

UNITED STATES PATENT OFFICE.

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GRAVITY DROP-DOOR.

No. 815,284.

Specification of Letters Patent.

Patented March 13, 1906.

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To all whom it may concern:

Be it known that I, JOHN MARSTON GOODWIN, a citizen of the United States, and a resident of the city of Mount Vernon, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Gravity Drop-Doors, of which the following is a full, true, and concise specification.

10 This invention concerns gravity drop-doors for dumping vehicles or receptacles, and relates more particularly to the structural formation of a valve-door for use in dumping apparatus—such as is shown, for
15 example, in Patent No. 678,657, granted to me July 16, 1901—the object of the invention being the production of a valve-door having superior qualities of rigidity and resistance
20 against shock and strain combined with features of simplicity, economy, and lightness of weight, as will hereinafter more fully appear.

Referring to the accompanying sheet of drawings, forming a part hereof, Figure 1 is a
25 vertical transverse sectional view through a valve-door embodying my invention and also so much of the adjacent portions of the receptacle with which said door is used as is necessary to illustrate the relation of my invention thereto. Fig. 2 is a longitudinal sec-
30 tional view of a portion of the door, showing several of the united sections or components thereof, the said view being taken on line 3² 3² of Fig. 4 and in the direction of the arrows 2 2. Fig. 3 is a similar view on the same line
35 in the direction of the arrows 3 3. Fig. 4 is a half bottom and half top plan view of the valve-door, showing a portion of the hinge mechanism; and Fig. 5 is a plan of the sheet-metal blank from which the individual sec-
40 tions of the door are formed.

Referring to Fig. 1, the reference character H represents one of the two longitudinal girders which constitute the margins or side walls of a dumping-car or other receptacle,
45 and J is a shaft extending longitudinally of the receptacle which provides a pivotal axis for the two center dumping-valves A A'. The latter are adapted to be supported in the position shown in the drawings by means of the
50 detents C, which, however, are capable of outward rotation, so as to permit the said center valves to drop to a lower position, as is fully disclosed in my said prior patent above referred to. The valve or gravity drop-door,
55 which constitutes the major portion of the

bottom of the receptacle, is represented generally by the reference character G and is pivotally supported at one side from the girder H by means of hinge mechanism B, while its other or free side is adapted to be supported
60 by resting upon the proximate edge of the center valve A. The said hinge mechanism comprises a longitudinal shaft 1, located beyond the upper edge of the valve-door G and journaled to rock in brackets 2. A number
65 of hinge arms or links 3 are carried on the said shaft, which have pivotal connection with the flanges of the valve-door by means of hinge-pins 4, located inward of the margin
70 or upper edge of the valve-door. The brackets 2 may be fastened to the girder H in any suitable manner and are preferably disposed beneath the inclined plate or member 5, so that the door G may close upwardly against
75 the lower edge of the same, as shown in Fig. 1. When the valve A is tripped by the removal of its detent C, the door G, acted upon by the mass of the load resting upon it, swings
80 first on the axis of the shaft 1 and then on that of the pivotal connection 4, thereby allowing the contents of the receptacle to escape; but when held by the valve A, as shown in the drawings, the upper portion of
85 the valve-door braces against the hinge-arms 3 with a locking effect, so that there is no tendency for pivotal motion at the axis of
90 4, strain at this point being resolved in an outward direction, and the closed condition of the valve-door is thus maintained solely by the supporting effect of the detent means A.

