June 6, 1961 A. HAARMANN 2,987,290

PROP ARRANGEMENT FOR MINES

Filed Dec. 2, 1957

Fig. 1

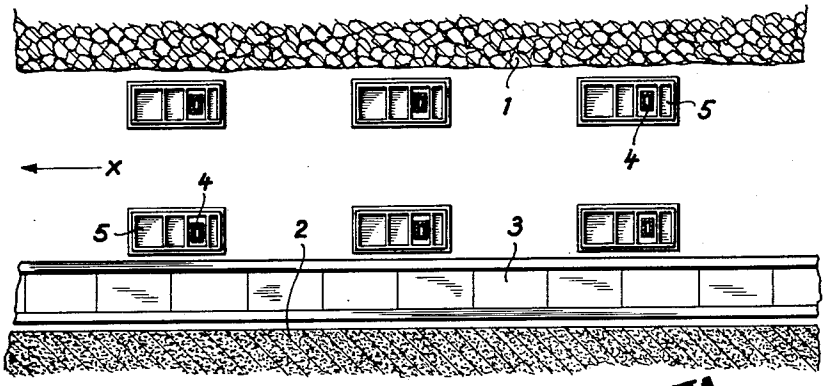


Fig. 2

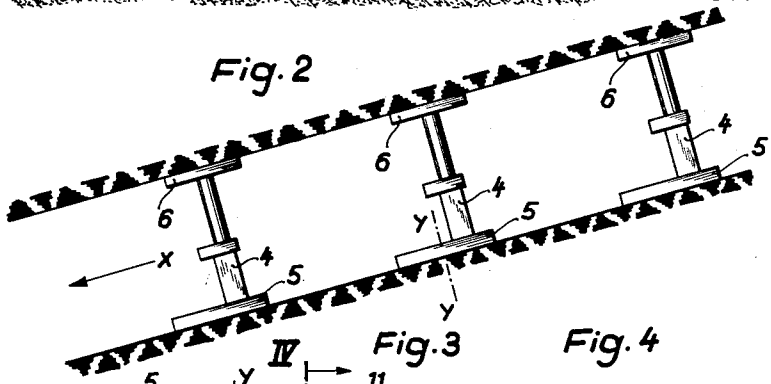


Fig. 3

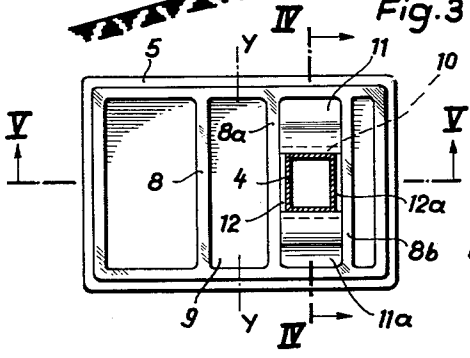


Fig. 4

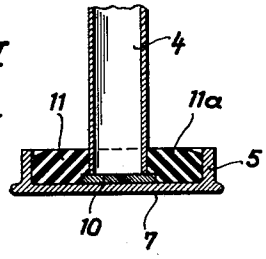
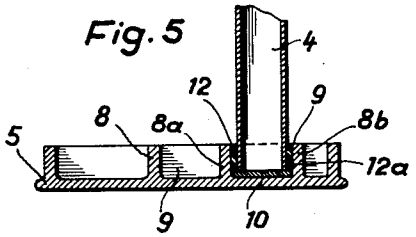


Fig. 5



INVENTOR
Arnold HAARMANN

by:
Michael V. Thiker
Attorney

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PROP ARRANGEMENT FOR MINES

Arnold Haarmann, Hermann-Lons-Strasse 11, Dortmund-Gartenstadt, Germany

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The present invention relates to props for mines.

In order to provide a stable support for props for mines it has already been proposed to provide such props with base plates of relatively large area which engage the floor of the mine gallery. However, such base plates present certain disadvantages. Thus, because of their large area the base plates prevent the location of the props as close as desired to the mine face, and also even though the base plates have a relatively large area the props still tilt and fall when the mine gallery is inclined. Furthermore, it is often very difficult to shift a prop because of the connection between the base plate and the upwardly extended prop member itself.

One of the objects of the present invention is to provide a prop member with a base plate of relatively large area to give a stable support thereto, while at the same time rendering it possible to locate the prop member very close to the mine face and, in fact, directly next to the conveyor which extends along the mine face.

