Dec. 6, 1966 J. E. FEUCHT 3,289,779

MOBILE ROCK DRILL CARRIER SUSPENSION SYSTEM

Filed Feb. 1, 1965 5 Sheets-Sheet 1

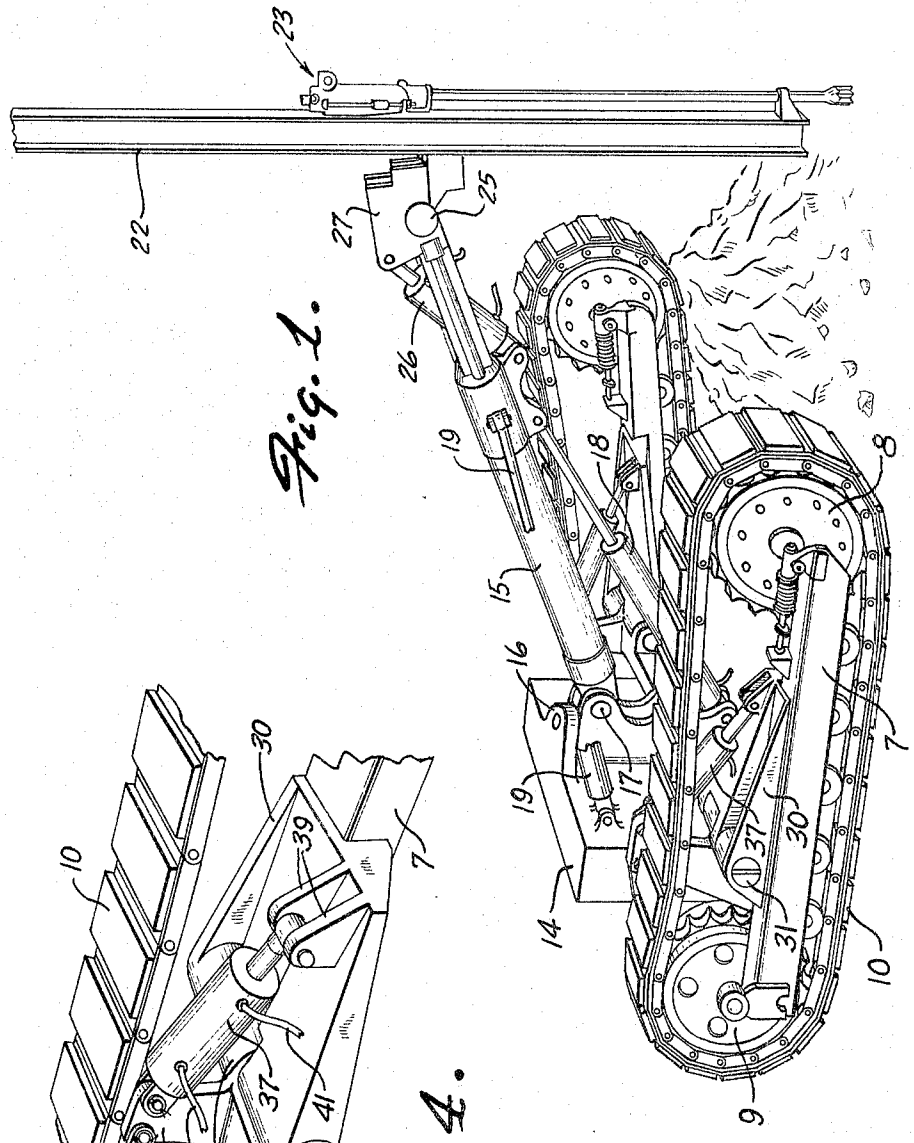


Fig. 1.

Fig. 4.

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Fig. 2.

