Sept. 2, 1969 J. V. BURGESS, JR 3,464,756

VENTILATION CONTROL SYSTEM

Filed Nov. 15, 1967 2 Sheets-Sheet 1

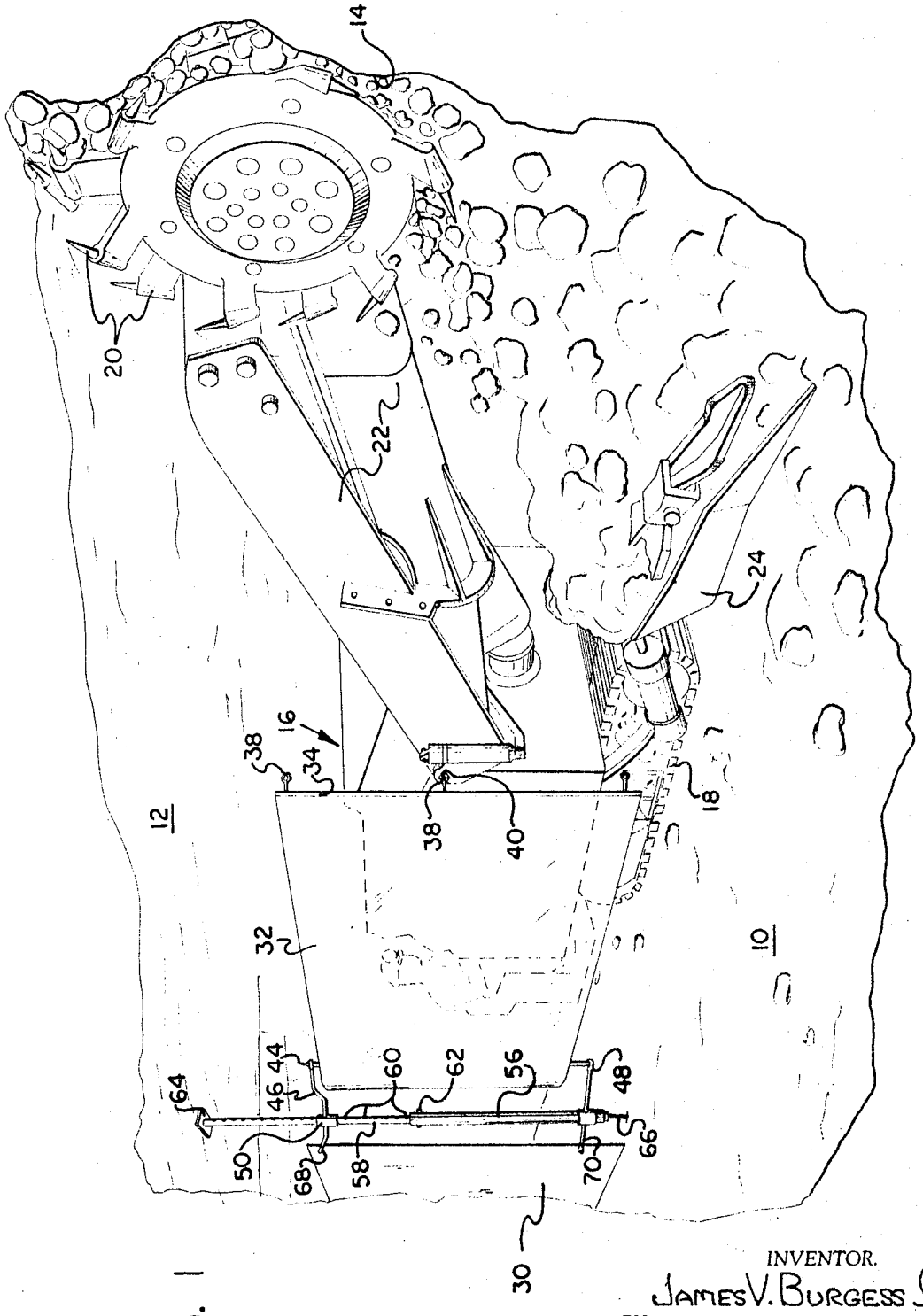


FIG. 1

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Sept. 2, 1969 J. V. BURGESS, JR 3,464,756

