Oct. 22, 1957 G. E. DATH 2,810,356

LOCK FOR SLIDING HOPPER GATE

Filed Dec. 31, 1953 2 Sheets-Sheet 1

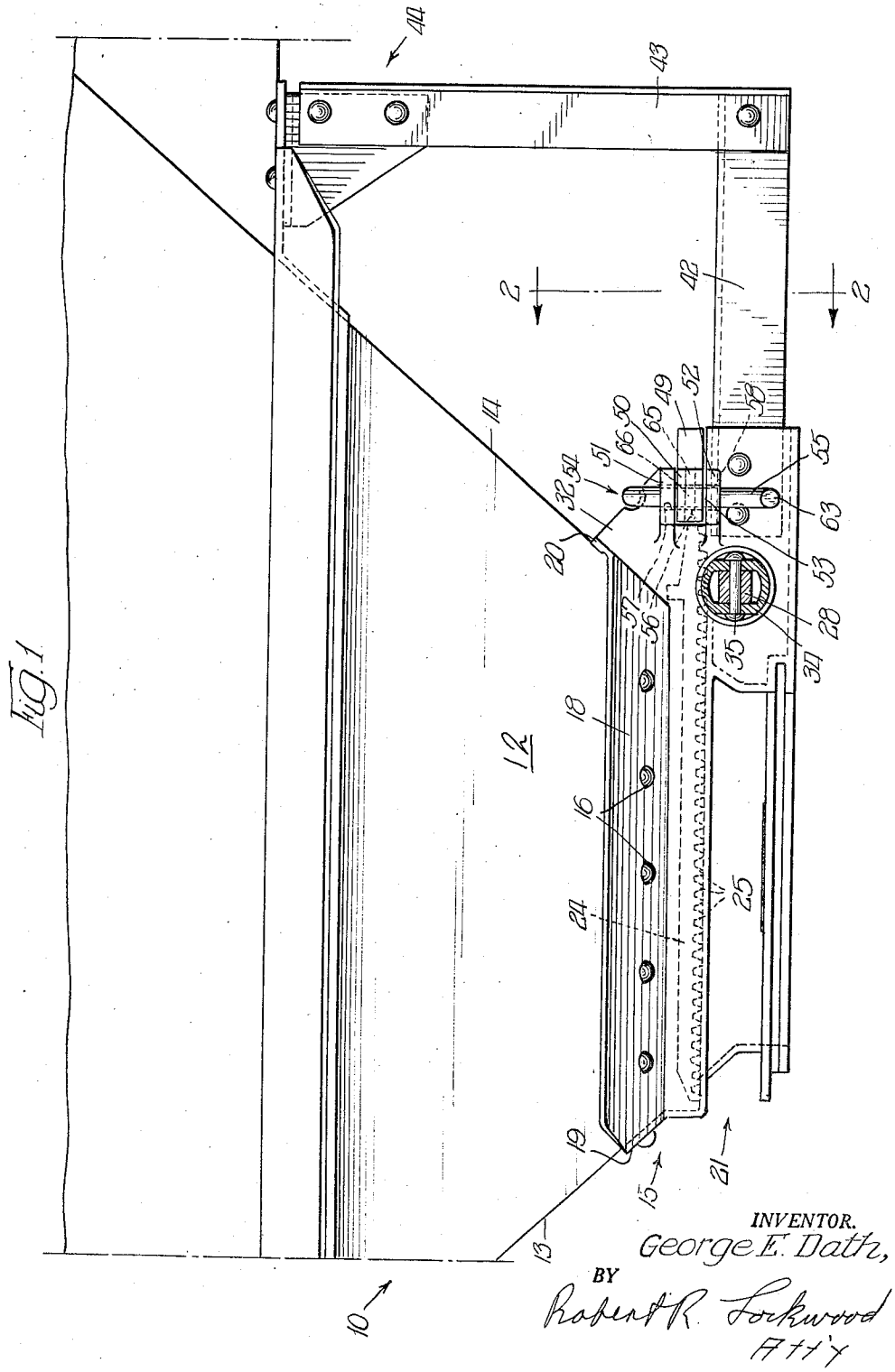


Fig. 1

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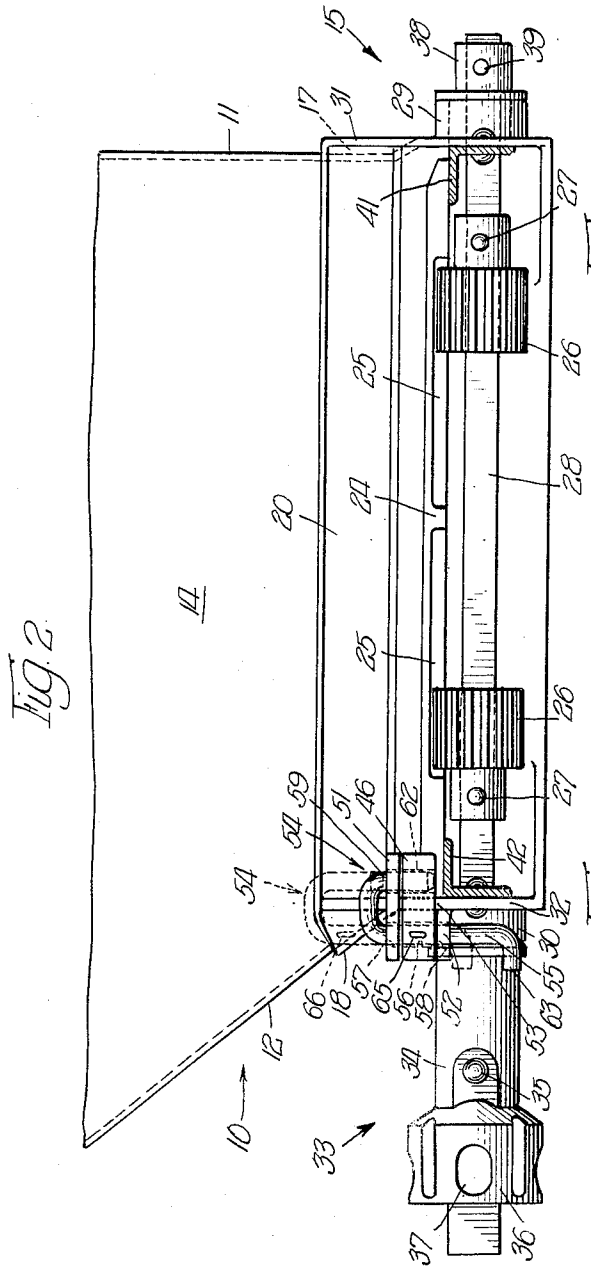


Fig. 2

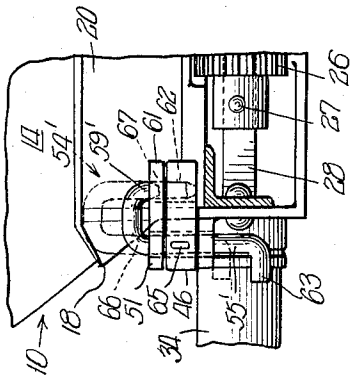


Fig. 4

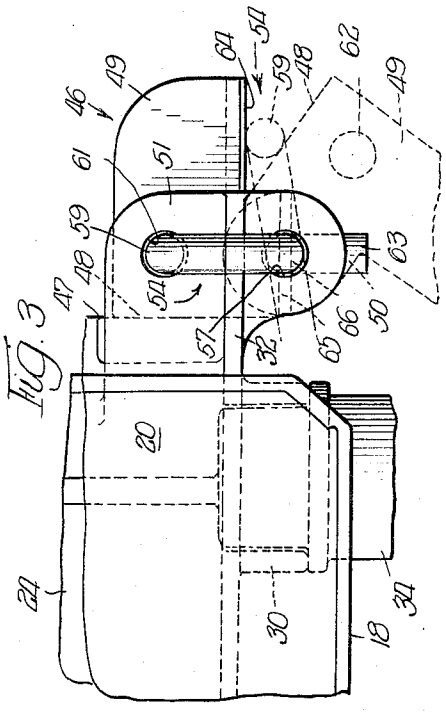


Fig. 3

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LOCK FOR SLIDING HOPPER GATE

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8 Claims. (Cl. 105—308)

This invention relates, generally, to hopper outlets for railway cars and trucks, and it has particular relation to mechanism for locking the gate thereof in the closed position.

