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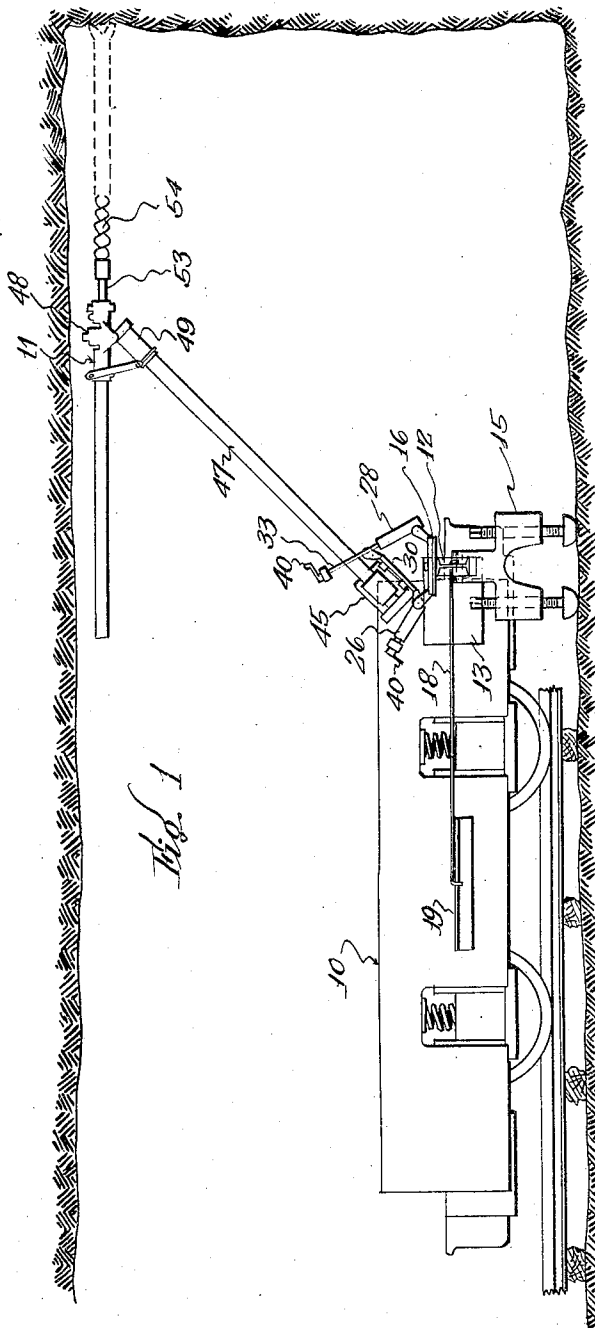
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1,878,074