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Filed Nov. 15, 1967 2 Sheets-Sheet 2

FIG. 2

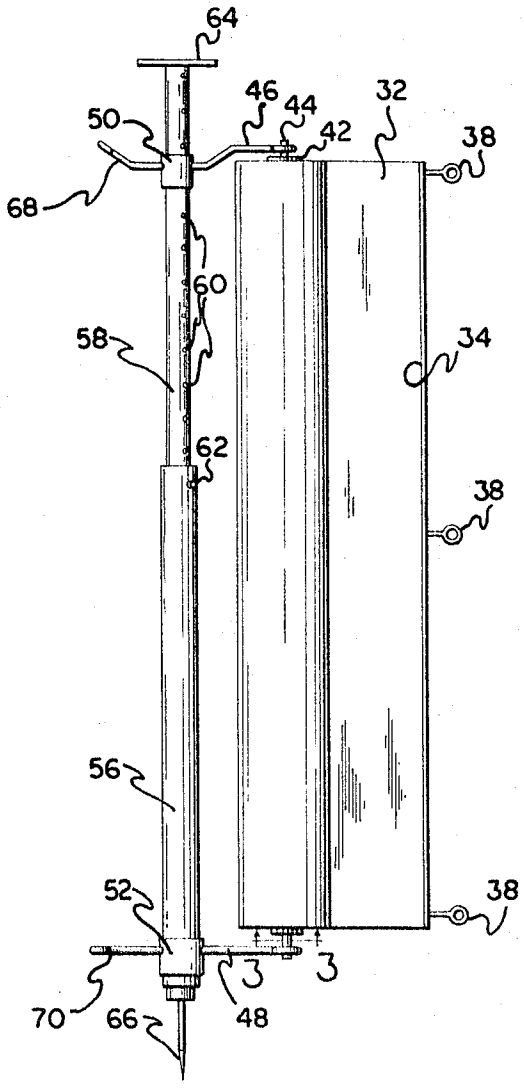
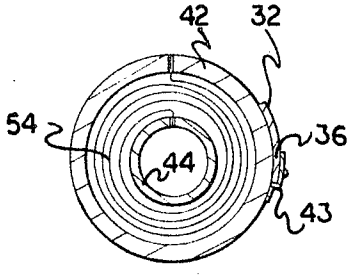


FIG. 3



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VENTILATION CONTROL SYSTEM

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Int. Cl. E21f *1/00, 3/00;* E21c *29/22*
U.S. Cl. 299—19 6 Claims

ABSTRACT OF THE DISCLOSURE

A ventilation control system consisting of an extensible and retractable air current directing curtain attachable to an underground mining machine to direct the flow of air over the cutting bits of the machine and as close to the working face of the mine as possible to render harmless any gas emissions, and to provide a current of air to sweep away dust that has become suspended by the cutting action of the machine.

Background of the invention

In the present system of ventilating underground mines, one of the problems not adequately solved is the presence of dangerous gases and dust immediately adjacent the working face of the mine. The present ventilating systems do not have the ability of diverting the clean air from the end of the line curtain assemblies to the working face which is continuously advancing as the mining machinery removes the material being mined. It is readily apparent to those knowledgable in the art of mining, that with the modern, fast and continuous mining operations, it has become of paramount importance to provide proper air circulation within the working areas of the mine to insure proper ventilation.

It is an object of the present invention to produce a ventilation control system for use in continuous mining operations which overcomes the aforesaid problems and provides an efficient and economically feasible means for achieving air circulation control immediately adjacent the cutting bits of a mining machine to effectively remove dangerous gases and dust content therein.

Summary

The above objectives of the invention may be typically achieved by a mine ventilation control system for use in a mine working with an associated mining machine comprising an extended surface web of flexible substantially gas impervious sheet material having a leading and a trailing edge portion; a roller mechanism attached to the trailing edge of the sheet material; means for supporting the roller mechanism in a vertical position within the mine working; and coupling means for connecting the leading edge of the sheet material to the mining machine whereby movement of the machine will effectively cause the sheet material to be pair off from the roll mechanism.

