Jan. 29, 1963 M. J. BLES 3,075,754

ROCK PICK

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FIG. 1.

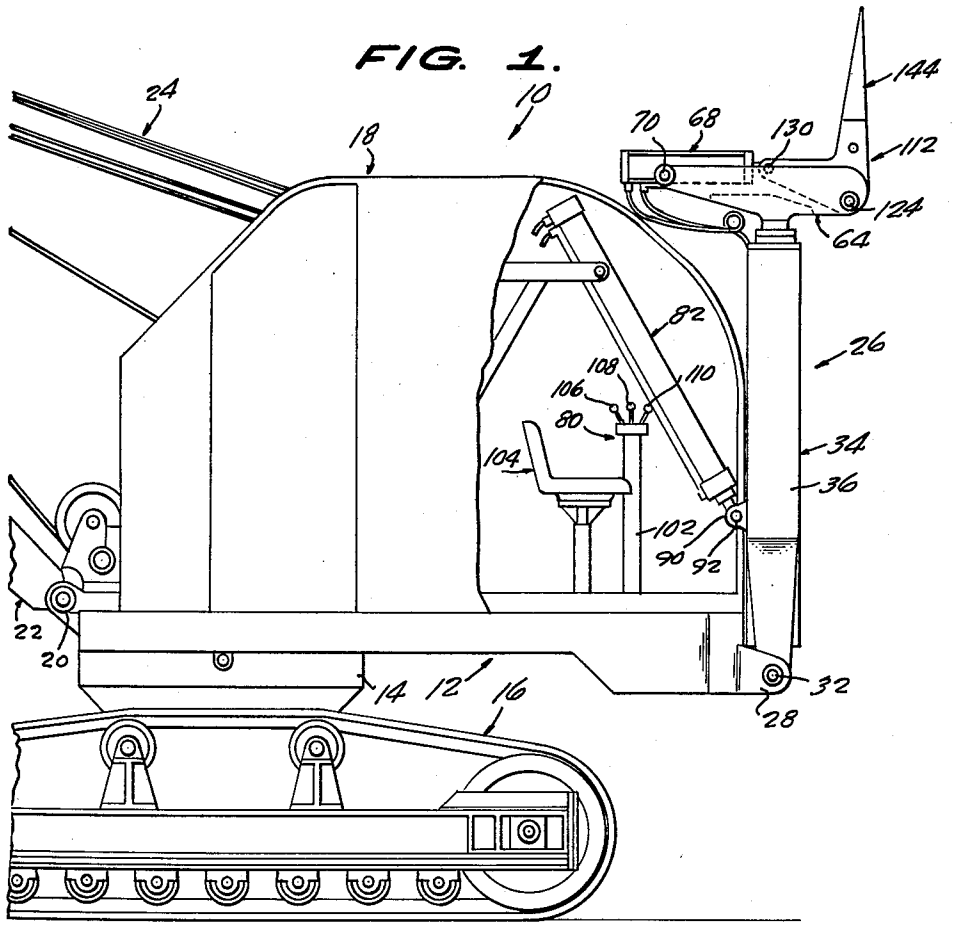
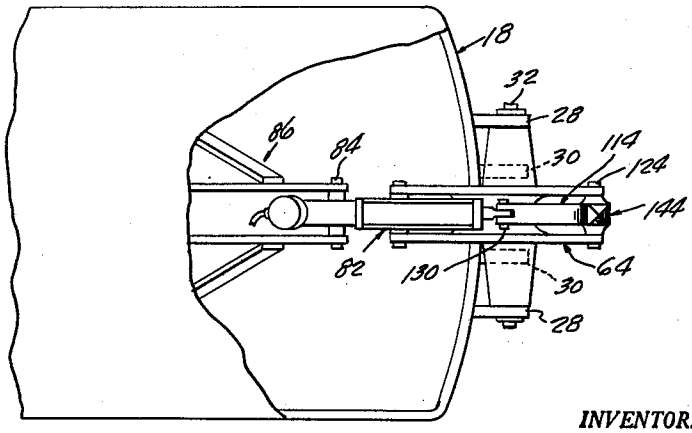


FIG. 2.