Among the objects of this invention are: to provide for pivotally mounting the locking dog which holds the gate against opening movement on the locking pin which functions to hold the dog in the locking position; to mount the dog for pivotal movement on the frame on which the gate is slidably mounted and to fix the dog solidly to the frame when it is in the locking position with respect to the gate; to employ a J-shaped locking pin for this purpose; to pivotally mount the locking dog on the long arm of the J-shaped locking pin and to employ the short arm thereof for holding the locking dog in the locked position; to employ the short arm of the locking pin to prevent movement of the locking dog to the locking position; and to limit the movement of the J-shaped locking pin to sliding movement with respect to the frame.

Other objects of this invention will, in part, be obvious and in part appear hereinafter.

This invention is disclosed in the embodiments thereof shown in the accompanying drawings, and it comprises the features of construction, arrangement of parts and combination of elements which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

For a more complete understanding of the nature and scope of this invention, reference can be had to the following detailed description, taken together with the accompanying drawings, in which:

Figure 1 is a view, in side elevation, of a hopper having an outlet frame applied thereto in which the present invention is embodied;

Figure 2 is a detailed sectional view taken generally along the line 2—2 of Figure 1;

Figure 3 is a top plan view, at an enlarged scale, of one corner of the outlet frame and illustrating the novel locking means of the present invention; and

Figure 4 is a view of a portion of the rear end of the outlet frame, as shown in Figure 2, with a modified form of locking pin construction.

Referring now particularly to Figures 1 and 2 of the drawings, it will be observed that the reference character 10 designates, generally, a hopper which is intended to contain lading, such as cement, coal, etc., and can be mounted either on a railway car or on a truck. The hopper 10 includes a vertical inner side wall 11 and an inclined outer side wall 12 together with inclined end walls 13 and 14 which together form a generally rectangular discharge opening that is surrounded by an outlet frame, shown generally at 15. The outlet frame 15 is secured by rivets 16 to the hopper 10, and it includes side walls 17 and 18 and end walls 19 and 20, which overlie, respectively, the walls 11, 12, 13 and 14 of the hopper 10. A chute portion 21 depends from the underside of the outlet frame 15 and is arranged to be connected

to suitable conveying mechanism as will be understood readily.

In order to close off the opening at the bottom of the hopper 10 and through the outlet frame 15, a horizontally slidable gate 24 is mounted on the latter. On the underside of the gate 24 rack teeth 25 are provided which are arranged to cooperate with the pinions 26 that are secured against axial sliding movement by rivets 27 to a square shaft 28. One end of the shaft 28 is journaled on a bearing 29 while the other end is journaled in a bearing 30. The bearings 29 and 30 are carried, respectively, by wall extensions 31 and 32 from the side walls 17 and 18 of the frame 15. At the outer end of the shaft 28 an operating head, shown generally at 33, is employed to rotate the shaft. The operating head 33 includes a sleeve 34 which telescopes over the adjacent end of the shaft 28 and is secured thereto by a transverse rivet 35. The operating head 33 also has a head portion 36 provided with openings 37 for receiving a removable bar to which torque can be applied for rotating the shaft 28 and thereby moving the gate 24 between the open and closed position. At the other end of the shaft 28 is a collar 38 which is secured by a rivet 39 to the shaft 28. This prevents axial movement of the shaft 28 from right to left while the operating head 33 prevents such movement from left to right.

In order to support the gate 24 in the open position, horizontally extending angles 41 and 42 are connected, respectively, to the wall extensions 31 and 32 of the outlet frame 15. Vertically extending angles 43 interconnect the outer ends of the gate supporting angles 41 and 42 to the superstructure which is indicated, generally, at 44.

