F. L. SAWYER.

HOPPER VALVE.

APPLICATION FILED DEC. 19, 1906.

898,689.

Patented Sept. 15, 1908.

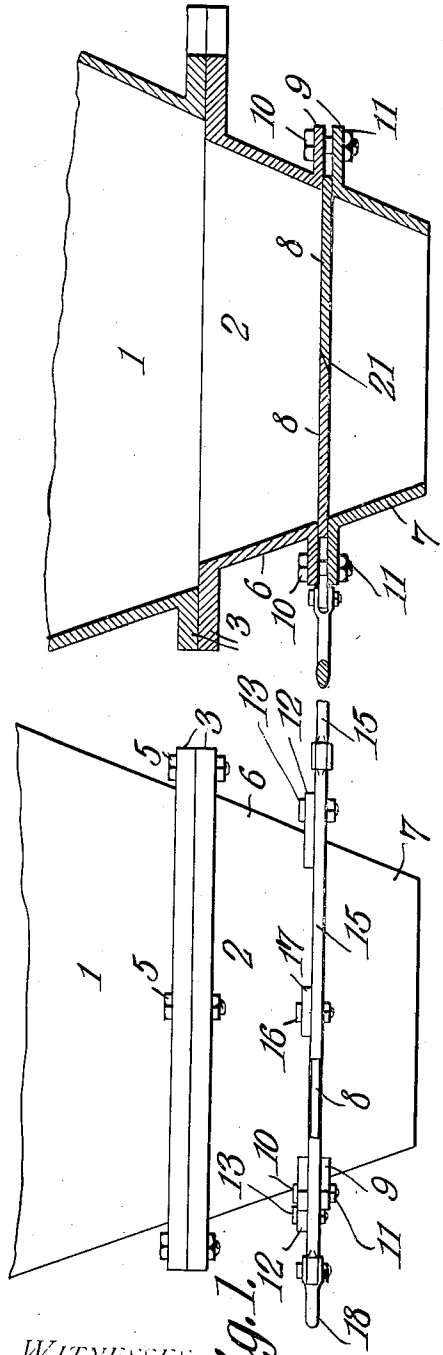


Fig. 1.

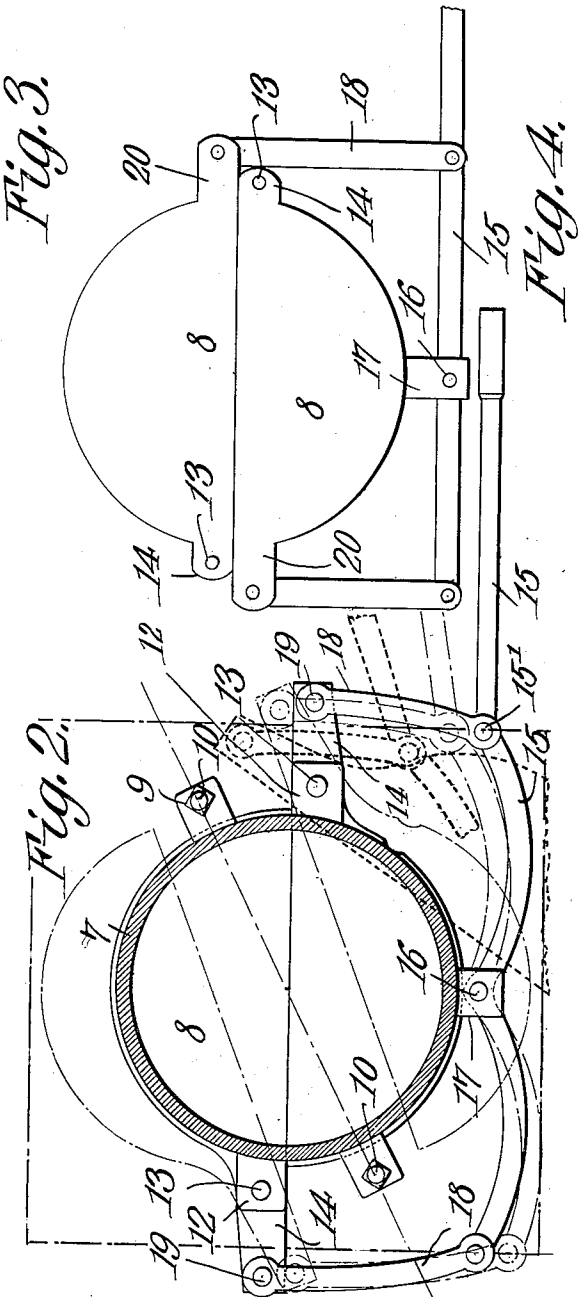


Fig. 2.

