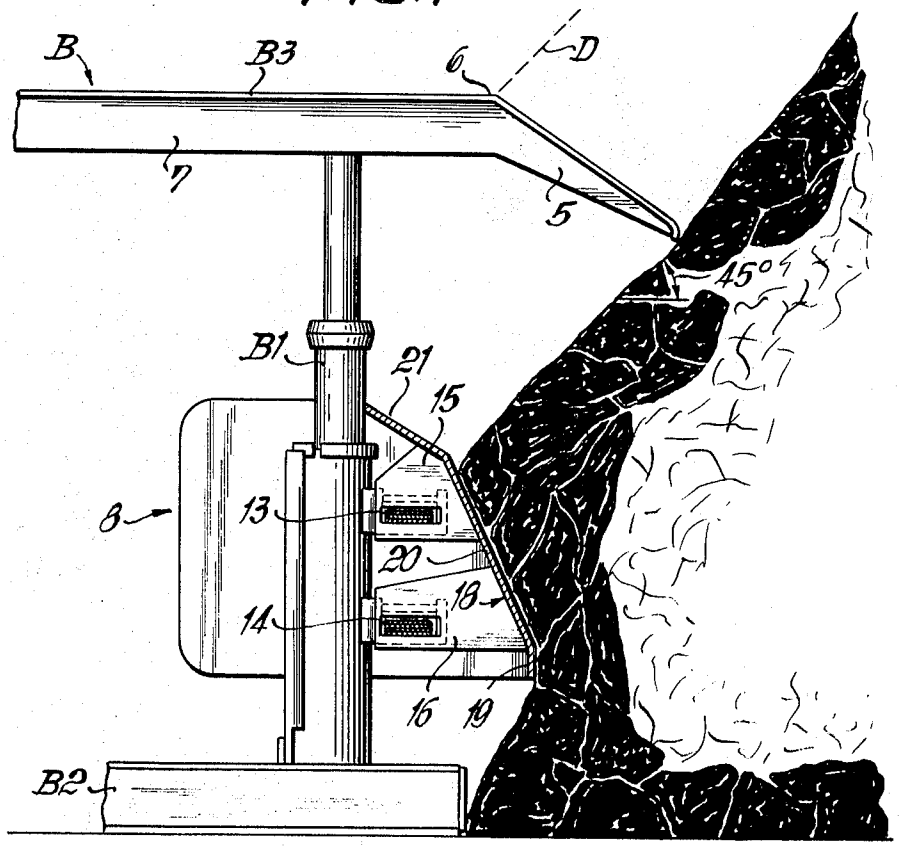
Nov. 9, 1971 M. KUHN ET AL 3,618,325

HYDRAULIC SUPPORT SYSTEMS FOR MINE WORKINGS

Filed Jan. 22, 1970 3 Sheets-Sheet 1

FIG. 1



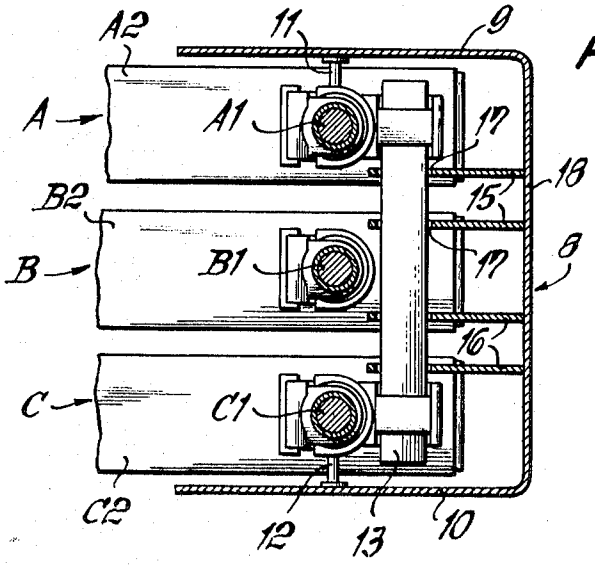


FIG. 2

INVENTORS
Max Kuhn
Gunter Bell
Willy Watermann
by Richard W. Kruse
