

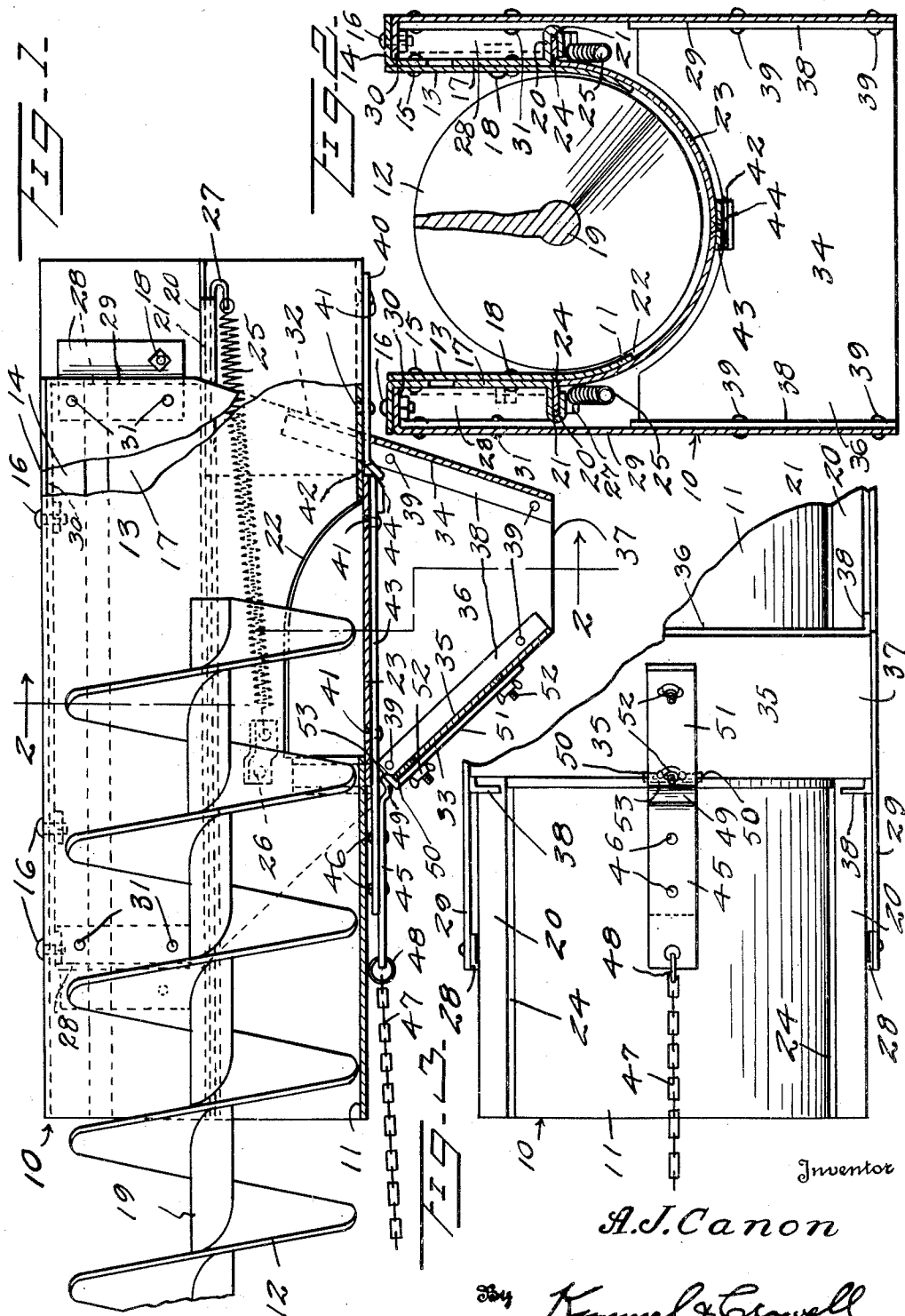
Nov. 8, 1949

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2,487,693

GRAIN GATE

Filed June 18, 1948



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2,487,693

GRAIN GATE

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Application June 18, 1948, Serial No. 33,691

4 Claims. (Cl. 198—65)

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My invention relates to grain gates for use in grain elevators or buildings for elevating, storing, discharging and sometimes processing grain, and particularly in the elevating conveyors embodying a chute, trough or channel-like structure in and along which the grain is conveyed or moved as by means of a screw, and an object thereof is to provide means whereby the grain propelled along and through the chute may be discharged at a point in the extent or length thereof into a vehicle, grain wagon, railway grain car, for packaging in containers, barrels, sacks, for processing or for any other purpose.