Brief description of the drawings

Other objects and advantages of the invention will become readily apparent to one skilled in the art from reading the following detailed description of an embodiment of the invention when considered in the light of the accompanying drawings, in which:

FIGURE 1 is a fragmentary perspective view of the invention employed in a mine working with a continuous mining machine;

FIGURE 2 is an enlarged elevational view of the invention showing the flexible sheet material in an almost entirely rolled condition; and

FIGURE 3 is an enlarged fragmentary sectional view of the invention taken along line 3—3 of FIGURE 2.

Description of the preferred embodiment

Referring to the drawings wherein like reference numerals designate similar parts throughout, there is illustrated an underground mine working having a floor **10**, a roof **12**, and a working face **14**. A mining machine **16** having ground engaging track laying treads **18** to provide movement of the machine and an array of cutting bits **20** mounted for rotation at the extended ends of a pair of outwardly extending booms **22** is employed to continuously move toward the material being mined. As the machine **16** advances toward the working face **14** of the mine, the bits **20** are rotated and caused to cut-away at the material being mined, such as coal for example. The bits **20** tend to break the coal from the vein which then drops toward the mine floor where it is typically collected on a moving conveyor **24**. The conveyor **24** then transports the coal to a position in the rear of the machine **16** where it may be loaded in shuttle cars and eventually transported out of the mine.

FIGURE 1 clearly illustrates a line curtain **30** which has been previously installed in the mine to aid in the directing of a current of ventilating air through the mine. Typically, the fresh air is directed toward the working face **14** along one side of the curtain **30**; while the gas and dust laden air is caused to travel in an opposite direction along the opposite face of the curtain **30**. These line curtains are installed in the mine after the mining machinery has advanced some predetermined distance. However, it will be appreciated that it is extremely difficult and time consuming to stop the mining machinery every so many feet of travel to install an additional length of line curtain.

To assure a substantially continuous ventilation control system effective to remove dangerous gases and dust in the region of the working face **14** of the mine, there is provided a web of flexible substantially gas impervious sheet material **32** having a leading edge portion **34** and a trailing edge portion **36**. The leading edge portion **34** of the sheet material **32** may be reinforced in any of the well known manners, such as for example, being folded back upon itself and stitched to form a reinforcing hem. Attached to the leading edge portion **34** are a plurality of spaced eyes **38** which are employed to be connected to a cooperating hook or hooks **40** affixed to the mining machinery **16**.

The trailing edge portion of the sheet material **32** is connected to a tubular spool or drum **42** by a clamping member **43**. The tubular spool **42** is mounted in substantially coaxially relation about a center tube **44** which has its opposite ends fixedly secured to the outer ends of arms **46** and **48** of brackets **50** and **52**. The outer tubular spool **42** and the center tube **44** are interconnected by a spiral spring means **54**. It will be appreciated that since the center tube **44** is fixed, the outer tube **42** can be rotated relative thereto as the sheet material **32** is caused to be paid off therefrom. As the relative rotational movement occurs between the outer tube **42** and the center tube **44**, the spring means **54** is placed under tension or loaded tending at all time to rewind the sheet material **32**.

The brackets **50** and **52** are rotatably mounted on a vertically disposed supporting column which includes a lower tubular member **56** and a cooperating upper tubular member **58** which is adapted to slide therewithin. The total over-all length of the supporting column may be varied by causing the tubular member **58** to slide within the tubular member **56**. The desired length may be fixed by aligning one of the holes **60** of the tubular member **58** with a hole in the upper portion of the tubular member **56** so that a pin **62** may be inserted therein to militate against any relative movement therebetween.

The uppermost end of the upper member **58** is provided with a pad **64** which is adapted to be placed into snug contact with the roof **12** of the mine; while the lowermost end of the tubular member **56** is provided with spike-like extension **66** which is adapted to be inserted into the floor **10** of the mine. Clearly, the pin **62** is removed when the supporting column is to be installed in a mine; tubular members **56** and **58** are typically extended in such a fashion that the pad **64** snugly contacts the roof **12** and the spike-like extension **66** penetrates a portion of the floor **10**; and the pin **62** is reinserted. In this manner, the roll of web material **32** is adequately supported in a vertical position within the interior of the mine working.