attorney

Nov. 9, 1971 M. KUHN ET AL 3,618,325

HYDRAULIC SUPPORT SYSTEMS FOR MINE WORKINGS

Filed Jan. 22, 1970 3 Sheets-Sheet 3

FIG. 5

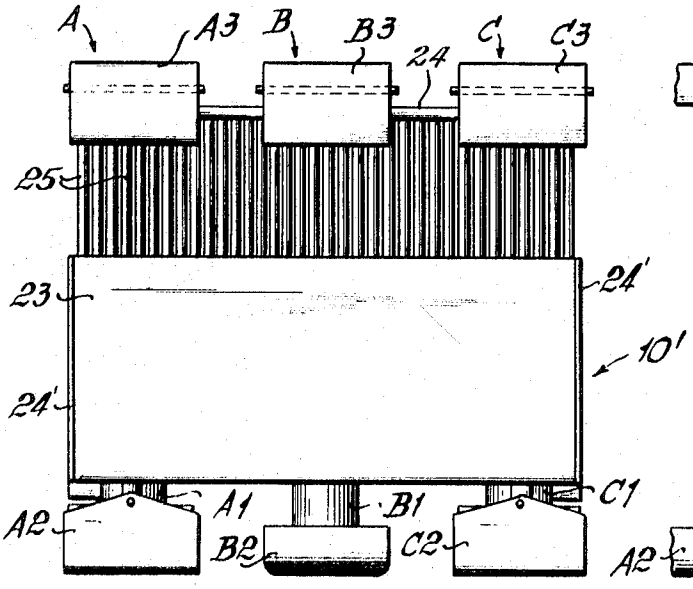


FIG. 3

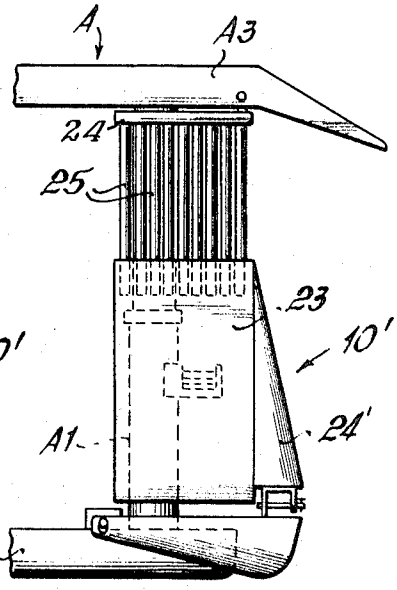
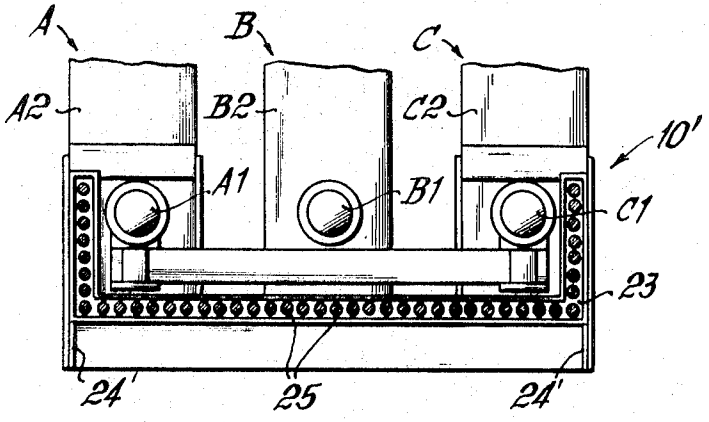


