May 29, 1951 M. W. POWELL 2,554,751

SAFETY LATCH MECHANISM FOR COAL DISTRIBUTING APRONS

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Fig. 1.

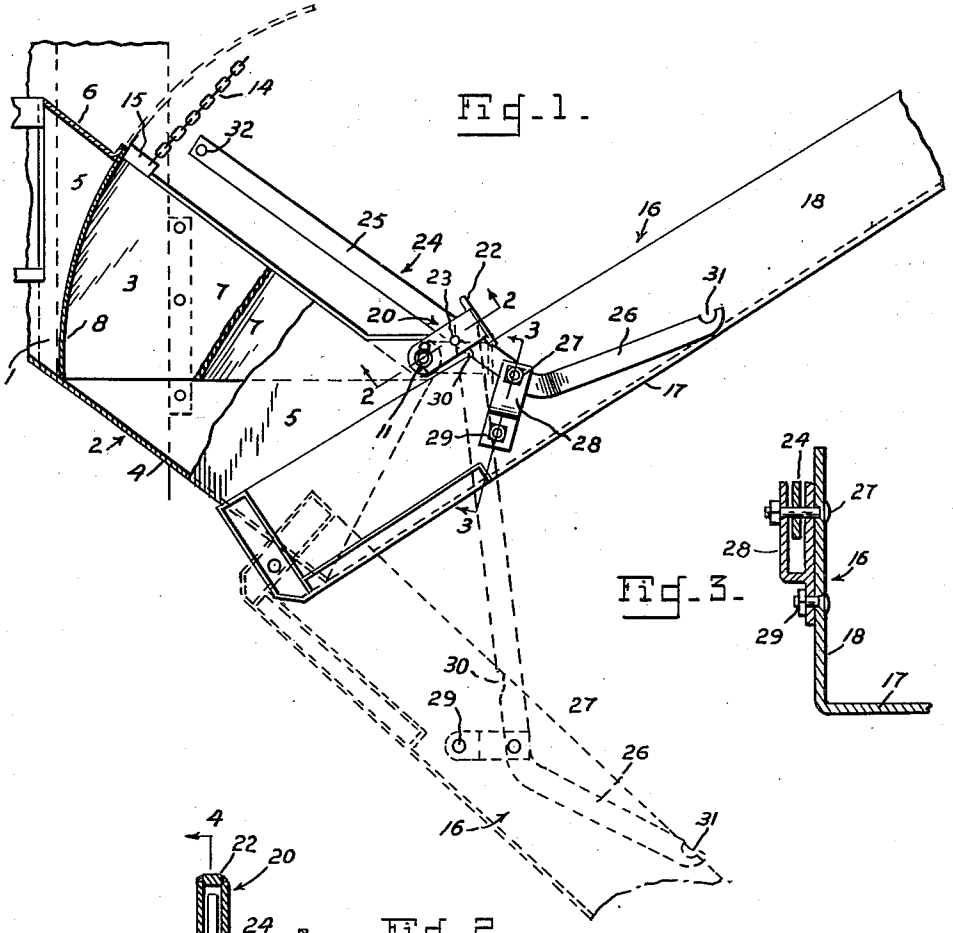


Fig. 3.

Fig. 2.

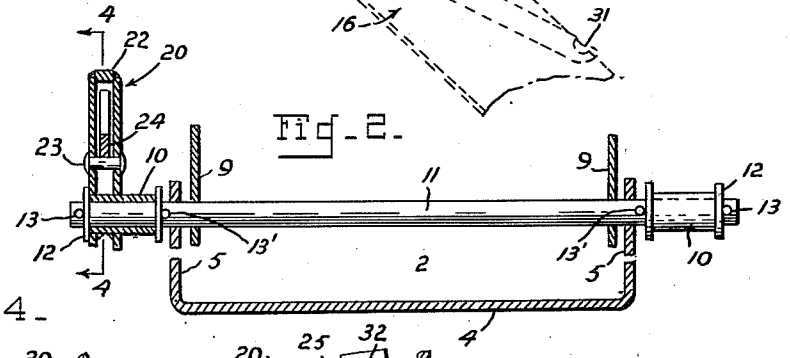


Fig. 4.

