June 21, 1938. F. J. HABE 2,121,291

ROOF SUPPORT FOR UNDERGROUND PASSAGEWAYS

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Fig. 1.

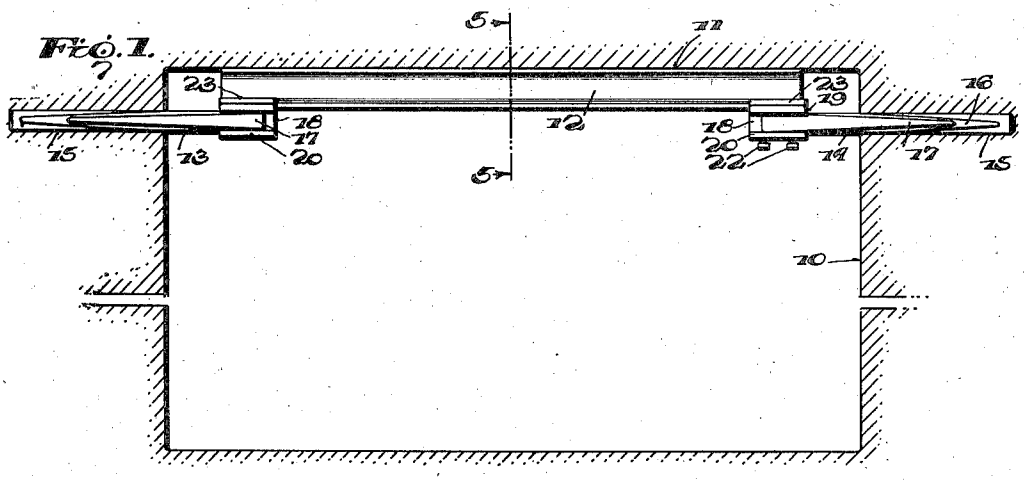


Fig. 2.

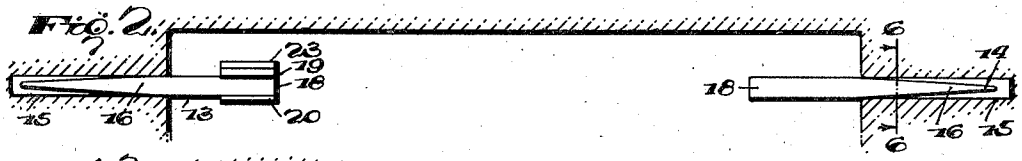


Fig. 3.

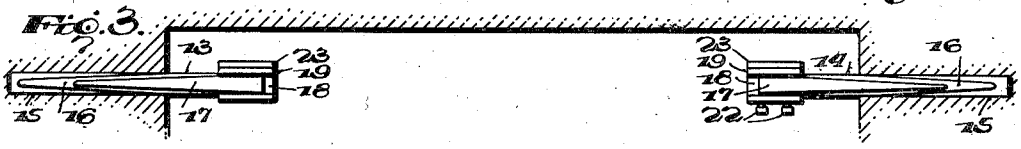


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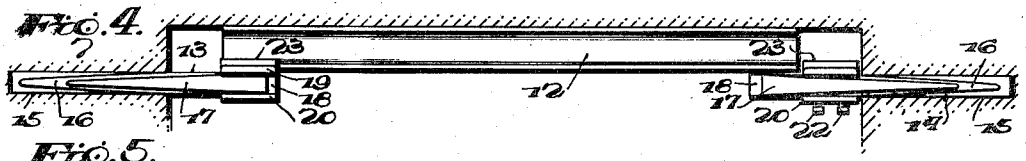


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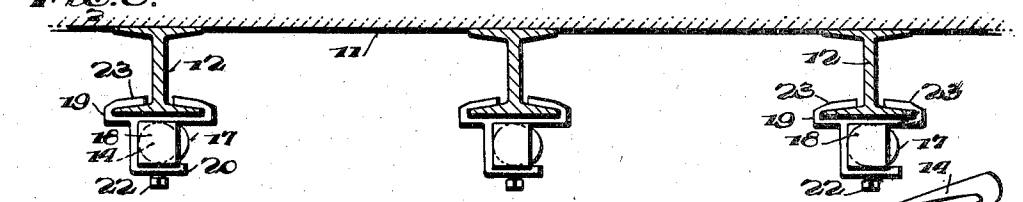


Fig. 6.

