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VENTILATION CONTROL SYSTEM

Filed Aug. 5, 1957

Fig 1.

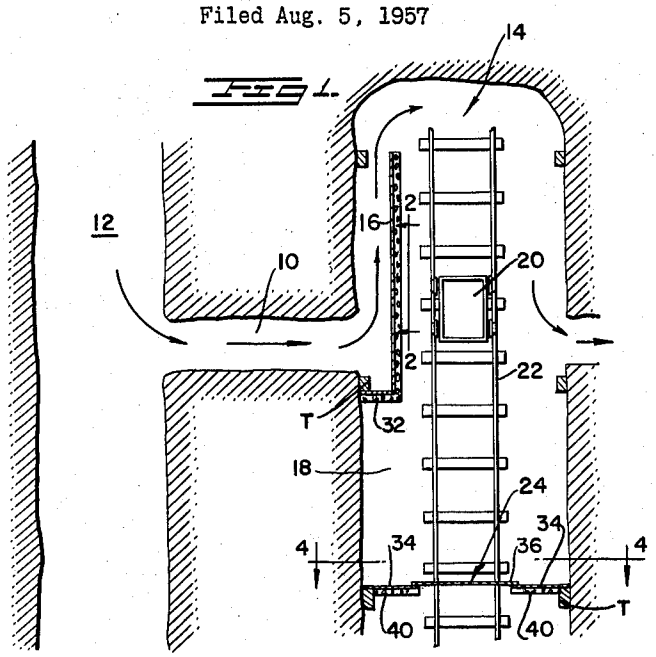


Fig 2.

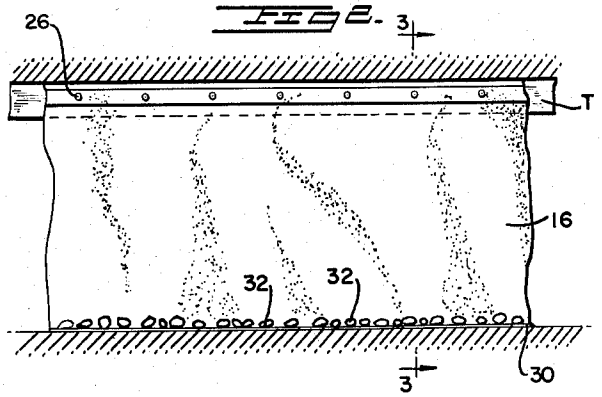
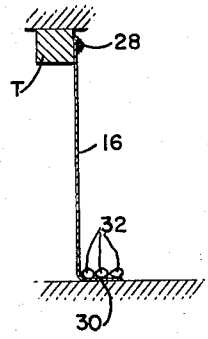


Fig 3.



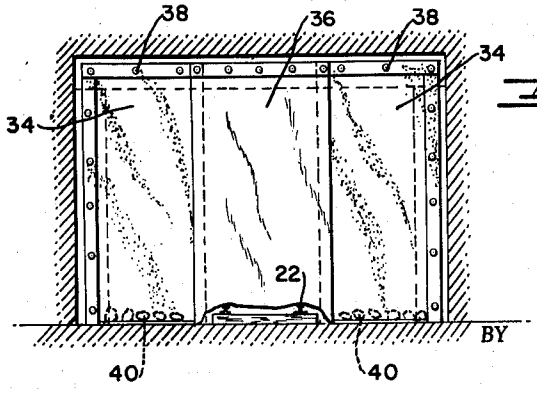


Fig 4.

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VENTILATION CONTROL SYSTEM

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3 Claims. (Cl. 98—50)

This invention relates to a ventilation control system and more particularly and specifically to ventilation control curtains for use in mining operations as line brattices, check curtains and temporary stoppings to effect circulation of air in predetermined paths and prevent undesirable gases from reaching the working areas of a mine.

In the present day fast and continuous mining operations, it has become of paramount importance to provide proper air circulation within the working areas of a mine to insure proper ventilation. Heretofore, line brattices, check curtains and temporary stoppings have been fabricated of material which has been to a certain extent impervious to air and harmful gases, moisture and dust absorbent, and of relatively short effective life.

It is an object of the invention to produce a ventilation control system for use in mining operations which overcomes the aforesaid disadvantages and provides an economic and extremely simple means for achieving efficient air circulation control.