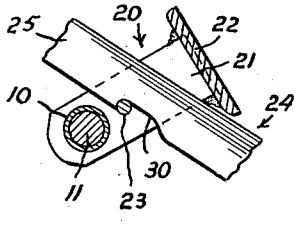
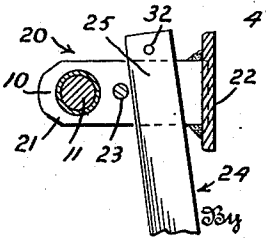


Fig. 5.



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Fig. 6.

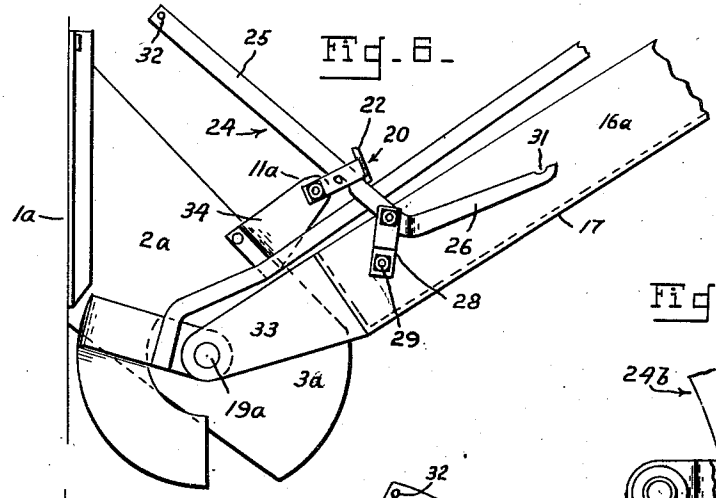


Fig. 8.

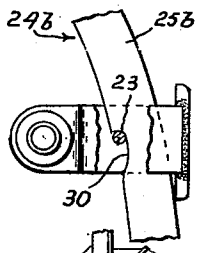


Fig. 7.

Fig. 9.

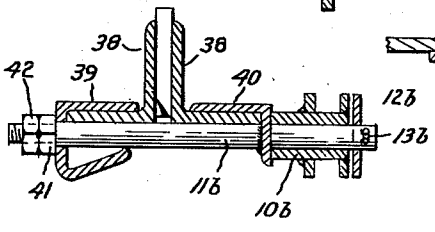
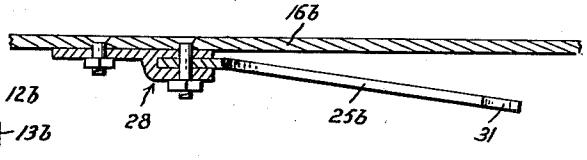
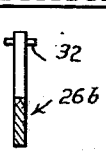
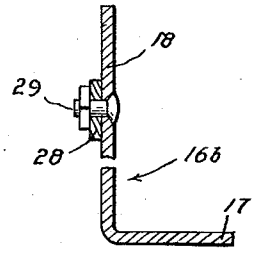


Fig. 10.







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SAFETY LATCH MECHANISM FOR COAL DISTRIBUTING APRONS

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Application June 14, 1948, Serial No. 32,803

4 Claims. (Cl. 193—17)

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This invention relates to a safety latch mechanism for coal distributing aprons of that type designed for distributing coal from an elevated bin or hopper to the tender of a locomotive standing on a track below the level of the bin or hopper. More particularly the invention relates to a safety latch mechanism for locking in its elevated or inoperative position a counterbalanced or counterweighted pivotally mounted apron used in conjunction with an outlet chute provided or not with a cut-off gate, and which is movable upwardly to an inoperative position by its counterbalancing or counterweight means and adapted to be manually drawn down to distributing or servicing positions.

One object of the invention is to provide a novel and improved construction of safety latching means for automatically latching the apron in its raised position in a secure manner above a definite clearance of railway rolling stock traveling below on a coaling track.

Another object of the invention is to provide a latch mechanism adapted to be released in an easy and simple manner and operated to lower the apron to service position.

Still another object of the invention is to provide a safety latch mechanism which is readily applicable to any type of coaling chute or spout employing a pivotally mounted coaling apron.