Referring now to Figs. 2 to 5, the valve-door G is formed of a plurality of sheet-metal sections united to form a unitary structure with the flange-joints between them disposed
95 transversely to the longitudinal dimension of the door and also transversely to the pivotal axis of the hinge mechanism. The individual sections are formed from rectangular blanks, like that indicated in Fig. 5, wherein
100 the body portion 6 of each section is substantially flat and the side edges thereof are bent downwardly to form downturned side flanges 7 7. The lower margins of these flanges are then bent inwardly to constitute auxiliary
105 flanges 8 8. Apertures 9 are formed in the side flanges 7 to receive the hinge-pins 4, carried by the links 3, above referred to, and these apertures may be and preferably are
110 formed in ears 10 10 on the flanges 7 7, which ears depend below the flanges a distance

about equal to the width of the auxiliary flanges 8, as will be observed from an examination of the blank shown in Fig. 5. The ends of the side flanges 7 7 are bent or pressed inwardly at right angles therewith to form tabs 11 11 at the free end of the section and likewise the tabs 12 12 and 13 13 at the hinge ends of the sections, the tabs 12 being preferably bent at an angle, as shown in Fig. 5, and the tabs 13 being turned inwardly substantially the same as the auxiliary flanges 8. It will be observed that by the above-described method of folding and shaping a rectangular blank the body portion 6 is caused to extend over the ends of its flange and substantially all of the metal is utilized in the production of a rigid section, and there is no appreciable waste of material in so doing, it being understood that the apertures for the hinge-pins and rivets are preferably made before the blank is bent. The several sections thus made are placed side by side with their side flanges 7 respectively adjacent and preferably contiguous, in which positions they are joined together by means of two longitudinal cleat members 14 and 15, secured to them at their opposite ends. The cleat 14 is shown herein as an angle-bar having two flanges at an obtuse angle to each other, the upper flange being secured by rivets to the inturned tabs 12 and the lower flange being similarly secured underneath the door to the tabs 13. This flange of the angle-bar is in this manner so located that it provides a continuous bearing-surface for the valve-door against the links 3 when the said door is in its closed position, and thereby coöperates with the pivotal connections 4 for supporting the hinged side of the door, as already described. The other cleat member 15 is shown herein as a Z-bar, having its web secured to the inturned tabs 11 11, with its upper flange adjacent to that portion of the body 6 which extends beyond the tabs 11 and with its lower flange adjacent to the lower faces of the auxiliary side flanges 8 8. The flanges of the Z-bar are preferably riveted to the portions of the sections which are adjacent to them, the rivets of the upper member being countersunk at least at their lower ends, so as to produce a continuous bearing-surface for the side of the valve-door against the edge of the detent means A. The side flanges 7 of the several sections are also preferably united by a number of rivets, as shown in Fig. 1. As thus united the hinge-pin apertures 9 in each pair of adjacent side flanges are brought into registry, and the hinge-links 3, which are also arranged in pairs, respectively embrace adjacent flanges, with their hinge-pins 4 passing through the apertures.

It will be understood that the proportions of the sections and the cleat members, as well as of the hinge-links, may be altered and modified to suit special requirements. In

such cases as where the hinge-pin apertures are provided in the flanges as distinguished from the projecting ears the hinge-links will naturally require to be so formed as to form an appropriate pivotal support for the side doors, as above described.

Various other modifications may also be made and are intended to be included within the scope of the following claims.

Having described my invention, what I claim, and desire to secure by United States Letters Patent, is—

1. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections having downturned side flanges and united to form a unitary structure, hinge mechanism for supporting one side of said structure having its pivotal axis transverse to the flanges thereof and removable means for supporting the opposite side of said structure.

2. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections having downturned side flanges and longitudinal cleats secured to the opposite ends of said sections, in combination with hinge mechanism adapted to support one side of said door having its pivotal axis transverse to the flanges thereof and removable detent means adapted to support the opposite side of said door.

3. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections having downturned side flanges, hinge mechanism with its axis transverse to said flanges, adapted to support one side of said door, and a longitudinal cleat joining the opposite ends of the said sections and forming a continuous bearing-surface for the free edge of the door, in combination with removable detent means for supporting the said free edge.

4. A structural valve-door for dumping-receptacles, comprising a plurality of flanged sheet-metal sections united by their adjacent flanges to form a unitary structure, cleats respectively secured to the opposite ends of said sections and a hinged support for said door having its pivotal axis transverse to the flange-joints.

