L. E. SHAW.

FEEDING DEVICE.

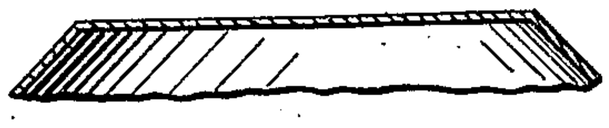
APPLICATION FILED JULY 8, 1909.

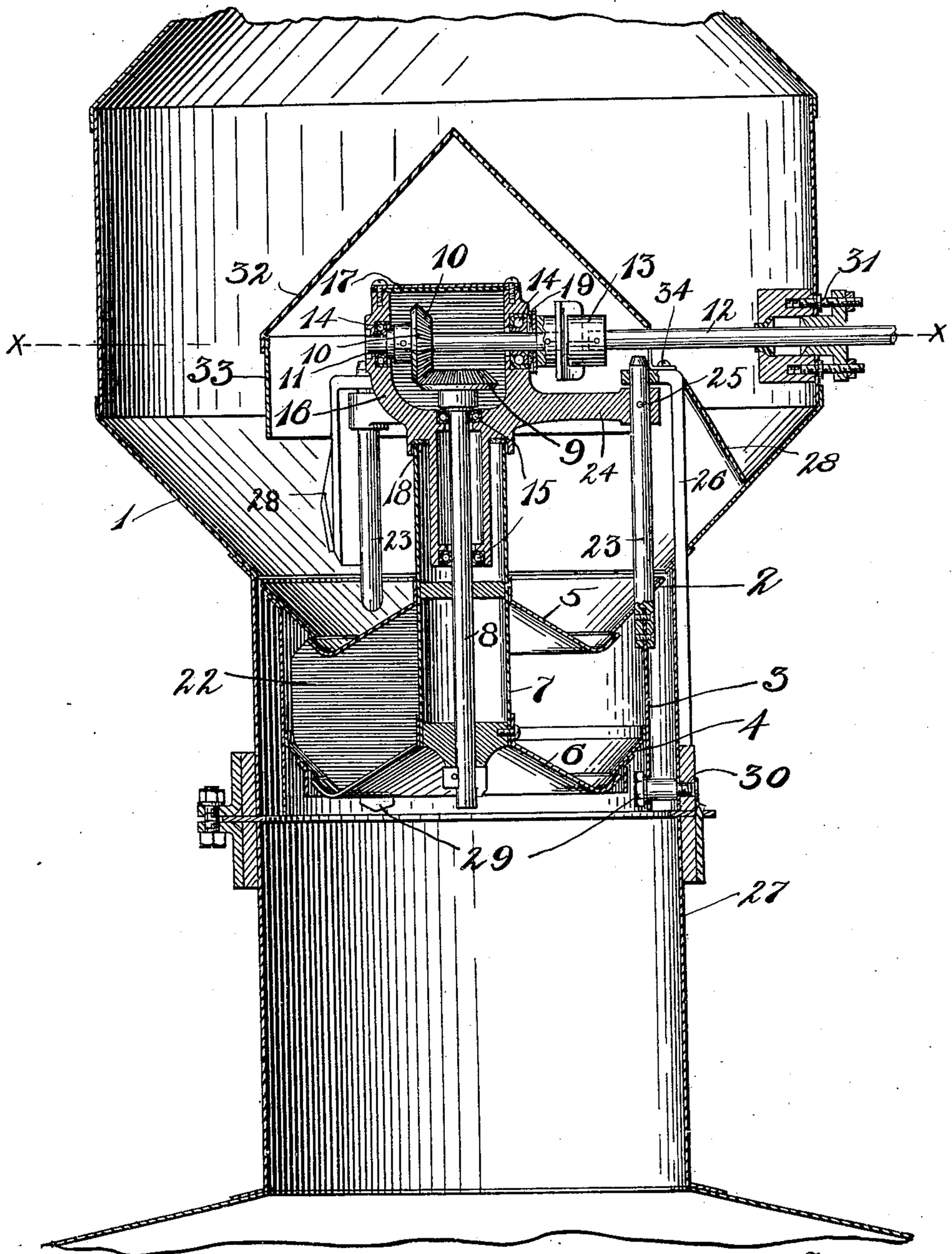
991,758.

Patented May 9, 1911.

4 SHEETS—SHEET 1.

Fig. 1.