With a view to holding the gate 24 in the closed position, an L-shaped dog 46 is employed. It is arranged, as shown in Figure 3, to engage the back end 47 of the gate 24, the base 48 of the dog 46 being the portion which engages the gate. The long arm of the dog 46 is indicated at 49, while the short arm is indicated at 50. It will be observed that the short arm 50 is pivotally mounted between an upper ear 51 and a lower ear 52 that are formed integrally with the wall extension 32. The upper ear 51 extends laterally on both sides of the wall extension 32, while the lower ear 52 projects outwardly therefrom. Between the ear 51 and 52 there is a horizontally extending slot 53 through which the L-shaped dog 46 can be swung.

Provision is made for pivotally mounting the L-shaped dog 46 and locking it in position through the agency of a J-shaped bolt that is shown, generally, at 54. As shown in the drawings, the long arm 55 of the bolt 54 is vertically positioned to extend through an opening 56 in the short arm 50 and through openings 57 and 58 in the ears 51 and 52, respectively. The short arm 59 of the bolt 54 is arranged to project downwardly through an opening 61 in the upper ear 51 that is spaced from the opening 57 a distance equal to the distance between the arms 55 and 59. Also the short arm 59 is arranged to project into an opening 62 in the short arm 50 of the L-shaped dog 46 when the latter is in the locking position shown by full lines in Figure 3. It will be noted that the opening 62 is spaced from the opening 56 in the short arm 50 of the L-shaped dog 46 to the same extent that the short arm 59 is spaced from the long arm 55 of the J-shaped bolt 54. The upward movement of the J-shaped bolt 54 is limited by a stop 63 which is formed by turning the lower end of the long arm 55 outwardly after the bolt 54 has been inserted in position.

When the L-shaped dog 46 is to be swung to the position shown by broken lines in Figure 3 out of the path of movement of the gate 24, the J-shaped bolt 54 is moved upwardly to the position illustrated by broken lines in Figure 2. Then, after the dog 46 has been swung to the

unlocked position, the bolt **54** can be rotated about the long arm **55** to the position shown by broken lines in Figure 3 where the short arm **59** is positioned between the base **48** and the outer side **64** of the wall extension **32**. In this position the bolt **54** prevents the return of the dog **46**.

Sealing band apertures **65** are located in the short arm **50** and they extend transversely thereof to intersect the opening **56** therein. In alignment with the apertures **65** is an aperture **66** in the long arm **55** of the J-shaped bolt **54**. It will be understood that a sealing band can be threaded through the apertures **65** and **66** when they are in registering position, as shown in Figure 3. The sealing band then prevents unauthorized lifting of the J-shaped bolt **54**.

The construction illustrated in Figure 4 is generally the same as described above, except that the length of the long arm **55'** of the J-shaped bolt **54'** is such that the short arm **59'** thereof cannot be lifted out of the opening **61** in the upper ear **51**. Thus the lower end **67** of the short arm **59'** always remains either within the opening **62** in the short arm **50** of the L-shaped dog **46** or within the confines of the opening **61** in the upper ear **51**. Only vertical movement of the J-shaped bolt **54'** is permitted in the embodiment shown in Figure 4.

In both embodiments of the invention described, the L-shaped dog **46** is pivotally mounted on the long arm of a J-shaped bolt **54** or **54'** which not only provides the pivot mounting but also through the agency of the short arm **59** or **59'**, cooperates with the upper ear **51** and with the dog **46** to prevent turning movement thereof until the J-shaped bolt is moved bodily to the unlocked position.

Since further changes can be made in the foregoing constructions, and different embodiments of the invention can be made without departing from the spirit and scope thereof, it is intended that all matter shown in the accompanying drawings and described hereinbefore shall be interpreted as illustrative and not in a limiting sense.

