No. 698,146. Patented Apr. 22, 1902.

A. SMITH.

GATE FOR HOPPERS OR CHUTES.

(Application filed Jan. 21, 1902.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 2.

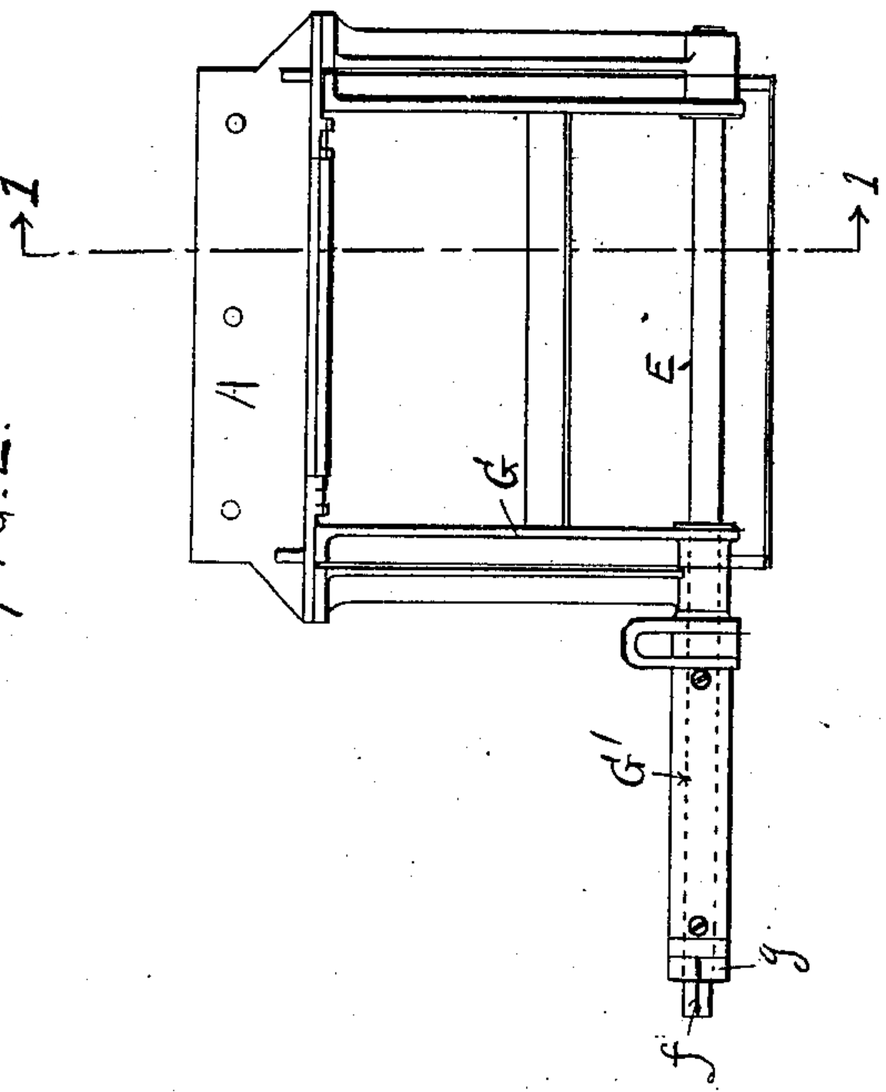
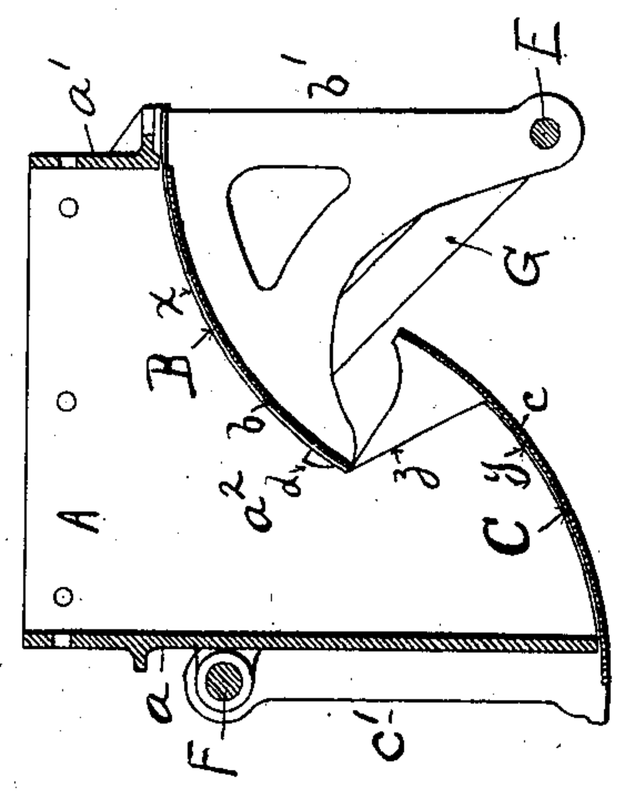


FIG. 1.