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4 SHEETS—SHEET 2.

Fig. 2.

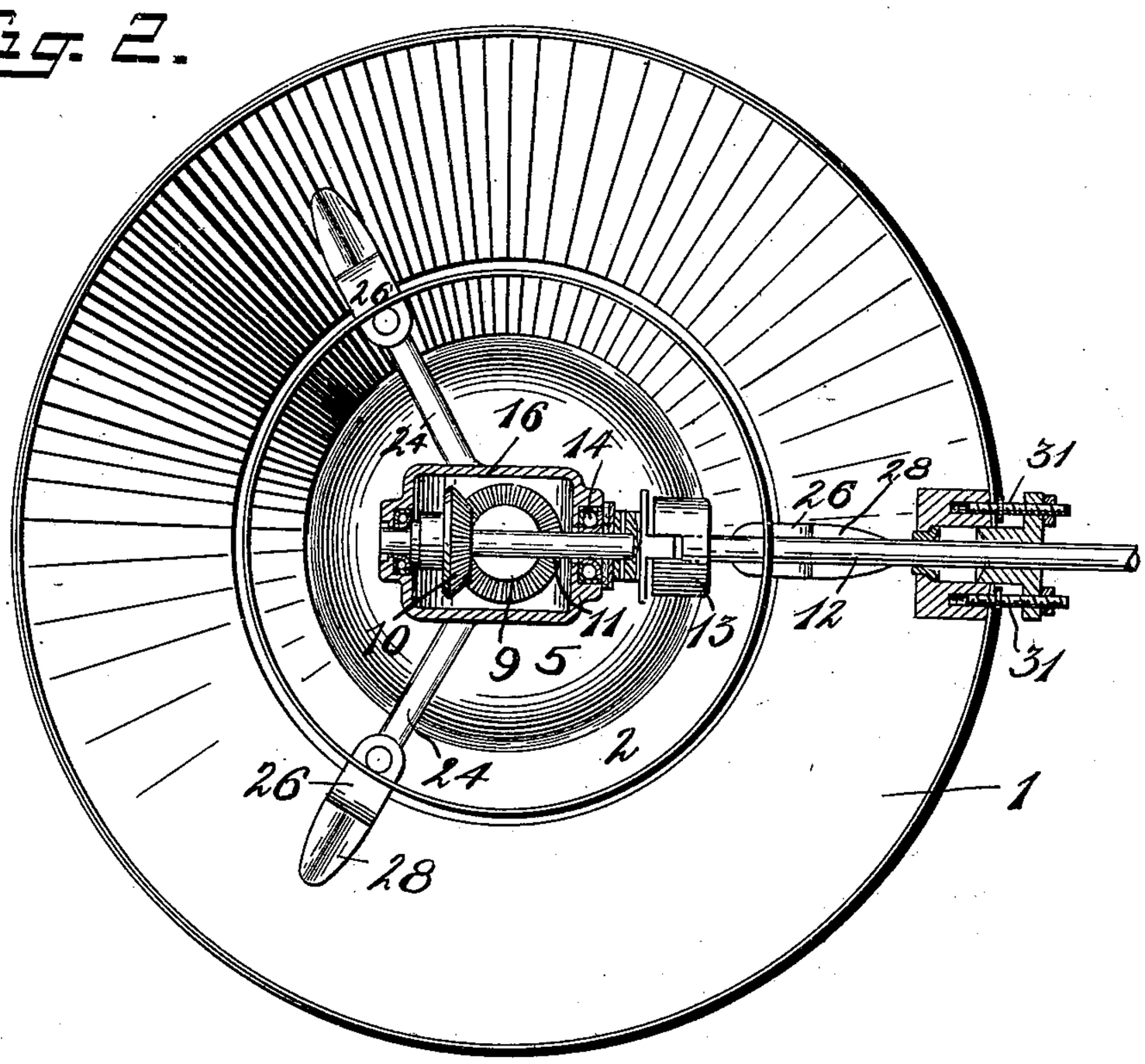


Fig. 6.

