Oct. 1, 1935. M. P. HOLMES 2,015,677

DRILLING APPARATUS

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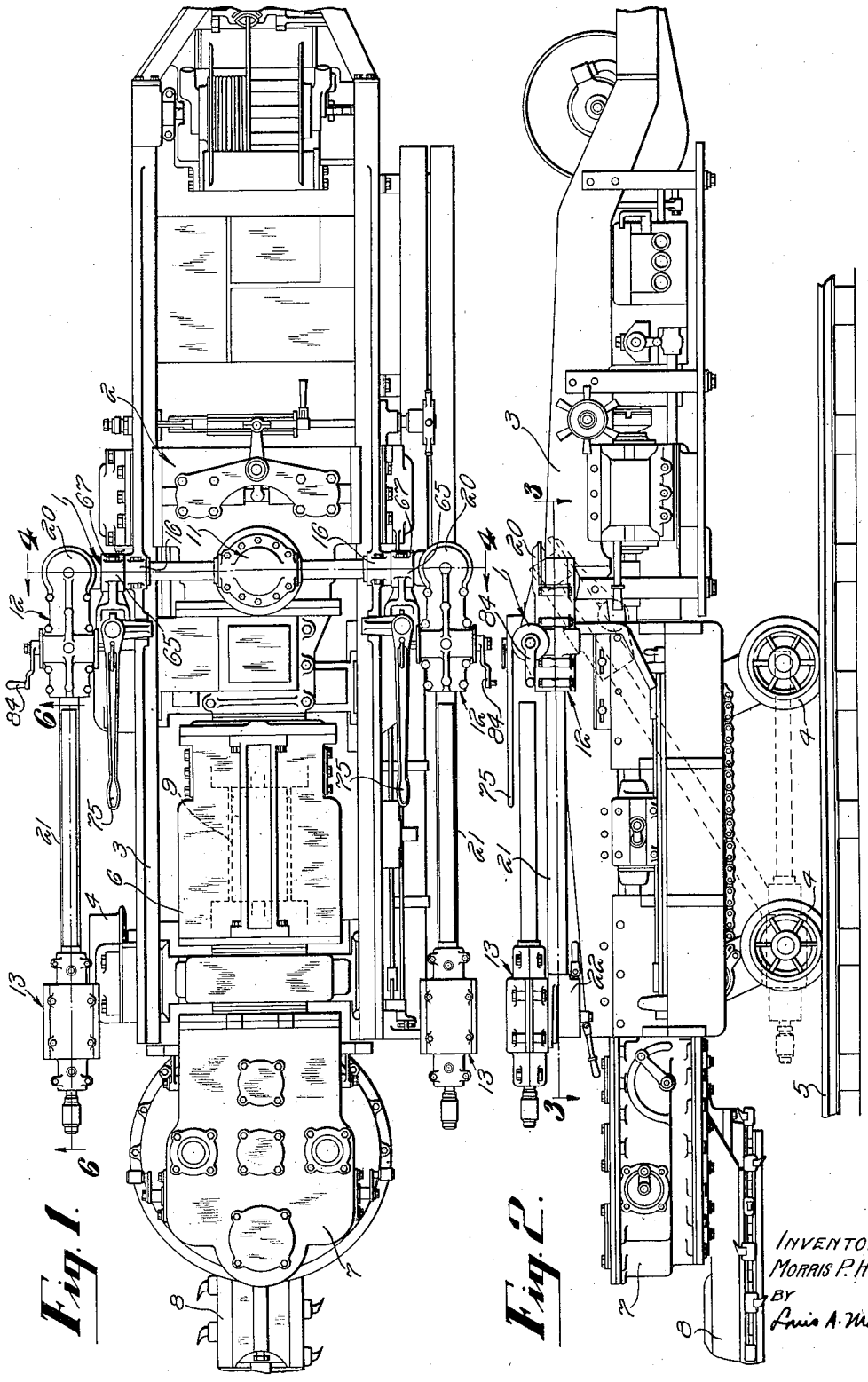


Fig. 1.

Fig. 2.

