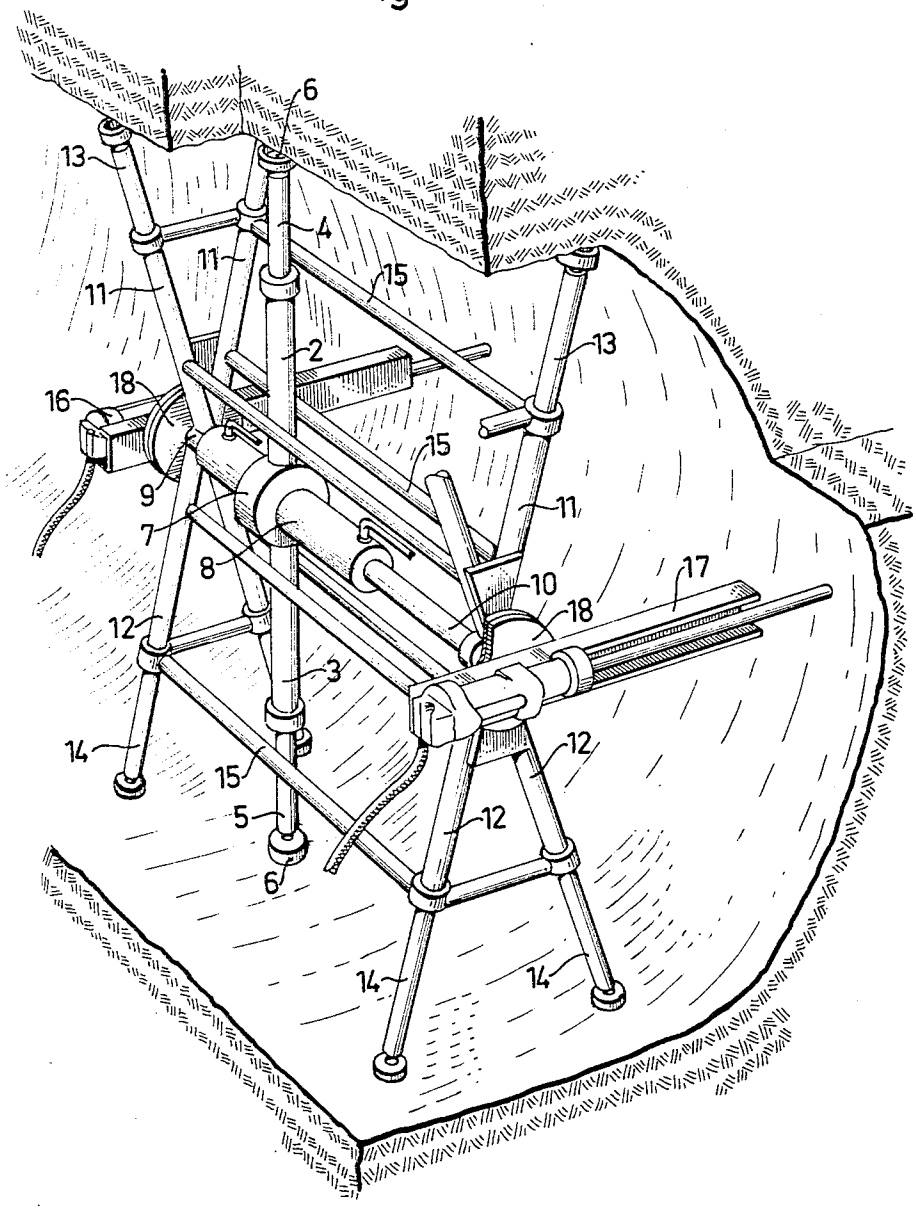
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ROCK-DRILL RIG ASSEMBLY