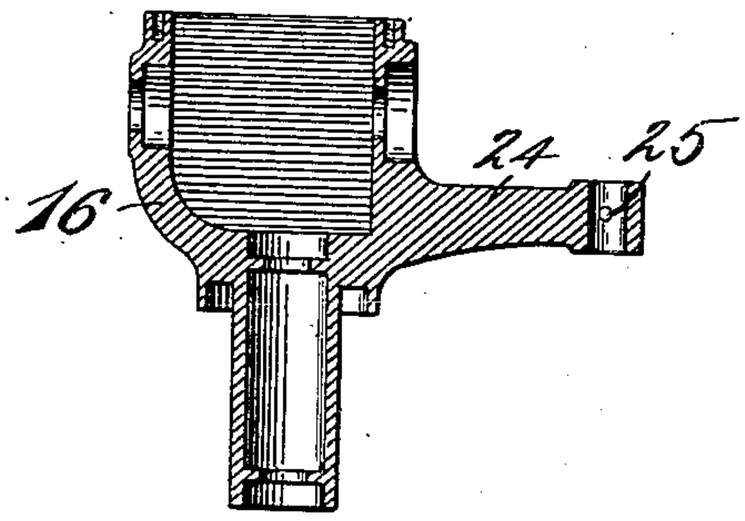
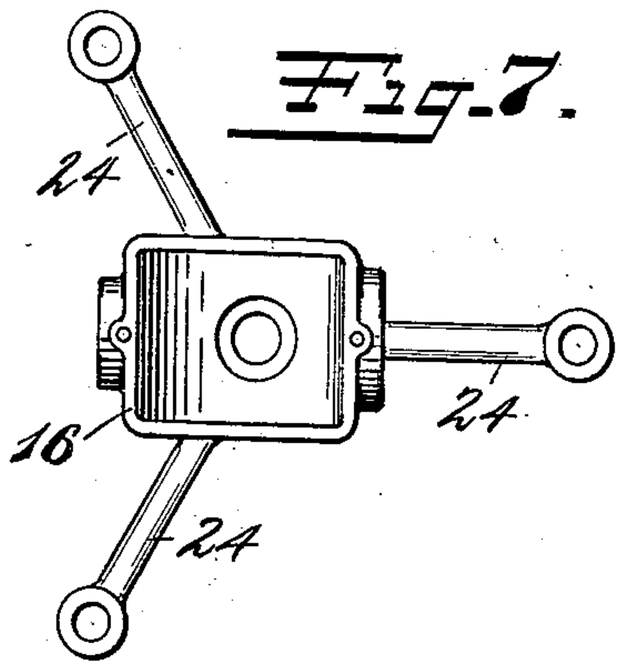


Fig. 7.



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4 SHEETS—SHEET 3.

Fig. 3.

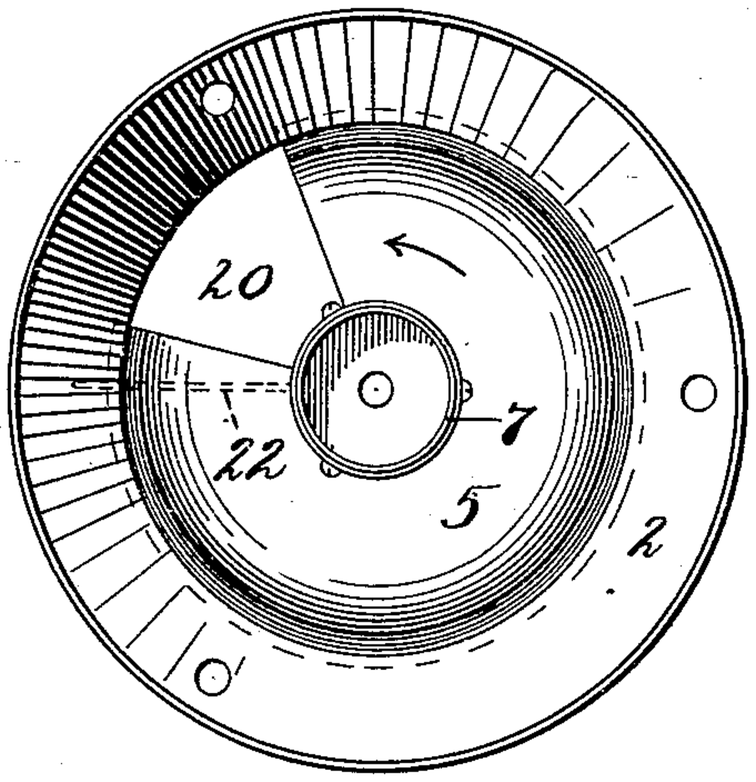


Fig. 4.

