March 15, 1927. 1,620,669

T. E. LITTLEJOHN

MINE DOOR

Filed June 16, 1926

Fig. 1.

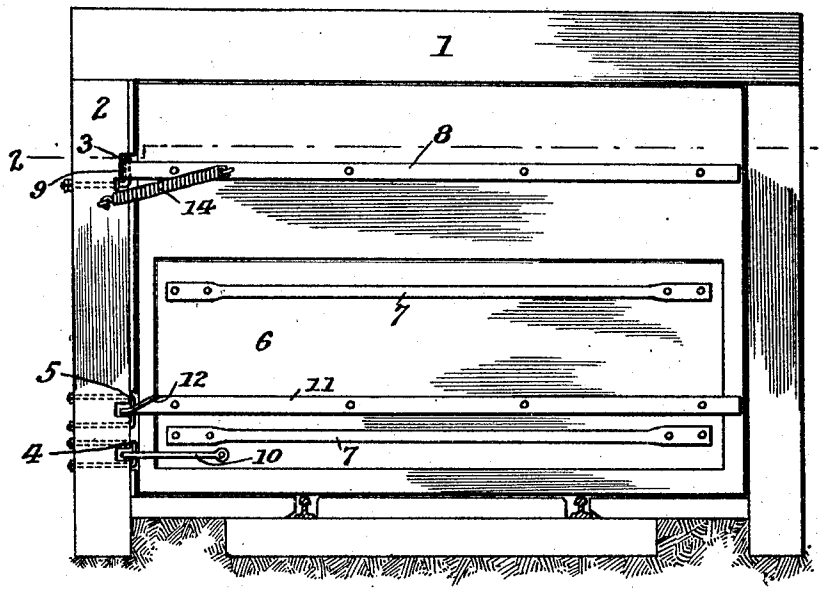


Fig. 2.

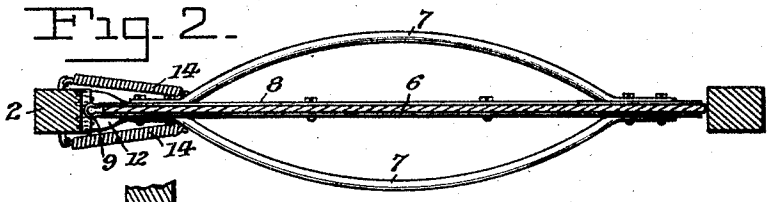




Fig. 3.

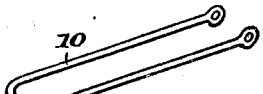


Fig. 5.

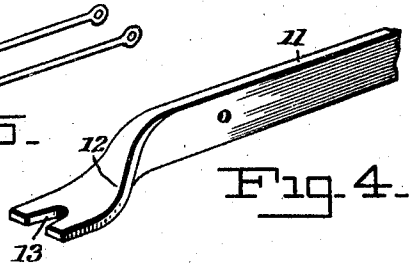


Fig. 4.

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UNITED STATES PATENT OFFICE.

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MINE DOOR.

Application filed June 16, 1926. Serial No. 116,428.

This invention relates to a mine door and it consists in the novel features hereinafter described and claimed.

An object of the invention is to provide a mine door structure including a frame adapted to be positioned at the mouth or entrance or any part of a mine or shaft and having the door panel so mounted and arranged that it will normally remain in a closed position but the parts are so assembled that it may be opened by swinging in either of two directions by means of pressure which is applied laterally to the door panel.

With this object in view the structure includes a hinge pintle mounted at one of the vertical uprights of the frame of the door and a U bolt mounted upon the same upright at a point spaced below said pintle and with its intermediate portions in vertical alinement with the frame. Other U bolts are also mounted upon the said uprights one at each side of the vertical line passing through the pintle and the intermediate portion of the first mentioned U bolt. A door panel is provided with a hinge member which engages the pintle and with a pivoted loop member adapted to engage around the intermediate portion of the first mentioned U bolt. Strips are applied to opposite sides of the door panel and are provided at their ends with notches adapted to receive the second mentioned U bolts. While springs are employed, they are not absolutely necessary, and they are connected at one end with the door panel and at their other end with the frame upright at the same side of the door panel. Curved buffers are mounted one at each side of the door panel.

The arrangement is such that when pressure is applied to either one of the buffers the door panel is swung whereby the edge one of the notches of one of the strips engages the adjacent U bolt as the panel springs to an open position and consequently the lower portion of the door panel is slightly lifted as the panels swing to an open position. When the locomotive, car, or animal or any other agency which has swung the door passes through the frame and pressure is removed from the side of the door or the buffer thereof the panel will by gravity and by the assistance of the frame swing back to its normal closed position in the door frame.

In the accompanying drawing:—

Figure 1 is a side elevational view of the mine door,

Figure 2 is a horizontal sectional view thereof cut on the line 2—2 of Figure 1,

Figure 3 is a side elevation of the supporting uprights of the door frame and showing the upper portion of the door frame in section,

Figure 4 is a fragmentary perspective view of one of the strips applied to the side of the door panel.

Figure 5 is a perspective view of the loop used upon the door panel and which is adapted to engage the lower U-bolt.

As illustrated in the accompanying case the mine door structure includes a frame 1 including a vertical side upright 2. A hinge pintle 3 is mounted upon the upright 2 and a U-bolt 4 is also mounted upon the said upright below the hinge pintle and spaced therefrom and with its intermediate portion in vertical alinement with the end of the pintle 3. Other U-bolts 5 are mounted upon the upright 2 and are located between the pintle 3 and U-bolt 4. These U-bolts 5 are located one beyond each side of the vertical line which passes through the intermediate portion of the U-bolt 4 and through the end portion of the pintle 3.

