

W. REINHARD.
MEANS FOR PROPPING MINES.
APPLICATION FILED MAR. 30, 1910.

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Patented Apr. 4, 1911.

3 SHEETS—SHEET 1.

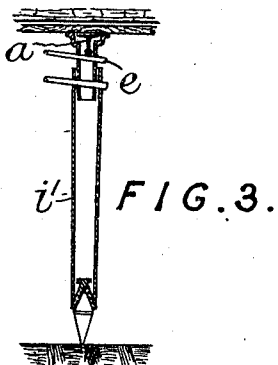
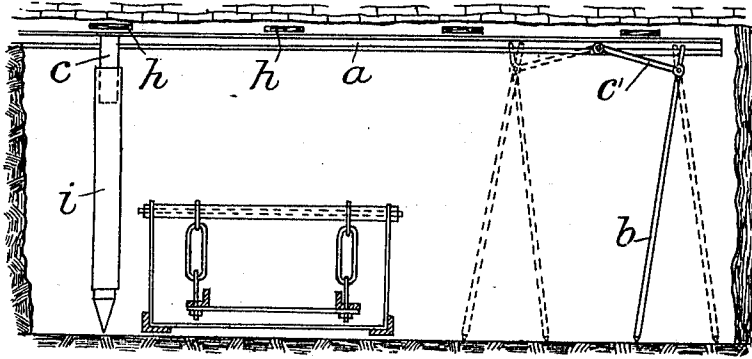


FIG. 3.

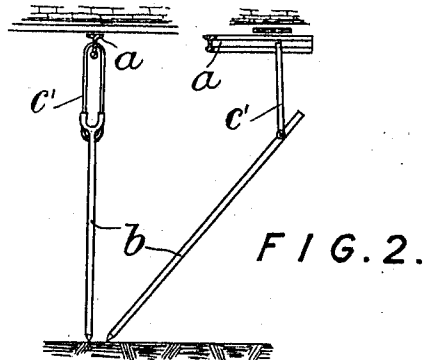


FIG. 2.

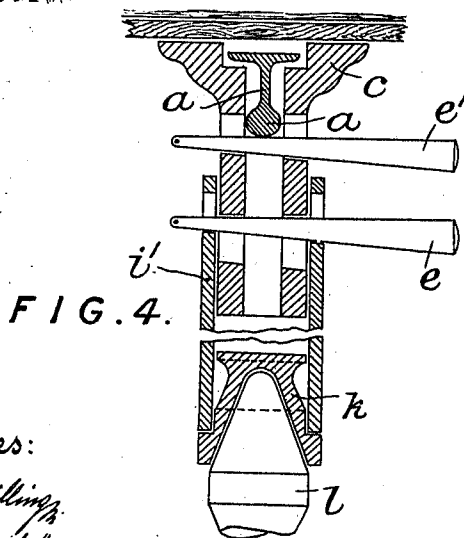
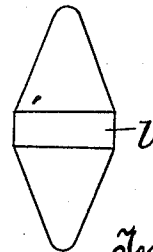


FIG. 4.



Witnesses:

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Georg. Tiedtke

Inventor:

Wilhelm Reinhard.

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2 SHEETS—SHEET 2.

FIG. 5.

FIG. 6.

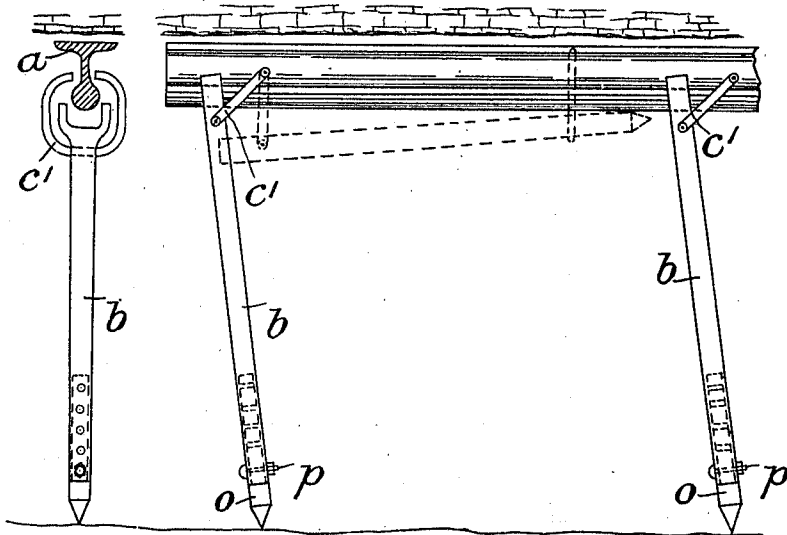


FIG. 7.