5. A structural valve-door for dumping-vehicles, comprising a plurality of sheet-metal sections formed with downturned side flanges and longitudinal cleats uniting said sections to form a unitary structure, in combination with hinge mechanism for said structure connected with the side flanges thereof and means for supporting the free ends of said sections.

6. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections formed with downturned side flanges and longitudinal cleats uniting said sections to form a rigid unitary structure, in combination with hinge-links pivotally

joined at their ends respectively to said flanges and to a part supported by the receptacle beyond the ends of said sections, and means for removably supporting the opposite ends of said sections.

7. A structural valve-door for dumping-receptacles, comprising a plurality of united sheet-metal sections respectively formed with body portions and downturned side flanges, and hinge mechanism for connecting said door with the receptacle, in combination with said body portions extended beyond the free ends of the side flanges and a longitudinal cleat secured to the free ends of said flanges adjacent to said extended body portions.

8. A structural valve-door for dumping-receptacles, comprising a plurality of united sheet-metal sections formed with body portions and contiguous downturned side flanges, and hinge mechanism for supporting one side of the door secured to the flanges thereof, in combination with extensions of said body portions at the opposite side of said door beyond the free ends of said side flanges and a longitudinal cleat secured to the under sides of said extensions to form a bearing-surface.

9. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections respectively having body portions and downturned side flanges, angle-bars disposed along the ends of said sections and inwardly-bent tabs on said flanges secured to said angle-bars, in combination with hinge mechanism secured to said sections along one side of the door with its pivotal axis transverse to said side flanges, and means for removably supporting the opposite side of said door.

10. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections, respectively having body portions and downwardly-bent side flanges, an angle-bar disposed along the hinge ends of said sections and inwardly-bent tabs on said flanges secured to said bar, in combination with extensions of said body portions at the opposite ends thereof beyond their side flanges and an angle-bar having a flange adjacent to said extensions and another flange secured to the ends of said side flanges.

11. A structural valve-door for dumping-receptacles, comprising a plurality of united sheet-metal sections respectively having body portions and downturned side flanges, the ends of said flanges being bent inwardly to form tabs, and the said body portion being extended beyond said tabs, in combination with a Z-bar having its intermediate flange or web secured to said tabs with its two flanges respectively adjacent said ex-

tended body portions and the lower edges of said side flanges.

12. A structural valve-door for dumping-receptacles, comprising a plurality of united sheet-metal sections respectively having body portions and downwardly-bent side flanges, auxiliary side flanges on said side flanges and inwardly-bent tabs formed on the ends of said flanges, the said body portions being extended beyond said tabs, in combination with a Z-bar having its web secured to said tabs and with its two flanges disposed respectively adjacent to said extended body portions and said auxiliary side flanges.

13. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections having downturned side flanges provided with hinge-pin apertures, hinge members respectively engaging in said apertures, and means for supporting said hinge members from the receptacle.

14. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections having body portions and contiguous downturned side flanges, and a longitudinal cleat secured to and uniting the ends of said sections, in combination with supporting hinge-links pivoted respectively to said flanges and the receptacle on opposite sides of said cleat, and means for supporting the free ends of said sections.

15. A structural valve-door for dumping-receptacles, comprising a plurality of sheet-metal sections having body portions and downturned side flanges, a longitudinal cleat secured to and uniting the ends of said sections and so disposed with respect to said supporting hinge-links, in combination with said hinge-links disposed normally beneath said cleat and pivotally connected with said side flanges and the receptacle respectively on opposite sides of said cleat.

16. A structural valve-door for dumping-receptacles, comprised of a plurality of contiguous sheet-metal sections having downturned side flanges of less length than the body portions of said sections, in combination with angle-bars secured to the opposite ends of said side flanges and hinge mechanism connected with said flanges for supporting the door from the receptacle.

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

JOHN MARSTON GOODWIN.

Witnesses:

H. G. KIMBALL,

E. W. GOODWIN