The mine door structure also includes a panel 6 adapted to fit within the frame 1 and which is provided at its opposite side surfaces with outwardly bowed buffers 7. A strap 8 is applied to the intermediate portions of the panel 6 and is carried around one end thereof providing a bend 9 which receives the end portion of the pintle 3. A loop link 10 is pivotally connected with the lower part of the panel and its intermediate portion extends around the edge of the panel and passes through or around the intermediate portion of the lower U-bolt 4. This connection is relatively loose so that the panel 6 may tilt as it is being swung with relation to the frame and upon the pintle 3. Strips 11 of metal are applied to the side surfaces of the panel 6 and have end portions which project beyond the edge of the said panel. The said projecting end portions of the strips 11 are twisted as at 12 and the extremities of the said twisted portions are provided with notches 13 which lie opposite the intermediate portion of the U-bolts 5 and the wall surfaces of which may engage the intermediate portion of the said

U-bolt when the door panel is swung with relation to the frame in either of two directions. Coil springs 14 are connected at one end with the panel 6 and at their other end with the upright 2. These springs assist in returning the door panel from an open to a closed position as will be hereinafter explained.

The arrangement of the parts and features is such that when pressure is applied to the buffers 7 or at either of the sides of the door panel 6 the panel is swung in the same direction in which the pressure is being applied, and the bend 9 of the hinge member 8 turns upon the ends of the pintle 3. At the same time the edge wall of one of the notches engages the adjacent U-bolt 5 and thus the lower portion of the door panel is slightly lifted and one of the springs 14 is stretched. When pressure is removed from the door panel the same will gravitate to its closed position in the frame and the said spring will contract and assist in bringing the door panel to its normal closed position.

The loop link 10 in conjunction with the adjacent U-bolt 4 will prevent the door panel from being knocked off of the hinge pintle in the event that the pressure is applied to the side of the panel with great force. At the same time the link connection between the loop link and the bolt is sufficiently loose to permit the door panel to swing in the manner as hereinbefore described, when pressure is applied to the same.

The degree to which the door is lifted or elevated when swung to an open position may be regulated by adjusting the U-bolts 5 longitudinally in the upright 2, thus increasing or diminishing the space which is normally provided between the intermediate portion of the said U-bolts and the walls of the notches 13.

A door thus constructed requires no attention, and may be readily operated by a mule's head coming in contact with the same in either of two directions. In case of accident in the mine the door will not in any way interfere with the ready escape of the miners, as it will open as well from either direction and will swing to an open position equal to the full capacity of the frame of the door.

The structure will also prevent the escape of dangerous gases from the mine or from one shaft of the mine into another.

From the foregoing description of the construction of my improved device, it will be seen that I have provided a simple, inexpensive and efficient means for carrying out the objects of the invention and while I have particularly described the elements best adapted to perform the functions set forth, it is obvious that various changes in form, proportion and in the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the principles of the invention.

Having thus described the invention, what is claimed is:

1. A mine door structure comprising a frame having a vertical upright, a hinge pintle mounted upon the upright, a U-bolt mounted upon the upright and having its intermediate portion in alinement with the pintle, other U-bolts mounted upon the upright and located one at each side of the line between the pintle and the intermediate portion of the first mentioned U-bolt, a door panel, a hinge member carried by the door panel and engaging the pintle, a loop member carried by the panel and engaging the intermediate portion of the first mentioned U-bolt and members applied to the sides of the door panel and provided with end portions extending beyond the edge thereof and having notches adapted to receive the second mentioned U-bolts when the panel is swung with relation to the frame.

2. A mine door structure comprising a frame having an upright, a pintle mounted upon the upright, a retaining U-bolt mounted upon the upright and having an intermediate portion in alinement with the pintle, other U-bolts mounted upon the upright and located one at each side of the alinement between the first mentioned bolt and the pintle, and having intermediate portions disposed out of the vertical plane in which the pintle lies, a door panel, a hinge member carried by the door panel and engaging the pintle, members applied to the opposite sides of the door panel and having end portions projecting beyond the edge thereof and provided with notches engageable with the intermediate portions of the second mentioned U-bolts and springs connected at one end with the door panel and at their other end with the upright.

3. A mine door structure comprising a frame having an upright, a hinge pintle mounted thereon, a retaining U-bolt mounted thereon and having an intermediate portion in alinement with the pintle, other U-bolts mounted upon the upright at opposite sides of the alinement between the first mentioned U-bolt and the pintle, and having intermediate portions disposed out of the vertical plane in which the pintle lies, a door panel, a hinge member carried by the door panel and engaging the pintle, straps applied to the opposite side of the door panel and having end portions projecting beyond the edge thereof, said end portions of the straps being twisted and having notches normally engaging the intermediate portions of the second mentioned U-bolts when the door panel is closed and adapted to disengage said U-bolts singly when the door panel is swung with relation to the frame.

4. A mine door structure comprising a

frame having an upright, a pintle mounted upon the upright, a retaining U-bolt mounted upon the upright and having an intermediate portion in alinement with the pintle, other U-bolts mounted upon the upright and located one at each side of the alinement between the first mentioned bolt and the pintle, a door panel, a hinge member carried by the door panel and engaging the pintle, a link member carried by the door panel and engaging through the first mentioned U-bolt, members applied to the opposite side of the door panel and having end portions projecting beyond the edge thereof and provided with notches engageable with the intermediate portions of the second mentioned U-bolt and spring connected at one end with the door panel and at their other end with the upright.

In testimony whereof I affix my signature.

THOMAS EDWARD LITTLEJOHN.