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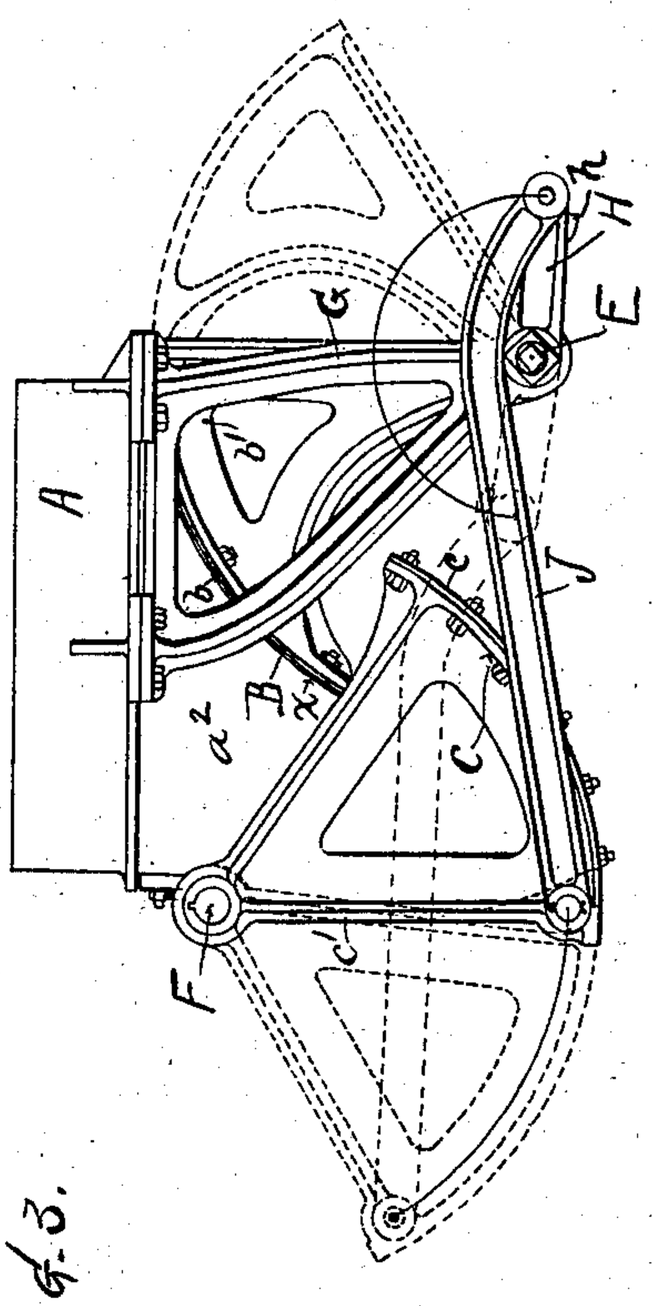

FIG. 3.