An object of the invention is to provide a novel and simple grain gate associated with the chute or trough and interposed in the length thereof to control the discharge thereof and prevent the sagging of the gate proper when the chute is closed off thereby to avoid leaving a low place or area in the chute by maintaining the gate up in line.

The invention also comprehends a grain gate in which as many gates as desired may be provided at a plurality of points in the length of or along the chute without having the bottom of the conveyor out of line or sagging at such points to interfere with the conveyance of the grain or permit leakage.

Another object is to construct the gate in a simple, novel and inexpensive manner to render the same efficient in use and capable of easy control to normally close the gate and to open the same when desired at the will of the operator without getting out of order while permitting convenient assembly or disassembly and removal of all the parts thereof and consequently expeditious repair or replacement of parts of the gate when necessary under unusual instances or when occasion arises.

A further object is to provide means in the form of a latch for limiting the movements of the gate to open and closed positions and to prevent movement thereof when in such positions, spring means normally holding the gate closed, means for opening the gate to any desired degree or fully open position, as well as means for supporting the gate for movement to and in open and closed positions and guiding the same in such movements and positions.

A still further object is to provide a means or latch for holding or wedging the gate in open position and stops for limiting the movements in either direction in open or closed positions.

To the foregoing objects, and others which may hereinafter more fully appear, the invention consists of the novel construction, combination and

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arrangement of parts, as will be more specifically referred to and illustrated in the accompanying drawings, but it is to be understood that changes, variations, and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawing:

Figure 1 is a vertical sectional side elevation of a grain elevator with a grain gate embodying my invention.

Figure 2 is a vertical cross section taken on the staggered section line 2—2 of Figure 1.

Figure 3 is a fragmentary bottom view.

Referring to the drawing, the parts are constructed of suitable sheet metal such as galvanized iron or otherwise, in which 10 designates the grain conveyor adapted to be installed in a grain elevator or the like, or otherwise, including a concavo-convex chute, trough or channel-like structure 11 in which a screw 12 driven in the usual or any suitable manner operates to convey the grain along the chute or trough 11 with screw 12 operating in the oval or semi-circular lower part thereof with its periphery tangential to and between the spaced parallel upwardly directed spaced parallel vertical sides 13 of the chute. The sides 13 of the chute 11 are provided at the top edges with outwardly directed flanges 14 shown as comprising right-angle strips having vertically depending inner flanges or sides, riveted, spot welded, bolted or otherwise secured to the outer faces of the sides 13 as at 15 and provided along the outwardly directed top flanges or sides with a plurality of spaced bolts 16 for attachment of the cover of the usual conveyor (not shown).

Also secured to the outer faces of the sides 13 in spaced parallel relation beneath angle strips or flanges 14 are wider angle strips 17, as at 18, in the same manner as angle strips or flanges 14 are secured but preferably with bolts at the ends, all of said strips being above the center axis of trough or chute 11 and shaft 19 of screw 12. Outwardly of opposite sides horizontally in line or in the same horizontal plane with the center axis of chute 11 and shaft 19 are guideways or tracks 20 shown as formed by bending the lower edge portions of the strips 17 in reverted fashion horizontally outwardly at the top, downwardly at the outside, and inwardly at the bottom with narrower portions to the vertical plane in line with the outer faces of the strips 17 in spaced parallel relation to the top portions to form inwardly facing grooves or channels of the guideways or tracks 20 as at 21.