DRILLING MECHANISM

Filed April 8, 1929

3 Sheets-Sheet 1



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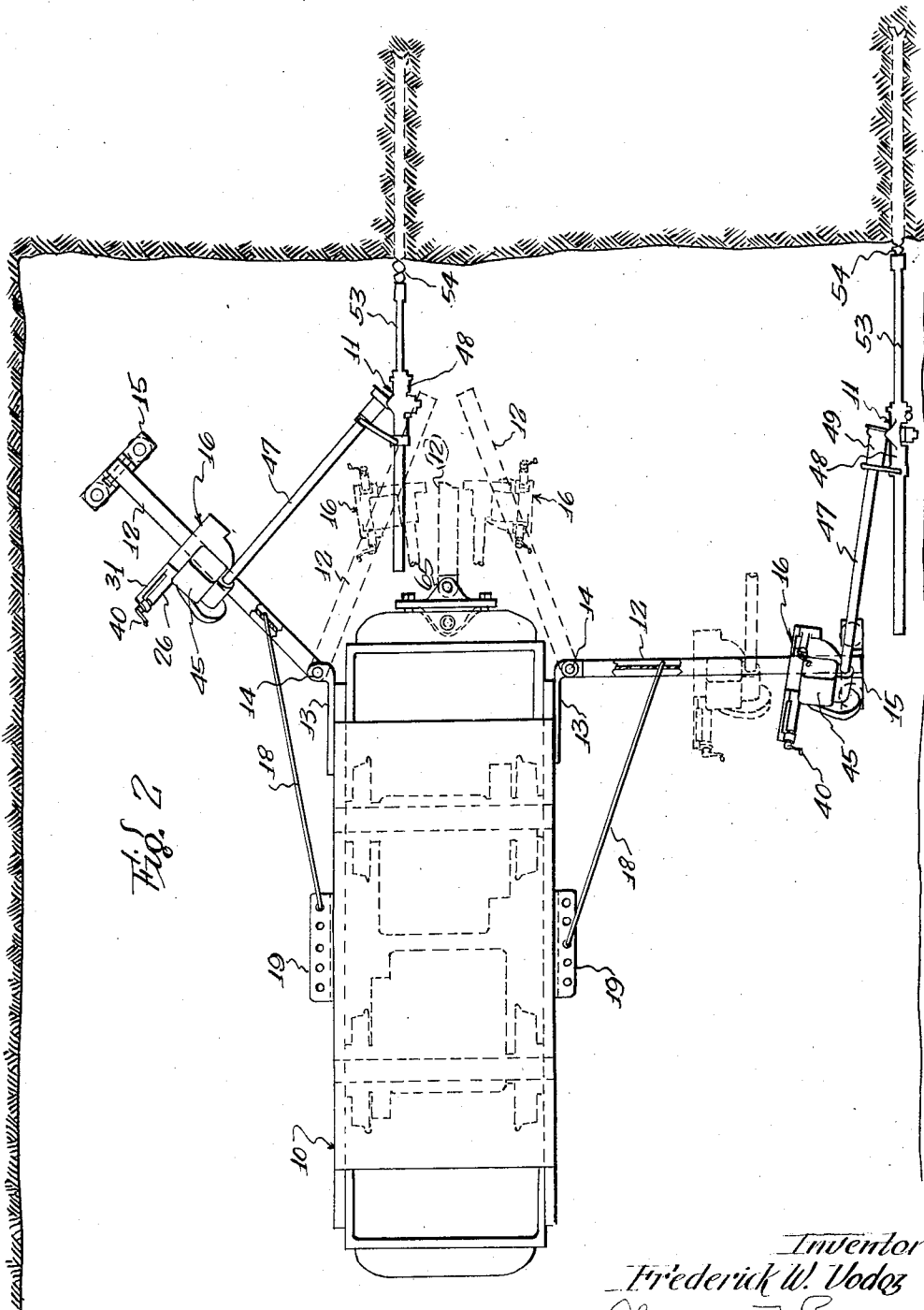
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DRILLING MECHANISM