In the accompanying drawings:

Fig. 1 is a view in side elevation of a coaling apparatus embodying my invention, showing in full and dotted lines the gate in normal and discharging positions;

Fig. 2 is a transverse section on line 2—2 of Fig. 1 through the outer end of the chute and parts of the latch mechanism;

Fig. 3 is an enlarged detail section on line 3—3 of Fig. 1;

Figs. 4 and 5 are enlarged detail sections on line 4—4 of Fig. 2, showing, respectively, the swinging guide-latch and latch-bar in latching and unlatching positions;

Fig. 6 is a view similar to Fig. 1 showing a modified application of the invention and showing the pivot shaft for the guide-latch differently located and mounted on the chute body;

Fig. 7 is a view similar to Figs. 1 and 6, showing another modified application and a modified form of the invention, and showing the pivot shaft for the guide-latch located on an adjacent structure;

Fig. 8 is a detail view in side elevation of the latch shown in Fig. 7, with a portion of the guide-latch broken away, showing said guide-latch and the latch-bar in latching position;

Fig. 9 is a section on the line 9—9 of Fig. 7; and

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Fig. 10 is a vertical transverse section on line 10—10 of Fig. 7.

Referring now more particularly to Figs. 1 to 5, inclusive, of the drawings, 1 designates a coal storage bin or hopper arranged in practice at a suitable elevation above and to one side of a track along which the tenders to be coaled travel, from which bin extends an outlet chute or spout 2, discharge of coal from which is controlled by a gravity closing pivoted gate 3. The chute 2 is fixed to the hopper and is in the form of an outwardly and downwardly inclined trough comprising a bottom wall 4, side walls 5, and a short inner top wall 6, the top of the chute having an opening in front of the wall 6 through which the gate may swing in its upward and downward opening and closing movements. The gate 3 may be of any approved construction, but, as shown, comprises spaced triangular side walls or plates 7 connected at their inner edges or base portions by a curved cut off plate 8 and pivotally supported at their forward ends or vertex portions 9 adjacent latch sleeves 10 on shaft 11 which passes through said portions 9 of the gate and through the side walls 5 of the chute. The latch sleeves 10 are fitted on the extended ends of a transverse shaft 11 between sets of washers 12 held in position by pins 13 on the shaft, whereby the sleeves and shaft are held from longitudinal sliding movement or displacement. A chain 14 attached to bracket means 15 at the inner end of the gate forms part of gate operating means of any suitable type adapting the gate to be swung upward to open position and allowed to swing by gravity to closed position. The part 8, when the gate is in closed position, cuts off the feed of coal from the hopper to the chute 2.

An apron 16, of trough type, and comprising a bottom wall 17 and side walls 18, is provided for the delivery of the coal from the chute to a tender arranged on a track below. The side walls 18 at the inner end of the apron are arranged outside of and in lapping relation to the forward portions of the side walls of the chute, and said end of the apron is pivotally connected, as at 19, to the bottom of the chute to adapt the apron to swing upwardly and downwardly. The apron is counterbalanced or counterweighted, in practice, by the use of any suitable counterbalancing or counterweight means (not shown) which operates, when the apron is free for movement, to swing it upwardly to and maintain it normally in an upwardly inclined inoperative position. Fig. 1 shows in full lines the upwardly inclined inoperative position of the apron, and in dotted lines the downwardly inclined discharge position of the apron.

The apron is adapted to be held in its upwardly inclined position and to be released and drawn down to its downwardly inclined position by my improved construction of safety latch mechanism, which I will now proceed to describe.

To the sleeve 10 mounted on one end of the shaft 11 is fixed one end of a combined guide and latch or keeper member 20 composed of spaced side plates 21 connected at the opposite or free end of the latch by a crosspiece or plate 22. A lock pin 23 extends between and is fixed to the plates 21, and the space between the plate 22 and the pin 23 forms a guide passage. The latch member 20 is thus mounted to swing on an arc between an upper latching position, shown in Fig. 4 and in full lines in Fig. 1, to a lower releasing and guiding position, shown in Fig. 5 and in dotted lines in Fig. 1. A combined latch and operating bar 24, having a long rear arm 25 and an angularly arranged shorter front arm 26, is provided for cooperation with the latch member 20. The long arm 25 of this bar is slidably and tiltably mounted in the guide space of the member 20 and is pivoted at 27, adjacent its point of intersection with its short arm, to the free end of a bracket 28 pivoted at its opposite end, as at 29, to one of the side walls 18 of the apron 16, whereby the latch bar is coupled to the apron to swing upwardly and downwardly therewith. The forward portion of the arm 25 of the latch bar is provided in its lower edge with a locking notch 30 to engage the pin 23, while the free end of the arm 26 of the latch bar is provided in its upper edge with a recess 31. At the rear end of the arm 25 of the latch bar is a stop pin 32 which is engageable with the latch 20 to limit the downward sliding movement of the latch bar.