The bottom of the chute 11 at the curved portion is provided at one or more points where the gate or valve is to be provided with a discharge opening 22 which as shown may be square or transverse and straight at one end perpendicular to the axis and longitudinal side edges thereof, and curved concavely or tapered at the opposite end. A semi-circular gate or closure proper 23 of the same cross-sectional shape as the bottom of the chute or trough 11 has outwardly directed longitudinal side flanges 24 slidably engaged in grooves 21 and is positioned against the bottom thereof and so correlated to opening 22 to move or slide to open and closed positions longitudinally beneath said opening to uncover and cover the same to permit or shut off the discharge of grain therethrough.

Gate 23 overlaps the chute or trough 11 at the ends of the opening 22 and, of course, extends above the side edges thereof so as to cut off said opening when closed to the right as shown in Figure 1 and when moved to the left will uncover said opening. It is held in a normally closed position by resilient means shown as coil springs 25 anchored to offset angular lugs 26 riveted or welded to the sides of the gate 23 at the end remote from the curved edge of the opening 22 and having their opposite ends anchored in hooks or lugs 27 attached to or struck from the rebent inwardly extending bottom portions of the guideways 20 beyond the remote end of the gate 23 so that the springs normally move the gate to closed position under the opening 22. Also, the springs are preferably slightly inclined so as to draw upwardly on the gate to assist in maintaining it against the chute and in connection with the slide mounting of the gate to prevent sagging of the latter in open or closed position.

Angular vertical webs or spacers 28 are connected to the sides 13 and strips 14 and 17 at the vertical portions or flanges of the latter above the guideways 20 and also reinforce and strengthen the latter. Spacers or webs 28 have oppositely directed vertical edge flanges secured to strips 14 and 17 at the inside and have side plates 29 secured thereto at the outside in spaced parallel relation outwardly of the guideways 20 and sides 13. These sides or side plates have inwardly directed top flanges 30 which may be secured to the flanges of strips 14 and by the fastening means 16 designed for attachment of the cover of the chute of the conveyor. The attachment of the plates 29 to the outer flanges of the webs 28 may be by means of rivets, bolts or spot welding as indicated at 31 and the webs 28 act as shields to the guides in which the gate works.

It should also be noted from Figure 1 of the drawings that the side plates 29 taper downwardly with the front edges at a relatively sharp angle slightly off vertical toward the opposite end of the opening 22 as indicated at 32 and the opposite edges at a more gradual incline of substantially 45° as indicated at 33.

Transverse plates 34 and 35 are disposed between the side plates 29 at the edges 32 and 33 to form a spout 36 constricted toward the bottom or outlet opening 37. As shown, plates 34 and 35 forming the ends of the spout or hopper are provided with inwardly directed right-angular side flanges 38 bolted, riveted, welded or otherwise secured as indicated at 39 to the sides 29, and the spout is designed to discharge into any suitable receiver and, preferably, its transverse dimension

is greater than its longitudinal dimension but may be otherwise if desired.

Secured to the bottom of the chute 23 beyond the opening 22 is a stop strip or bar 40 riveted or otherwise secured in position as indicated at 41 to extend longitudinally at the lower part of the chute and having its inner end directed downwardly in angular relationship substantially at 45° to form a stop 42. Secured to the bottom of the gate 23 is a similar strip or bar 43 attached in a similar manner and correspondingly numbered. The inner end of the bar 43 carries a tapered block, abutment or button 44 having a beveled front edge designed to engage the stop 42 and limit the closing movement of the gate 23. The opposite end of the bar or strip 43 extends beyond the gate 23 and has riveted to it an extension bar or strip 45 as indicated at 46 with its end spaced from the bottom of the chute or trough 11 and adapted for connection with the pull chain, rod or the like 47 as by means of a ring or eye 48 by which the gate may be opened to uncover the opening 22 against the action of the springs 25 which normally hold the gate closed. The bar or strip 45 is formed at its inner end with an angularly offset bent portion 49 against the bottom face of the bar or strip 43 to form a stop or shoulder, and a notch or shoulder 50 is formed in the upper edge of the wall 35 or vertical portion thereof attached to the sides 29. A bar or strip 51 forming a latch is bolted centrally and longitudinally to the wall 35 as indicated at 52, preferably using wing nuts and with the bar 51 in line with the bars or strips 43 and 45. The upper end of the bar 51 is directed upwardly substantially at right angles into the notch 50 beneath the end 49 of bar 45 as indicated at 53 so as to limit the closing movement of the gate 23 by engagement of the end 49 therewith. However, the gate may be opened by pulling on the connection 47 and moving the end 49 away from the end 53 and the abutment 44 away from the stop 42, but the opening movement is limited by engagement of the abutment 44 with the end 53.