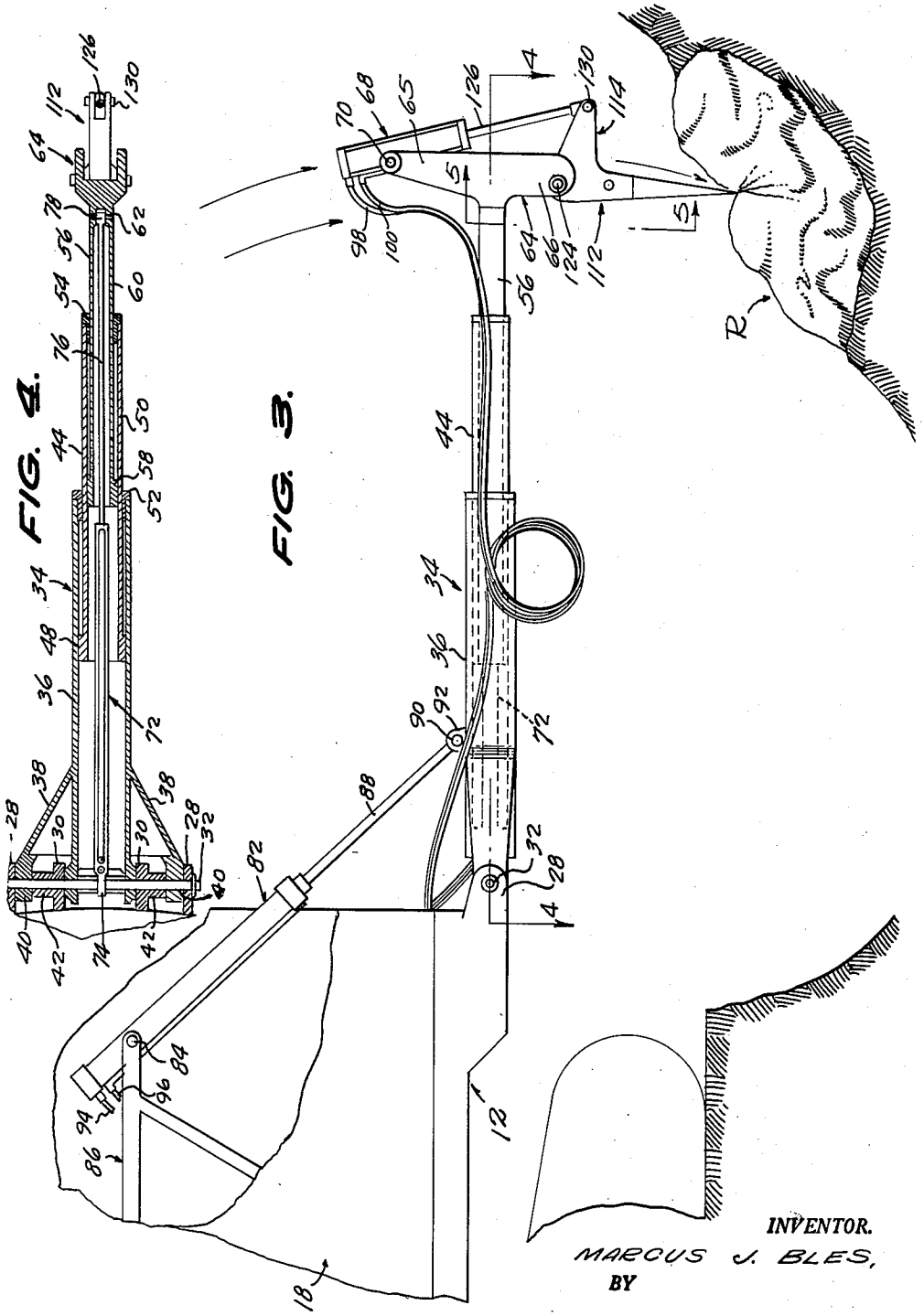
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ROCK PICK

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FIG. 10.