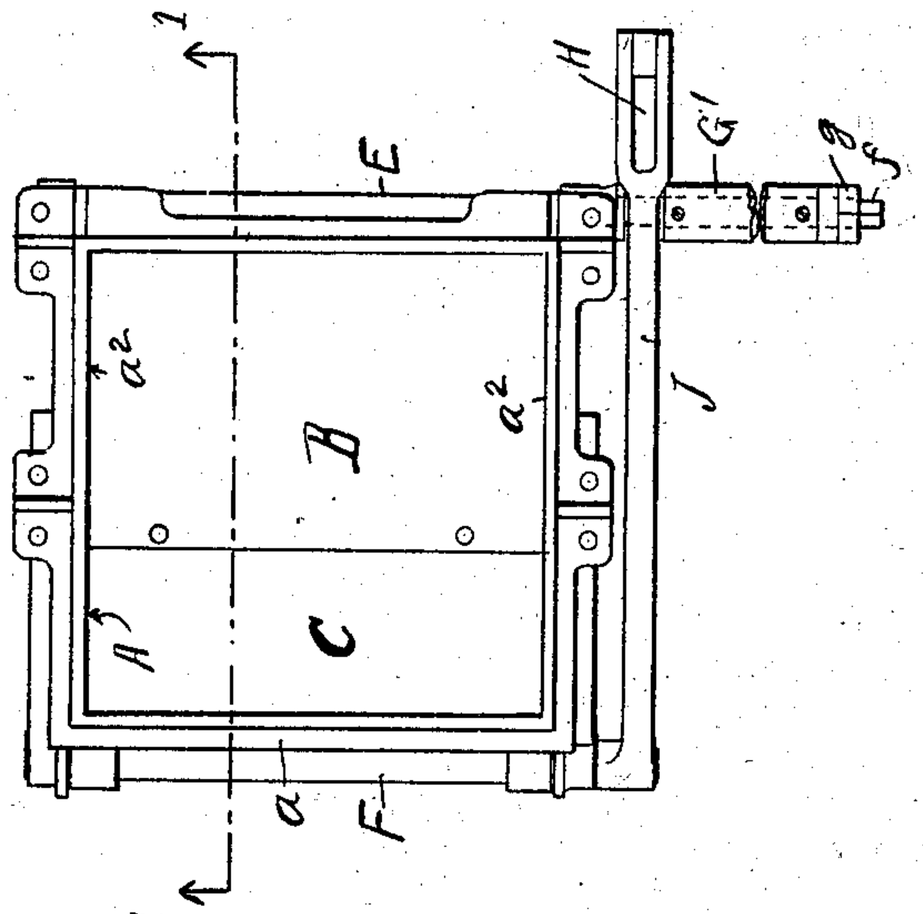

FIG. 4.

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UNITED STATES PATENT OFFICE.

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GATE FOR HOPPERS OR CHUTES.

SPECIFICATION forming part of Letters Patent No. 698,146, dated April 22, 1902.

Application filed January 21, 1902. Serial No. 90,614. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS SMITH, a citizen of the United States of America, residing in the borough of Manhattan, in the county and State of New York, have invented an Improved Gate for Hoppers or Chutes, of which the following is a specification.

My invention relates more particularly to that class of gate-valves which are required for use on hoppers, storage-bins, and chutes employed in the handling of coal, broken stone, gravel, or other granular material; and one of the main objects of my invention is to so construct the gate-valve that it shall be adapted to the handling of coal or other granular material having in it large lumps which cannot easily be broken or bitten through by the double valve or other gates of the ordinary construction. This object I attain by the construction of double gate-valve, which I will proceed to describe.

In the accompanying drawings, Figure 1 is a cross-sectional view of my improved double gate-valve on the line 1 1, Figs. 2 and 4. Fig. 2 is a rear elevation, Fig. 3 is a side elevation, and Fig. 4 is a plan view.

In the drawings I have shown the casing or discharge-spout for the chute or hopper as in the form of a short tube A, preferably rectangular in section, Fig. 4, and adapted to be closed by two pivoted gate-valves B and C, the gate or cut-off elements of the valves being constructed so that their adjacent edges do not meet as two-part gates commonly do when the valves are closed, but are then separated one above the other by a considerable space, Fig. 1, depending on the size of the lumps to be handled. Each valve B (C) is composed of a curved cut-off or gate part *b* (*c*) to lie across the mouth of the discharge-spout A when the valve is closed, and also side pieces or arms *b'* (*c'*), by which each valve is connected to its pivot-shaft E (F.) By preference one valve B is pivoted below its working face or gate part *b*, while the other valve C is pivoted above its working face or gate part *c*. For the support of the pivoting-shaft E of the valve B, I provide pendent brackets G, between which the valve works. The pivoting-shaft F of the valve C is mounted in bearings near the upper part of the discharge-spout outside the adjacent wall *a*, which extends down to the curved inner face of the gate part *c*, Fig. 1. The opposite wall *a'* of the discharge-spout is much shorter, as it has to reach only to the upper curved face of the gate part *b* of the valve B. The side walls a^2 a^2 of the discharge-spout are cut with curved edges *x* and *y* to fit down over the curved upper faces of the gate parts *b* and *c* of the two valves when closed, as seen most clearly in Fig. 1. The edges *z* of the side walls a^2, which lie between the curved edges *x* and *y* and between the overlapping parts of the valve-gates, are cut to a suitable angle to prevent the escape of the coal or other granular material at the sides when the valves are closed.

