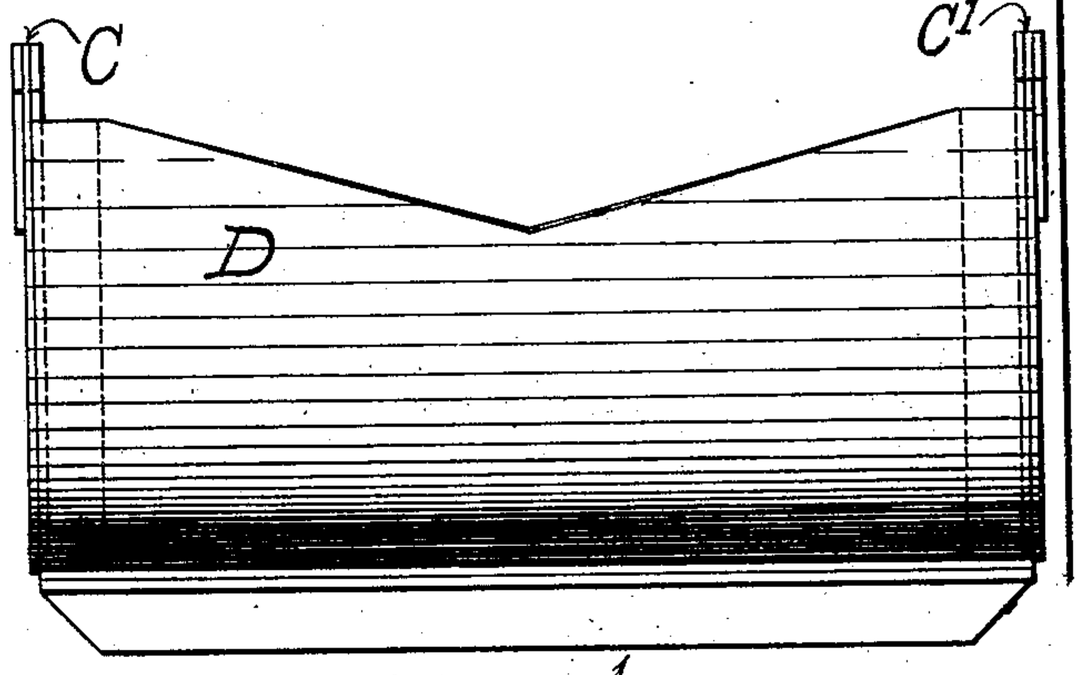

Fig. 4.