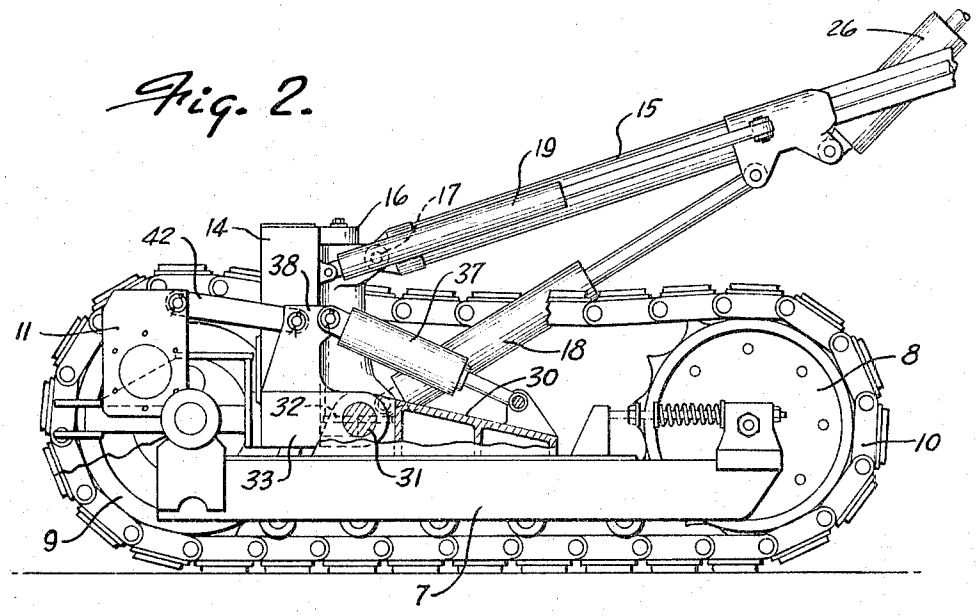
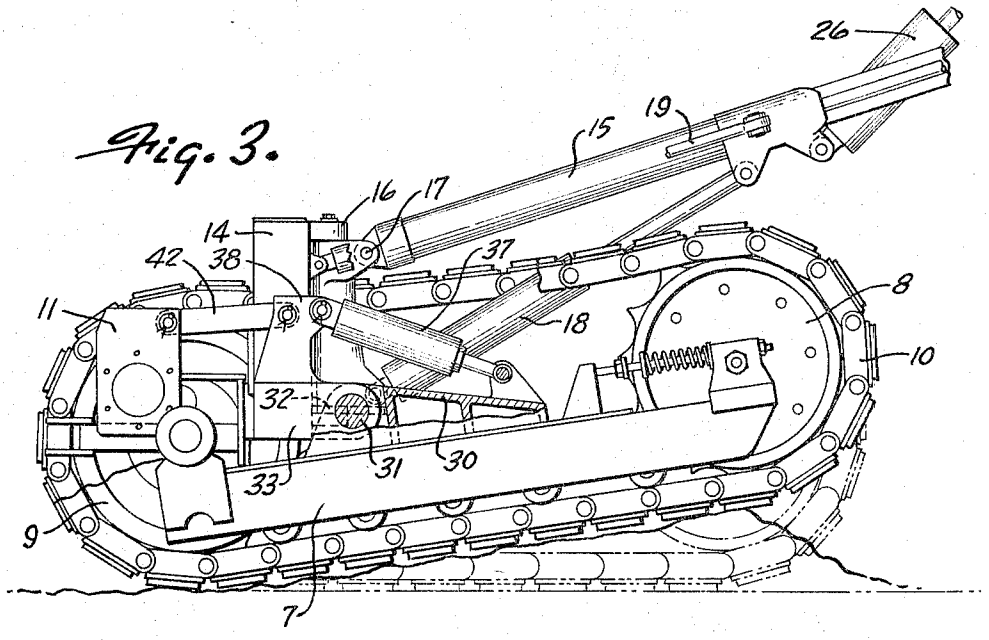


Fig. 3.



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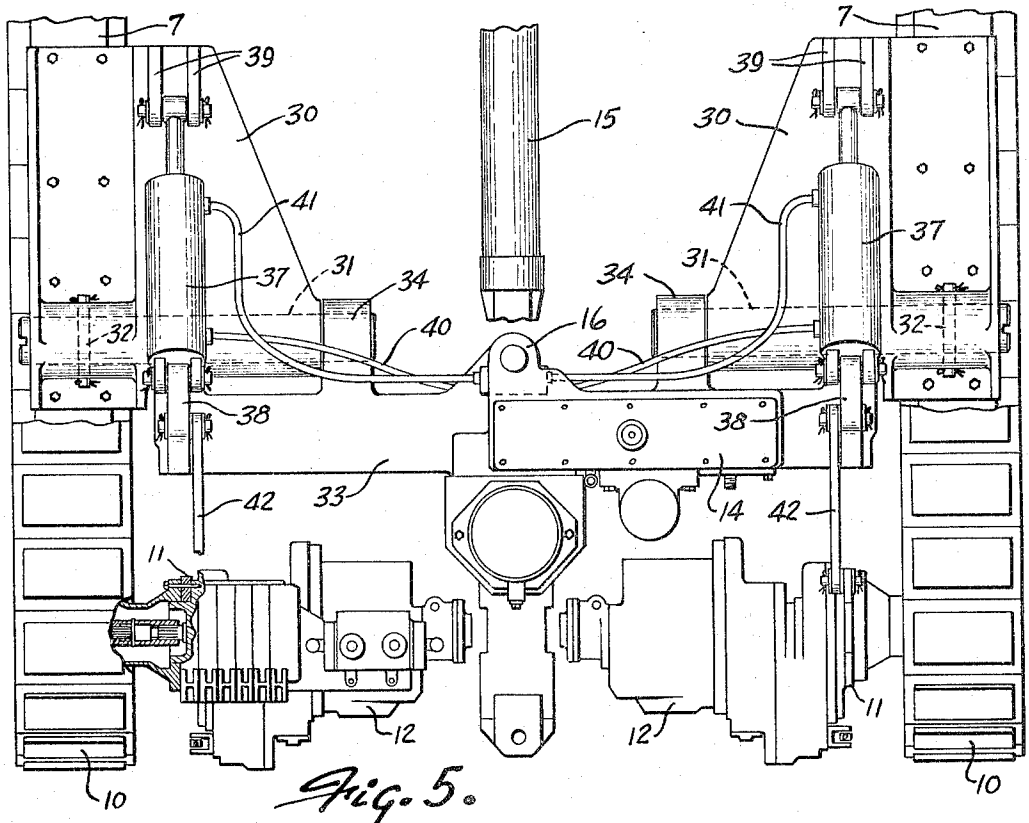