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3 Sheets-Sheet 2



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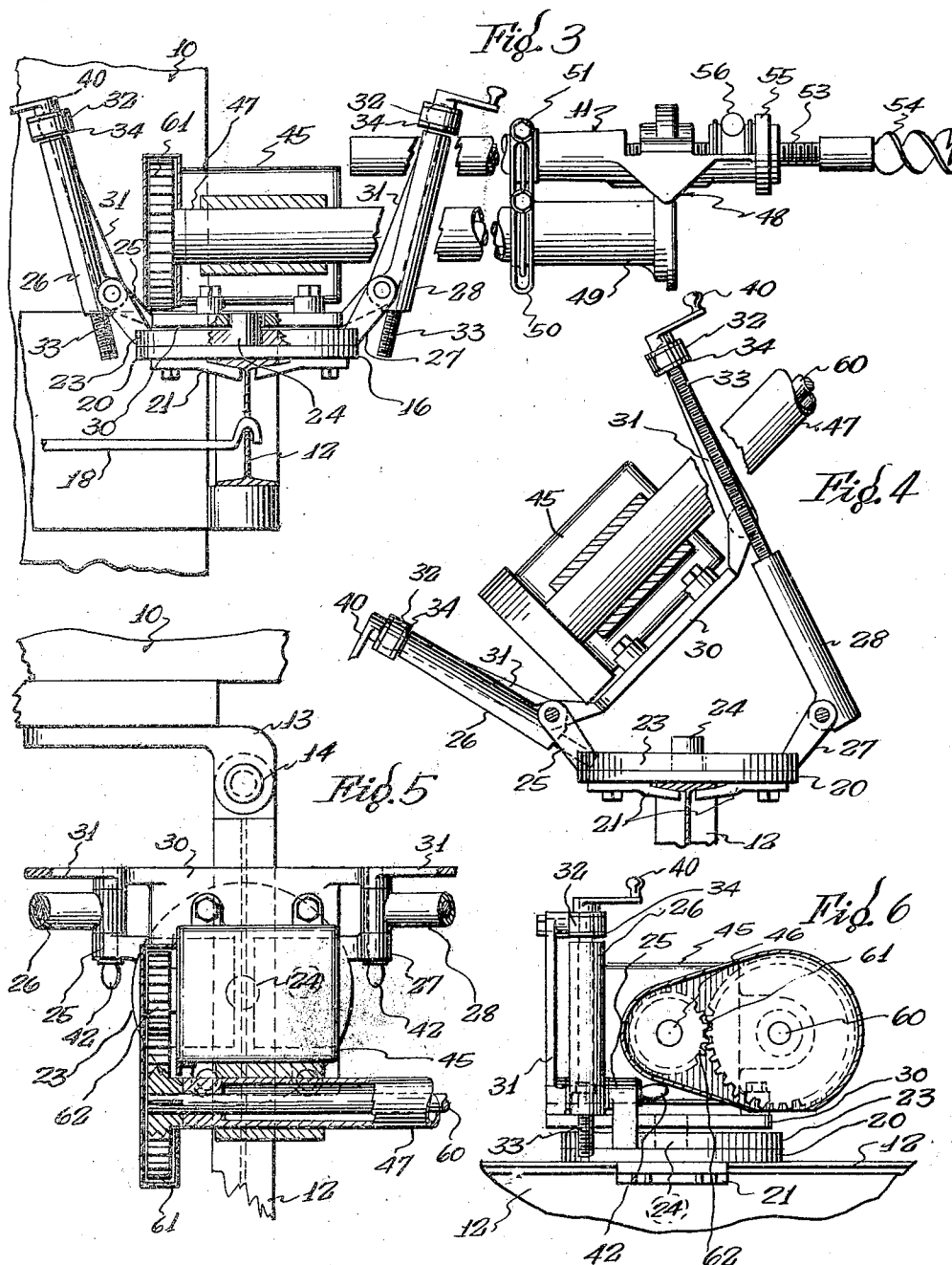
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DRILLING MECHANISM

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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DRILLING MECHANISM

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This invention relates to improvements in drilling mechanisms particularly adapted for use in coal mines and has among other objects to provide a new and improved drilling mechanism and support therefor and particularly one which may be supported on a mine locomotive, or a similar portable power device.

Other objects of my invention will appear from time to time as this specification proceeds.

My invention may be more clearly understood with reference to the accompanying drawings, wherein:

Figure 1 is a side elevation of a mine locomotive having the device of my invention mounted thereon in position to drill a hole in a mine wall;

Figure 2 is a top plan view of a mine locomotive having a plurality of drilling mechanisms supported thereon drilling holes in a mine wall;

Figure 3 is an enlarged fragmentary side elevation of the drilling mechanism and support embodying my invention with parts broken away and in section to more clearly show the details of my invention;

Figure 4 is a fragmentary side elevation of the drilling mechanism shown in Figure 3 with the drilling mechanism in another position than that shown in Figure 3;

Figure 5 is a fragmentary top plan view of the device shown in Figure 3 with parts broken away and in section to more clearly show the details of my invention; and

Figure 6 is a rear elevation of the device shown in Figure 3 with parts broken away and in section to more clearly show the details of my invention.