In the normal, inoperative and upwardly inclined position of the apron 16, shown in full lines in Fig. 1, the arm 25 of the latch bar 24 lies in an upwardly and rearwardly inclined position so that its notch 30 engages the pin 23, whereby the apron is locked in its raised position. In this position of the parts the latch 20 is in its uptilted position and its guard plate overlies and rests on the latch arm 25 in advance of the pin 23 and holds the notch 30 in engagement with the pin 23, assisted by the weight of the arm 25 and outward and downward pull of the apron on the arm 25, thus insuring a safe and secure locking engagement of the parts against liability of casual release under any jolts or vibrations to which the apron may be subjected. This safe and secure engagement is greatly augmented by the rotation of the latch under the outward and downward pull of the bar to bring its top plate 22 into firmer contact with the top of arm 25 in advance of the latch pivot and latch pin, as will be readily understood. In such position of the parts the arm 26 of the latch bar lies alongside the apron in an outwardly and upwardly inclined position, in which it provides a lever arm whereby the latch bar may be rocked on its swinging pivot to release the latch bar from engagement with the pin 23 and whereby the apron may be drawn downwardly to discharge position.

When it is desired to lower the apron and open its gate to supply coal to a tender, a draft bar or rod having a hooked end is engaged by its hooked end with the recess 31 and a downward pull exerted on said bar or rod. By this means arm 26 will be pulled downwardly and arm 25 lifted on pivot 27, so that the notch 30 will be released from engagement with the pin 23, allowing the apron to be drawn down to discharge position on its pivot 19. In this downward movement of the apron to its dotted line discharge position shown in Fig. 1 the latch 20 tilts downwardly and forwardly to a position allowing the latch bar arm 25 to slide freely therethrough until stop pin 32 comes in contact with the latch plates 21, as shown in Fig. 5, which occurs when the apron reaches its lowest discharge position. The gate 3 is then opened and the apron suitably held down for the discharge of coal from the bin and until the desired amount of coal is discharged. The gate is then closed and the apron released and raised. The raising of the apron causes the parts of the latch mechanism to be retracted and automatically relocked in an obvious manner.

The above described construction of the latch mechanism insures a firm and secure holding of the counterbalanced apron in elevated position until the latch bar is positively operated to effect its release and the drawing down of the apron, while such construction of the latch mechanism also insures free movements of the latch bar through the guide latch or keeper member without binding, gripping or pinching on each downward or upward movement of the apron. In practice the pivot 29 is so located on the counterbalanced apron as to insure easy movement of the apron itself, and its arrangement determines the clearance height of the apron, while the location of the pin 32 determines the extent to which the apron may be lowered.

The structure shown in Figs. 1 to 5 is adapted for general use in connection with the coal outlets of conventional overhead locomotive tender coaling devices. In Figs. 6 and 7 to 10, however, I have shown special applications for use under some conditions, which I will now proceed to describe.

Referring to Fig. 6, 1^a designates the storage bin, 2^a the outlet chute, 3^a the gate and 16^a a counterweighted apron, which may be of any suitable general construction, but in which the apron is provided with extension arms 33 pivoted at 19^a to the chute. Bracket arms 34 are secured to the chute side walls and support a shaft 11^a or other suitable pivot means on which the latch member 20 is mounted, such mode of mounting the apron and the said latch member adapting the apron to be raised to a highly elevated normal or inoperative position. The latch member 20, latch bar 24 and other parts of the latch mechanism are the same in construction and operation as the parts shown in Figs. 1 to 5, and are designated by the same reference characters, and from which the operation of the parts shown in Fig. 6 will be readily understood.

Referring to Figs. 7 to 10, inclusive, 1^b represents the storage bin, 2^b an outlet chute and 16^b a counterweighted apron. The apron here is attached at its inner end to a hanger or other suitable supporting means 35 pivotally connected at each side of the apron, as shown at 36, to brackets 37 fastened to flanged bars or rails forming a beam 38 projecting from the storage building. The apron is so mounted by the hanger 35 as to be movable to a substantially horizontal inoperative position as shown. This mode of mounting the apron necessitates a change in mounting the guide-latch or keeper member and in the form of the latch bar. To this end a pivot rod or shaft 11^b is arranged beneath one of the beams 38 and supported therefrom by angle brackets 39, 40.