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Fig.1

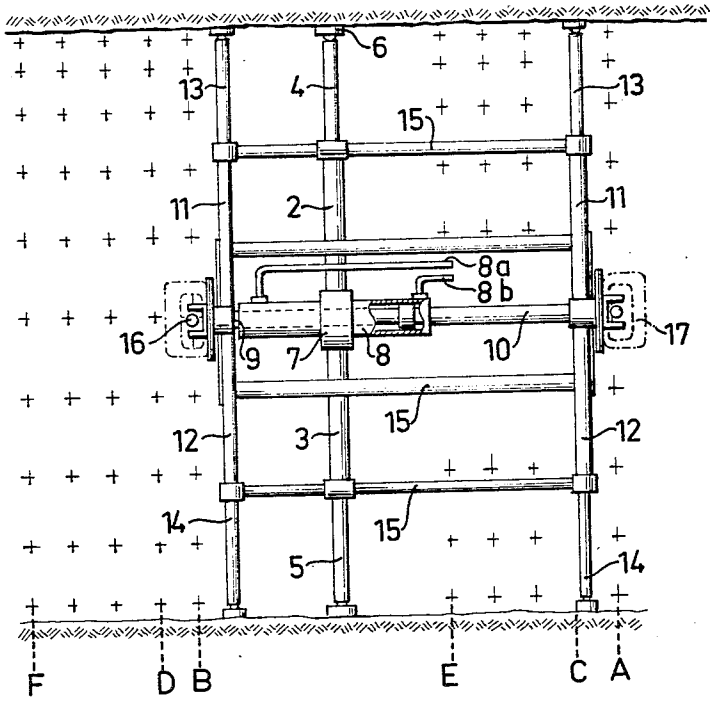


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ROCK-DRILL RIG ASSEMBLY

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Fig. 2



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ROCK-DRILL RIG ASSEMBLY

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U.S. Cl. 173—35 9 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates to a drilling rig assembly adapted for use in drilling blasting charge holes in drifts, rock tunnels and similar passages where, in the course of the drilling work, the drilling tool is required to be moved stepwise both in the longitudinal and in the peripheral directions of the passage. A first subassembly includes laterally extending means for clamping it in fixed position, and a second subassembly is interconnected with the first subassembly for slidable longitudinal movement with respect thereto. The second subassembly has means at the opposite ends thereof for clamping it in fixed position. Rock-drilling means is supported by said second subassembly.

BACKGROUND OF THE INVENTION

Such work, at present, is carried out by first fixing the drilling rig in a predetermined position within the passage. Holes spaced according to a certain pitch are then drilled in the walls of the passage, usually around the complete circumference thereof. As the drilling machine, which is rotatable about a horizontal axle, has been rotated through a complete revolution (or through a slightly smaller angle, as is the case in certain applications), it will have to be moved in the longitudinal direction of the passage. This is enabled by the fact that the horizontal axle just mentioned is displaceable relative to the drilling rig and can be clamped in different positions of displacement. However, when such displacement has reached the limit determined by the maximum throw of the horizontal axle, the entire rig must be removed and relocated relative to the holes already drilled, as well as levelled relative to the horizontal plane. Such an operation is time-consuming—requiring about three hours when using the conventional type of equipment.

The principal object of the present invention resides in the provision of a drilling rig constructed so as to permit the aforesaid stepwise displacement, or indexing, to be executed without losing the proper localization or set-up alignment of the rig.

The main characterizing feature of a rock-drill rig according to the present invention is that the rig assembly is composed of at least two principal sub-assemblies, each sub-assembly comprising means for locating the sub-assembly in a fixed position relative to the walls of the passage, and the two sub-assemblies being relatively displaceable in the longitudinal direction to enable the rig assembly to be indexed longitudinally and with one of the sub-assemblies alternately remaining fixed.

One embodiment of the invention will be described hereinafter with reference to the accompanying drawing, in which:

FIG. 1 is a perspective view of a rock-drill rig mounted within a passage, such as a drift of a mine; and

FIG. 2 diagrammatically illustrates a drill-hole pattern which can be obtained in accordance with the present invention.

Referring now to the drawing more specifically, the passage has a substantially circular profile. Disposed within the passage is a drill-rig assembly composed of two principal sub-assemblies. One sub-assembly, in the present case, comprises a vertically mounted post which is composed of upper and lower hydraulic power cylinders or jacks, **2** and **3**, respectively. Projecting from each such cylinder is a piston rod **4**, **5**, respectively, carrying at its extreme end an abutment ferrule **6** connected to the associated piston rod by a ball joint. Each such rig or frame element comprising a radially extending power cylinder or jack with its piston rod carrying an abutment ferrule, for simplicity, will be referred to hereinafter as a "leg." The two relatively diametrically opposite legs just described are secured at their inner ends to a rugged carrier ring **7** which, in its turn, has passed through it a horizontally oriented hydraulic power cylinder or jack **8**. The parts **2**, **3**, **7** and **8**, forming the first sub-assembly of the drill rig or frame, are integrally connected to one another, such as by welding. The cylinder **8** contains a piston having two oppositely directed piston rods **9** and **10**. Each such rod is connected at its extreme end to two pairs of legs crossing each other in an X-like fashion, each such leg pair, in a manner similar to the first-described one, being composed of two diametrically opposite hydraulic power cylinders or jacks **11** and **12** having projecting piston rods **13** and **14**, respectively. These two X-leg pairs are interconnected by a plurality of horizontally extending truss rods **15** and constitute together therewith the second sub-assembly of the drill rig or frame. Mounted at each end of this sub-assembly is a rock drill **16** and **17**, respectively. The two rock drills, being suitably pneumatically operated, as is conventional, are each rotatable about a horizontally extending axis which is preferably coaxial with the power cylinder or jack **8**. Numeral **18** relates to a graduated limbus associated with each rock drill which is useful for determining and setting the angular position of the drill. By means of two pipe lines **8***a* and **8***b* pressurized oil can be admitted selectively into the cylinder space at one or the other side of the piston within the cylinder **8**.