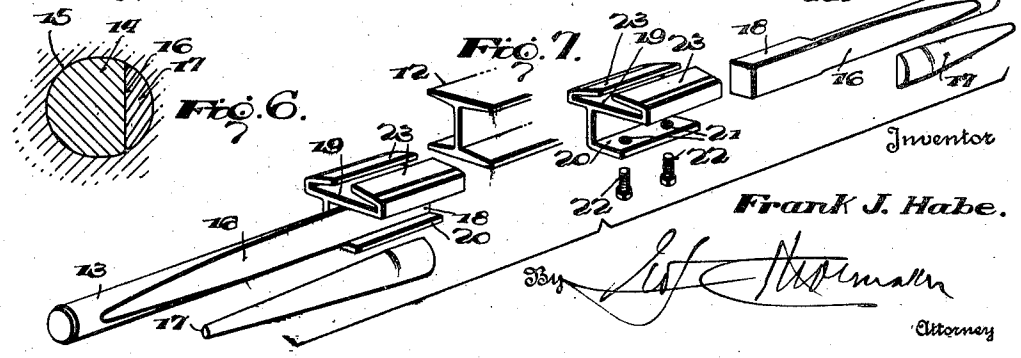


Fig. 7.

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ROOF SUPPORT FOR UNDERGROUND PASSAGEWAYS

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Fig. 8.

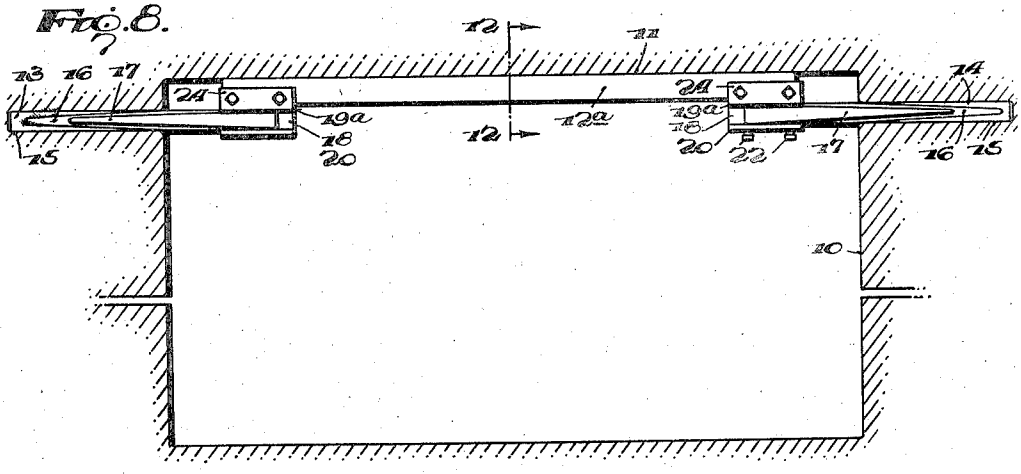


Fig. 9.

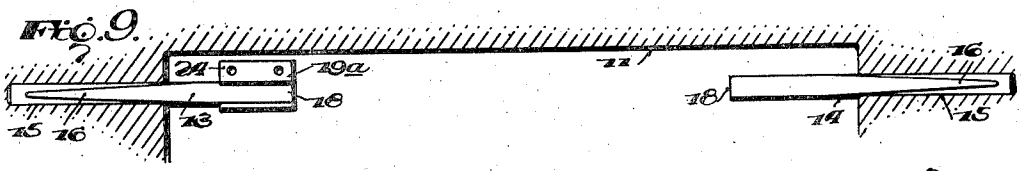


Fig. 10.