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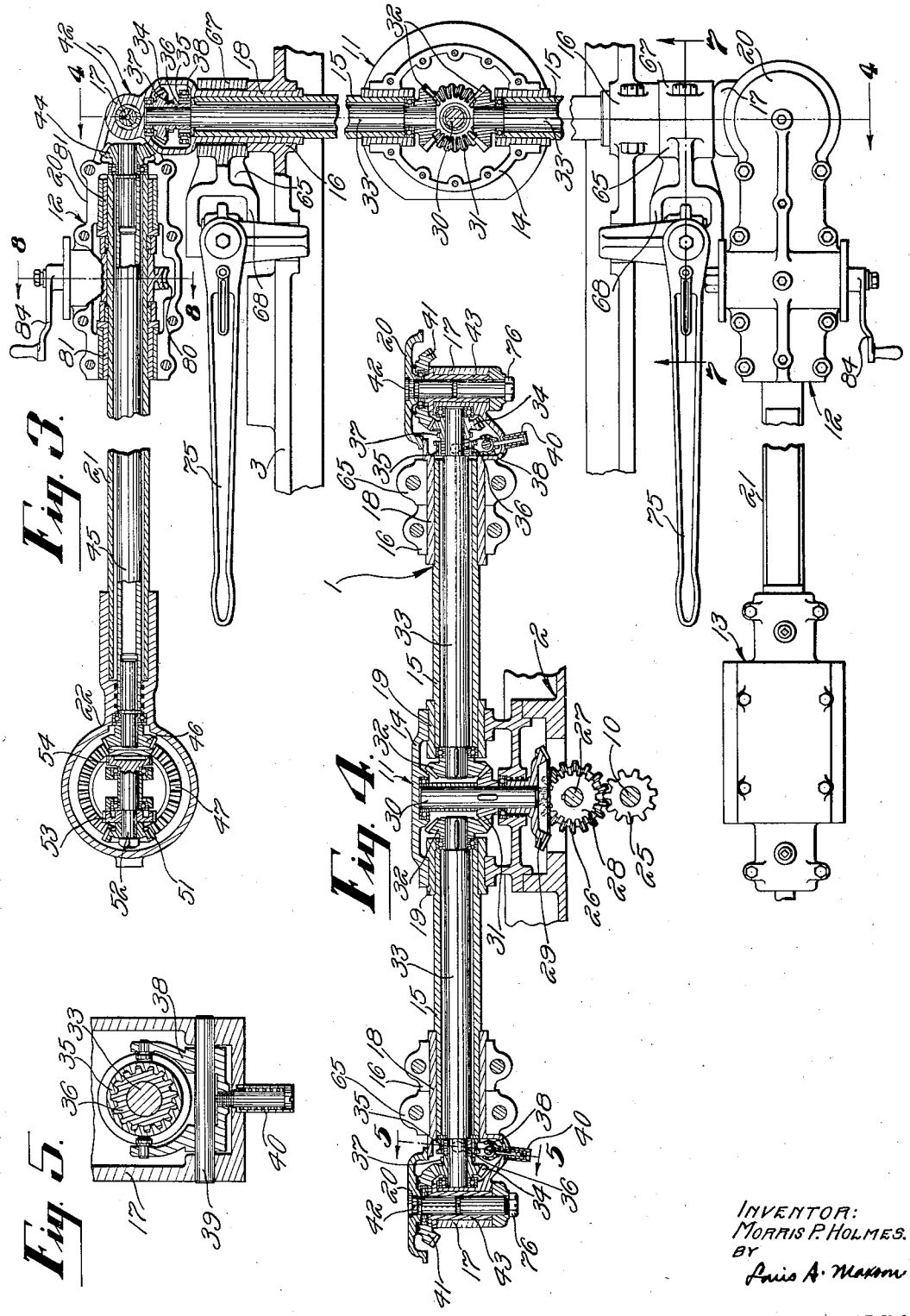


Fig. 3.

Fig. 4.

Fig. 5.

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DRILLING APPARATUS

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Fig. 6.