Referring now in particular to Figures 1 and 2, my invention is shown as applied to a mine locomotive 10 of an ordinary type. A plurality of drilling mechanisms generally indicated at 11 are provided with arms 12, 12, supported on and extending outwardly from each side of the forward portion of the locomotive. The arms 12, 12, may be constructed in any suitable manner but are herein shown as I-beams of an ordinary type and are pivotally mounted on brackets 13, 13, by

means of pivotal pins 14, 14. The arms 12, 12, are supported on their outer end by means of adjustable supports 15, 15, engageable with the mine bottom and detachably connectible to said arms by any suitable means well known to the art to more solidly support said arms while the drilling mechanisms 11, 11, are drilling holes in the mine wall.

Means are provided to hold the arms 12, 12, stationary in various desired pivotal positions with respect to the locomotive frame which herein comprise a spacing rod 18 for each arm having hooked end portions which may engage one of a plurality of holes in the arm 12 at one end and one of a plurality of holes in an angle 19 on the locomotive 10 at its opposite end.

A supporting means for the drilling mechanism 11, generally indicated at 16, is adapted to be detachably mounted on each arm 12 and is slidable therealong for supporting the drilling mechanism 11 in any desired position along the arm 12. The supporting means 16 includes a plate 20 adapted to rest on the top portion of the supporting arm 12 having strips 21, 21, bolted to the lower portion thereof and abutting the under portion of the flange of the I-beam which comprises the supporting arm 12 to form a holding means for the plate 20 on the supporting arm 12 so said plate may be slidably supported on said arm. A plate 23 is pivotally mounted on the plate 20 by means of a pivot pin 24 to move on said plate about a vertical axis. An ear 25 projects upwardly from one end of the plate 23 and has a threaded member 26 pivoted thereon. Likewise an ear 27 projects upwardly from the opposite end of the plate 23 and has a threaded member 28 pivoted thereon.

A supporting member 30 serves to support the drilling mechanism 11 and is adjustably supported on the ears 25 and 27 by means of the threaded members 26 and 28. Arms 31, 31, project upwardly from opposite ends of the supporting member 30 and have inwardly projecting lugs 32 attached thereto at the top portion thereof by any suitable means, said holding means being herein shown as a cap screw of a usual type.

Threaded rods 33 pass through the lugs 32 and are threaded within the threaded members 26 and 28 respectively. Collars 34, 34, abut the lower portion of the lugs 32, 32, and are held from movement along the threaded rods 33, 33, by any suitable means, said collars herein shown being preferably welded to the threaded rods 33, so that the arms 31, 31, will be raised or lowered as the threaded rods 33, 33, are rotated in one direction or the other. Handles 40, 40, are provided to rotate the rods 33, 33, to raise or lower the supporting member 30.

When it is desired to angularly move the supporting member 30 with respect to the plate 23 one end or the other of said members is pivoted to one of the ears 25 or 27 according to the position it is desired to move the supporting member 30. A plurality of pins 42, 42, are provided for this purpose. The pins 42 serve to connect the threaded members 26 and 28 to the ears 25 and 27, respectively, and when extended through the ears 25 and 27 may engage apertures in the lower portion of the arms 31, 31, to hold the supporting member 30 in a stationary position parallel to the plate 23. When either one or the other of the pins 42 is disengaged from the respective aperture in one of the arms 31, the supporting member 30 may be tilted about the other pin by rotating the handle 40 and one of the threaded rods 33 opposite the pivot about which it is desired to pivot the supporting member 30.

A motor 45 is attached to the top portion of the supporting member 30 by any suitable means, said means herein being shown as cap screws of an ordinary type. The motor 45 may be of any well known type, but is herein preferably shown as an electric motor of an ordinary type provided with an armature shaft 46. A tubular supporting arm 47 is fixed to one side of the motor 45 and projects forwardly therefrom parallel to the armature shaft 46.

A drilling head 48 is trunnioned on a member 49 on the forward end of the tubular supporting arm 47 so as to be angularly movable with respect to said arm. A strap 50 is provided to hold the drilling head 48 in various desirable positions with respect to the tubular arm 47, said straps being attached to said drilling head and tubular arm by nuts and bolts generally indicated at 51.