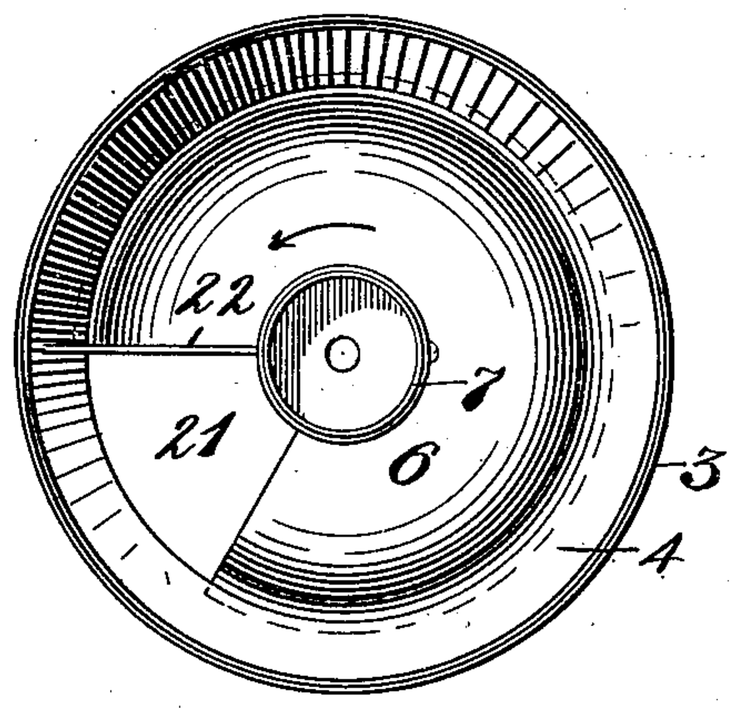
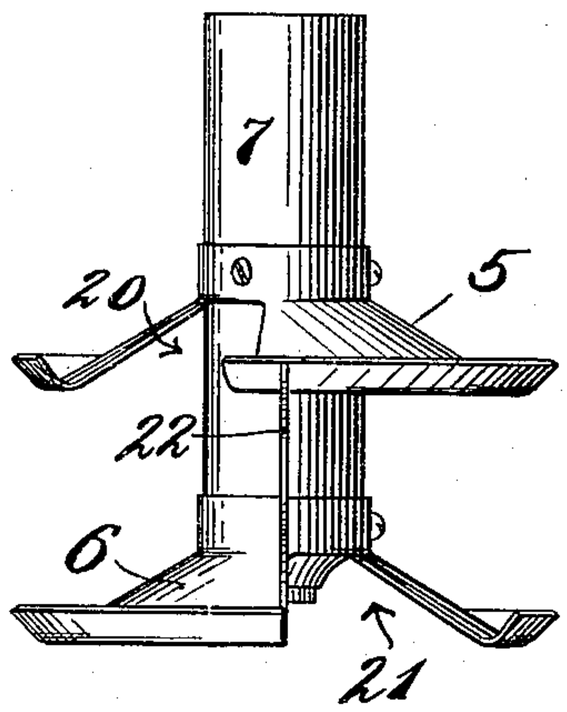


Fig. 5.



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APPLICATION FILED JULY 8, 1909.

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Patented May 9, 1911.

4 SHEETS—SHEET 4.

Fig. 8.