Fig. 3.

Fig. 4.

WITNESSES:

E. T. Stewart

C. Bradway.

Fred L. Sawyer, INVENTOR.

By C. A. Snow & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

FRED L. SAWYER, OF AMERICUS, GEORGIA.

HOPPER-VALVE.

No. 898,689. Specification of Letters Patent. Patented Sept. 15, 1908.

Application filed December 19, 1906. Serial No. 348,586.

To all whom it may concern:

Be it known that I, FRED L. SAWYER, a citizen of the United States, residing at Americus, in the county of Sumter and State of Georgia, have invented a new and useful Hopper-Valve, of which the following is a specification.

This invention relates to hopper valves intended for use in connection with elevator spouts or discharge conduits for handling grain, meal, flour, fertilizer, and the like, and relates more particularly to a valve of that type having two movable members which operate simultaneously to open or close the valve port by a single operating mechanism.

While the hopper valve is especially adapted to grain elevators, and the like, there are certain features of the invention which are capable of other uses.

The invention has for one of its objects to improve and simplify the construction and operation of apparatus of this character, so as to be comparatively simple and inexpensive to manufacture, and easy and reliable in operation.

A further object of the invention is to provide a discharge mouth for the hopper designed to support the two valve members and guide their movement, and to carry the mechanism for simultaneously actuating the valve members.

With these objects in view, and others, as will appear as the nature of the invention is better understood, the invention comprises the various novel features of construction and arrangement of parts, which will be more fully described hereinafter, and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates certain of the embodiments of the invention, Figure 1 is an elevation of a hopper mouth with the improved valve applied thereto. Fig. 2 is a plan view thereof with the upper section of the hopper mouth removed. Fig. 3 is a central vertical section of a modified form of hopper valve. Fig. 4 is a plan view of the valve and its operating mechanism according to the modified construction, the parts being isolated from the hopper.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

Referring to the drawing, 1 designates the lower portion of the hopper, and 2 the mouth attached thereto. The hopper and mouth are preferably castings of frusto-conical form and provided with transverse flanges 3 which, as shown by the dotted lines 4, Fig. 2, are square in plan view, and the flanges 3 are provided with registering apertures for the reception of bolts 5 whereby the mouth is supported on the hopper.

The mouth 2 forms a casing for the valve and comprises the two horizontally divisible sections 6 and 7, which sections together form a frustum of a cone. The section 7 is supported on the section 6, and the two sections are suitably spaced apart at adjacent ends to receive between them the two members 8 of the valve. To support the section 7 in this manner, the two sections are provided at diametrically opposite points with alining lugs 9 which are apertured to receive the bolts 10. The lugs of the upper section 6 serve to support the bolts, and the nuts 11 of the latter support the lower section 7. The nuts are adjusted to such a position that a space is provided between the sections slightly greater than the thickness of the valve members 8, so that the latter can move freely back and forth.

The valve members 8 are of semi-discus form and are pivotally mounted so as to swing between the two sections of the mouth to open or cut off the supply of material through the latter. The upper section 6 of the mouth is provided at two diametrically opposite points with apertured lugs 12 on each of which one of the members 8 of the valve is fulcrumed by the vertical pivot 13, each member 8 being formed with an apertured lug or ear 14 through which its respective pivot 13 passes. The mechanism for actuating the valve members simultaneously comprises an operating lever 15 fulcrumed at 16 on the lug 17 formed in the section 6 of the mouth, and the two links 18 both pivotally connected with the operating lever and each connected with one of the valve members. The links 18 are connected with the operating lever on opposite sides of the fulcrum 16, so that as the lever is moved, the links are actuated in opposite directions for simultaneously opening or closing the valve. The links 18 may be connected to the valve members 8 at the fulcrumed ends of the latter, as shown in Fig. 2, or at the ends opposite from the fulcrums 13, as shown in Fig. 4. According to the first construction, the lugs 14 are extended a suffi-