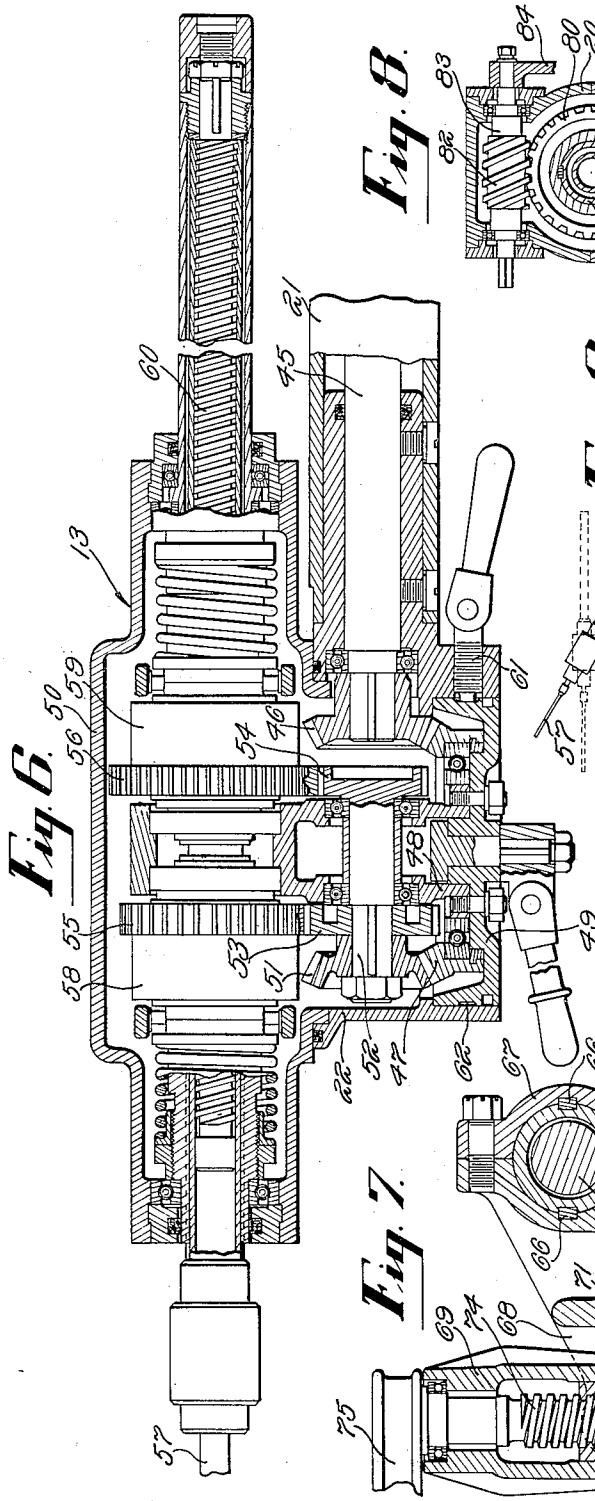
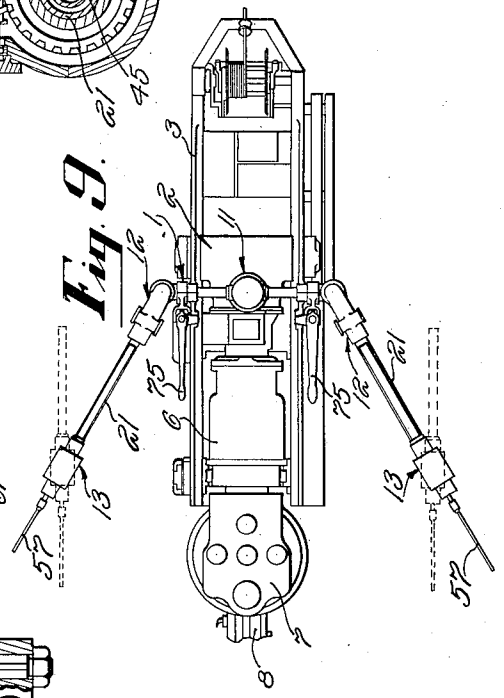


Fig. 7.

Fig. 8.

Fig. 9.



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2,015,677

DRILLING APPARATUS

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Application March 14, 1932, Serial No. 598,759

16 Claims. (Cl. 262—9)

This invention relates to drilling apparatus and more particularly to improvements in coal drilling apparatus particularly adapted to use in conjunction with coal mining apparatus.