What is claimed as new is:

1. In combination with a bottom discharging hopper having an opening through which the lading flows, a gate horizontally slidably mounted on said hopper for closing said opening, means for moving said gate between open and closed position, a dog pivotally mounted on said hopper and acting in one position to prevent movement of said gate to open position and in another position to permit such movement, and a latch pin carried by said hopper and providing the pivot mounting for said dog and cooperating therewith in said one position to hold the same against movement therefrom.

2. In combination with a bottom discharging hopper having an opening through which the lading flows, a gate horizontally slidably mounted on said hopper for closing said opening, means for moving said gate between open and closed position, a dog pivotally mounted on said hopper and acting in one position to prevent movement of said gate to open position and in another position to permit such movement, and a J-shaped latch pin slidably carried by said hopper with the long arm providing the pivot mounting for said dog and the short arm cooperating therewith in said one position to hold the same against movement therefrom.

3. For combination with a bottom discharging hopper having an opening through which lading flows, a frame adapted to be attached to said hopper and to surround said opening, a gate horizontally slidable on said frame for closing said opening, means for moving said gate between open and closed position, a pair of ears extending in spaced horizontal relation from said frame, said frame having a slot aligned with the space between said ears, a dog pivoted about a vertical axis between said ears to swing horizontally through said slot into and out of the path of said gate for engaging the back end thereof to prevent opening of said gate, and a latch pin carried by said ears and providing the pivot mounting for said dog and cooperating therewith when it is in the path of said gate to hold said dog against movement therefrom.

4. For combination with a bottom discharging hopper having an opening through which lading flows, a frame adapted to be attached to said hopper and to surround said opening, a gate horizontally slidable on said frame for closing said opening, means for moving said gate between open and closed position, a pair of ears extending in spaced horizontal relation from said frame, said frame having a slot aligned with the space between said ears, a dog pivoted about a vertical axis between said ears to swing horizontally through said slot into and out of the path of said gate for engaging the back end thereof to prevent opening of said gate, and a J-shaped latch pin with the long arm slidably mounted on said ears and providing the pivot mounting for said dog and the short arm cooperating therewith when it is in the path of said gate to hold said dog against movement therefrom.

5. For combination with a bottom discharging hopper having an opening through which lading flows, a frame adapted to be attached to said hopper and to surround said opening, a gate horizontally slidable on said frame for closing said opening, means for moving said gate between open and closed position, a pair of ears extending in spaced horizontal relation from said frame, said frame having a slot aligned with the space between said ears and said ears having aligned openings therein and the upper ear having an opening spaced from said opening therein, a dog pivoted about a vertical axis between said ears to swing horizontally therebetween through said slot into and out of the path of said gate for engaging the back end thereof to prevent opening of said gate, said dog having a pair of spaced openings therein one in alignment with said aligned openings in said ears and the other in alignment with said spaced opening in said upper ear when said dog is in locking position, and a J-shaped latch pin with the long arm slidably mounted in said aligned openings in said ears and providing the pivot mounting for said dog and the short arm of said latch pin entering said aligned spaced openings in said upper ear and in said dog for holding the latter against movement out of the path of said gate.

6. The invention, as set forth in claim 5, wherein the J-shaped latch pin is movable upwardly sufficiently far for the lower end of the short arm to clear the upper ear and to swing to a position where downward movement of said latch pin with the dog swung away from the path of the gate places said short arm between the frame and said dog and prevents movement thereof into said path.

7. The invention, as set forth in claim 5, wherein stop means are provided for limiting the upward movement of the J-shaped latch pin to a position where the short arm thereof is withdrawn from the dog and remains within the spaced opening in the upper ear.

8. The invention, as set forth in claim 5, wherein stop means are provided on the long arm of the J-shaped latch pin for cooperating with the lower ear for limiting the upward movement of said J-shaped latch pin to a position where the short arm thereof is withdrawn from the dog and remains within the spaced opening in the upper ear.

References Cited in the file of this patent

UNITED STATES PATENTS

1,458,388	Boyd	June 12, 1923
2,142,236	Campbell	Jan. 3, 1939
2,145,174	Hankins	Jan. 24, 1939
2,352,887	Davidson	July 4, 1944