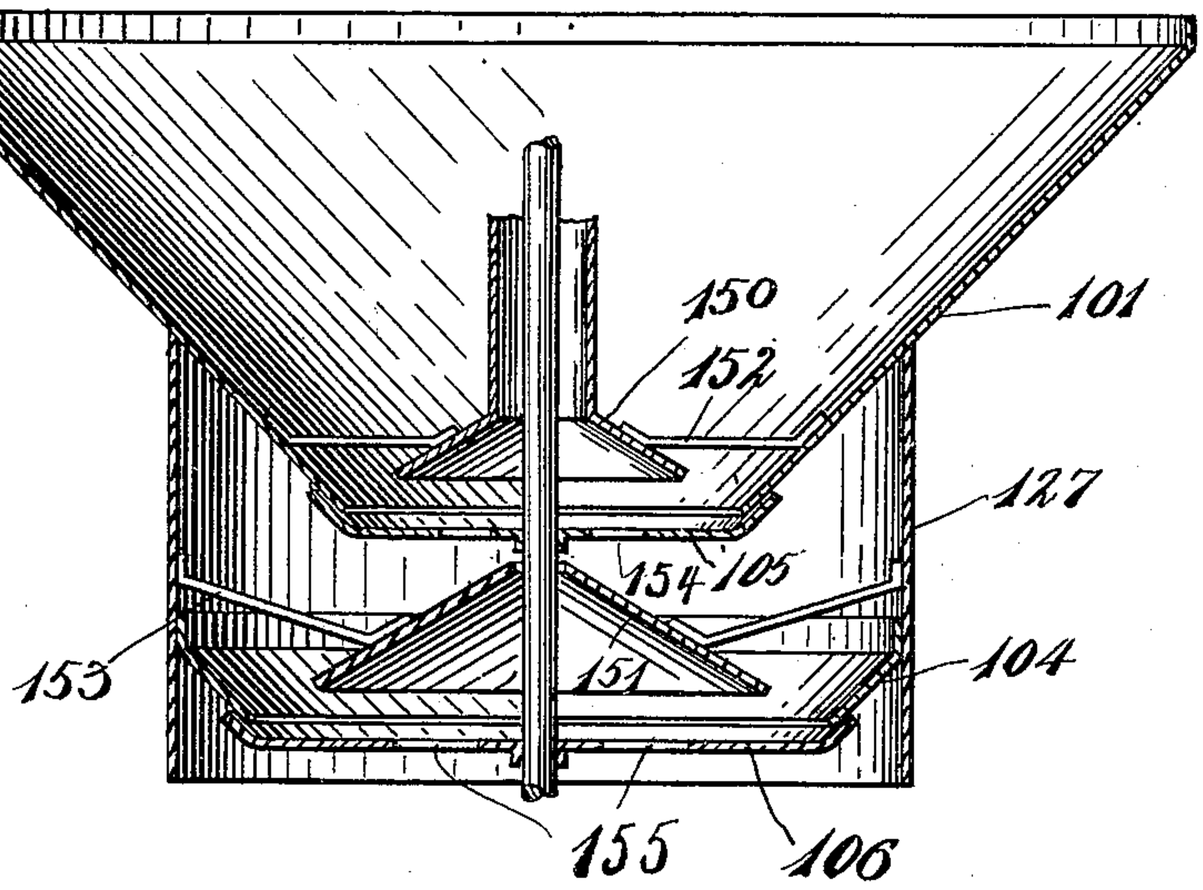


Fig. 10.

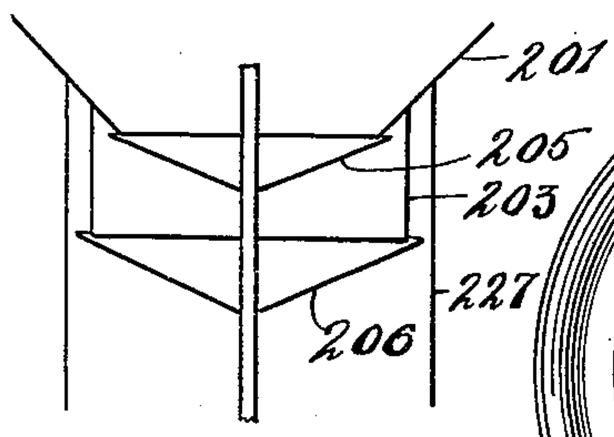
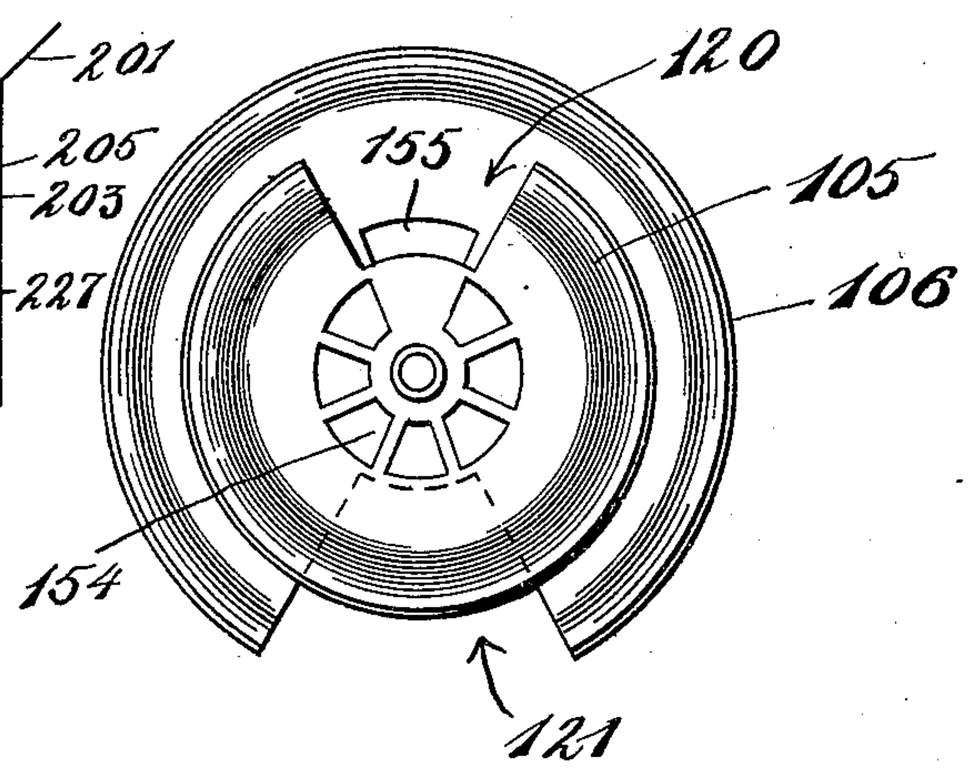