The drilling mechanism 11 and drilling head 48 is of an ordinary construction well known to those skilled in the art so will not herein be described in detail. A gear (not shown) is journaled in the drilling head 48 and has a threaded shaft 53 passing through its hub and feathered therein so that said shaft may move through said gear for substantially its entire length. Threaded jaws (not shown herein since they are no part of

my invention) are provided on the drilling head 48 to engage the threaded shaft 53 to move said shaft translationally with respect to the drilling head 48 to feed a drill 54 held on the forward end of said shaft in a usual manner into the material it is desired to drill. A hand operated disc 55 is provided to engage or disengage the aforementioned jaws with the threaded shaft 53 while suitable frictional control means (not shown) controlled by a suitable hand wheel 56 is provided to stop feeding or translational movement of the threaded shaft 53 on overload of the drilling mechanism.

A shaft 60 is journaled within the tubular arm 47 for feeding and rotating the drill 54 through a suitable system of gearing not herein shown since it is no part of my present invention. The shaft 60 is driven from the motor 45 by means of a suitable geared reduction which herein comprises a spur gear 61 keyed on said shaft driven by a pinion 62 keyed on the armature shaft 46.

In Figure 2 a plurality of drilling devices are shown mounted on the forward portion of a mine locomotive simultaneously drilling a plurality of holes in a mine wall in the usual manner. A bracket 65 is provided on the forward end of the locomotive to serve as a support for an additional arm 12 to support the drilling mechanism thereon when desired as is partially shown in dotted lines. When it is desired to travel about the mine the arms 12 are folded on to the forward portion of the locomotive as is shown in dotted lines in Figure 2 so that the locomotive which supports and transports the drilling mechanism may also be used to haul cars about the mine.

It may now be seen that I have provided a new and improved drilling mechanism and support therefor of a new and improved construction which may be detachably connectible with a mine locomotive, or a similar track-mounted power vehicle, such as a truck, to drill holes in a mine wall at various angles and positions with respect thereto, and that said support and drilling mechanism is of a light and compact design and is so arranged that it will take up a minimum of room while being transported about the mine.

Although I have shown and described one form in which my invention may be embodied, it will be understood that the arrangement and construction of the various parts may be altered or changed without departing from the spirit or scope of the invention. Furthermore, I do not wish to be construed as limiting myself to the particular and specific embodiment illustrated, excepting as it may be so limited in the appended claims.

I claim as my invention:

1. In a drilling mechanism, a support

therefor, a drill supporting member supported on said support for pivotal movement about horizontal axes at opposite ends thereof, and means for moving said drill supporting member about said pivotal axes comprising a plurality of members pivotally connected to said support, and a plurality of adjustable supporting members having movable connection with each of said last mentioned members.

2. In a drilling apparatus, a support therefor, a drill supporting member supported on said support for pivotal movement with respect thereto about horizontal axes at opposite ends thereof, and means for moving said drill supporting member about said pivotal axes comprising a plurality of members pivotally connected to opposite sides of said support, and a plurality of threaded rods in said last mentioned members having supporting engagement with said drill supporting member.

3. In combination with a drilling apparatus, a drilling mechanism, a support for said drilling mechanism comprising a turntable, a drill supporting member supported on said turntable for selective pivotal movement about a horizontal axis at either side of said turntable, and means for angularly moving said drill supporting member with respect to said turntable about either of said last mentioned horizontal axes comprising threaded members pivotally connected to opposite sides of said turntable, and a plurality of rods threaded in said threaded members having supporting engagement with said drill supporting member.

4. In combination with a drilling apparatus, a drilling mechanism, a support for said drilling mechanism comprising a turntable, a drill supporting member supported on said turntable for selective pivotal movement about a horizontal axis at either side of said turntable, a motor fixed to said drill supporting member, a drilling arm fixed to said motor for supporting said drilling mechanism, means for driving said drilling mechanism from said motor, and means for angularly moving said drill supporting member with respect to said turntable about either of said horizontal axes comprising threaded members pivotally connected to opposite sides of said turntable, threaded rods engageable with said threaded members and having supporting engagement with said drill supporting member, and means for rotating said threaded rods.