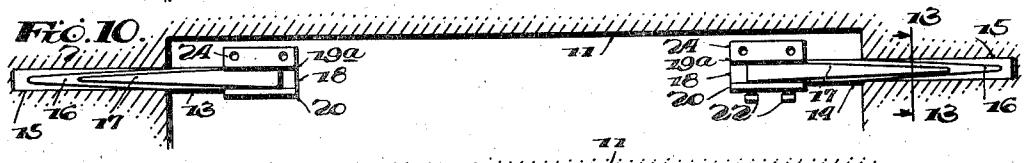


Fig. 11.

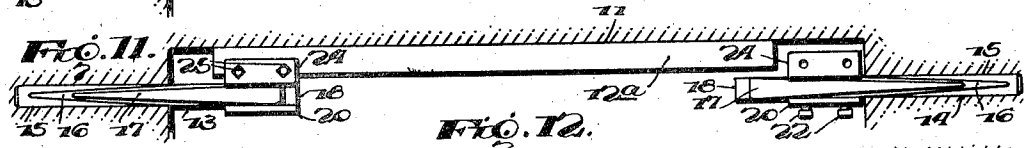


Fig. 12.

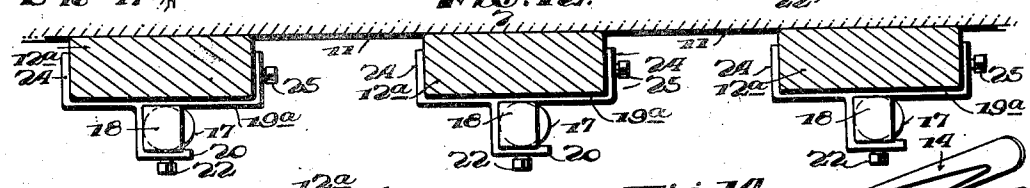


Fig. 13.

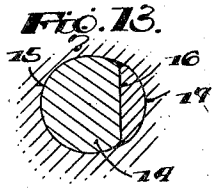


Fig. 14.

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Patented June 21, 193 2,121,291

UNITED STATES PATENT OFFICE

2,121,291

ROOF SUPPORT FOR UNDERGROUND PASSAGEWAYS

Frank J. Habe, Rimersburg, Pa., assignor of one-half to Eli Racusin, Rimersburg, Pa.

Application February 2, 1938, Serial No. 188,384

3 Claims. (Cl. 61—45)

The present invention relates generally to roof supports for use in underground passageways and among other things for strengthening, in mines, the weak points in the slate stratum commonly underlying coal veins. The invention may be usefully employed in various portions of a coal mine, such as an entry, corridor or narrow room, and has for its primary object the provision of a support which will eliminate the space absorbing uprights commonly used in similar instances at present, and provide in lieu thereof means capable of convenient utilization as either temporary or permanent fixtures.

It is well known that employment of the usual upright posts creates many disadvantages in mine passageways, especially narrow corridors and rooms since considerable space is taken up which might otherwise be efficiently utilized. Furthermore, such uprights ordinarily constitute a distinct menace under such circumstances since they are subject to ready displacement through the derailing of cars and the like and when displaced endanger workmen through the falling of headers or supporting beams and portions of the passageway roof. The invention aims to do away with these disadvantages.

A further object of the invention is the provision of a device which necessitates for its installation only those tools commonly at hand and does away with the necessity of special tools as well as other materials aside from the device itself.

A still further object is the provision of a device of this character which may be readily and easily installed without requiring skilled mechanics or workmen for the purpose, as well as a device which is simple, lasting and effective and will be capable of reuse where it is employed for temporary purposes.