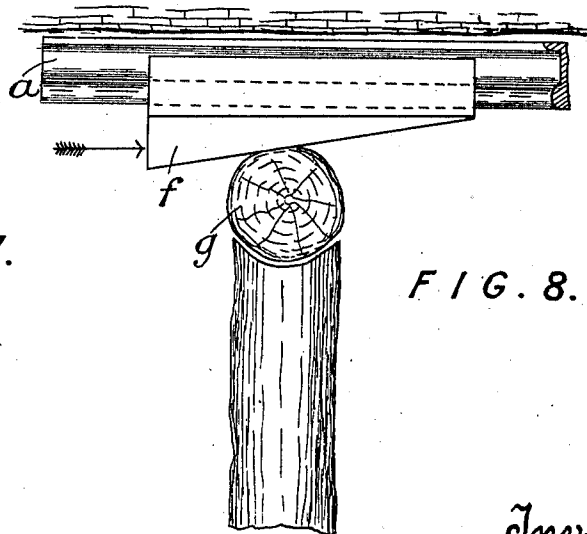


FIG. 8.

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UNITED STATES PATENT OFFICE.

WILHELM REINHARD, OF KREFELD-ON-THE-RHINE, GERMANY.

MEANS FOR PROPPING MINES.

988,948.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed March 30, 1910. Serial No. 552,396.

To all whom it may concern:

Be it known that I, WILHELM REINHARD, a subject of the Emperor of Germany, residing at Krefeld-on-the-Rhine, in the German Empire, have invented new and useful Improvements in Means for Propping Mines, of which the following is a specification.

My invention relates to improved means for propping mines which consist in supporting the roof at the working face of the mine by means of traveling rails adapted to be advanced as the face progresses, the rail being suitably supported so as to prevent it from tilting and so that it can easily be relieved of pressure when it is to be advanced.

The advantage of the traveling rails is that the latter can be advanced close to the face of attack, while the supports for the rails can be kept at a sufficient distance from the face for not hindering the miners in their work. Better security and more comfort for the miners will thus be obtained through the arrangement.

A particular advantage is derived from the arrangement in cases where the minerals are conveyed from the face by mechanical means, in that the conveyer can be advanced with the face without previous removal of erected timbering or without taking the conveyer to pieces.

The invention is illustrated in the accompanying drawing, Figure 1 representing a longitudinal section of a gallery with traveling rail and mechanical conveyer, Fig. 2, views at right angles of an adjustable support for the rail, Fig. 3, a longitudinal section of the prop which serves as main support for the rail, Fig. 4, a similar section on an enlarged scale, Figs. 5 and 6, an end and a side view respectively of the rail with adjustable support, and Figs. 7 and 8, a sectional end view and a side view respectively of a wedge for securing the rail on the head piece of ordinary wooden props.

The roof of the working gallery is supported by means of rails *a*, between which and the roof the necessary lagging *b* is arranged. Said rails are directed toward the face of the working gallery and arranged at such a distance apart as to enable each slab

of the lagging to traverse at least three rails. This precaution is necessary in order to prevent dislocation of the slabs, which should be held by at least two rails while the third is being loosened and advanced. Should the ground be very loose, it may be necessary to arrange two rails close to one another; in that case the distance between such pairs of rails may be greater than between the single rails. The rail *a* is provided with a main support in the form of a strong prop *i* which is placed at a suitable distance from the gob, so as to support the rail where the pressure of the roof is the greatest. In connection with said prop, arrangements must be made for guiding the rail with its base applied to the lagging, as well as for pressing the rail against and loosening it from the roof. These objects are attained through the provision of a prop such as illustrated in Figs. 3 and 4. This prop consists of a metal tube *i'* in the upper part of which a head piece *c* is slidably arranged. An incision adapted to receive the rail *a*, is made in the upper part of said head piece, and this incision, being formed in accordance with the profile of the rail, prevents the latter from tilting.

The head piece is supported in the tube *i'* by a wedge *e* which is passed through coinciding slots in the tube and the head piece, said slots being so adjusted that a driving home of the wedge effects a raising of the head piece. Another wedge *e'* is arranged in a separate slot in the head piece underneath the rail *a* which, through the tightening of said wedge, is pressed against the roof of the gallery. The wedges are provided with cotters or split pins at their smaller ends so as to prevent their dropping out of the slots of the tube.

In the lower part of the tube *i'* a cup-shaped insertion *k* is provided which is adapted to receive the wooden plug *l* and which has a shoulder engaging the lower edge of the tube *i'*. The object of the plug *l* is to make the prop pliable, the former being gradually crushed under the pressure until the tube *i'* gives firm resistance. The plug is tapered at both ends, one so as to fit in the hollow of the insertion *k*, and the other so as to give increasing resistance to

the pressure. By providing plugs of different lengths a prop of standard size can be adapted for galleries of various heights.