Projecting radially outwardly of the brackets **50** and **52** are arms **68** and **70**, respectively, which support the innermost end of a stationary line curtain **30** as illustrated in FIGURE 1.

Since the brackets **50** and **52** are free floating, the arms **46** and **48** may be moved forward when the drum mechanism **42** is positioned in front of the point of suspension and may be moved rearwardly when the drum mechanism **42** is positioned in the rear of the point of suspension.

In the normal mining operations, the line curtain **30** is typically terminated approximately six feet from the face of the mine. The mining machinery **16** will then progress into the mine toward the face **14** to a point which is not beyond the overhead roof supports which are typically installed as the mining operation progresses. As the mining machinery progresses in toward the working face, the web of sheet material **32** which is hooked to the mining machinery **16** will progress therewith. As the mining operation advances into what is referred to as a box cut or a full face, the web of sheet material **32** advances along with the mining machinery **16** and automatically effects an extension of the line curtain **30**.

While the sheet material **32** may be formed of a large number of plastic sheet film materials, whether made of polymerizates, condensation products, or cellulosic derivatives, it is considered preferable 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 diameter of the roll containing the sheet material **32** will vary according to the desired length of line curtain and the size of the suspension mechanism employed. Of course, the width or height of the sheet material **32** will depend primarily on the height of the mine, which in coal mining operations is a function of the height of the coal bed or vein.

It will be appreciated that the manner of connecting the leading edge portion **34** of the sheet material **32** to the mining machinery **16** may vary considerably. The manner in which the connection is made and the exact point of connection on the machinery will be determined by the specific type of mining machinery being used.

While the illustrated embodiment of the invention discloses the roll containing the sheet material **32** as being mounted in a stationary position within the mine and the leading edge **34** being attached to the mining machine **16**, it will be appreciated that the structure could be reversed. The roller mechanism for the sheet material could be mounted on the mining machine **16** and the leading edge **34** could be anchored adjacent the innermost edge of the curtain **30**.

After the particular face **14** has become idle and the mining operation has relocated, it may be necessary to bleed off gaseous emmissions, such as methane gas, and this may be accomplished by fixedly supporting the leading edge portion **34** of the sheet material **32** a few feet from the working in a somewhat permanent disposition thereof to achieve the desired ventilating air flow through the mine.

What I claim is:

1. A mine ventilation control system for use in a mine working with an associated mining machine comprising:
   - an extended surface web of flexible substantially gas impervious sheet material having a leading and a trailing edge portion;
   - a roller mechanism attached to the trailing edge of said sheet material;
   - means for supporting said roller mechanism and said sheet material in a vertical position within the mine working;
   - coupling means for connecting the leading edge of said sheet material to the mining machine whereby movement of the machine will effectively cause said sheet material to be paid off from said roller mechanism; and
   - spring means associated with said roller mechanism normally maintaining said web of sheet material rolled on said roller mechanism.

2. The invention defined in claim **1** wherein said means for supporting said roller mechanism consists of a telescoping columnar member adapted to extend between the floor and the roof of a mine.

3. The invention defined in claim **1** wherein said means for supporting said roller mechanism includes an extensible columnar member extending between the roof and the floor of the mine working.

4. The invention defined in claim **3** wherein said means for supporting said roller mechanism includes a pair of spaced brackets for supporting said roller mechanism.

5. The invention defined in claim **4** wherein said brackets are rotatably mounted on said columnar member.

6. A mine ventilation control system for use in a mine working with an associated mobile mining machine comprising:
   - an extended surface web of flexible substantially gas impervious sheet material having a first and a second edge portion;
   - roller means including spring means normally containing said sheet material in rolled condition thereon;
   - means for maintaining one of the edge of said sheet material at a fixed position in the mine working; and
   - means for coupling the other of the edge portions of said sheet material to the mobile mining machine whereby said sheet material is disposed in a vertical plane and forward movement of the machine will effectively cause said sheet material to be paid off from said roller means.

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