Another object of the invention is to produce a check curtain which provides an effective air seal between various areas of the mine and provides for the passage of mining equipment therethrough.

Another object of the invention is to provide an air circulation control system impervious to air, harmful gases, dust and moisture capable of rapid installation, removal and reuse.

These and other objects and advantages are accomplished by the provision of mine ventilation control curtains consisting of extended sheets of flexible substantially gas impervious plastic material which can be mounted in or across mine workings to effect the desired control of air flow therein. While any of the plastic sheet or film materials, whether made of polymerizates, condensation products or cellulosic derivatives provide many of the advantages of the invention, it is preferred to use sheets of fire-resistant or fire-retardant materials, such as those containing chlorine in their composition, for example, vinyl chloride polymers and copolymers, polyvinylidene chloride, vinyl chloride-vinylidene chloride copolymers and the like, or those containing fire-retardant components, such as tricresyl phosphate or chlorinated compounds, because of the greater safety provided by such materials.

The principles of the invention are illustrated in the specific embodiments of the invention described below in connection with the accompanying drawings in which:

Fig. 1 is a plan view of a section of a mine showing various embodiments of the invention;

Fig. 2 is a sectional view of a line brattice taken along line 2—2 of Fig. 1;

Fig. 3 is a sectional view of the line brattice taken along line 3—3 of Fig. 2; and

Fig. 4 is an elevational view of a check curtain of the invention shown in Fig. 1.

Referring to Fig. 1, there is illustrated a section of a mine of the type employed in coal mining wherein air

is admitted into the mine working through a ventilation shaft 10 from a main air shaft 12 and into the working space, generally indicated at 14. In order to channel or control the flow of fresh air to the working space 14 there is provided a line brattice 16 suitably supported within the working shaft 18 to effectively direct the fresh air as desired. As will be noted, the path of the fresh air, which is generally illustrated by means of arrows, is caused to travel between the line brattice 16 and the side wall of the shaft 18 until it reaches the proximity of the working space 14. To complete the ventilation circuit, a ventilation shaft 10' is provided on the opposite side of shaft 18 to effect communication to another working area or to an exhaust shaft such that the fresh air will be constantly circulated through the desired areas.

The material being mined is transported from the working area 14 through shaft 18 by a shuttle car 20 which is adapted to ride on tracks 22. To insure that the fresh air supplied to the working area 14 is not too quickly dissipated to other sections of the mine shaft 18, a check curtain 24 is mounted in sealing relation across the shaft 18. The check curtain 24 maintains proper atmosphere with the working area 14 of the shaft 18 by militating against the passage of fresh air into other sections of the mine, and also effectively prevents the entrance of harmful gases and dust into the working area from other areas of the mine.

The line brattice 16, is formed of a flexible fire resistant or retardant plastic material and may be installed in any of the conventional manners. Satisfactory manners include either hanging the brattice on fasteners which have been driven directly into the roof and walls of the mine shaft or securing the brattice to the vertical and horizontal supporting timbers. In mines which are provided with timber supports, the line brattice may be mounted as illustrated in Figs. 2 and 3. In such an arrangement, the brattice 16 is provided with a plurality of grommets 26. Hooks 28 or the like are suitably secured to the mine shaft supporting timbers T at intervals corresponding to the separation of the grommets 26 in the line brattice 16. The hooks 28 engage the grommets 26 thereby providing support for the entire weight of the line brattice. This arrangement results in easy and expeditious installation and subsequent removal and reuse of the line brattices. It will be readily apparent that there are many other methods which may be satisfactorily employed in mounting the curtains of the invention.

The sheet material comprising the line brattice 16 has a greater height dimension than the height of the mine shaft 18 so that a portion of the bottom edge 30 will rest in intimate contact with the floor of the shaft. To prevent the passage of air, gases, or dust to selected mine workings, weights 32, such as rocks or pieces of coal, are placed on top of the bottom edge 30 to form a relatively air-tight seal between the bottom edge of the line brattice 16 and the floor of the shaft 18 thereby achieving maximum efficiency in the ventilation of the mine.