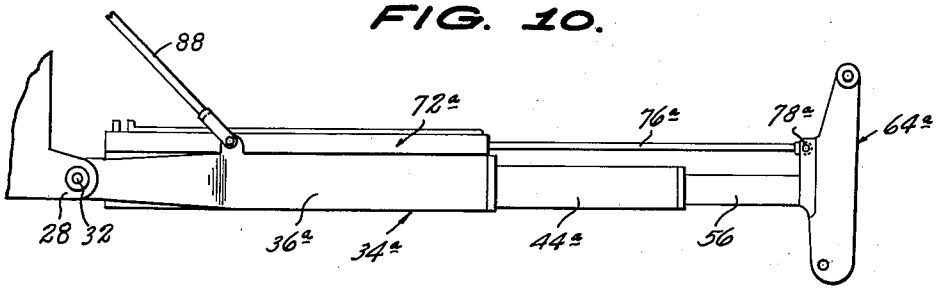


FIG. 5.

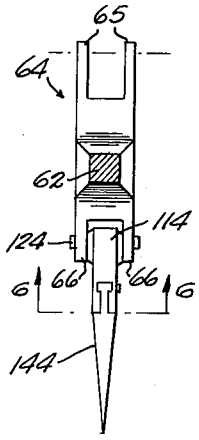


FIG. 7.

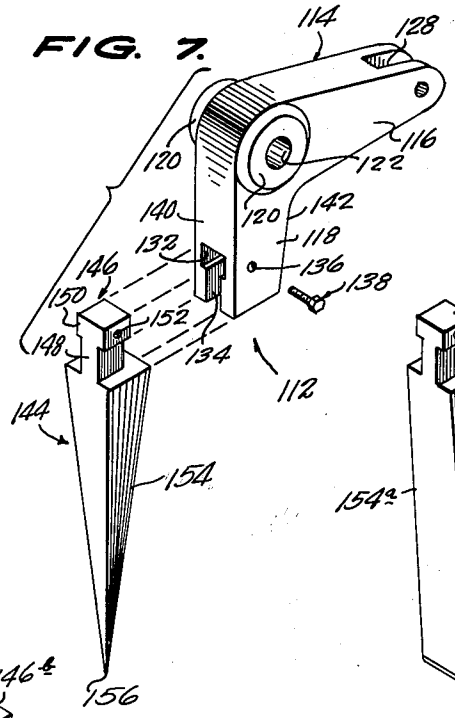
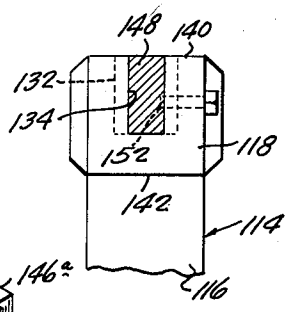


FIG. 6.



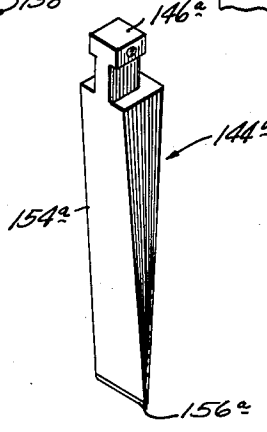


FIG. 8.

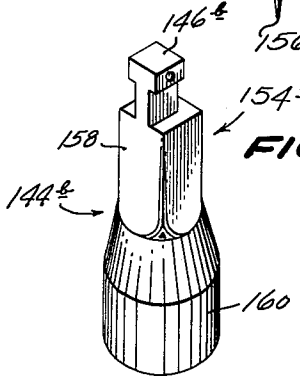


FIG. 9.

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3,075,754

ROCK PICK

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Filed Mar. 28, 1961, Ser. No. 98,895
3 Claims. (Cl. 262—14)

This invention relates to a novel rock pick.

The primary object of the invention is the provision of an efficient, time and labor-saving device of the kind indicated which combines novel means for splitting rock, present in an area being excavated or levelled, which is too massive and/or too securely embedded to be dislodged and moved by an earth and rock moving component of the machine, into fragments which can be readily handled by such component, thereby eliminating the delay and expense of employing workmen and their tools for dislodging and fragmenting such rock.

Another object of the invention is the provision of a device of the character indicated above wherein the rock and earth-moving component can be an ordinary power shovel having a revolving platform, and the rock splitting means comprises a boom mounted on and reaching away from the platform and carrying a rock splitting tool, and means operated from the platform for raising and lowering the boom for forcibly applying the tool to the rock to be split, whereby the operator by rotating the platform, can successively or alternately apply the rock splitting means and the shovel or other excavating means, to the work, without leaving his seat on the machine.

