J. K. ORR & L. F. JONES.

MINE DOOR.

APPLICATION FILED APR. 7, 1910.

1,090,562.

Patented Mar. 17, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

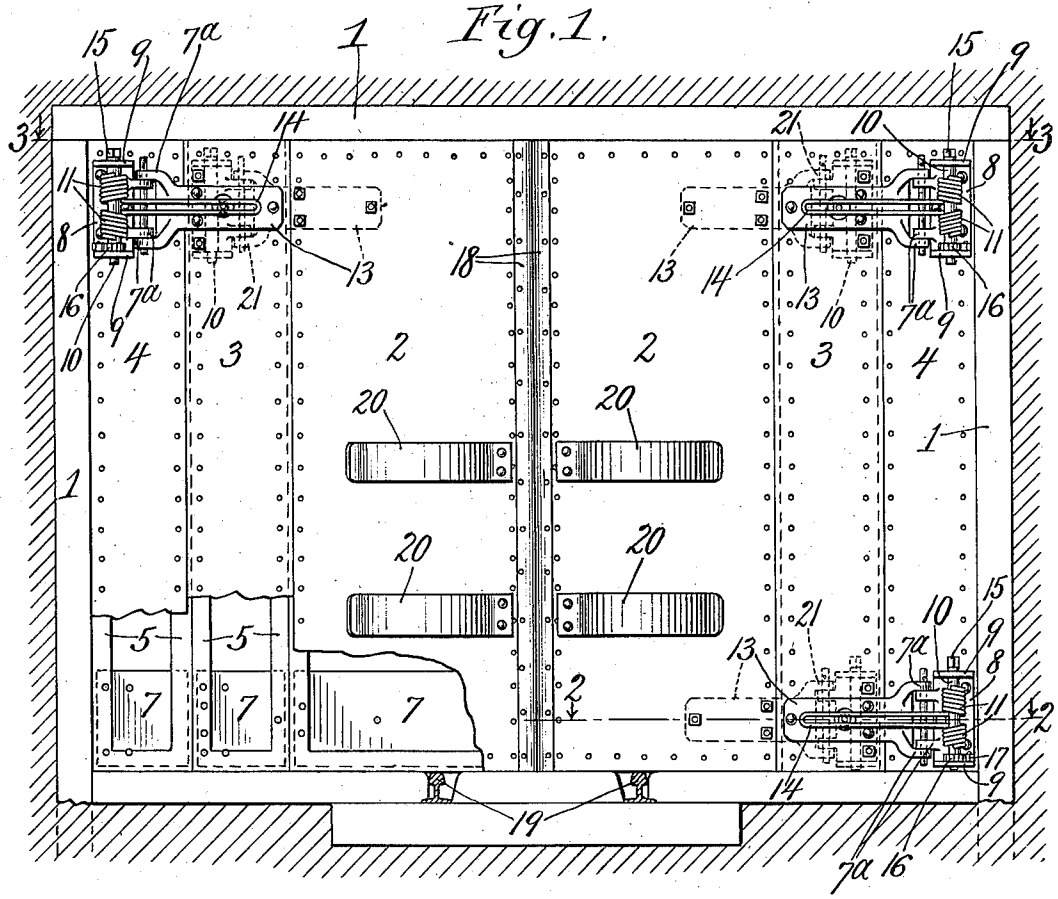
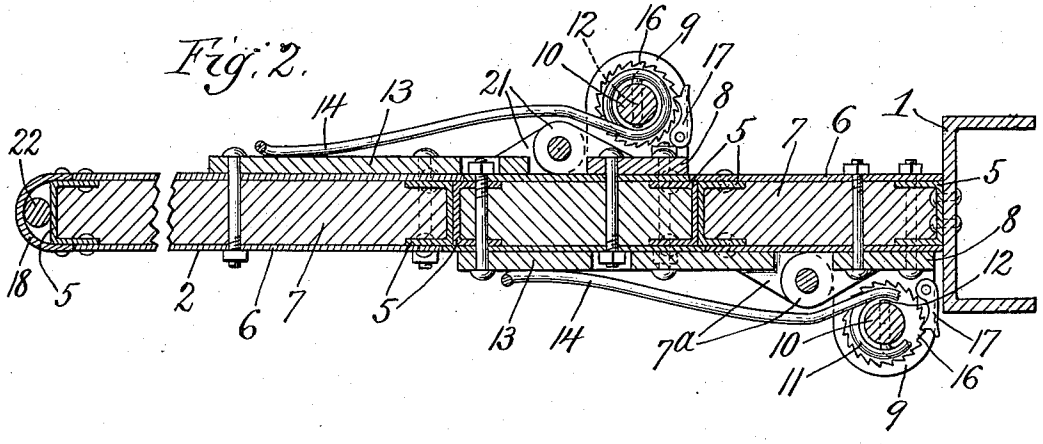