FIG. 4



INVENTORS
Max Kuhn
Günter Bell
Willy Waterkamp
by Richard W. Pinner
attorney

Nov. 9, 1971 M. KUHN ET AL 3,618,325

HYDRAULIC SUPPORT SYSTEMS FOR MINE WORKINGS

Filed Jan. 22, 1970 3 Sheets-Sheet 3

FIG. 8

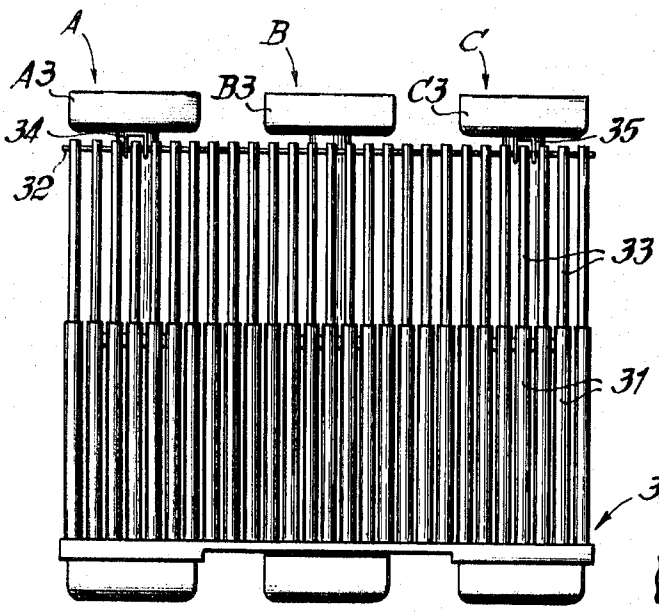


FIG. 6

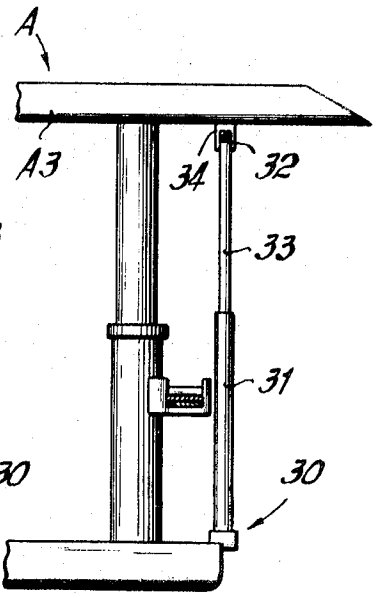
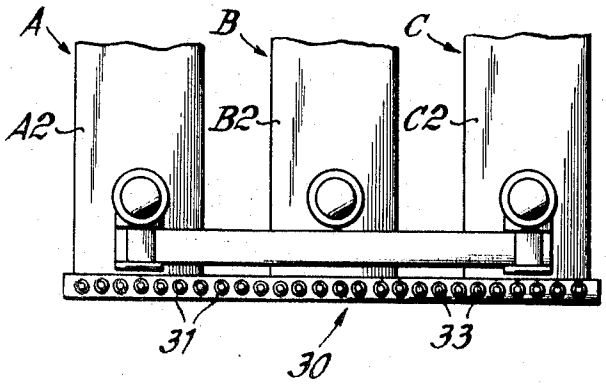


FIG. 7



INVENTORS
Max Kuhn
Gunter Bell
Willy Watermann
by Robert W. Brown
attorney

United States Patent Office 3,618,325 Patented Nov. 9, 1971

3,618,325

HYDRAULIC SUPPORT SYSTEMS FOR MINE WORKINGS

Max Kuhn, Bochum-Langendreer, Gunter Bell, Horneburg, and Willy Watermann, Dortmund-Berghofen, Germany, assignors to Klockner-Werke AG, Duisburg, Germany

Filed Jan. 22, 1970, Ser. No. 4,930
Claims priority, application Germany, Jan. 23, 1969, G 69 02 441
Int. Cl. E21d 15/44
U.S. Cl. 61—45 D 3 Claims

ABSTRACT OF THE DISCLOSURE

A three frame assembly for an advancing roof support, each frame having a pit prop and a roof engaging cap. A shield is common to the three frames and is secured to the two outer frames for movement with the same. The shield prevents packing material from entering between the frames and is contoured for this purpose. The center frame may advance and subsequently the two end frames together with the shield advances. The roof engaging cap for each frame inclines downwardly at an angle generally parallel to the angle of rest of the packing material.