Fig. 9.



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UNITED STATES PATENT OFFICE.

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FEEDING DEVICE.

991,758. Specification of Letters Patent. **Patented May 9, 1911.**

Application filed July 8, 1909. Serial No. 506,473.

To all whom it may concern:

Be it known that I, LOUIS E. SHAW, a citizen of the United States, residing at New York, county of New York, State of New York, have invented certain new and useful Improvements in Feeding Devices, of which the following is a full, clear, and exact description.

My invention relates to feeding devices applicable to acetylene generators and the like, and has for its object to provide a new and improved feeding device for feeding granular material and the like. It is especially adapted to feed lump carbid from a carbid holder to a water tank located below it.

The following is a description of an embodiment of my invention, reference being had to the accompanying drawings, in which—

Figure 1 shows a vertical section of carbid hopper and feeding device; Fig. 2 is a horizontal section on the line *x*—*x*, Fig. 1; Fig. 3 is a horizontal view of the lower portion of the hopper and the upper valve; Fig. 4 is a plan view of the auxiliary hopper and its valve; Fig. 5 is a side elevation of the two valves; Fig. 6 is a section of a gear casing; Fig. 7 is a plan view of the gear casing; Fig. 8 shows a vertical section of a modification; Fig. 9 is a plan view of the valves of Fig. 8; Fig. 10 is a vertical section of another modification.

Referring more particularly to the drawings, 1 is the main hopper for holding the carbid, the same preferably having a tapering bottom and being provided with a removable lower section 2.

3 is the auxiliary hopper having an inwardly turned flange 4.

5 is the upper valve partially closing the discharge opening of the main hopper. 6 is the lower valve partially closing the discharge opening of the auxiliary hopper. These valves are rigidly mounted upon a hollow shaft 7 which is secured to and driven by a shaft 8 having at its upper end a bevel gear 9 meshing with a bevel gear 10, carried by a horizontal shaft 11, which is connected to a shaft 12 by a flange and slot clutch 13. The shaft 12 is driven by power from any suitable source, such for instance as a gasometer bell or an independent motor device. The shaft 11 is provided with ball-bearings 14 to reduce the friction. The shaft 8 is provided with ball-bearings 15 for the same purpose. The gears 9 and 10 are inclosed within a gear casing 16 which provides a support for the ball-bearings 14 and 15. This gear casing has a removable cover 17 secured thereto by screws so as to form a tightly closed chamber for the gears 9 and 10. The upper end of the hollow shaft 7 comes in proximity to the gear casing and bears against a felt washer 18 which prevents the dust from reaching the ball-bearings 15. A similar felt washer 19 prevents the dust from reaching the ball-bearings 14 and the inside of the gear casing.