Fig. 5.

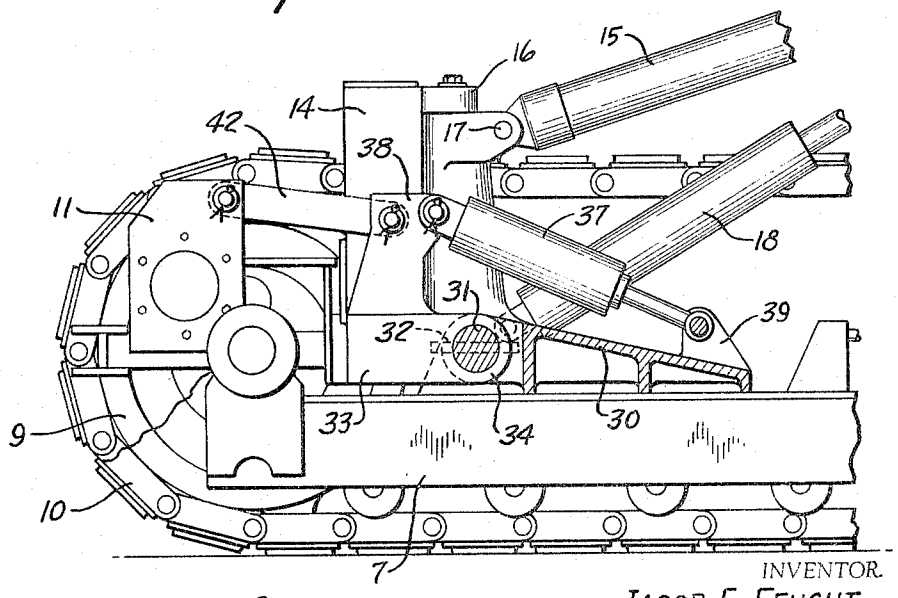


Fig. 6.

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United States Patent Office 3,289,779 Patented Dec. 6, 1966

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MOBILE ROCK DRILL CARRIER SUSPENSION SYSTEM

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Filed Feb. 1, 1965, Ser. No. 429,246
4 Claims. (Cl. 180—9.5)

The present invention relates generally to improvements in devices for transporting drilling equipment and the like from one location to another and for properly positioning the drills and maintaining the same in such positions during normal use.

More particularly the invention relates to an improved rock drill carrier of the endless track or crawler type having a rock drilling rig mounted thereon for universal positioning, the tracks of the carrier being mounted for oscillation relative to each other in a novel manner.

It has been heretofore proposed to provide vehicles of various types for facilitating transportation of heavy and cumbersome rock drills from site to site, and because of the relatively rough terrain which must frequently be traversed, it has become quite common to employ vehicles having endless crawler tracks for such purpose. In these mobile rock drill rigs, the drilling tool is generally adjustably mounted on the mobile carrier, and the carrier is provided with the necessary control devices for effecting operation of the carrier and the drill by a single operator. The mobile crawler base is moreover customarily mounted on the track carrying side frames in a manner which permits the tracks to oscillate relative to the chassis or base and relative to each other so that the machine can traverse rough and undulating terrain without damaging the drill rig and without unduly disturbing the equilibrium of the unit.