Referring now to the accompanying drawings which form a part of this specification and which illustrate the best mode so far devised for carrying the invention into practical effect—

Fig. 1 is a vertical cross sectional view through an underground passageway, showing my improvements in side view in effective position.

Fig. 2 is a similar view through the upper portion only of the pasageway, showing the anchor or supporting bars as initially set in wall bores.

Fig. 3 is a view similar to Fig. 2, showing the wedge strips driven into effective position.

Fig. 4 is another similar view showing the initial positioning of the header or supporting beam.

Fig. 5 is a longitudinal sectional view showing the arrangement of several of the roof supports of the present invention in spaced relation in a series.

Fig. 6 is a detail sectional view through one of the wedged supporting bars, taken on line 6—6 of Fig. 2.

Fig. 7 is a detail perspective view of the several parts of the device in slotted relation, and

Figs. 8 to 14, inclusive, are views respectively coinciding in character with Figs. 1 to 7, inclusive, showing an alternate form of header or supporting beam and seat blocks therefor.

Referring now to these figures and especially to Figs. 1 to 4, inclusive, and 8 to 11, inclusive, an underground passageway 10, which may be a mine entry, corridor, or narrow room, as for instance one of an over-all width which under present conditions would be unduly restricted by the use of supporting uprights or props where roof supporting headers or cross beams are necessary, is shown with the usual vertical or approximately vertical side walls and the usual roof 11, beneath the latter of which and as a support therefor it is desirable to use headers or cross supporting beams as at 12.

For the support of these beams 12 and to eliminate the necessity for upright props or supports, the invention proposes the use of a pair of generally cylindrical supporting bars or anchors 13 and 14, each to be extended horizontally as indicated in Fig. 2, within conformable bores 15 formed in the side walls of the passageway at calculated spacing below the roof 11.

Each of the bars 13, 14, is provided with a tapering flattened side 16, and each is utilized with a wedge strip 17, which forms a mate with the flattened side 16, and, after the bar has been positioned within its respective bore 15, may be driven longitudinally into the bore along the flattened side of a supporting bar as best seen in Figs. 3 and 6 to thus not only securely anchor the bar in the wall bore against accidental displacement therefrom but also securely hold the same against rotation.

Each of the bars 13, 14 is provided at one end with a polygonal head 18 and in securing the bar within the wall of the passage as previously described, care is taken to see that a flat surface of the polygonal head 18 is in horizontal position to receive thereon a seat block 19 for the support of one end of the header or cross beam 12.

Each seat block 19 is preferably provided with a depending angular flange 20 to extend downwardly along one side of the head 18 and laterally therebeneath, preferably as shown, to a

point beyond the other side of the head so that between the extreme edge of the flange 20 and the body of the seat block 19, there is thus formed a guide for the larger end of the wedge strip 17 when the latter is initially driven into the wall bar alongside its supporting bars 13, 14.

While both seat blocks 19 may be shiftable lengthwise of their supporting bars, it is possible that one, for instance the seat block 19 of the bar 13 may be stationarily secured thereto by nails, rivets, bolts or the like or by welding. It is essential that one at least of the seat blocks, however, be shiftable longitudinally of its bar. In the present instance, seat block 19 of bar 14 is so shown and is provided in the lower portion of its flange 20 with threaded openings 21 for the reception of set screws 22, the latter serving to clamp the seat block at a selectively adjusted point on the head 18 of the bar 14.

Thus after the bars 13, 14 have been securely anchored by their wedge strips 17 within the wall openings or bores, the seat block 19 of bar 14 is either moved, or if the bar sufficiently extends into the passageway the seat block may be shifted toward the wall on the bar to clear the head 18. If the seat block is removed, according to the form of structure shown in Figs. 1 to 7, inclusive, it is placed on the base of the beam 12, the latter in this instance being in the form of an I-beam and the seat block having upper flanges 23 overlapping the base flange of the beam. This position of the parts is for instance shown in Fig. 4, the beam being initially placed in position with one end on the head 18 of bar 14 so that when its opposite end is aligned with the seat block of the bar 13, the beam may be shifted lengthwise to enter its latter end within the seat block 19 of bar 13. The seat block 19 of bar 14 is then shifted lengthwise of the beam 12 and of the bar onto the head 18 and clamped in position by means of the clamping screws 22.