The apparatus thus described is operated as follows: After the entire drill rig assembly has been moved into the passage and disposed in a suitable starting position, the vertical post **2**, **3** is clamped in place by forcing the piston rods **4** and **5** outwardly. Before accomplishing this operation, a levelling of this portion of the rig or frame is assumed to have been executed, for instance by means of levels indicating the vertical and horizontal positions, respectively. Then hydraulic fluid is admitted into the cylinder **8** through the pipe **8***a* so as to cause complete retraction of piston rod **9** and complete extension of piston rod **10**, after which the second sub-assembly of the rig or frame is fixedly located by forcing piston rods **13** and **14** outward. Then a drilling operation will ensue, in the course of which, in a conventional way, each one of the two rock drills is intermittently rotated through a certain angle in the circumferential direction. After two rows A and B of peripherally disposed holes have thus been drilled, the leg portions **13** and **14** are hydraulically unclamped, and the piston rods **9** and **10** are displaced by a certain amount to the left, as seen in FIG. 2, this action being effected by supplying hydraulic fluid through the pipe **8***b*. Thus, it is seen that, during this displacement, the rig or frame is bodily carried by the central post with its legs **2**, **4** and **3**, **5** respectively. When the desired spacing between the rows of drill holes has been reached, the two pairs of crossed legs **13**, **14** are again located in position, after which two further rows of holes are drilled at C and D. The work is continued in this way, until the piston rod **9** will have reached its completely extended position and the piston rod **10** will have reached its completely retracted position, in which positions drilling of

the two rows of holes E and F will take place. When this has been effected, the piston rods **4** and **5** are retracted, thus only leaving the sub-assembly of the drill rig or frame which carries the drills **16** and **17** in engagement with the walls of the passage **1**. Then, through the line **8***a*, hydraulic fluid is admitted into the cylinder **8**, whereby the piston rods **9** and **10** will again occupy the relative positions as shown in the drawing, i.e. with the rod **9** completely retracted and rod **10** completely extended. The next step is the operation of re-clamping the central post by forcing the piston rods **4** and **5** outward by means of admitted hydraulic fluid. After this, the sequence of operations just described will be repeated, so that, as shown in FIG. 2, the drill **17** will form rows of holes within the previously empty field between the rows E and B, while the drill **16** will work within a field immediately to the left of the field B–F.

Obviously, the embodiment of the invention here described and as illustrated in the drawing is only one representative of many structural forms which may be built on the basic concept of the invention: i.e. to divide the rig or frame assembly into two sub-assemblies which are displaceable and preferably non-rotatable relative to each other and so arranged as to enable one sub-assembly to remain located during the operation of displacing the other whereby one or more rock drills carried by the rig or frame can be moved stepwise, i.e. be indexed without the necessity of ever unclamping the entire assembly from the walls of the passage. It is further obvious also that such indexing movement may be controlled in an automatic or semi-automatic way, such as by the use of a programmed control or timer unit, and that indexing may be provided for in two opposite directions.

What is claimed is:

1. A rock-drilling rig for use in passageways such as tunnels, drifts and the like comprising a first subassembly having laterally extending means for clamping said first subassembly in a fixed position relative to the walls of a passageway, a second subassembly interconnected with said first subassembly for slidable longitudinal movement with respect thereto, said second subassembly having opposite end portions disposed longitudinally outwardly of the respective opposite ends of said first subassembly so that said second subassembly straddles said first subassembly, each of said opposite end portions of said second subassembly having laterally extending means for clamping said second subassembly in a fixed position relative to the walls of a passageway, means for displacing said first and second subassemblies longitudinally with respect to one another, and rock-drilling means supported by said subassembly.

2. Apparatus as defined in claim **1** wherein the means for clamping said first and second subassemblies in fixed position comprise hydraulic power jacks of adjustable length.

3. Apparatus as defined in claim **1** wherein the means for displacing the first and second subassemblies longitudinally with respect to one another comprises hydraulic power cylinder means.

4. Apparatus as defined in claim **1** wherein the means for clamping said first and second subassemblies in fixed position comprises hydraulic power jacks of adjustable length, and said means for displacing said first and second subassemblies longitudinally with respect to one another comprises hydraulic power cylinder means.

5. Apparatus as defined in claim **1** wherein said first and second subassemblies are mounted so as to be relatively non-rotatable relative to the longitudinal axes of said subassemblies.

6. Apparatus as defined in claim **1** including devices in the nature of water-levels carried by said subassemblies to enable the rig to be leveled before commencing a drilling operation.

7. Apparatus as defined in claim **1** wherein the means for clamping said first subassembly in a fixed position comprises a pair of oppositely directed hydraulic power jacks of adjustable length, each end portion of said second subassembly including a pair of legs each of which supports oppositely directed hydraulic power packs of adjustable length, truss means interconnecting the legs at opposite end portions of said second subassembly, a rock-drilling means carried at each end portion of said second subassembly, each of said rock-drilling means being angularly adjustable in a plane extending substantially perpendicular to the longitudinal axes of said subassemblies.

8. Apparatus as defined in claim **1** wherein rock-drilling means is supported at each of the opposite end portions of said second subassembly.

9. Apparatus as defined in claim **8** wherein each of said rock-drilling means is angularly adjustable in a plane extending substantially perpendicular to the longitudinal axes of said first and second subassemblies.

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