One end of the shaft projects beyond the bracket 39 and is threaded to receive securing and jamb nuts 41, 42. The other end of the shaft projects beyond the braket 40 and has fitted thereon a washer 12b, retained in place by a fastening pin 13b, and a sleeve 10b, which is arranged between the bracket 40 and washer 12b. These parts are held in assembled relation by the nuts 41, 42 and the washer 12b. To the sleeve is secured the guide-latch or keeper member 20, which is of the same construction as shown in the structures previously described, said latch member being pivotally mounted by the sleeve on the shaft. The latch bar 24b employed in this construction is pivotally connected by the bracket 28 to the apron and is provided with arms 25b, 26b arranged at an angle to each other, the arm 24b being slidable through the latch member 20. This bar is of the same general construction as the latch bar 24 except that its arm 25b is arcuately curved to adapt it to slide in a path substantially concentric with the pivot of the apron so that the apron may have free swinging movement between a raised horizontal position and a lowered inclined position. The operation of the latch bar in this construction is the same as the bar 24 disclosed in Figs. 1 to 5 and Fig. 6.

From the foregoing description, taken in connection with the drawings, the construction and mode of operation of my improved safety latch mechanism for the delivery aprons of coaling apparatus of the type described will be readily understood, and it will be seen that the invention provides a latch mechanism which will securely hold the apron in its elevated inoperative position while permitting it to be readily and conveniently drawn down to discharge position when desired. While the constructions shown are preferred, it will, of course, be understood that changes in the construction, form and arrangement of parts may be made, within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

It is to be understood that by the use of the term "supporting structure" in the claims I mean a storage receptacle or bin and/or its discharge outlet, or any framework or means carried thereby on which the apron and the latch member 20 may be mounted.

Having thus described my invention, I claim:

1. In a latch mechanism for a device of the character described embodying a fixed supporting structure and an apron member pivotally mounted on said structure for movement from an elevated position to a downwardly inclined position, and vice versa, a latch member pivotally mounted on a supporting shaft carried by the fixed supporting structure and having a guide passage, and a latch-bar pivotally mounted on the apron member and comprising a bell crank having an operating arm and a locking arm rigid therewith, the latter named arm being adapted to interlock with the latch member when the apron member is in raised position and being slidably movable through said guide passage in the downward and upward movements of the bar with the apron member.

2. In a latch mechanism for a device of the character described embodying a fixed supporting structure and an apron member pivotally mounted on said structure for movement from an elevated non-discharge position to a downwardly inclined discharge position, and vice versa, a latch member pivotally mounted on a supporting shaft carried by the fixed supporting structure and having a guide passage, and a locking pin in said passage, and a latch-bar pivotally mounted on the apron member and comprising a bell crank having an operating arm and a locking arm rigid therewith, the latter named arm having a notch to interlock with said pin when the apron member is in raised position and being slidably movable through said guide passage in the downward and upward movements of the bar with the apron member.

3. In a latch mechanism for a device of the character described, a fixed supporting structure, a vertically swinging apron member pivoted at one end to the supporting structure, an upwardly and downwardly tilting bail-shaped latch member on a supporting shaft carried by the fixed supporting structure presenting a guide passage and a locking element extending thereacross, and a latch bar of angular form comprising a bell crank having an operating arm and a latch arm rigid therewith, the latter being pivoted to the apron member below and in advance of the latch member and at a point adjacent to the operating arm and being slidable in the guide passage of the latch member and having means to engage the locking element of the latch member in a raised position of the apron member, said latch arm being of a length and weight to extend over and rearwardly beyond the latch member in a raised position of the apron member and to be held by gravity normally in latching position.

4. In a latch mechanism for a device of the character described, a fixed supporting structure, a vertically swinging apron pivoted at one end to the supporting structure, a suitably supported transverse shaft, a tilting latch member mounted on said shaft and having a guide passage, a locking pin in said passage and a guard plate at its free end, and a latch bar of angular form having an operating arm and a latch arm, the latter being pivoted to the apron at a point adjacent to the operating arm and being slidable in the guide passage of the latch member between the locking element and the guard plate, said arm having a notch therein to engage the locking pin of the latch member in a raised position of the apron, the construction and arrangement being such that in the raised position of the apron the gravity weight of the latch arm and latch member will hold the notch in engagement with the locking pin augmented by rotation of the latch member under the outward and downward pull on the arm holding the guard plate in contact with the arm outward beyond the point of engagement of the notch and pin.

MAX W. POWELL.

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