The same procedure is carried out with the form of construction shown in Figs. 8 to 14, inclusive, which is similar in all respects to the construction previously described except that the headers or supporting beams are in the nature of heavy planks as shown at 12^a and, for this reason, the seat blocks 19^a have upright side flanges 24 instead of the upwardly, inwardly angular flanges 23 of the seat blocks 19. Thus the beams or planks 12^a lying between the upright flanges 24, may be clamped by clamping screws 25 through certain of the flanges 24 to thus avoid any possibility of accidental lengthwise gripping of the beams.

It is obvious from the foregoing that no especial skill is necessary for the installation of the support of this invention and that its installation necessitates but the boring of side wall openings and the turning of clamping screws with the use of tools commonly at hand in mining and the like underground operations. It is to be particularly observed that other than the foregoing the installation involves merely the manipulation of the parts of the invention as described and avoids the necessity of any additional materials such as cement and the like which would tend to defeat reuse of the device particularly where it was initially employed for temporary purposes only.

What is claimed is:—

1. A support for the roof of an underground passageway, comprising an intermediate roof supporting beam or header, a pair of anchor bars for extension into conformable wall openings of the passageway below its roof, the bars being arranged and opposed in aligned relation and having elongated tapering flattened sides and portions projecting into the passageway provided with polygonal heads, tapering wedge strips mating the flattened sides of said bars and when driven into the wall openings serving to securely hold the bars against accidental withdrawal or turning movements, beam holding seat blocks carried by the projecting headed ends of the bars to receive thereon the ends of the supporting beam or header, having means to engage the supporting beam ends for preventing their accidental lateral displacement, each of said seat blocks having a lower angular flange extending along one side and the bottom of its respective head, the free end of said flange projecting beyond the adjacent side of the head to form between the same and its seat block a guide channel for the respective wedge strip, and one at least of said seat blocks being adjustable lengthwise of, and removable from, its respective supporting bar and provided with means for clamping the same in connection with the bar.

2. A roof support for underground passageways, including an intermediate supporting beam or header, a pair of supporting bars for extension within side wall openings of the passageway below its roof and having longitudinally tapering flattened side portions, wedge strips of tapering form mating the flattened sides of the bars and serving, when driven within the wall openings, to securely hold the bars against accidental withdrawal as well as against rotation, said bars including portions extending within the passageway below the ends of the supporting beam or header, seat blocks carried by the said projecting end portions of the supporting bars to receive the ends of the supporting beam and having means to prevent lateral displacement of the latter, one at least of said seat blocks being shiftable lengthwise of its respective bar and removable therefrom, and means carried by the adjustable removable seat block to clampingly engage its bar as and for the purpose set forth.

3. A roof support for underground passageways, including an intermediate supporting beam or header, a pair of supporting bars for extension within side wall openings of the passageway below its roof and having longitudinally tapering flattened side portions, wedge strips of tapering form mating the flattened sides of the bars and serving, when driven within the wall openings, to securely hold the bars against accidental withdrawal as well as against rotation, said bars including portions extending within the passageway below the ends of the supporting beam or header, seat blocks carried by the said projecting end portions of the supporting bars to receive the ends of the supporting beam and having means to prevent lateral displacement of the latter, one at least of said seat blocks being shiftable lengthwise of its respective bar and removable therefrom, and means carried by the adjustable removable seat block to clampingly engage its bar as and for the purpose set forth, each of said seat blocks including means forming a guide for the respective wedge strip.

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