An object of this invention is to provide an improved drilling apparatus. Another object is to provide an improved coal drilling apparatus particularly adapted to be mounted on and used in conjunction with a coal mining apparatus. A further object is to provide an improved drilling apparatus having improved adjustable supporting means for the drilling tool. A still further object is to provide an improved coal drilling apparatus of the multiple drilling tool type having improved independently adjustable supporting means for the drilling tools whereby the latter may be positioned in various locations relative to the coal face. Still another object is to provide improved means for mounting the drilling tools on the coal mining apparatus and improved means for driving the drilling tool from the motor of the mining apparatus. Yet another object is to provide improved means for mounting the drilling tools on the coal mining apparatus whereby the drilling tools may be independently adjusted both vertically and horizontally relative to the mining apparatus. These and other objects and advantages of the improved mining apparatus will, however, hereinafter more fully appear.

In the accompanying drawings there is shown for purposes of illustration one form which the invention may assume in practice.

In these drawings:

Fig. 1 is a plan view of a coal mining apparatus having associated therewith the illustrative embodiment of the improved drilling apparatus;

Fig. 2 is a side elevational view of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged horizontal sectional view taken substantially on line 3—3 of Fig. 2, parts being shown in plan to facilitate illustration;

Fig. 4 is a transverse vertical sectional view taken substantially on line 4—4 of Figs. 1 and 3;

Fig. 5 is a detail sectional view taken substantially on line 5—5 of Fig. 4;

Fig. 6 is an enlarged central longitudinally extending vertical sectional view taken substantially on line 6—6 of Fig. 1 and illustrating the drilling tool structure;

Fig. 7 is a detail sectional view taken substantially on line 7—7 of Fig. 3;

Fig. 8 is a detail sectional view taken substantially on line 8—8 of Fig. 3; and

Fig. 9 is a diagrammatic plan view of the apparatus shown in Fig. 1 showing the drilling tools in different positions.

In this illustrative embodiment of the invention the improved drilling apparatus, generally designated 1, is shown associated with a coal mining apparatus generally designated 2. The coal mining apparatus is herein of the wheel supported, track guided type of the same general construction as that disclosed in my patent, Patent No. 1,785,961, patented Dec. 23, 1930, and generally comprises a portable body 3 adjustably mounted on support wheels 4 adapted to run along a mine trackway 5. Mounted on the body 3 for rotation about a longitudinal axis is a support 6 carrying a cutter head 7 in turn having pivotally mounted thereon a usual cutter element carrying cutter bar 8. Arranged within the cutter head support 6 is a motor 9 having its power shaft 10 operatively connected to the mechanisms for actuating the cutting elements on the cutter bar 8, for rotating the cutter head 7, for adjusting the support carrying body 3 and for driving the support wheels 4 to propel the apparatus as clearly described in the above mentioned patent. As the specific structure of the mining apparatus is fully disclosed in Patent No. 1,785,961 above mentioned, and as the improved drilling apparatus may be mounted on mining apparatus of various other types, a further description of the same is herein deemed unnecessary other than to state that the kerf cutter is adjustable to cut horizontal kerfs adjacent the mine floor, horizontal kerfs a substantial distance above the mine floor and vertical kerfs between the mine roof and mine floor.

The drilling apparatus 1 generally comprises supporting means generally designated 11 extending transversely of and mounted centrally on the top and adjacent the rear end of the body 3 of the mining apparatus as shown in Figs. 1 and 2 and having adjustably mounted thereon at the opposite sides of the mining apparatus independently adjustable drill supporting structures 12, 12, each having swiveled thereon at its outer extremity a drilling tool generally designated 13, the supporting structures being swingable horizontally and vertically relative to the mining apparatus to position the drilling tools in various locations at the opposite sides thereof. In this instance, the drill supporting structures, their adjusting means, the drilling tools and their driving means are identical in construction and therefore a description of each of the same separately is not considered necessary. In this instance, the supporting means 11 herein com-

prises a central housing 14 attached to the top of the body 3 and having mounted thereon and projecting laterally therefrom at the opposite sides thereof and extending transversely over the top of the body 3 tubular supporting members 15, 15. Journaled within bearing brackets 16, 16 at the opposite sides of the body 3 are swivel frames 17, 17 having tubular bearing portions 18 rotatable within the bearing brackets 16 and within which the outer extremities of the tubular members 15, 15 are supported as shown in Fig. 4, the inner ends of these tubular members 15, 15 being supported within sleeves 19 in turn supported within the housing 14. Swiveled on the frames 17 about axes perpendicular to the axes of the swivel frames 17 are swingable frames 20, 20, each rotatably supporting a tubular arm-like support or boom 21 arranged along the side of the mining apparatus. Attached to the outer extremity of each of the booms 21 is a swivel bracket 22 on which the drilling tool 13 is swiveled about an axis perpendicular to the boom axis.