A further object of the invention is the provision of a hydraulically operated rock pick of the character indicated above, wherein the boom is extensible, relative to the platform, for reaching the locations of rock to be split without having to move the machine, and wherein the tool can be angled, relative to the boom, to strike rock at desired angles, and to effectively reach different portions of a rock or rock formation to which the boom has been extended.

A still further object of the invention is the provision of a rock pick of the character indicated above, wherein the boom is hydraulically extended and retracted, the tool is hydraulically angled relative to the boom, and the boom is hydraulically elevated and depressed, to apply the tool to the work, all under the control of the operator of the machine on the platform.

Yet another object of the invention is the provision of a simple rock pick of the character indicated above, which is composed of a small number of uncomplex and easily assembled parts, and which can be easily installed on an earth work or moving machine, such as a power shovel.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

FIGURE 1 is a fragmentary side elevation of a rock pick of the present invention, showing the rock splitting assembly elevated to an inoperative, storage position;

FIGURE 2 is a fragmentary top plan view of FIGURE 1, a portion of the cab being broken away to show details of and the mounting of the boom operating hydraulic cylinder;

FIGURE 3 is a fragmentary schematic side elevation, showing the assembly in operative position, with its boom extended to reach a rock, and its tool applied to the rock;

FIGURE 4 is a horizontal section taken on the line 4—4 of FIGURE 3;

FIGURE 5 is a vertical transverse section taken on the line 5—5 of FIGURE 3;

FIGURE 6 is an enlarged fragmentary horizontal section taken on the line 6—6 of FIGURE 5;

FIGURE 7 is an enlarged and exploded perspective view of the tool holding bell crank and a tool;

FIGURES 8 and 9 are perspective views of two different forms of interchangeable tools; and

FIGURE 10 is a side elevation of a modified form of boom.

Referring in detail to the drawings, wherein like and related numerals designate like parts throughout the several views, and first to FIGURES 1 through 7, the device illustrated therein and generally designated 10, comprises a revolving horizontal platform 12 which is suitably mounted, as indicated at 14, upon a mobile unit, such as a caterpillar tractor assembly 16. Mounted upon the platform 12 is an operator's cab 18. Suitably mounted, as indicated at 20, on the first or forward end of the platform 12, is a power shovel boom 22 having a shovel (not shown), from which positioning and operating cable means, generally designated 24, reach into the cab 18, to operating mechanism (not shown). It will be understood that invention is not necessarily confined to a power shovel, but that the invention comprehends, as a component thereof, any other suitable earth-working components, on which a rock pick assembly of the present invention can be usefully mounted.

The illustrated rock pick assembly, generally designated 26, is mounted on the second or rear end of the platform 12, and comprises a pair of centered laterally spaced outer lugs 28, affixed to and extending rearwardly from the platform, and a pair of similar laterally spaced inner lugs 30, which are centered between the outer lugs, with a single transverse horizontal axle 32 extending through all of the lugs. An extensible boom 34 comprises an inner tube 36 whose inner end is located between the inner lugs 30 and is pivotally traversed by the axle 32. Bracing for the inner end of the boom tube 36 can take the form of diagonal braces 38 which are fixed, at their outer ends, to opposite sides of the tube 36 and, at their inner ends, to bearings 40 which are journalled on the axle 32, between the outer and inner lugs 28 and 30 respectively. As shown in FIGURE 4, the bearings 40 bear against the outer lugs 28, and spacers 42, on the axle 32, space the bearings 40 from the inner lugs 30.

The boom 34 further comprises an intermediate tube 44 which is positioned through the outer end of the inner tube 36 and has an external annular bearing 48, at its inner end, which slides in the tube 36, and a side wall 50 which slides through a removable sleeve bearing 52, which is secured in the outer end of the inner tube 36. The intermediate tube 44 has a removable internal sleeve bearing 54 secured in its outer end. An outer tube 56 is engaged in the intermediate tube 44, from the outer end thereof, and has an external annular bearing 58, at its inner end, which slides in the intermediate tube 44, and a side wall 60 which slides through the sleeve bearing 54.