A support for the front end of the rail is provided in the form of a bifurcated rod *b* the fork of which fits on the head of the rail. This rod is connected to the rail *a* by means of a link *c'*, one end of which is pivoted in an aperture in the rod and the other end of which may either be pivoted in an aperture in the rail *a*, as shown in Figs. 1 and 2, or adapted to clamp the head of the rail as shown in Figs. 5 and 6. In case of the former arrangement being resorted to, the rod *b* only allows of adjustment in four positions, as shown in Fig. 1; in the latter case it can be adjusted all along the rail. A loop, adapted to hook the lower end of the rod *b*, may be arranged on the rail, so that the rod, in case of need, can be brought altogether out of the way, as shown dotted in Fig. 6. Instead of the stiff link *c'*, a chain link may be provided.

As it may be necessary to vary the length of the rod *b*, its lower end is preferably formed into a socket adapted to receive a slidable abutment piece *o* which can be fastened to the socket in various positions by means of a bolt and nut *p*.

As the face of the working progresses, the rails *a* are advanced one by one. For this purpose, the wedge *c'* must be loosened so as to relieve the rail of the pressure which meanwhile is partly transferred directly to the head piece *c*. The rail having been advanced, the wedge is again tightened and the rod *b* adjusted, at a convenient distance from the face, to support the front end of the rail. The rod *b* is tightened against the rail through driving its lower end along the ground by any suitable object. Before the rear end of the rail leaves the prop *i*, another prop must be applied at a suitable distance in front of the former which is then removed and put away for later use. The space behind the rail is at the same time filled with rubbish.

If it should be desired to use ordinary wooden pit props, instead of the main prop hereinbefore described, a modified arrangement for guiding the rail must be provided. Such arrangement may consist of a wedge *f* which on one side has a longitudinal groove shaped so that the wedge closes around the head of the rail and supports it on both sides. The lower, inclined side of the wedge is flat so that, when the wedge is driven along the rail over a cap *g* (Fig. 8) arranged across two props, it both presses the rail against the roof and prevents it from tilting. The arrangement is shown in Fig. 1 in connection with a mechanical coal conveyer of known construction, the coals being delivered into the rocking tray *m* of said conveyer and advanced through the slow forward movement and quick back-

ward movement of the tray. The conveyer can be shifted simultaneously with the rods *b* and thus always be kept close to the face of the working.

With regard to economy, as well as safety and convenience in the working, the described means offer numerous advantages: The amount of timber required is greatly reduced; the time saved, owing to the more readily operated propping system, increases the output of minerals; old materials such as tram rails and boiler pipes may be utilized, in the propping to the same advantage as in older systems since only small heights are required, the method may be employed equally well for the exploitation of narrow veins; the manipulation of the propping plant is exceedingly easy and no special tools are required; the reduction in the number of props necessary, leaves more space available and thus greatly facilitates the extraction and removal of minerals; and more security against collapse is obtained, since the resistance presented to the ground by the supporting elements is not lessened during the robbing of the props or advancement of the supporting rails.

I claim:

1. In propping mines, the combination of traveling rails designed to support the roof of the working gallery and bearing against the lagging and adapted to be advanced as the face progresses, a main prop to support the rear of each rail and arranged at a suitable distance from the gob, and a bifurcated rod to support the front of each rail and adjusted at a suitable distance from the face for not hindering the working, both props being adjustable in height and allowing a temporary release of the pressure on the rail for the advancing of the latter.

2. In propping mines, the combination of traveling rails designed to support the roof of the working gallery and bearing against the lagging and adapted to be advanced as the face progresses, a bifurcated adjustable rod linked to each rail and designed to support the same at a convenient distance from the working face, a main prop to support each rail at a suitable distance from the gob and comprising a tube, a head piece slidably fitted in the upper part of said tube and having a recess in which the rail is guided, a wedge passed through slots in the tube for adjusting the head, a wedge passed through the head piece for pressing the rail against and loosening it from the roof, and a cup-shaped insertion in the lower end of the tube adapted to receive a wooden plug, substantially as and for the purpose set forth.

3. In propping mines, the combination of traveling rails designed to support the roof of the working gallery and bearing against the lagging and adapted to be advanced as

the face progresses, an adjustable main prop to support each rail at a suitable distance from the gob means on said main prop for releasing the rail from pressure when it is to be advanced, a rod to support each rail at a convenient distance from the working face, a fork on one end of said rod for gripping the head of the rail, a socket with an adjustable abutment piece at the other end of said rod, and means to connect said rod 10 and rail.

WILHELM REINHARD.

Witnesses:

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MARIA SINZIG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