Now referring to the driving connections between the motor 9 of the mining apparatus and each drilling tool 13, it will be noted that fixed to the motor shaft 10 is a spur pinion 25 meshing with a spur gear 26 fixed to a longitudinal shaft 27 arranged parallel with and above the motor shaft as shown in Fig. 4. Rotatable with and driven by the shaft 27 is a bevel gear 28 meshing with a bevel gear 29 fixed to the lower end of a vertical shaft 30 suitably journaled within the housing 14. Also fixed to the shaft 30 and driven by the latter is a bevel gear 31 meshing with bevel gears 32, 32 fixed to the inner ends of alined shafts 33, 33 arranged with their axes coincident with the axes of the swivel frame 17. These shafts are journaled at their inner ends within the housing 14 and at their outer ends within the swivel frames 17 in the manner shown. Journaled on the outer extremity of the shaft 33 is a bevel gear 34 connectible to the shaft in driving relation therewith by a sliding clutch 35. The clutch 35 has teeth engageable with the teeth of a clutch member 36 keyed to the shaft 33 and connectible to the teeth 37 formed on the hub of the bevel gear 34. The operating means for the clutch 35 comprises, as shown in Fig. 5, a shipper yoke 38 pivotally mounted on a shaft 39 carried by the swivel frame 17 and having a suitable operating handle 40. The gear 34 meshes with a bevel gear 41 rotatably supported on a vertical shaft 42 arranged with its axis coincident with the axis of the swingable frame 20 and forming the pivotal mounting for the latter. The shaft 42 is attached at its ends to the frame 20 and is rotatably mounted within a bearing sleeve 43 carried by the frame 17. Meshing with the gear 41 is a bevel gear 44 fixed to the rear end of a transmission shaft 45, herein extending centrally through the tubular supporting arm of boom 21 as shown in Fig. 3. This shaft is journaled at its rear end within the swingable frame 20 and at its forward end within the swivel bracket 22, and has fixed thereto at its forward end a bevel gear 46 meshing, as shown in Fig. 3, with a large bevel ring gear 47. This bevel ring gear is rotatable about the swivel axis of the drilling tool 13 and is, as shown, journaled on a bearing bracket 48 and a cooperating swivel plate 49. This swivel plate is rigidly secured to the bearing bracket, while the latter is rigidly attached to the housing 50 of the drilling tool. The bevel gear 47 meshes with a bevel gear 51 fixed to a shaft 52 suitably journaled within the bearing bracket 48. Fixed to the shaft 52 and driven thereby are spur gears 53 and 54 (see Fig. 6), which mesh respectively with spur gears 55 and 56 which constitute driving elements for the tool rotating and feeding mechanisms respectively. These driving elements are adapted to effect rotation and feeding of a drilling implement 57 under the control of multiple disc clutches 58 and 59 and a differential screw mechanism 60. As the specific drilling structure is clearly described in my co-pending application, Serial No. 255,754, filed Feb. 20, 1928, now matured into Patent No. 1,933,589, granted Nov. 7, 1933, further description thereof is herein considered to be unnecessary other than to state that the drilling implement 57 may be fed forwardly at a relatively slow drilling speed or fed in either direction at a relatively high positioning speed while the same is constantly rapidly rotated. It will thus be seen that, due to the arrangement of various driving shafts and bevel gearings, it is possible to drive the drilling tools 13 irrespective of their adjusted positions relative to the mining apparatus. Each of the drilling tools 13 may be locked against swinging movement relative to the bearing bracket 22 by means of a clamp or set screw 61 engageable with a peripheral groove 62 formed on the swivel plate 49 as shown in Fig. 6.