BACKGROUND OF THE INVENTION

Shields for protecting the advancing roof prop assemblies for mine use are concerned in this instance. Such shields particularly bent to U-shape replace wire netting, papers or wires formerly utilized frequently as packing shields, because the durability of such shields is not good, and with the great advances in the art, which make possible the advancing hydraulic mine roof support, these shields had to be replaced too frequently. The use of the shields frequently formed from sheet metal must, however, on the one hand, take place so that the support assembly can advance, and on the other hand, the shielding of dirt or the like during advance cannot permit the entrance of lumpy material into the retaining space for the props.

A two frame assembly is already known which utilizes two sheet metal parts as shielding members which are suitably joined or articulated with one another. Such shielding members, on account of the mobility afforded by the frame joints or articulations, are easily subjected to damage by material containing coarse pieces or lumps. The known shielding members made of U-shaped sheet metal up to now do not make possible the reliable shielding of the space between two or more frames when they are combined into one unit. Therefore, material gets into this space and easily blocks the advancing movement of the mine roof supports. Besides, the danger exists that the advancing devices, particularly the hydraulic props, which are ordinarily arranged between the frames, are damaged.

SUMMARY OF THE INVENTION

The invention provides a three frame assembly for an advancing mine roof support, which is provided with a material shielding means for shielding in all phases of the advance, the entire bottom and also the intermediary spaces between the frames against the penetration of packing material. In accordance with the basic idea of the invention, this is achieved by the use of a shield bent into U-shape and fixed only to the two outer frames but covering all three frames.

Upon advance, then first the center frame is pushed forward, which takes place protected from the packing insulation, which remains at the breakage edge, and is held in place by the two outer frames. When the outer

frames are brought up or advanced, the shield moves up to the middle frame which has already been pushed along on the packing side of the prop support. Therefore, the shield can prevent neither the advance of the outer frames, nor the advance of the inner frame. The packing material on the surface is present only between two consecutively disposed three frame assemblies and not between the frames of an assembly. In view thereof, no packing material can penetrate to the base plate means of the three frame assembly.

According to the invention, the rear ends of the mine roof engaging caps incline downwardly, so that in the driving position of the frame assembly a plane touching the cap ends, whose incidence is parallel generally to the angle of inclination of the packing material, encounters a rear angular portion of the U-shaped shield. Thus, it is possible to keep the height of the U-shaped shield relatively low, and not only save material and weight, but also restrain the packing material.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation partially in section of an embodiment of a three frame assembly taken approximately on the line 1—1 of FIG. 2;

FIG. 2 is a transverse sectional view of the three frame assembly taken approximately on the line 2—2 of FIG. 1;

FIG. 3 is a side elevation partly in section of an alternate embodiment of the invention and showing a view similar to FIG. 1;

FIG. 4 is a view similar to FIG. 2, the assembly being in accordance with FIG. 3;

FIG. 5 is a view of the embodiment according to FIG. 4 viewed from the packing side;

FIG. 6 is a view similar to FIG. 3 of a further embodiment of the invention;

FIG. 7 is a view similar to FIG. 4 of the embodiment according to FIG. 6; and

FIG. 8 is a view similar to FIG. 5 of the embodiment of the invention according to FIGS. 6 and 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The three frame assembly illustrated in the drawings consists of frames A, B, C with hydraulic props or roof supports A1, B1, C1 on the packing side, base-rails A2, B2, C2 and roof supporting caps A3, B3, C3.

In the embodiments by way of example according to FIGS. 1 to 5, the upper supporting caps on the packing side are constructed in predetermined manner, which is to be explained more in detail in the example of the cap B3. The end 5 of this cap facing the packing is inclined downwardly so that at 6 the upper peak of the angle results, which includes the downwardly inclined end portion 5 joined to a forwardly extending front part 7. At the peak of the angle there is formed a breakage edge D extending upwardly and illustrated in dotted lines. At the outer end of the part 5 of the cap occurs the packing slope. Dotted line E designates the plane contacting the end of the part 5, and the incidence of the plane corresponds to the angle of inclination of the packing material.

On the packing side there is disposed in the embodiments shown by way of example on FIGS. 1 to 5, a U-shaped bent sheet metal part 8. The sheet metal part 8 is so constructed that between its parallel end flanges 9 lie the three frames A, B, C forming the support. The flanges 9 are connected by rods 12 to roof props A1 and C1 of the two outer frames A and C respectively.