Another object of the present invention is to provide a prop arrangement which will guarantee that the prop member and the base plate which carries the same will not tilt in a mine gallery which has an inclined floor which is relatively steep.

A further object of the present invention is to provide a connection between a prop member and a base plate located at the foot end thereof which will permit easier shifting of the prop arrangement in the mine gallery.

With the above objects in view, the present invention includes an elongated base member which is made of a rigid material and which is of an elongated substantially rectangular configuration. This base member is adapted to be located on the floor of an inclined mine gallery with one end of the base member located at a lower elevation than the opposite end thereof. The rigid base member, which may be made of any suitable metal, for example, is provided with an upwardly directed recess, and an elongated prop member extends upwardly from the base plate and has a bottom foot end which extends into this recess. The lower end of the base plate, when located on an inclined floor of a mine gallery, is located sufficiently beyond the foot end of the prop member to prevent undesirable tipping of the prop member and base plate. A means is located in the recess of the base plate for connecting the prop member thereto for turning movement in a plane which extends across the base plate.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claim. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a diagrammatic top plan view of a mine gallery in which prop arrangements according to the present invention are located;

FIG. 2 is a diagrammatic elevational view of an inclined mine gallery in which props of the invention are located;

FIG. 3 is a top plan view of a base plate of a prop arrangement according to the present invention, FIG. 3

showing in section a prop member extending upwardly from the base plate;

FIG. 4 is a transverse sectional view taken along line IV—IV of FIG. 3 in the direction of the arrows; and

FIG. 5 is a longitudinal sectional view taken along line V—V of FIG. 3 in the direction of the arrows.

Referring to FIGS 1 and 2, the mine gallery illustrated therein is inclined downwardly to the left, as viewed in FIGS. 1 and 2, and the arrow *x* indicates the downwardly directed inclination of the mine gallery. The wall **2** shown in FIG. 1 represents the mine face which is being worked, while the wall **1** represents the opposite side wall of the mine gallery where the back-fill is located. A conveyor **3** is shown diagrammatically in FIG. 1 extending along the mine face **2**, as is conventional.

As may be seen from the diagrammatic illustrations in FIGS. 1 and 2 a plurality of prop arrangements are located in the mine gallery and extend between the floor and roof thereof. These prop arrangements each include a base plate **5** of a suitable rigid metal, for example, and a cap or top plate **6** which is pressed against the roof of the mine gallery, and an elongated prop member **4** extends between the base plate **5** and the cap member **6**. As is conventional, the prop member **4** is in the form of an elongated telescoped tube arrangement, for example, provided with suitable hydraulic fluid or the like, so that it is capable of being expanded in order to press the cap member **6** against the roof and the base plate **5** against the floor of the mine gallery, and, as is also conventional, the prop member **4** carries a suitable releasable locking device for maintaining the prop member in its expanded operative condition. The details of the prop member **4** itself are purely conventional.

The line *y—y* shown in FIGS. 2 and 3 indicates the center of the base plate **5**. It will be noted from the drawings that the base plate **5** is of an elongated rectangular configuration, and the line or plane *y—y* is located midway between the ends of the elongated base plate **5**. As is evident from FIGS. 1 and 2, the base plate **5** is placed in the mine gallery with one of its ends located at a lower elevation than its opposite end. Moreover, the prop member **4** may be located, as shown in the drawings, more distant from the lower end of the base plate **5** than the upper end thereof, and as a result the prop arrangement **4—6** is very stable and will not tip so as to fall down the inclined mine gallery.

As may be seen from FIGS. 3–5, the base plate **5** includes an upwardly extending rim which extends along the periphery of the base plate, so that the base plate has a construction similar to that of an open-top box. Moreover, a plurality of ribs **8**, **8***a*, and **8***b* extend transversely across the base plate **5**, and these ribs may be integral with the base plate or may be in the form of metal bars which are welded thereto. The ribs which extend transversely across substantially the entire width of the base plate **5** cooperate with the rim thereof to define a pair of recesses **9**. It will be noted that the left recess **9** of FIG. 5 is located substantially midway between the ends of the base plate **5**, while the right recess **9** is displaced to the right of the center of the base plate **5**, as viewed in FIG. 5. It is possible to locate the foot end of the prop member **4** in the central recess **9**, where, for example, the prop arrangement is used in a substantially horizontal mine gallery. However, where the prop arrangement is used in an inclined gallery, the foot end of the prop member **4** is placed in the right recess **9** of FIG. 5 and the right end of the base plate **5** is then located at a higher elevation than the left end thereof, as viewed in FIG. 5, so as to provide the stable arrangement referred to above.