While these prior devices have all enjoyed varying degrees of commercial success and acceptance, they are nevertheless unduly complicated and costly or they are rather poorly balanced with the load improperly distributed for utmost efficiency and safety.

It is accordingly a primary object of this invention to provide an improved mobile rock drill carrier which obviates the disadvantages and objections attendant prior devices of this general type.

Another important object of the invention is to provide an improved rock drilling rig which is extremely simple and economical in construction and which is moreover highly efficient and exceedingly stable in operation.

Still another object of the present invention is to provide an improved mobile rock drill carrier wherein the drill rig is mounted on the crawler side frames in a novel and improved manner with the drill support and pivot axes for the side frames most advantageously located intermediate the front and rear sprocket wheels.

These and other more specific objects and advantages of the invention will become apparent from the following detailed description.

A clear conception of the several features constituting a part of the present improvements, and of the construction and mode of operation of a rock drill carrier embodying the inventions, may be had by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

FIG. 1 is a perspective view of a typical mobile rock drill carrier embodying the invention and showing the crawler vehicle resting on undulating terrain and with the drill in one of its drilling positions;

FIG. 2 is a fragmentary side view of the device with parts being broken away and some shown in section for the purpose of clarity;

FIG. 3 is a similar side view of the rig but with one of the crawler tracks and its frame shown swung to an angular position relative to the drill rig and the other track assembly;

FIG. 4 is an enlarged fragmentary perspective view of one of the stabilizing cylinders and its attendant mechanism and showing the pivotal mounting for the drill;

FIG. 5 is a part sectional plan view of the crawler base and chassis with the drill and its attendant structure removed therefrom;

FIG. 6 is a fragmentary section through one of the supporting brackets adjacent to the stabilizing cylinder.

While the invention has been shown and described herein as being embodied in a rock drill cruiser in which the drill is of a particular pneumatically operable type mounted for universal swinging movement with the aid of hydraulic power cylinders on a vertical support in a particular manner, it is not intended or desired to unnecessarily limit or restrict the use of the improvements by reason of such embodiment; and it is also contemplated that certain descriptive terms as used herein shall be given the broadest possible interpretation consistent with the disclosure.

Referring to the drawings, the rock drill cruiser illustrated therein as embodying the invention comprises, in general, a pair of laterally spaced elongated track frames 7 having front and rear sprockets 8, 9 respectively journalled thereon, each pair of sprockets 8, 9 being traversed by an endless crawler track 10 with suitable power means 12 being provided for driving the rear sprockets 9 in a known manner. The crawler track assemblages as such are of commercially available and well-known construction, and the motors 12 for independently driving each of the sprockets 9 may be mounted between brackets 11 or the like and coupled to the sprockets through suitable transmission gearing such as described in detail in U.S. Patent No. 3,088,531.

Mounted on the crawler base or chassis in a manner hereinafter described in detail is a rock drill rig comprising, an upright support or bracket 14 to which a rock drill supporting boom 15 is attached for universal swinging movement as by means of an upright pivot 16 and a transverse pivot pin 17, the boom 15 being swingable about the pin 17 by a hydraulic power unit 18 pivotally secured between the swinging end of the boom 15 and the lower end of the upright pivot 16 and being swingable about its upright pivot axis by a hydraulic power unit 19 pivotally secured between the swinging end of the boom 15 and the bracket 14 laterally of the upright pivot 16.

The extending end of the boom 15 carries a drill feed tower 22 with which a pneumatically operable rock drill 23 and its feed motor (not shown) is associated, the tower or drill feed leg 22 being swingable to different angular positions of adjustment about its pivotal connection 25 to the boom as by means of a hydraulic power unit 26 pivotally secured between the boom 15 and the feed leg mounting plate 27 laterally of the pivot 25. This rock drill and the mounting mechanism therefor as thus described are likewise well-known and commercially available with the drill and its feed motor being operable by compressed air supplied from an air compressor in the usual manner and with the hydraulic units being operable by hydraulic fluid supplied thereto by a pump and suitable valves under the control of an operator in customary fashion.

In accordance with the present invention, a support bracket 30 for the drill assembly is rigidly bolted or otherwise secured to each of the crawler side frames 7 intermediate the ends thereof and between the sprockets 8, 9 and each of the brackets 30 has a stub shaft or trunnion 31 fixedly mounted therein as by means of a transverse pin 32 or the like. Supported on the inwardly

projecting pivot shafts or trunnions **31** is a cross frame or platform supporting member **33** having spaced bearings **34** for receiving the respective pivot shafts **31** so that there is relative pivotal movement between each of the crawler track assemblies and the frame or supporting member **33**. The cross frame **33** forms a chassis for supporting the hydraulic oil reservoir and pump, the drill mounting bracket **14**, operating mechanism for the drill **23** and its feed motor, control mechanism for the hydraulic power units and the drill, and the operator's platform (not shown).