The outer boom tube 56 has fixed or has integral with its outer end, the stem 62 of a vertically elongated stationary head 64, which extends above and below the stem 62, and has, as shown in FIGURE 5, a pair of laterally spaced upstanding upper arms 65, and a pair of laterally spaced downwardly extending lower arms 66. A tool positioning hydraulic cylinder 68 is positioned between the upper arms 65 and is pivoted thereto, intermediate its ends, as indicated at 70, and is angled outwardly and downwardly, relative to the head 64, when the head 64 is in the position shown in FIGURE 3.

For extending and retracting the boom 34, a hydraulic cylinder 72 is positioned lengthwise within the inner boom tube 36, and is secured, at its inner end, as indicated at 74, to the axle 32. The cylinder 72 has a piston rod 76 which extends outwardly therefrom and is suitably secured, at its outer end, to the stem 62 of the head 64, as indicated

at 78. Suitable hydraulic lines (not shown) lead from the cylinder 72, to a control, generally designated 80, which is mounted upon the platform 12 within the cab 18.

FIGURE 10 shows an alternate arrangement of a boom extending and contracting hydraulic cylinder 72a which is mounted externally atop the inner boom tube 36a and has its piston rod 76a secured, as indicated at 78a, to the head 64a.

For elevating and depressing the boom 34, an outwardly declining hydraulic cylinder 82 is provided, which is pivotally mounted, adjacent to its upper end, as indicated at 84, on a frame 86 fixed to and rising from the platform 12, within the cab 18, and has a piston rod 88 extending outwardly and downwardly therefrom and pivoted, at its outer end, as indicated at 90, to upstanding ears 92 on an intermediate part of the inner boom tube 36. Suitable hydraulic lines 94 and 96 lead from the cylinder 82 to the control 80. Lines 98 and 100 lead from the tool positioning cylinder 68 to the control 80.

The control 80 can be a standard 102 which rises from the platform 12, alongside of a swivel operator's chair 104, and has separate control levers 106, 108, and 110, which are individually workable to elevate and depress the boom 34, to extend and contract the boom, and to position a tool assembly which is pivoted on the lower part of the head 64. Fluid under pressure for operating the several hydraulic cylinders can be supplied by any suitable means on the platform 12, such as pump means (not shown) operated by the motor (not shown) which operates the shovel and the shovel boom.

The tool assembly 112 comprises a bell crank lever 114, which, as shown in detail in FIGURE 7, comprises an outwardly extending horizontal arm 116 on the upper end of a downwardly extending vertical arm 118, and lateral spacer bosses 120 on the opposite sides of the meeting of these arms. The bosses 120 and the bell crank lever have a transverse bore 122 extending therethrough which receives a pivot pin 124. The bell crank lever is positioned between the lower arms of the head 64, and the pivot pin 124 extends through these arms at a point which is inwardly offset from the vertical centerline of the head 64, as shown in FIGURE 3. The piston rod 126 of the tool positioning cylinder 68 is pivoted to the outer end of the bell crank arm 116, in a notch 128 provided therein, as indicated at 130.

The vertical bell crank arm 118 is formed, in its lower end, with a compound vertical slot which is composed of a wider upper portion 132 and a narrower lower portion 134, centered relative to the upper portion 132, and a transverse threaded bore 136 extends through one side of the arm 118 into one side of the upper slot portion 132, to accommodate a locking screw 138. The slot portions 132 and 134 open only to the inner edge 140 of the bell crank arm 118, and are spaced from and are closed relative to the outer edge 142 thereof, as indicated in FIGURE 6.

A tool or bit 144 has an upstanding T-shaped head 146 on its upper end, which fits the compound slot, and includes a standard 148 and a crosshead 150, the latter having in one end a socket 152 in which the inner end of the locking screw 138 engages to hold the head 146 in place. The tool 144 has a vertically elongated pyramidical or spike body 154 which terminates in a sharp point 156, at its lower end, and is suited for splitting rock R when forced downwardly thereon, as shown in FIGURE 3.