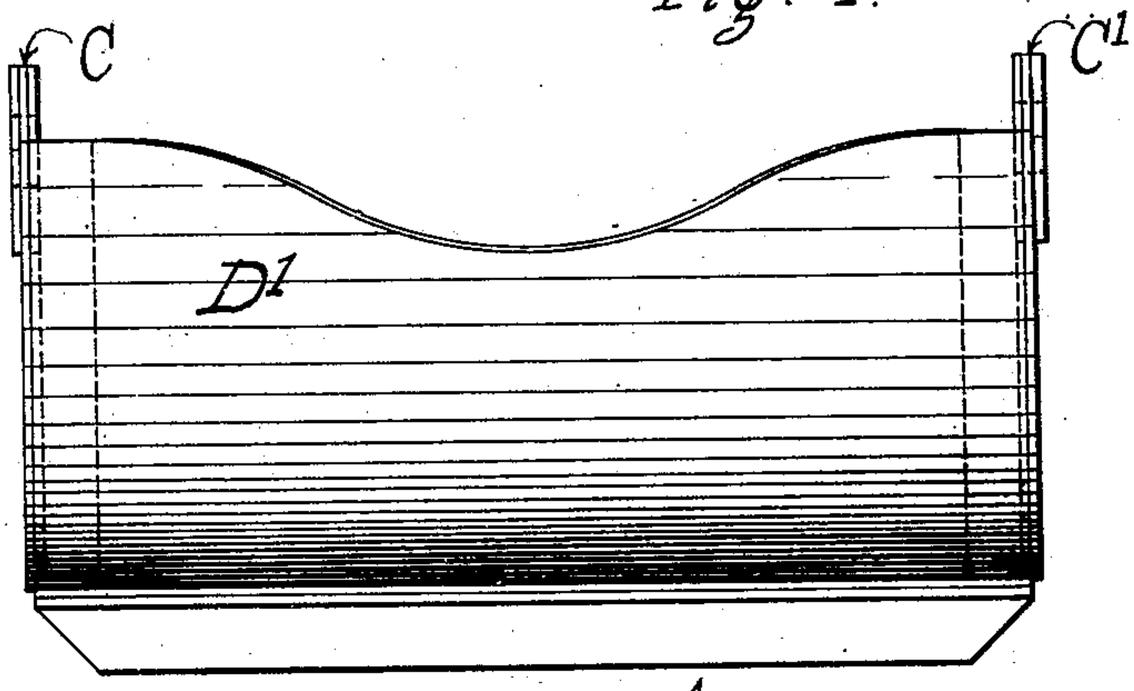

Fig. 5.

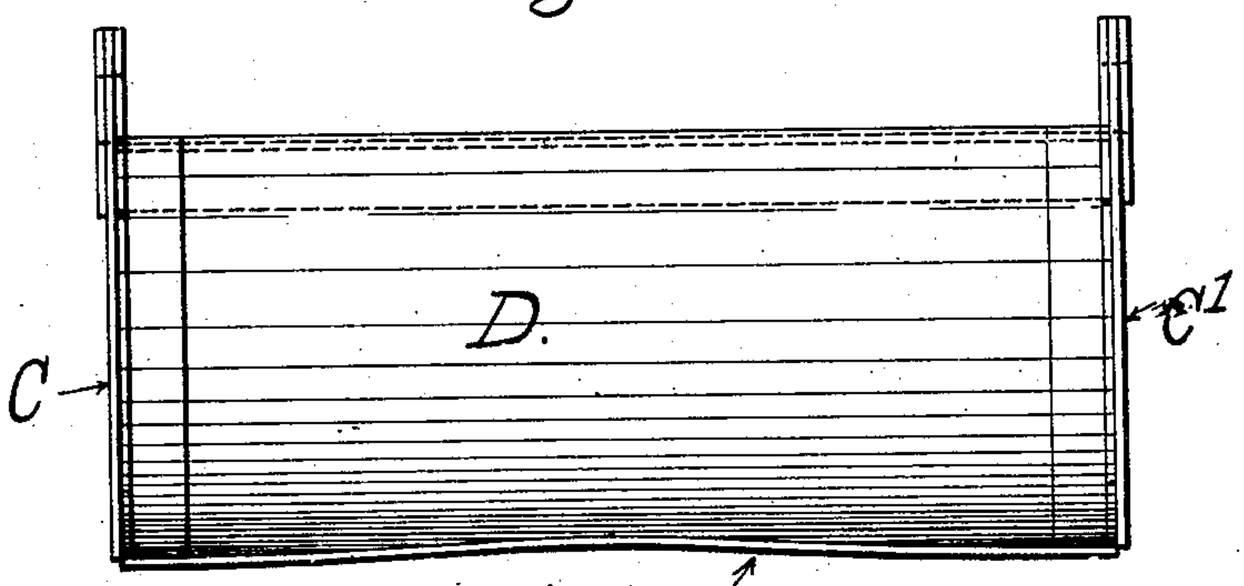

Fig. 6.

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UNITED STATES PATENT OFFICE.

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GATE FOR BINS AND OTHER SIMILAR RECEPTACLES.

No. 917,746. Specification of Letters Patent. Patented April 13, 1909.

Application filed June 15, 1908. Serial No. 438,676.

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Gate for Bins and other Similar Receptacles; and I hereby declare the following to be a full, clear, and precise description of the same, reference being made to the drawings accompanying and making a part of this specification, wherein similar parts are designated by similar letters in each case.