Transversely extending connecting beams 13 and 14 on the packing side are arranged in spaced superimposed relation in the props A' and C' of the outer frames A and C respectively. These frames A and C are advanced simul-

taneously by suitable hydraulic rams (not shown) while the middle frame B is first advanced. The beams **13** and **14** extend through in flanges **15** and **16**, which for this purpose are provided with apertures **17**. The flanges **15** and **16** are arranged on the side of the panel **18** of the U-shaped sheet metal **8**.

In addition, the U-shaped shield has a lower portion **19** which extends vertically, a middle portion **20** which is inclined slanting upwardly and forwardly in the open support space, and a more abruptly inclined upper closure portion **21**.

While the packing insulation in the embodiment shown by way of example in FIGS. 1 and 2, consists of a sheet metal bent U-shaped shield, the embodiment illustrated in FIGS. 3 to 5 utilizes a shield **10'** which is formed of a sheet metal box **23** open towards the top. This sheet metal box or case is provided with reinforcements **24'** in order to impart to it the required stiffness. On the ceiling engaging caps A3 to C3 is arranged, as particularly shown in the example of the cap A3 in FIG. 3, a structure **24** on which is arranged a curtain made of individual rods **25**. The rods may also be tubular and are guided telescopically in the opening of the shield forming the packing insulation. They pass upon lowering of the caps into the shield and upon subsequent loading of the props are again drawn out of the opening.

This fundamental principle is also realized in the embodiment according to FIGS. 6 to 8. Here, however, the shield consists of a rearward, relatively flat construction **30**. This construction is located only along the rear side of the three frame assembly consisting of the frames A, B and C. It consists of a plurality of pipes **31**. The caps, however, again support a guide rod **32** to which rods or pipes **33** are fixed. The pipes **33** are of smaller cross-section than the pipes **31** and are guided telescopically in these pipes.

In the embodiment by way of example according to FIGS. 6 to 8 fastening means are provided only on the two outer frames for the curtain of pipes **33** and are indicated at **34** and **35**, respectively.

The embodiments which are described in FIGS. 3 to 5 on the one hand, and in FIGS. 6 to 8 on the other hand, may be inserted with and without bent caps.

What we claim is:

1. In an advancing mine roof support, a three frame assembly for advancing mine face support, each frame assembly having a base rail, a hydraulic roof support and a roof supporting cap, said frames being arranged in a row, a shield having a portion extending completely across the rear of the several frames, parallel wings on opposite sides of said shield, bracket means on each of the outer end frame assemblies, beams extending transversely of said shield and secured at opposite ends to said bracket means, and means for securing each wing to the adjacent end frame assembly, thereby enabling the outermost assemblies along with said shield to be advanced while the intermediate assembly is under load, and the intermediate assembly is advanced when the outermost assemblies are under load, whereby the entire bottom and the spaces between the frames are shielded against the penetration of packing material.

2. An advancing mine roof support as claimed in claim **1**, in which said bracket means comprises flange plates extending from said shield and through which said beams extend, and fixed connections between the end portions of said beams and the outer end frames, respectively.

3. An advancing mine roof support as claimed in claim **1**, in which said shield is in the form of a U-shaped metal box open at the top, a curtain of closely spaced rods secured at their top to the roof supporting caps of the two outer end frame assemblies and with their lower end portions extending telescopically into the open top of said box.

References Cited

UNITED STATES PATENTS

3,201,943	8/1965	Wilkenloh, et al.	61—45 D
3,342,034	9/1967	Andrews, et al.	61—45 D
3,375,668	4/1968	Allen	61—45 D
3,383,866	5/1968	Groetschel	61—45 D
3,474,627	10/1969	Groetschel	61—45 D
3,483,705	12/1969	Roberts	61—45 D

FOREIGN PATENTS

1,061,071	3/1967	Great Britain	61—45 D
1,085,719	10/1967	Great Britain	61—45 D
970,540	10/1958	Germany	61—45 R

DENNIS L. TAYLOR, Primary Examiner