cient distance outwardly from the fulcrums 13 to permit the pivots or hinge connections 19 to be suitably removed from the fulcrums for affording ample leverage to actuate the valve members with facility. In the construction shown in Fig. 4, each valve member 8 is formed with an ear 20 at the end opposite from the ear 14, and the links 18 are hingedly connected with the ears 20 of the valve members. The diametrical meeting edges of the valve members are formed into knife edges 21 which are beveled in opposite directions so as to overlap each other when the valve members are in closed position, as shown in Fig. 3. These knife edges coöperate to form a tight closure, so that fine particles, such as flour, cannot sift through when the valve is closed.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and method of operation will be readily appreciated by those skilled in the art to which the invention appertains. When the valve is closed, the parts are in the full line position shown in Figs. 2 and 3. In this position, the members 8 of the valve are supported at their peripheral edge on the lower section 7 of the mouth, so that the said members are capable of sustaining an enormous weight of material in the elevator spout. When it is desired to open the valve, the operating lever 15 is actuated from either end to the broken line position, Fig. 2. This causes the valve members 8 to be swung outwardly so that the material in the hopper can discharge between the meeting edges of the members. The outward and inward swinging movement of the valve members takes place around their respective fulcrums, and the members slide on the top end surface of the mouth section 7. It will thus be seen that the valve members are always substantially supported and that the wear is taken by large surfaces as distinguished from that type of hopper valve in which the wear and the weight of material on the valve members are taken by the pivots. The parts of the valve mechanism are so disposed that the valve members can be actuated in a simple and easy manner.

As the two members 8 of the valve open outwardly from the center of the hopper, the products in the latter will be permitted to have a perpendicular fall at once from the center of the column or body in the hopper, thereby eliminating the process of pounding the hopper to get the flow started from the sides thereof where the material tends to bank up on the inclined portions of the mouth. This difficulty is very common in the old method of handling sticky and damp products, such as acid phosphate, sugar, cotton seed meal, and so forth. The opening movement of the two members 8 of the valve is limited by one of the members striking against the pivot or bolt 15′ between the actuating lever 15 and one of the links 18, and the outward limit of one of the members is indicated by dotted lines in Fig. 2.

I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative, and that various changes may be made, when desired, as are within the scope of the invention.

What is claimed is:—

1. In an apparatus of the class described, a hopper having a discharge mouth, a valve forming a closure for the mouth and comprising co-acting members mounted on diametrically disposed pivot pins and adapted to swing in a plane at substantially right angles to the axis of said mouth, said members having meeting edges, and means for simultaneously swinging said valve members in opposite directions.

2. In an apparatus of the class described, a hopper having a discharge mouth, a valve forming a closure for the mouth and comprising co-acting members mounted on diametrically disposed pivot pins and adapted to swing in a plane at substantially right angles to the axis of said mouth, said members having meeting edges, an operating lever fulcrumed to a fixed part of said apparatus, and a link pivoted in like manner to each valve member and to the lever on opposite sides of its fulcrum.

3. In an apparatus of the class described, a hopper having a discharge mouth, a valve forming a closure for said mouth and comprising co-acting sections disposed in the same plane and having meeting edges, pivots for said valve sections on opposite sides of said meeting edges, and means connected to said valve sections on opposite sides of said meeting edges and on the same side as their pivot pins for simultaneously swinging said valve sections to and from each other.

4. In an apparatus of the class described, the combination with an inverted frusto-conical discharge mouth comprising separable mating sections spaced to form between them a valve way and having parallel opposing faces, lugs projecting from each section and connected by fastening devices for adjusting the width of said valve way, hinged coöperating valve members lying in the same plane and mounted in said valve-way on diametrically disposed pivot pins, and a rocking lever fulcrumed to said hopper and connected to the valve members for opening and closing the discharge mouth.

5. In an apparatus of the class described, the combination with a hopper having a discharge mouth formed of two separable sections having apertured lugs disposed to reg-

ister, bolts extending through the apertured lugs for supporting one section on the other with a space between them, a pair of valve members lying in the same plane and mounted on diametrically disposed pivot pins, said valve members being slidably mounted on one of the sections and movable to and from each other, a lever supported on the discharge mouth, and links connected with the lever on opposite sides of the fulcrum thereof and with the valve members for simultaneously operating the same.

6. In an apparatus of the class described, the combination with a hopper having a discharge mouth composed of frusto conical sections arranged one over the other and slightly spaced apart, bolts supporting one section upon the other, horizontally movable valve members disposed in the space between the sections, vertically disposed pivots for the valve members, said valve members having over-lapping knife edges at the meeting portions thereof, a lever fulcrumed on the mouth, ears on the valve members projecting outwardly through the space between the sections, and a link between each ear and the lever.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

FRED L. SAWYER.

Witnesses:
T. H. McLENDON,
E. B. EVERETT.