My said invention has particular application to that class of constructions where an overhead reservoir for coal, ore, limestone or other gross material, is to discharge predetermined portions of its contents by gravity, through a depending chute or spout into cars, lorries, buckets or other receptacle beneath. In all such operations it is desirable, for instance, that the bulk capacity of the receiving car, should not be exceeded, or a heavier load be given to the same than is to be shipped, and, in some cases, as when the several constituents of a furnace charge, are to be drawn off into a single car or skip, it is essential that the weight of material for each of said constituents should be approximated with as much precision as possible.

The modern type of bin used in the connection above referred to is generally parabolic, or curved, through the lower portion, and provided with discharge orifices beneath to which are appended chutes or spouts that are closed or opened by a gate provided for the purpose in front of the same. Said gate, is usually a hood-like construction, made up of a pair of parallel sector-shaped pieces, of the same dimensions, united at their peripheries by a damper-member of steel sheet or plate which member is rectangular, when produced, but is superficially curved to be concentric with points, at the inner end of said pieces, respectively, at which the latter are pivotally attached to said bin or chute. The outer edges of the side-walls of said chute or spout have an inscribed curve to that of said sheet or plate of the gate, so that when the latter is rotated about its axis, or points of pivotal attachment said sheet or plate will move exteriorly of said spout and in close juxtaposition therewith. Means for thus rotating the gate are provided, and, for weighing the quantity of material from time to time discharged.

The gate is opened by rotating the same downwardly across its place, at the mouth of the chute, whereupon, the material in the bin will, of course, flow over the upper edge of said sheet or plate (forming the lip or cut-off edge of the gate), and, because, in prevailing devices, this is always parallel with the gate's axis of rotation, such overflow will be simultaneous and uniform at each point of rotation, along the entire length of the same. It is manifest that, in such gates, during the movement of closing, material will similarly overflow and the discharge will diminish in the operation only in proportion as the rectangular aperture in the chute's mouth above said lip is gradually reduced in dimensions by the gate. It is found, in practice, however, that the desired rapidity of drawing off material from bins in the above manner does not allow of chutes or spouts of such limited dimensions that the overflow can be quickly enough stopped by a gate, as above described, to avoid an overload in some cases, or, in other cases, after the flow is shut off, to enable the operator to turn it on again, in order, by comparatively small additions, to bring an underload up to a close approximation to the weight desired. The flow being along the entire lip is apt to be too gross in amount, however, slightly the gate is opened, for any nice adjustments of the load, either, in the latter case, or to reduce the flow so gradually as not to exceed the desired weight in the first instance.

The object of the present invention is to provide a gate of the type referred to that will enable the operator, when he observes by the weight-indices, that the full load has nearly run out, to reduce the flow to any degree required to accurately complete the load. I accomplish this object by the simple inventive feature shown in the drawings, and which I will now proceed to point out.

In said drawings Figure 1 is an end elevation of a bin provided with discharge chutes and gates of the kind to which my improvement is pertinent. Fig. 2 is a side view of said gate and of appropriate means for oscillating the same. Fig. 3 is a side view of the gate proper, without such means. Fig. 4 is a front elevation of such a gate according to one form of the same. Fig. 5 is a similar view of another form and, Fig. 6 is a plan elevation of Fig. 3.

The bin shown in the drawings is what is

known as a double parabolic bin, being made up of an initial bin A, one of whose sides serves as a wall to a second adjoining bin B. Said bins, at their lowest part, are provided with discharge orifices b', b'. Beneath said orifices in each case are superstructures made up of oppositely located pairs of plates P, P′ and P^2, P^3 that slant or converge towards each other, and are supported respectively by angle irons s, s', and s^2 s^3, riveted to the bottom of the bins, together making up the chutes S and S′.