With the chassis **33** thus free to pivot about the axles or stub shafts **31** on either side of the unit, a stabilizing cylinder **37** is mounted on each side to act as an adjustable means between the chassis **33** and the respective support brackets **30**. As shown, each of the stabilizing cylinders may be conveniently pivotally secured at one end to an upright bracket **38** rigid with the chassis **33** and at the other end to a lug or lugs **39** projecting upwardly from the corresponding support bracket **30**. The hydraulic stabilizing cylinders **37** have corresponding ends thereof interconnected by suitable conduits **40**, **41** as fully described in U.S. Patent No. 3,088,531 to thereby permit the oscillation of one track assembly relative to the other and relative to the chassis **33**, and since the mounting for the drill is basically a part of the chassis, it moves along with the chassis. Also, each of the motor mounting brackets **11** is coupled to the adjacent upright support **38** of the chassis **33** as by means of a link **42**, such link thereby serving as the reaction member for the motor drive.

With the cross frame or chassis **33** pivotally supported by the axles **31** and the stabilizing cylinders **37** interconnected, the chassis and everything supported thereby as well as both of the track assemblages will remain level while the carrier is travelling over level ground. However, when undulating terrain is encountered as shown in FIGS. 1 and 3, the tracks **10**, sprockets **8**, **9** and their carrying frames **7** will become vertically displaced causing liquid to flow through the flexible conduits **40**, **41** to and from the corresponding displacement chambers of the stabilizing cylinders in an obvious manner, and this stabilizing action is transmitted by the cylinders **37** to the chassis **33** which, by reason of its pivotal connections to the side track frames **7** through the axles **31**, is caused to automatically remain substantially stable at all times. It is apparent that whenever liquid flows in either direction through the conduit **41** from the displacement chamber of one cylinder **37** to the corresponding displacement chamber of the other cylinder, liquid also is caused to flow in a reverse direction through conduit **40** and between the other displacement chambers of the cylinders due to the fact that all of the displacement chambers and conduits **40**, **41** are sealed from the atmosphere. In addition to stabilizing the chassis **33** during transportation of the drill rig, the cylinders **37** serve a dual function of resisting tilting of the chassis during use of the drill in drilling operations.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. A rock drill carrier comprising, a pair of laterally spaced elongated frames each carrying an endless ground engaging track, motor means for independently driving each of said tracks, a support for each of said track driving motor means, means mounted intermediate the ends of each of said frames providing a pair of inwardlly projecting and coaxially alined pivot shafts, a chassis forming member spanning the space between said frames and pivotally supported at its opposite ends by said pivot shafts, an extensible hydraulic stabilizer secured between said chassis forming member and each of said frames, each of said hydraulic stabilizers having a piston reciprocable within a liquid filled cylinder and providing a piston displacement chamber, conduit means interconnecting the displacement chambers of said cylinders on corresponding sides of said pistons whereby said frames are permitted to swing about the axis of said coaxial pivot shafts relative to each other and relative to said chassis forming member, a rock drill assemblage mounted on said chassis forming member for transportation by said tracks, and a reaction link pivotally interconnected between said chassis forming member and each of said motor supports for permitting relative movement thereof whenever said frames are swung relative to one another and relative to said chassis forming member.

2. A rock drill carrier according to claim **1**, wherein the means for fixedly supporting the chassis forming member includes a support bracket rigidly secured to each of the track carrying frames, the inwardly projecting and coaxially alined pivot shafts being fixedly mounted on said support brackets.

3. A rock drill carrier according to claim **2**, wherein each support bracket is formed with upstanding lugs remote from the chassis forming member and each of the extensible hydraulic stabilizers is secured between the chassis forming member and the lugs of one of the support brackets.

4. A rock drill carrier according to claim **2**, wherein the chassis forming member is provided with upright brackets at opposite sides thereof, each of said upright brackets pivotally receiving one end of one of the hydraulic stabilizers and one end of one of the reaction links.

References Cited by the Examiner

UNITED STATES PATENTS

2,312,389	3/1943	Cordes.	
2,842,340	7/1958	Burress	173—27
2,845,251	7/1958	Barton	180—9.5 X
3,012,624	12/1961	Lich	180—9.5
3,088,531	5/1963	Garrett	173—27

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