It should be noted that when the gate is opened the stop 49 is unlatched from under the bar or latch 51 and, with the gate partially open, the abutment or knob 44 is moved away from the stop 42 also that the gate or valve is arranged for slidable movement over the end 53 of bar 51 and is of such length as to effect pivoting across said bar with one end in engagement with the trough 11 and the other end spaced adjacent to discharge opening 22 for limited downward movement under the weight of grain passing through the gate. The weight of said grain is sufficient to overcome the lift of springs 25 so as to wedge the gate into close engagement with both the bar and trough and thereby frictionally restrain the gate in an open position. In this manner of operation the gate may be opened and held at any desired position between open and closed positions, to regulate the size of the discharge opening uncovered by the gate and the speed at which the grain is discharged through the spout from the hopper beneath the chute and gate and thus the discharge opening 22. The gate 23 returns to closed position under the urge of springs 25 when the grain ceases to flow. The degree of opening also depends upon the size of the container or receptacle into which the grain is allowed to be discharged and fed. By removing the wing nuts of the bolts 52, the bar may be removed or moved to one side in order that the gate may

be more easily opened and access had to the parts for repairs or replacement should occasion arise.

By reason of the construction of the gate and limiting means as well as the guiding and supporting means for the gate, the contents of the chute may be diverted to the desired place and when the gate is closed, it cannot sag or leave a low place in the chute into which the grain might be wedged to interfere with the movement of the gate or the movement of the grain along the chute since the bottom of the conveyor chute will not be sagging out of line with the bottom of the chute at the gate at points where the discharge openings 22 are provided. Mere removal of the wing nuts permits removal of the parts of the latch and bars or strips connected to the gate in the event of injury or necessity for repair. The slopes of the hopper or spout and discharge opening under the gate will necessarily be in proportion to the size of the conveyor chute or trough end of the gate.

I claim:

1. In a grain gate, a conveyor having a chute with an opening therein, a gate correlated to the opening to move to open and closed positions, means for moving the gate to an open position, and a spring means urging the gate to a closed position, movement control means comprised of a bearing member positioned under the gate for frictional engagement therewith in response to the weight of grain passing through said gate to frictionally restrain said gate in any intermediate open position to prevent closing thereof.

2. In a grain gate, a chute having a discharge opening, a gate slidable against the chute to cover and uncover the opening, means normally holding the gate in closed position to cover the opening, means for limiting the movement of the gate to open and closed positions, means for opening the gate, and means comprised of a fixed bearing member positioned under the gate to frictionally engage therewith, with said gate held in an open position due to the weight of grain bearing thereagainst so as to frictionally restrain

said gate against movement in any intermediate open position.

3. In a grain gate, a conveyor comprising a chute in the form of a trough, means for moving grain along the chute, said trough having a discharge opening, guideways at the sides of the trough, a gate having flanges slidable in the guideways, a hopper having a discharge spout and secured to the sides of the chute and having inclined end walls, spring means anchored at one end and connected to the gate at the opposite end to normally hold the gate closed, a stop on the trough at one end of the opening, an abutment on the gate to engage the stop to limit the closing movement of the gate, means connected to the gate to open the same, and means on the spout comprised of a fixed member spaced from the trough, having an upper surface positioned for engagement with the gate when said gate is placed in an open position and weighed down by grain against the urge of the closing spring means.

4. In a grain gate, a conveyor having a chute with an opening therein, a gate correlated to the opening to move to open and closed positions, spring means extending between the gate and chute urging the gate to a closed position, a bearing member positioned under the gate for frictional engagement therewith under weight of grain passing therethrough to frictionally restrain the gate and normally hold it in an intermediate open position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
275,153	Craik	Apr. 3, 1883
311,052	Anderson	Jan. 20, 1885
489,289	Dodge	Jan. 3, 1893
1,574,751	Barker	Mar. 2, 1926