The valves 5 and 6 are provided with openings 20 and 21 respectively, and if placed near one another, as shown in the drawings, these openings are separated by a dividing wall or partition 22, the opening 20 being in proximity to one side of this wall and the opening 21 being in proximity to the other side thereof. If the angle of distance between the openings 20 and 21 is increased, and particularly if the valves 5 and 6 are close enough together, the partition may be omitted. The valves 5 and 6 have their outer edges upturned and are preferably so constructed as to slightly overlap the lower edges of their respective hoppers.

The operation of the feeding device is as follows: The carbid is placed in the main hopper 1 and falls through the opening 20 of the valve 5 on to the valve 6 until a sufficient mass has been collected to stop the further flow of carbid. The surface of the carbid lying between the opening 20 and the opening 21 is inclined, the thickness of the mass growing less and less as the opening 21 is approached. If now the shaft 11 is turned, the valves 5 and 6, through the medium of the gears 9—10, are revolved counter-clockwise and synchronously. The result is that the carbid which is supported by the lower valve 6 is slowly moved relatively to that valve until it drops a little at a time through the opening 21 into the water chamber below. The feed is continuous so long as the valves 5 and 6 rotate and is very definite and positive for a given rotation of the shaft 11.

In order that the feed mechanism may be easily removed for inspection or repair, the lower portion 2 of the main hopper, together with the auxiliary hopper 3 and its flange 4, is made removable, said parts being fastened

together so as to make a rigid device. To the auxiliary hopper are connected three posts 23 to the upper ends of which the gear casing 16 is secured by arms 24 and pins 25. The upper ends of the posts 23 pass through holes in uprights 26, secured to the body portion 27 of the generator, and backed by angular shields 28, which are secured to the inside of the stationary portion of the main hopper, so that when the auxiliary hopper is removed, the gear casing 16, together with gears 9 and 10 and their shafts, and one member of the clutch 13, are also removed. The auxiliary hopper 3, together with the lower portion 2 of the main hopper and the parts which are carried thereby, are secured in position by bolts 29 which engage screw-threaded openings 30 in the stationary portion of the generator. The perforations in the upper ends of the arms 26 determine the location of the removable portions at one end, while the bolts 29 determine the position of the removable portions at the lower end and sustain their weight.

The shaft 12 is provided with the ordinary stuffing box 31. A housing 32 having a depending flange 33 is secured by screws 34 to the upper ends of the uprights 26 and prevents the direct weight of carbid within the main hopper from coming upon the valve 5. The direct weight of the carbid between the housing and the valve 5 is sustained by the inclined lower portion of the main hopper.

Figs. 8 and 9 show diagrammatically a modification of the device above described, in which the partition 22 is omitted. In Fig. 8, the two valves are located somewhat nearer together than in Fig. 1, and as shown in Fig. 9, the angular distance between the openings in the two valves is considerably increased. The use of the partition 21 of Fig. 1 permits the two valves to be spaced farther apart so as to feed larger carbid and yet to be of comparatively small diameter, but with proper proportions it may be omitted as in Figs. 8 and 9. The upturning of the outer edges of the valves make it unnecessary to secure the same accuracy in fit that would be necessary if the edges between the hoppers and valves were made to abut instead of overlap, since with the abutting edges the joint would have to be so close as to practically prevent what is known as carbid dust from working through the joint. The lower valve may be of larger diameter than the upper valve if desired, as shown in Figs. 8 and 9. The larger the lower valve, the more gradually is the carbid fed therefrom.

In practical operation, the carbid never works over the edge of the valves 5 and 6, but always falls down through the openings 20 and 21 therein. If the lower valve were removed, the carbid would run directly through. The lower valve acts as a block for the carbid which flows through the opening 21 and the upper valve causes the carbid to pile up on a part of the lower valve which does not contain an opening, so that it cannot fall through the opening 21 of the lower valve unless that valve is revolved so as to move the carbid to the opening. By reason of the fact that both valves revolve, the carbid which falls through the opening 20 upon the lower valve always falls on the same part thereof and is moved along by the rotation until it falls through the opening 21.

In Fig. 8 the hopper is 101 and has no removable lower section. 105 and 106 are the valves having openings 120 and 121. The flange of the lower or auxiliary hopper 104 is secured directly to the body portion 127 of the generator. The valves do not have conical centers but have shields 150—151 located above their centers fixed in position by rigid connections 152—153 with the walls of the hopper and generator. The valve 106 is larger in diameter than the valve 105 so as to secure a feed more nearly piece by piece. Both valves are perforated at 154—155 to prevent material accumulating at their centers.