The ribs **8**, **8***a*, and **8***b* have a length which is approximately three times the dimension of the foot end of the prop member **4** in a direction parallel to these ribs, and the

distance between the rib **8** and the rib **8***a*, on the one hand, and the rib **8***a* and the rib **8***b*, on the other hand, is less than one and one-half times the dimension of the foot end of the prop member **4** in the longitudinal direction of the base plate **5**. Therefore, as can be seen from FIG. 3, the transverse ribs of the recess which receives the prop member are located quite close to the foot end of the prop member, while the rim of the base plate at the ends of the elongated transversely extending recess is distant from the foot end of the prop member.

As may be seen from FIGS. 4 and 5 the bottom end of the prop member **4** is provided with a plate **10** to which the remainder of the prop member is connected, and this plate **10** at its outer periphery extends beyond the remainder of the prop member to provide an outwardly directed bottom flange. A plurality of elastic resilient deformable bodies which may be made of rubber or a plastic having similar properties are located in the recess which receives the foot end of the prop member for fixing the latter to the base plate **5**. Thus, the drawings show elastic bodies **11** and **11***a* located between the foot end of the prop member and the rim of the base plate **5**, and a pair of elastic bodies **12** and **12***a* located between the ribs **8***a* and **8***b* and the prop member. These elastic bodies completely fill and are compressed into the space of the recess which surrounds the foot end of the prop member, and they overlap the outwardly extending peripheral portion of the foot plate **10** of the prop member so that the elastic bodies provide a reliable connection between the elongated prop member and the base plate **5**. Because of the size of the recess with respect to the foot end of the prop member, the prop member can have very little and substantially no tilting movement with respect to the base plate **5** in a plane which extends longitudinally through the base plate **5**. However, because of the greater distance of the rim of the base plate **5** at the ends of the elongated recess from the prop member, there is a sufficient amount of material in the elastic bodies **11** and **11***a* to permit the prop member **4** to turn with respect to the base plate **5** in a plane which extends transversely across the same. Where tilting in one direction or the other in this plane is desired, the elastic body located at the side opposite from that toward which the prop member is to be tilted may be removed.

With the above-described structure of the invention many advantages are obtained. As was pointed out above, the possibility of the prop arrangement tipping and falling down on the mine gallery is practically eliminated. Moreover, by making the base plates **5** of the elongated substantially rectangular configuration shown in the drawings, it is possible to preserve the advantage of a large contact area between the prop arrangement and floor of the mine gallery while at the same time rendering it possible to locate the prop members **4** extremely close to the conveyor **3**. Furthermore, where the prop arrangement is clamped between the floor and roof of the mine gallery, the release of the prop arrangement from this condition may be provided simply by pushing or pulling the base plate **5** toward the mine face **2**, for example, and the pivotal connection between the prop member **4** and the base plate will permit such movement of the base plate with respect to the prop member while at the same time preventing any undesirable harm to the parts. Also, it is possible, if desired, to disconnect the base plate and prop member from each other and to move them separately.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of props differing from the types described above.

While the invention has been illustrated and described as embodied in shiftable props, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claim.

What is claimed as new and desired to be secured by Letters Patent is:

A mine prop arrangement comprising in combination, an elongated rigid base plate of substantially rectangular configuration having a rim extending all along the periphery of said base plate and extending upwardly therefrom so that said base plate forms a construction similar to that of an open-top box, said base plate being made of a rigid material and being adapted to be placed on an inclined floor of a mine gallery with one end of said base plate located at a lower elevation than an opposite end thereof, and said base plate having at least two parallel ribs extending transversely across said base plate and connected to said rim to define an upwardly directed recess therewith, said recess being located at a substantial distance from said one end of said base plate; an elongated prop member extending upwardly from said base plate and having a bottom foot end located in said recess, said ribs each having a length which is approximately three times the dimension of said foot end of said prop member in a direction parallel to said ribs and the distance between said ribs being less than one and one-half times the dimension of said foot end of said prop member in the longitudinal direction of said base plate; and a plurality of compressible elastic bodies filling the space in said recess which surrounds said foot end of said prop member to connect the latter with said base plate while providing a pivotal support for said prop member allowing a pivotal movement thereof in a plane extending transversely across the base plate but preventing substantially any pivotal movement in a plane extending longitudinally through said base plate.

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