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

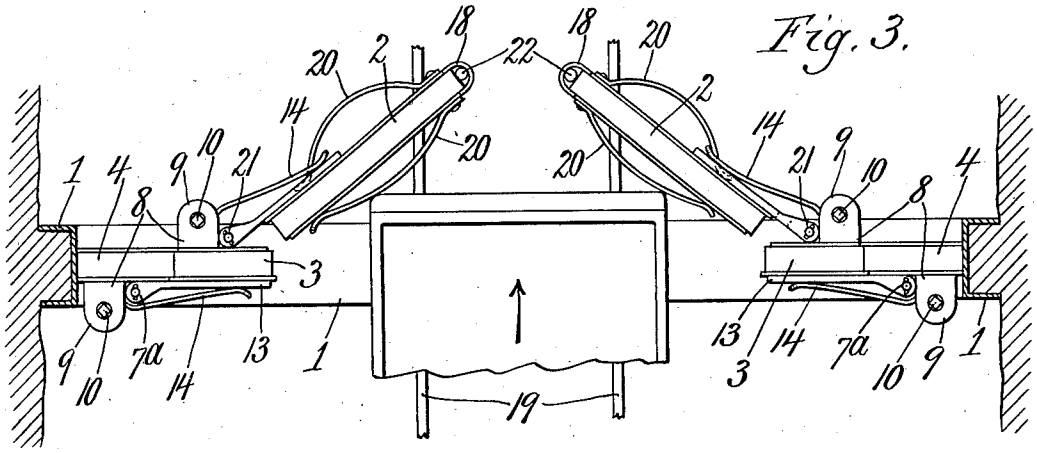


Fig. 4.

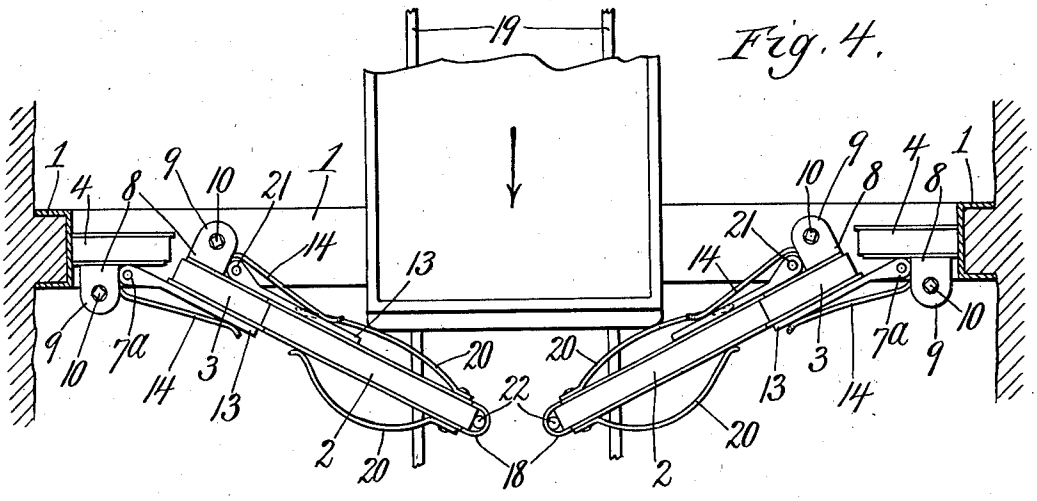
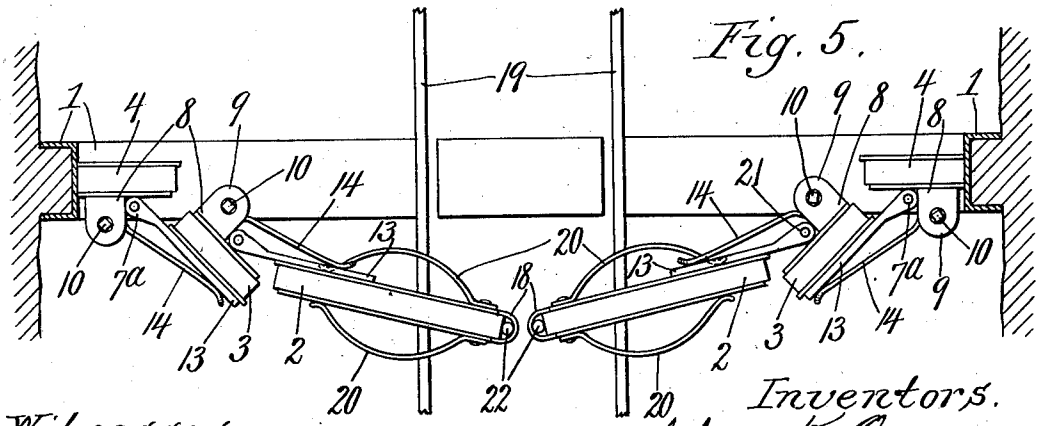


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN K. ORR AND LOUIS F. JONES, OF ZEIGLER, ILLINOIS.