Another form of interchangeable tool 144a, shown in FIGURE 8, has a vertically elongated chisel body 154a, having a sharpened lower edge 156a, and is suited for penetrating and riving rock. A further form of tool 144b (FIGURE 9) has hammer body 154b which preferably has a rectangular cross section upper portion 158, and an enlarged diameter axial lower peen portion 160, and is suitable for breaking up rock.

In use and operation, whenever the device, in an earth excavating or moving operation encounters rock R which cannot be handled by its shovel or other excavating component, the operator of the machine simply rotates the platform 12, by means (not shown) conventional for the purpose, so as to align the boom 34 with the rock, then depresses the boom 34 from storage position, shown in FIGURE 1, to a generally horizontal position, illustrated in FIGURE 3, and adjusts the length of the boom to put the tool assembly 144 over the rock, and then adjusts the angle of the tool, if necessary, to proper attack angle relative to the rock. The operator then alternately elevates and depresses the boom 34, so that, as the boom is forced downwardly the tool strikes the rock R, as indicated, in FIGURE 1. Then, when the rock R has been suitably fragmented, the operator elevates the boom 34, either part way or all the way to its vertical storage position, and rotates the platform 12, so as to put the shovel of the machine in position, when operated, to pick up the fragmented rock. It is to be noted that any and all of these operations can be performed without the operator leaving his seat 104.

Although there have been shown and described preferred forms of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. In combination, a rotary horizontal platform, means for rotating the platform, a rock splitting assembly comprising a boom pivoted on and extending away from the platform, the platform being rotatable to align the boom with a rock formation to be split, a tool assembly mounted on the boom and having a downwardly extending tool, and a hydraulic cylinder above the boom and connected at one end to the boom and at its other end to the platform for elevating the boom to a vertical storage position and for depressing the boom for applying the tool to a rock formation, said boom comprising slidably telescoped tubes, including an inner tube to which the hydraulic cylinder is connected and an outer tube, said inner tube being pivoted at its inner end on the platform, said outer tube having a head fixed on its outer end, said head having upper arm means extending above the boom and lower arm means extending below the boom, said tool assembly being pivoted on said lower arm means, and a hydraulic cylinder pivoted on said upper arm means and having a piston rod pivoted to said tool assembly, said tool assembly comprising a bell crank having a horizontal arm to which the piston rod is pivoted and a downwardly extending vertical arm to which the tool is secured.

2. In combination, a rotary horizontal platform, means for rotating the platform, a rock splitting assembly comprising a boom pivoted on and extending away from the platform, the platform being rotatable to align the boom with a rock formation to be split, a tool assembly mounted on the boom and having a downwardly extending tool, and a hydraulic cylinder above the boom and connected at one end to the boom and at its other end to the platform for elevating the boom to a vertical storage position and for depressing the boom for applying the tool to a rock formation, said boom comprising slidably telescoped tubes, including an inner tube to which the hydraulic cylinder is connected and an outer tube, said inner tube being pivoted at its inner end on the platform, said outer tube having a head fixed on its outer end, said head having upper arm means extending above the boom and lower arm means extending below the boom, said tool assembly being pivoted on said lower arm means, and a hydraulic cylinder pivoted on said upper arm means and having a piston rod pivoted to said tool assembly, said tool assembly

comprising a bell crank having a horizontal arm to which the piston rod is pivoted and a downwardly extending vertical arm to which the tool is secured, said vertical arm having a compound slot opening to one side of and the lower end of the vertical arm, said tool having a head on its upper end having portions conformably and removably engaging portions of the compound slot, and a locking screw threaded through the vertical arm and engaging a part of the tool head.

3. A rock pick, comprising:

(*a*) a mounting platform;

(*b*) an extensible boom assembly, including at least two tubes, the boom assembly having an inner end and an outer end and being pivoted to the platform at the inner end;

(*c*) extension means secured to each of the said two tubes for the extension and retraction of one tube relative to the other;

(*d*) means secured to the pltaform and secured to the boom assembly intermediate its ends for pivoting the boom;

(*e*) a head fixed to the boom assembly adjacent the outer end thereof;

(*f*) tool carrying means comprising a lever pivoted to the head and having a changeable bit secured thereto at one end; and

(*g*) means secured to the head and to the lever for pivoting the last named means and bit with respect to the head.

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