In Fig. 10, I have shown the valves in the form of inverted cones. In this figure, 201 is the hopper, 205 is the upper valve and 206 is the lower valve. The supplemental hopper 203 has a vertical wall, which ends above the lower valve 206, the whole being surrounded by the body portion 227 of the generator. The openings in the valves may be spaced as above described, a separating partition being used if the spacing is such as to require it. In this form, the tendency of the material as it lies upon the valves is the valves and their respective hoppers, so that the liability of a piece of the material always to work away from the joint between fed wedging in the joint between a hopper and valve is still further eliminated.

Various other modifications can be made in the form of my apparatus without departing from the spirit of my invention, as will be evident to those familiar with the problems involved in feeding carbid.

My invention, while described in connection with acetylene generators, is useful in other relations and for feeding other material than carbid, and is adapted for use when it is desired to feed any granular material in a uniform and positive manner. I have found that two hoppers and two valves are sufficient for ordinary purposes and produce good results. The number of hoppers used may be varied, however, so long as a plurality is used, so as to secure the best results for the particular conditions in hand.

What I claim is:

1. In a feeding device, the combination of a hopper having a discharge opening, a

valve therefor having an opening therein, an auxiliary hopper having a discharge opening, a valve therefor having an opening therein, said valves being mounted so as to rotate synchronously about a common axis and the openings in said valves being angularly displaced relatively to one another, the discharge opening in each hopper surrounding the axis of rotation of the valve so that said axis passes through said discharge openings.

2. In a feeding device, the combination of a hopper, a valve therefor having an opening therein, an auxiliary hopper, a valve therefor having an opening therein, said valves being mounted so as to rotate synchronously about a common axis, and a partition separating said openings.

3. In a feeding device, the combination of a hopper, a valve therefor having an opening therein, an auxiliary hopper, a valve therefor having an opening therein, said valves being mounted so as to rotate synchronously about a common axis, the openings in said valves being angularly displaced relatively to one another, each of said hoppers having a discharge opening surrounding the axis of rotation of said valves so that said axis passes through said discharge openings, said valves overlapping said discharge openings.

4. In a feeding device, the combination of a hopper, a valve therefor having an opening therein, an auxiliary hopper, a valve therefor having an opening therein, said valves being mounted so as to rotate synchronously about a common axis, the openings in said valves being angularly displaced relatively to one another, said valves overlapping the openings in said hoppers and having upturned edges.

5. In a feeding device, the combination of a hopper, a valve therefor having an opening therein, an auxiliary hopper, a valve therefor having an opening therein, said valves being mounted so as to rotate synchronously about a common axis, the auxiliary hopper and the lower portion of the main hopper being removable.

6. In a feeding device, the combination of a hopper having a discharge opening, a valve therefor having an opening therein, an auxiliary hopper, a second valve therefor having an opening therein, said valves being mounted so as to rotate synchronously about a common vertical axis, the auxiliary hopper and the lower portion of the main hopper being removable together with the valves and driving mechanism therefor.

7. In a feeding device, the combination of a hopper, a valve therefor having an opening therein, an auxiliary hopper, a valve therefor having an opening therein, said valves being mounted so as to rotate synchronously about a common axis, and a housing located above said valves.

8. In a feeding device, the combination of a hopper having a discharge opening, a revolving disk having an opening eccentric to said discharge opening and to the axis of revolution of said disk and constituting a valve for said discharge opening, a second disk below said first disk, and rotating therewith, and means for discharging from said second disk material fed thereto through said first disk.

9. In a feeding device, the combination of a hopper having a discharge opening, a revolving disk having an opening eccentric to said discharge opening and to the axis of revolution of said disk and constituting a valve for said discharge opening, a second disk below said first disk, rotating therewith and provided with an eccentric opening, and means for discharging from said second disk material fed thereto through said first disk.

LOUIS E. SHAW.

Witnesses:
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Correction in Letters Patent No. 991,758.

It is hereby certified that in Letters Patent No. 991,758, granted May 9, 1911, upon the application of Louis E. Shaw, of New York, N. Y., for an improvement in "Feeding Devices," an error appears in the printed specification requiring correction as follows: Page 2, line 107 should be stricken out, and same page, line 104, after the word "is" the words *always to work away from the joint between* should be inserted; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of June, A. D., 1911.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.