5. In combination with a drilling apparatus, a drilling mechanism, a support for said drilling mechanism comprising a turntable, a drill supporting member supported on said turntable, a motor fixed to said drill supporting member, a drilling arm fixed to said motor for supporting said drilling mechanism, means for driving said drilling mechanism

from said motor, and means for angularly moving said drill supporting member with respect to said turntable comprising a plurality of threaded members pivotally connected to opposite sides of said turntable, detachable means for pivotally connecting said drill supporting member with one or the other of said threaded members, and means for moving said drill supporting member about the axis of pivotal connection of said drill supporting member with one or the other of said threaded members comprising a plurality of rods having adjustable engagement with said threaded members and said drill supporting member.

6. In a drilling mechanism, a drilling head, a portable support, an arm pivotally connected to said support to swing with respect to said support in a horizontal plane, adjustable supporting means on the outer end of said arm engageable with a mine bottom, and means for supporting said drilling head on said arm for movement along said arm and adjustable movement with respect to said arm in both horizontal and vertical planes comprising a member supported on said arm for adjustable movement therealong, a supporting member supported on said member for angular movement with respect thereto, means for adjusting the angle of said supporting member with respect to said member, and means for supporting said drilling head on said supporting member comprising an arm having one end connected to said supporting member for movement with said supporting member and having said drilling head attached to said opposite end for angular movement with respect thereto.

7. In an apparatus of the class described, a drilling head, a drilling arm, means for supporting said drilling head on said drilling arm for adjustment with respect thereto about a horizontal transverse axis, and means for supporting said arm for selective adjustable movement about either one or another of a pair of horizontal axes whereby said arm may be pivotally adjusted upwardly or downwardly from a common plane comprising a member, a pair of members pivotally connected to said member at opposite sides thereof, each of said members being adapted to have selective adjustable and pivotal connection with said drilling arm.

8. In an apparatus of the class described, a drilling head, a drilling arm, means for supporting said drilling head on said drilling arm for adjustment with respect thereto about a horizontal transverse axis, and means for supporting said arm for selective adjustable movement about either one or another of a pair of horizontal axes whereby said arm may be pivotally adjusted upwardly or downwardly from a common plane comprising a member, a pair of members disposed at opposite sides of said member, means for pivotally

connecting said members to said member, each of said members being adapted to have selective adjustable and pivotal connection with said drilling arm, said means for pivotally connecting said members to said member also serving as a means for pivotally connecting said drilling arm with either one of the said aforementioned members.

9. In an apparatus of the class described, a drilling head, a drilling arm, means for supporting said drilling head on said drilling arm for adjustment with respect thereto about a horizontal transverse axis, and means for supporting said drilling arm for selective adjustable movement about either one or another of a pair of horizontal axes whereby said arm may be pivotally adjusted upwardly or downwardly from a common plane comprising a member, a pair of members disposed at opposite sides of said member, means for pivotally connecting said members to said member, each of said members being adapted to have selective adjustable and pivotal connection with said drilling arm, said means for pivotally connecting said members to said plate also serving as a means for pivotally connecting said drilling arm with either one of the said aforementioned members and said member opposite said member which has pivotal connection with said drilling arm being adapted to move said drilling arm about the axis of connection of said other member to said arm.

10. In a drilling mechanism, a portable support, an arm pivotally connected to said portable support to swing outwardly therefrom, drill supporting means movable along said arm comprising a member slidably supported on said arm, a supporting member supported on said member at opposite sides thereof for selective pivotal movement about a horizontal axis at either side of said member, an arm fixed to said supporting member and projecting forwardly therefrom, a drilling head on the outer end of said arm angularly movable with respect thereto, and means for angularly moving said supporting member with respect to said member about either of said aforementioned sides of said member.