Various means may be employed for manipulating the two valves, but the following construction can conveniently be used: The pivoting-shaft E, to which the valve B is pinned or keyed, is extended out at one side, Figs. 2 and 4, and has a squared end *f*, to which a wrench or lever may be applied. The outward or opening movement of the valve B (shown by dotted lines in Fig. 3) may be limited by stops *d* or other suitable stop means. The inward or closed portion of the valve B may be determined by the edges *z* of the side walls a^2 of the discharge-spout. Gravity will maintain the valve B in either position to which it may be swung. The valve C may be manipulated from a sleeve G', mounted to turn freely on the extended end of the shaft E and having a crank H, connected by means of a long link J to the lower end of the valve C. The sleeve G' may have a squared end *g* for the application of a wrench or lever. The link J is curved, as shown in Fig. 3, so that when the valve C is in its closed position, as shown by full lines in that figure, with the link resting upon the shaft E or sleeve G', the crank H will have passed the dead-center, and thus the valve will be locked in its closed position shown. Similarly when the crank H is thrown over to the left to turn the valve to the open position shown by dotted lines the crank will have passed its opposite dead-center, and so lock the valve in the open position. A stop *h* on the crank, Fig. 3, coming against the upper edge of the link J when the

crank is thrown over to the left may be employed to limit the movement in that direction. If the gate is open with the valves in the dotted positions shown in Fig. 3 and it is desired to cut off the flow of material, the valve B is first turned to the position indicated in full lines by rotating the shaft E by any suitable means. The gate is so arranged that the valve B will strike the sides of the discharge-spout at *z* when it has arrived at the position shown in full lines, so that it cannot turn farther, and thus it leaves open the space between its forward edge and the opposite wall of the spout. The size of this space is to be determined by the size of the lumps to be handled, the object being to make this space so large that a lump could pass through and not be caught between the wall of the tube and the gate of the valve B. The flow of material passing through the space referred to is finally stopped by turning valve C from the dotted position to the position shown in full lines in Fig. 3. The length of radius of this valve and the position of its axis are such that the edge of its gate *c* will pass below or outside of and overlap the edge of valve B in its closed position, as shown in Fig. 1. The distance between the gates of the two valves is taken with consideration to the size of the lumps to be handled, so that the lump could not jam either between the wall of the spout and the cutting edge of valve B or between the cutting edges of the two valves. The valve C is further arranged so that its advance edge will overlap valve B and rise high enough to prevent the granular material under the influence of considerable static pressure from rising up and flowing over the edge of valve C. By this means the valve C completely cuts off the flow of material. It is best to open the valves in the reverse of the above order—that is, first, by swinging back valve C to the dotted position and then by swinging valve B to its dotted position.

I claim as my invention—

1. The combination of the discharge-spout of a hopper or chute with two pivoted gate-valves, having their adjacent edges spaced apart but overlapping when the valves are closed, as and for the purpose described.

2. The combination of the discharge-spout of a hopper or chute, with two gate-valves pivoted one below and the other above its gate-face, the adjacent edges of the gates being spaced apart when the valves are closed, as and for the purpose described.

3. The combination of the discharge-spout of a hopper or chute with two pivoted valves, having curved gates to lie across the spout with their edges overlapping, but spaced apart when the valves are closed, substantially as described.

4. The combination of the discharge-spout of a hopper or chute with two valves consisting of gates and side arms, by which they are pivoted; said gates being adapted when closed to lie across the spout with their edges overlapping but spaced apart and by their joint action close the spout, substantially as described.

5. The combination of the discharge-spout of a hopper or chute with two gate-valves, one pivoted above and the other pivoted below its gate-face, the latter of the two valves being pivoted to stay in either its open or closed position by gravity.

6. The combination of the discharge-spout of a hopper or chute with two gate-valves, one pivoted below and the other pivoted above its gate-face, and means for locking the latter of the two valves in its open or closed position.

7. The combination of the discharge-spout of a hopper or chute with two valves, consisting of gates and side arms by which they are pivoted, said gates being adapted, when closed, to lie across the spout with their adjacent edges spaced apart, but by their joint action closing the spout, substantially as described.

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

AUGUSTUS SMITH.

Witnesses:

HUBERT HOWSON,

F. WARREN WRIGHT.