MINE-DOOR.

1,090,562. Specification of Letters Patent. Patented Mar. 17, 1914.

Application filed April 7, 1910. Serial No. 554,008.

To all whom it may concern:

Be it known that we, JOHN K. ORR and LOUIS F. JONES, citizens of the United States, residing at Zeigler, in the county of Franklin and State of Illinois, have invented a certain new and useful Improvement in Mine-Doors, of which the following is a specification.

This invention relates to improvements in mine doors and has for its object to provide a new and improved device of this description.

The invention is illustrated in the accompanying drawings wherein—

Figure 1 is a view showing the door in place; Fig. 2 is an enlarged sectional view taken on line 2—2 of Fig. 1; Fig. 3 is a diagrammatic plan view showing the position of the parts when a car is passing through the door in one direction; Fig. 4 is a similar view showing the position of the parts when the car is passing through the door in the opposite direction; Fig. 5 is a plan view showing the position of the parts during the opening of the door due to an explosion in the mine.

Like numerals refer to like parts throughout the several figures.

In the construction shown in the drawings for purposes of illustration, we provide an exterior frame 1 which fits into the entry or other place where the door is to be used. In the construction shown, the door is formed with two sections each consisting of two panels 2 and 3. The panel 3 of each section is hinged to a stationary part in any desired manner, as for example, the part 4 which may be attached to the frame 1. The panels 2 are movably connected or hinged in any suitable manner to the panels 3. The various panels may be made up in any desired manner. As herein illustrated these panels are made up of angle or channel irons 5 which form the frames thereof, the faces being made of plates of sheet iron or the like 6, fastened to the angle or channel irons. At the points where the hinges are applied, we prefer to provide oak or other wooden fillers 7. Any suitable hinges may be used to connect the panels together and to connect the sections of the door to the stationary parts 4. We prefer to have these hinges adjustable spring hinges of some suitable type. As herein shown the hinges 7^a connect the panels 3 with the stationary parts 4 each consisting of a plate 8 provided with projecting lugs 9 through which passes a pin 10. A spring 11 is coiled about the pin and in the form shown has the ends 12 connected thereto as shown in Fig. 2. A movable part 13 is pivotally connected with the plate 8 and is also connected with the panel 3. The parts are arranged so that the force of the spring 11 may be applied to the panel 3. As herein shown this result is secured by forming the spring with a loop 14 between the two coiled sections on the pin 10, said loop projecting outwardly as shown and engaging the part 13. The spring 11 may be tightened up by turning the pin 10. This may be done by providing the pin with the non-circular end 15 so that a tool may be applied thereto and providing the pin with a ratchet 16 and a holding pawl 17. It will thus be seen that by rotating the pin 10 the tension of the spring may be adjusted so as to properly hold the panel 3 in its closed position under normal conditions. It is, of course, evident that any other suitable form of hinge may be used. As illustrated, each panel 3 is provided with two hinges. The panel 2 is connected to the panel 3 by hinges 21 similar to those connecting the panel 3 with the stationary part 4. The parts are arranged so that the edges of the panels 2 come together when the door is closed as shown in Fig. 1. We prefer to provide these edges with engaging faces 18 of rubber or the like so as to make the door substantially air-tight when closed. The edges of the door may be formed to hold the engaging pieces 18 in proper position or a holding part 22 may be used for this purpose, such holding part as shown consisting of a rod. As illustrated, the door is placed across an entry containing a track 19 along which a car or train of cars pass. We prefer to provide the panels 2 with bumper springs 20 which are engaged by the car as it passes through the door.

The use and operation of our invention are as follows: The door when in use is automatic and is normally closed as shown in Fig. 1. If now a car comes along the track 19 going in the direction shown in Fig. 3, it strikes the panels 2, or when the bumper springs are used it strikes these bumper springs, and causes the panels 2 to be moved about the hinges 21 so as to open the passage way and permit the car to pass therethrough. These bumper springs in addition to protecting the panels 2 hold them away

from the car as it passes through so as to prevent them from brushing coal off of the car. As soon as the car passes through, the sections 2 are released and automatically return to their closed position. When the car is moving in the opposite direction, as shown in Fig. 4, it strikes the panels 2 or the bumper springs thereon and causes the panels 2 and 3 to move together about the hinges 7ª, thus opening the passage way and permitting the car to pass therethrough. After the car has passed the sections of the door automatically return to their closed position. If, for example, the cars are moved from place to place by means of a mule, the mule will push against the panels and open the door as explained in connection with the car.