11. In a drilling mechanism, a portable support, an arm pivotally connected to said portable support to swing outwardly therefrom, drill supporting means movable along said arm comprising a member slidably supported on said arm, a supporting member supported on said member at opposite sides thereof for selective pivotal movement about a horizontal axis at either side of said member, an arm fixed to said supporting member and projecting forwardly therefrom, a drilling head on the outer end of said arm angularly movable with respect thereto, and threaded means for angularly moving said supporting member with respect to said mem-

ber about either of said aforementioned sides of said member.

12. In a drilling mechanism, a portable support, an arm pivotally connected to said portable support to swing outwardly therefrom, drill supporting means movable along said arm comprising a member slidably supported on said arm, a supporting member supported on said member at opposite sides thereof for selective pivotal movement about a horizontal axis at either side of said member, an arm fixed to said supporting member and projecting forwardly therefrom, a drilling head on the outer end of said arm angularly movable with respect thereto, detachable means for pivotally connecting one end or the other of said supporting member to said member, and a threaded member for moving the end of said supporting member not pivotally connected to said member about the end of said supporting member pivotally connected to said member.

13. In a drilling mechanism, a portable support, an arm pivotally connected to said portable support to swing outwardly therefrom, drill supporting means movable along said arm comprising a member slidably supported on said arm, a turntable on said member, a supporting member supported on said turntable at opposite ends thereof, an arm fixed to said supporting member and projecting forwardly therefrom, a drilling head on the outer end of said arm angularly movable with respect thereto, detachable means for pivotally connecting one end or the other of said supporting member to said turntable, and means for moving the end of said supporting member not pivotally connected to said turntable about the end of said supporting member pivotally connected to said turntable.

14. In a drilling mechanism, a portable support, an arm pivotally connected to said portable support to swing outwardly therefrom, drill supporting means movable along said arm comprising a member slidably supported on said arm, a turntable on said member, a supporting member adjustably supported on said turntable at opposite ends of said turntable for selective pivotal movement about a horizontal axis at either end of said turntable, an arm fixed to said supporting member and projecting forwardly therefrom, a drilling head on the outer end of said arm and angularly movable with respect thereto, detachable means for pivotally connecting one end or the other of said supporting member to said turntable, and a plurality of threaded members for moving the end of said supporting member not pivotally connected to said turntable about the end of said supporting member pivotally connected to said turntable.

15. In a drilling mechanism, a portable support, an arm pivotally connected to said portable support to swing outwardly there-

from, drill supporting means movable along said arm comprising a member slidably supported on said arm, a turntable on said member, a supporting member, means for adjustably supporting said supporting member on said turntable comprising a plurality of threaded members supported on said turntable for pivotal movement with respect thereto, means for supporting said supporting member on said threaded members comprising a plurality of threaded rods, detachable means for pivotally connecting one end or the other of said supporting member to one or the other of said threaded members and means whereby said threaded rod opposite said point of pivotal connection of said supporting member to said threaded member may move said supporting member about the axis of pivotal connection of said threaded member to said turntable.

16. In a drilling mechanism, a portable support, an arm pivotally connected to said support to swing outwardly therefrom, drill supporting means movable along said arm comprising a member slidably supported on said arm, a turntable on said member, a supporting member, an arm fixed to said supporting member and projecting forwardly therefrom, a drilling head on the outer end of said arm and angularly movable with respect thereto, and means for adjustably supporting said supporting member on said turntable comprising a plurality of threaded members mounted on opposite sides of said turntable for pivotal movement with respect thereto, a plurality of threaded rods threaded in said threaded members and having supporting engagement with said support member, detachable means for pivotally connecting one end or the other of said supporting member to move about the pivotal axis of connection of said threaded members to said turntable, and means whereby said threaded rod opposite said point of pivotal connection of said supporting member to said turntable may move said supporting member about the axis of pivotal connection of said supporting member to said turntable.

Signed at Chicago, in the county of Cook and State of Illinois, this 5th day of April, A. D. 1929.

FREDERICK W. VODOZ.