Riveted or otherwise fastened to the bottom of the bins A and B are side plates M, and M^2 which, at the same time, are secured along their downwardly extending edges, against the flanges of the angle-irons s, s' etc., thereby completing the super-structures referred to, and constituting the chutes or spouts proper whose respective mouths are the spaces between the free ends of said converging plates. C C′ are the said sector-pieces of the gate, hereinbefore sufficiently described, and D and D′ the sheets or plates, uniting the same, in the two special forms covering my improvement. In the first of these forms as shown in Fig. 4, the upper edge of said plate D, recedes from each end toward the middle point of the plate in lines that form an obtuse angle, at such point, a triangular space in the plate being thus left. In the form shown in Fig. 5, such edge is a compound curve, receding from said ends downwardly to such middle point. The proper depth of the portions thus excerpted from the upper part of said plates will readily be determined by experiment. Said gate is pivotally attached to the bin or chute in any suitable manner, (as by means of shafts through the bearings f, indicated) at such distance above the free ends of the plates M M^2 as will bring the inner surface of the plates D and D′, in juxtaposition with the free end or edges of their said plates. It is now manifest, by reason of the peculiar angular, or curved upper edge I propose for said plates, that when the gate has been revolved downwardly, or opened, a ready flow will occur over said edge which will begin, as soon as the lowest point of said edge has descended in front of the chute's mouth, and, will gradually increase to a maximum when the entire edge is across the front; also that the reverse will occur, on closing—and, that, during this movement, instead of the flow continuing along the entire front of the spout until the gate is closed, it will be gradually checked along the front toward the middle point into a readily controllable stream. For the purpose of oscillating said gate any suitable means may be employed. In Fig. 2 I indicate such means in the connecting rod R, which engages the gate near its upper forward portion, and a gear-wheel G forming, with the pinion G and the wheel G^2, a train of gears actuated by a motor O. Fig. 2 also indicates by the dotted lines, the relative position of both the gate and said rod when the gate is opened.

It is evident that the invention above described has place in the connection or in the field generally wherein material or matter is to be drawn off from a receptacle and, although I illustrate the feature in question by specific forms it is not, in the broader scope, to be limited to such forms. It will be equally useful—with proper adaptations to, grain and other granular substances, and even in the case of fluids. And, be included, in gates or dampers that are flat instead of curved, that oscillate vertically instead of radially, and wheresoever on its upper edge the lowest point or points thereof may be.

What I claim and wish to secure by Letters Patent is —

1. In combination with a bin or other receptacle, provided with a discharge orifice, an oscillating gate, in juxtaposition to the same, having its upper or cut-off edge at an angle other than a right angle with respect to the direction of oscillation, and suitable means for oscillating said gate, substantially as shown and described.

2. In combination with a bin, or other receptacle, provided with a discharge chute or spout, an oscillating gate at the mouth of said chute or spout, having its upper or cut-off edge at an angle other than a right angle with respect to the direction of oscillation, and suitable means for oscillating said gate, substantially as shown and described.

3. In combination with a bin, or other receptacle, provided with a discharge chute or spout, an oscillating gate at the mouth of the same, composed of parallel sector-like pieces, united, at their outer-ends, by a curvilinear damper-piece and pivotally connected to said bin or sheet, at their inner ends, at points thereon concentric with said damper-piece, the upper or cut-off edge of the damper-piece being in a plane tangential to said piece but at an angle with the axis of rotation of said gate, together with means of oscillating said gate about said points, substantially as shown and described.

4. In combination with a bin or other receptacle provided with a discharge chute or spout, a curvilinear gate at the mouth of the same, having a downwardly receding upper or cut-off edge, the said gate being pivotally suspended to said spout, or said bin or receptacle, at points concentric with said gate, together with suitable means for oscillating said gate about said points, substantially as shown and described.

5. In combination with a bin or other receptacle provided with a discharge chute or spout, a curvilinear gate at the mouth

of the same; having its upper or cut-off edge, receding downwardly toward the middle point thereof, the said gate being pivotally suspended to said spout or said bin or receptacle, at points concentric with said gate, together with suitable means for oscillating said gate about said points, substantially as shown and described.

6. In combination with a bin or other receptacle, provided with a discharge chute or spout, a curvilinear gate at the mouth of the same having its upper or cut-off edge curved downwardly toward the middle point thereof, the said gate being pivotally suspended to said spout, or said bin or receptacle, at points concentric with said gate, together with suitable means for oscillating said gate about said points, substantially as shown and described.

ALEXANDER E. BROWN.

In presence of—
RICHARD B. SHERIDAN,
L. P. SIPPS.