One of the great difficulties with a mine door is due to explosions which occur in the mine. These explosions are liable to tear the door from its hinges due to the sudden great pressure of the air produced thereby. This result is obviated in the present device for with this door when a sudden force is applied thereto, as by means of an explosion or runaway car or the like, the panels 2 are free to move practically straight out along the track as shown, for example, in Fig. 5, due to the hinges 21 and the movement is gradually applied to the panels 3 so as to move them about their hinges, thus taking up the shock and permitting the door to open without being torn from its hinges or otherwise injured and when the force is removed the door automatically closes. The tension of the hinges may be properly adjusted to keep the doors closed against the drafts produced in ventilating the mine.

It will thus be seen that this construction is automatic under all conditions, that it gives an extra clearance, and that it may be easily and quickly installed. The door is also adjustable against all air currents and the panels 2 act as preliminary strain relieving parts when great or abnormal pressure is applied to the door, and act to open the passageway and relieve the pressure and to convey the movement gradually to the other panels 3 so as to relieve the strain upon the hinges and prevent injury to the door. With this construction it is not necessary to have an attendant because the door is self-contained and automatic. It is also free from outrigging or apparatus for opening it as it is opened by direct contact and is also free from counterbalances, and the like. It is also durable and comparatively cheap of structure and fulfils the conditions under which it is used.

In case of an explosion the door is not destroyed but is simply opened and will again automatically close so as to immediately reestablish ventilation, thus preventing a loss of life in a majority of cases. It is usually necessary in mines to have these doors across the entries closed to maintain proper ventilation.

We claim:

1. A mine door comprising a solid, substantially air-tight hinged section and a preliminary strain relieving part forming a part of said section, said preliminary strain relieving part pivotally connected to the remaining portion of the section intermediate the edges of the remaining portion of the section, so as to move under the preliminary strain and transmit such strain to the remaining portion of the section.

2. A mine door comprising two sections hinged at opposite sides of the passageway, each section provided with a separate preliminary strain relieving part pivoted to the other part, the edges of the strain relieving part and other part coming together so as to limit the pivotal movement of the strain relieving part, said strain relieving part adapted to be moved by abnormal air pressures to relieve such pressures, and means for normally holding said sections in their closed position.

3. A mine door comprising two sections hinged at opposite sides of the passageway and adapted to be opened by contact to provide a passageway for the mine car, and means associated therewith for securing a greater clearance for the car during its movement in one direction than that secured during its movement in the other direction.

4. A mine door comprising two sections each having two panels extending the entire length of the opening to be closed and forming a substantially air-tight closure for said opening, said panels hinged together so as to be normally in alinement, one panel of each section hinged to a stationary part so as to move in either direction, the other panel hinged to the first panel so as to move in one direction separate from the first panel and to carry the first panel with it when moved in the other direction, and means for automatically holding the several panels in alinement under predetermined conditions so as to keep the door closed, one panel of each section free to move with relation to the other panel when force is applied thereto from the inside.

5. A mine door comprising two sections each having two panels extending the entire length of the opening to be closed and forming a substantially air-tight closure for said opening, said panels hinged together so as to be normally in alinement, one panel of each section hinged to a stationary part so as to move in either direction, the other panel hinged to the first panel so as to move in one direction separate from the first panel and to carry the first panel with it when moved in the other direction, and means for automatically holding the several panels

in alinement under predetermined conditions so as to keep the door closed, one panel of each section free to move with relation to the other panel when force is applied thereto from the inside, and a spring bumper connected with each section.

6. A mine door comprising a section made up of two panels, an adjustable spring hinge fastened to one panel and connecting it to a stationary part, an adjustable spring hinge on the other side of said panel and connecting it with the other panel whereby the two panels will be moved together when the pressure is applied on one side, and will be moved with relation to each other when pressure is applied to the other side.

7. A mine door comprising a section made up of two panels, an adjustable spring hinge fastened to one panel and connecting it to a stationary part, an adjustable spring hinge on the other side of said panel and connecting it with the other panel whereby the two panels will be moved together when the pressure is applied on one side, and will be moved with relation to each other when pressure is applied to the other side, and means for adjusting said spring hinges so as to increase or decrease the pressure necessary to move said panels.

8. A self-contained mine door comprising two sections each comprising two panels hinged together, spring hinges normally holding said panels and sections in alinement and in their closed position, one section arranged to be opened by direct contact on one side without opening the other section and adapted when opened by pressure from the other side to carry the other section with it.

Signed at Zeigler, Illinois, this 16th day of March, A. D. 1910.

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Witnesses:
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JOHN JOTKO.