Fig. 4 illustrated the check curtain 24 which is provided as a means to seal the fresh air within the working area 14 of the mine and is comprised of three principle sections; a pair of spaced apart side sheets or panels 34 and a center fly-sheet or panel 36. The check curtain 24 is comprised of flexible plastic sheet material similar to the material of the line brattice 16. The side sheets 34 are provided with grommets 38 along their top marginal edges and along one of their vertical edges. The sheets 34 may be mounted in the same manner as the line brattice 16 on suitable hooks secured to the vertical supporting timbers. To provide for the sealing of the side sheets 34 to the floor of the shaft, the sheets have

a greater height dimension than the height of the mine shaft **18** such that a portion of the bottom edges rest on the floor of the shaft and are held in sealing relationship with the floor of the mine by weights **40** such as rocks or pieces of coal. The spacing between the innermost free marginal edges of the sheets **34** is sufficient to permit the passage of the shuttle car **20** or other equipment therebetween.

The top marginal edge of the center fly-sheet **36** is secured to the horizontal roof supporting timber so that the main body of the sheet depends downwardly with the outer marginal edges of the panel adapted to overlap the inner edges of the side sheets **34**. Due to the fact that the panel **36** is suspended on the side of the sheets **34** from which the fresh air is supplied, the pressure differential within the mine shaft **18** is sufficient to cause the vertical edges of the panel **36** to lay tightly against their respective mating edges of the panels **34**.

The construction of the check curtain **24** allows for the passage of the shuttle car **20** therethrough while only momentarily breaking the sealing relationship between the sheets **34** and the fly-sheet **36**. Due to the smooth flexible nature of the sheet **36**, any equipment passing through the check curtain **24** moves the sheet **36** away from contact with the side sheets **34** and then will fall back into sealing relationship with the side sheets **34** after the equipment has passed through the curtain.

It has been found advantageous in certain instances to use a translucent material for the fly-sheet **36** of the check curtain **24** to enable light to pass therethrough, while the side sheets **34** may either be translucent or opaque in nature.

While the illustrated embodiment of the invention has been directed to a shuttle car of the type adapted to move on tracks, it will be obvious that the objects of the invention may likewise be achieved with the use of shuttle car equipment of the type which travels on rubber or pneumatic tires. The latter type of equipment readily adapts itself to the invention in that without the necessity for tracks which necessarily extend above the level of the floor of the mine, the lower edge of the fly sheet **36**, shown in Fig. 4, will be able to lie against the floor of the mine thereby effecting an extremely efficient closure between the respective portions of the mine shaft.

From the above description it will be apparent to those skilled in the art, that the invention has produced a ventilation control system which is extremely durable, fire resistant, moisture proof, a nonconductor of electricity, resistant to acid, grease and oil and is readily adaptable for rapid installation, removal and subsequent reuse. Further, the system is one which will greatly add to the safety of mining operations by militating against the passage of explosive gases and dust to undesired areas of the mine and also insures the proper supply of fresh air to the personnel in the working areas of the mine.

I claim:

1. In a ventilation control system for a mine comprising a flexible fire resistant substantially gas impervious plastic material sheet means suspended transversely of the mine for sealing a section of the mine, said means having at least two side panels and a flexible center panel, said side panels being in intimate contact with the floor of the mine, means for securing each of said side panels to the wall of the mine, and means for securing the upper marginal edge of said center panel to the roof of the mine.

2. In a ventilation control system for a mine as claimed in claim 1 wherein said plastic material is selected from the group consisting of polymers and copolymers of vinyl chloride and vinylidene chloride.

3. In a ventilation control system for a mine having pressure air moving means, an air current directing member, said member comprising an extended sheet of flexible fire resistant substantially gas impervious plastic material, means for suspending said air current directing member disposed adjacent and extending along the roof portion of a mine section with the bottom edge of said member in intimate contact with the floor of the mine section, said means for suspending said air current directing member including a substantially horizontal member disposed adjacent and extending along the roof portion of the mine section and vertical supporting elements for retaining the relative position of the horizontal member, said means for suspending said air current directing member and said air current directing member cooperating to provide intimate gas sealing contact therebetween, said member cooperating with the lateral side walls of the mine section to provide an air passage duct for effectively controlling the flow of gases in cooperation with the pressure air moving means, said plastic material being selected from the group consisting of polymers and copolymers of vinyl chloride and vinylidene chloride.

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