The mechanisms for swinging the supporting structures 12, 12 about the axes of the swivel frames 17 each comprises a lever or arm (see Figs. 3 and 7) 65 secured as by keys 66 and a clamp 67 to the adjacent tubular member 15, the lever 65 being secured to the member 15 between the bearing bracket 16 and the swivel frame 20 as shown in Fig. 4. The outer end of the lever 65 is herein in the form of a yoke 68 and straddles a guide frame 69 suitably attached to the adjacent side of the body 3 of the mining apparatus and pivotally connected at 70 to a sliding trunnion 71 respectively mounted within a vertical guideway 72 formed in the bracket 69. The trunnion 71 is in the form of a nut and threadedly engages at 73 a vertical screw 74 suitably journaled within the guide bracket 69. Connected to the upper end of the screw 74 is a reversible ratchet wrench 75 of a usual design by means of which the screw may be manually rotated. It will thus be seen that when the screw 74 is rotated, the nut 71 slides either upwardly or downwardly within the guideway 72, thereby swinging the lever 65 about its pivot and as a result, the supporting structure for the drilling tool is swung either upwardly or downwardly about the axis of the swivel frame 17 as desired. The supporting structure for the drilling tool may be swung laterally about the pivot of the swivel frame 20 by simply releasing a clamping nut 76 (see Fig. 4) threadedly connected to the lower end of the pivot shaft 42, the nut 76 when tightened, clamping the parts of the swivel frames 17, 20 together, thereby frictionally to lock the supporting structure against lateral swinging movement.

The mechanisms for rolling the supporting structures for the drilling tools about the axes of the supporting arms or booms 21 herein comprises, as shown in Figs. 3 and 8, a worm wheel 80 keyed to the boom 21, intermediate sleeve bearings 81, 81 carried by the frame 20 and within which the boom is rotatably mounted. Meshing with the worm wheel 80 is a worm 82 fixed to a transverse shaft 83 suitably journaled within the frame 20. Attached to one end of the shaft 83 is an operating lever 84 by means of which the

worm gearing may be manually rotated. The worm gearing 80, 82 is self-locking and maintains automatically the supporting structure in its different adjusted positions about the boom axis. The drilling tool may be swung about its swivel mounting on the swivel bracket carried at the outer extremity of the boom simply by releasing the clamping screw 61 and manually turning the drilling tool about its swivel axis.

In the operation of the improved drilling apparatus, the coal mining apparatus is run into the entry and, when the coal face is reached, the cutter bar 8 is swung to a position with its tip end at the right hand side of the entry. The apparatus is then propelled along the mine trackway to effect sumping of the cutter bar into the coal face and the cutter bar is thereafter swung from one side of the entry to the other to effect its transverse cutting operation, thereby cutting a transverse kerf in the coal face in the manner clearly described in my Patent No. 1,785,961 mentioned above. During the swinging movement of the cutter bar or after the swinging movement is completed and the cutter bar is partially or entirely withdrawn from the cut, the operator adjusts the drilling tools 13 into the desired location relative to the coal face and a plurality of shot or blast holes are drilled in the coal face prior to the completion of the cut within the coal. If it is desired to drill a series of holes adjacent the ribs of the entry, the operator loosens the clamping nuts 76 and manually swings the supporting structures 12, 12 laterally from the position shown in Fig. 1 to the position shown in Fig. 9, the supporting structures thereafter being clamped in position by tightening the nuts 76. The clamping screws 61 are then released and the drills are swung about their swivel mountings at the other extremities of the supporting structures into the position indicated in dotted lines in Fig. 9. The feed and rotation control clutches 52, 53 of the drilling tool are then suitably operated to effect feed of the drilling implement 57 within the coal. If it is desired to drill a series of blast holes in the coal face adjacent the mine floor when the kerf cutter of the mining apparatus is in its top cutting position a substantial distance above the mine floor, the booms are rolled within the swivel mounting to bring the swivel axes of the drilling tools horizontal and thereafter the ratchet wrenches 75 are operated to swing the supporting structures 12, 12 for the drilling tools 13 downwardly and the drilling tools are then suitably adjusted about their swivel mountings until they assume the position indicated in dotted lines in Fig. 2. When it is desired to drill a series of blast holes in the coal face adjacent the mine roof when the kerf cutter of the mining apparatus is in top cutting position, the booms are swung upwardly to position the drilling tools adjacent the mine roof and the drills are then operated in the manner above described. It is accordingly evident that the drilling tools may be adjusted laterally in any desired position at the opposite sides of the mining apparatus or may be adjusted vertically into any desired position between the mine roof and the mine floor. When it is desired to swing the drilling tools about the axes of the booms 21, this may be accomplished simply by turning the handle 84 to actuate the worm gearing 80, 82 of the boom rotating mechanism, it being possible to adjust the drilling tools through a complete circle about the axes of the booms. After the drilling operation is completed, the supporting structures for the drilling tools are returned into transport position as shown in Fig. 1 adjacent the sides of the mining apparatus, and the cutting mechanism of the mining apparatus is again operated and the apparatus moves rearwardly to retract the cutter bar from the coal face in a well known manner. The drilling tools of the mining apparatus operate in this same general manner during the insertion of a shear or vertical cut in the coal face, it being possible to adjust the cutter bar into a shearing position simply by rotating the cutter head 7 about its axis in the manner clearly described in the patent above referred to. Various other adjustments and uses of the improved drilling apparatus will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which this invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position adjacent the mine floor and into a top cutting position a substantial distance above the mine floor, drill supporting boom structures swivelly mounted about rectangularly related axes at the opposite sides of the mining machine and swingable laterally outwardly from the sides of the mining machine and vertically downwardly along the sides of the mining machine, and drilling tools mounted on the outer extremities of said boom structures, said boom structures being adjustable to position the drilling tools to drill holes adjacent the mine floor when the kerf cutting mechanism is in its top cutting position and to drill holes adjacent the mine roof when the kerf cutting mechanism is in its bottom cutting position.

2. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position adjacent the mine floor and a top cutting position a substantial distance above the mine floor, a drill supporting structure mounted at the side of the mining machine and adjustable about a horizontal axis vertically downwardly along the side of the mining machine in planes parallel to the latter and laterally relative to the mining machine about an upright axis at the side of the mining machine, and a drilling tool mounted on the outer extremity of said supporting structure, said supporting structure being adjustable to position the drilling tool to drill holes near the mine floor when the kerf cutting mechanism is in its top cutting position and to drill holes adjacent the mine roof when the kerf cutting mechanism is in its bottom cutting position.

3. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position adjacent the mine floor and a top cutting position a substantial distance above the mine floor, a motor carried by the mining machine

for actuating said kerf cutting mechanism in any of its adjusted positions, a drill supporting structure mounted at the side of the mining machine for adjustment about a horizontal pivot vertically downwardly along the side of the mining machine in planes parallel to the latter and laterally relative to the mining machine and said motor about an upright axis at the side of the machine, a drilling tool mounted on the outer extremity of said supporting structure, said supporting structure being adjustable to position the drilling tool to drill holes adjacent the mine floor when the kerf cutting mechanism is in its top cutting position and to drill holes adjacent the mine roof when the kerf cutting mechanism is in its bottom cutting position, and driving connections between said motor and said drilling tool operative irrespective of the adjusted position of said supporting structure relative to the mining machine.

4. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a top cutting position a substantial distance above the mine floor, a motor carried by the mining machine for actuating said kerf cutting mechanism, a drill supporting structure mounted at the side of the mining machine for adjustment about a horizontal axis vertically downwardly along the side of the mining machine in planes parallel to the latter and laterally relative to the mining machine about an upright axis at the side of the mining machine, a drilling tool swivelly mounted on the outer extremity of said supporting structure, said supporting structure being adjusted as aforesaid to position the drilling tool to drill holes adjacent the mine floor when the kerf cutting mechanism is in aforesaid top cutting position, and driving connections between said motor and said drilling tool operative irrespective of the adjusted position of said supporting structure relative to the mining machine and the swiveled position of said drilling tool relative to said supporting structure.

5. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a top cutting position to cut a kerf a substantial distance above the mine floor, a motor carried by the mining machine for actuating said kerf cutting mechanism, drill supporting structures mounted at the opposite sides of the mining machine for adjustment downwardly along the sides of the mining machine relative to the mining machine and said motor, drilling tools mounted on the outer extremities of said supporting structures, said supporting structures being adjustable to position said drilling tools to drill holes adjacent the mine floor when said kerf cutting mechanism is in its top cutting position, and driving connections between said motor and said drilling tool operative irrespective of the adjusted position of said supporting structures relative to the mining machine.

6. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism, a motor carried by said mining machine for actuating said kerf cutting mechanism, drill supporting structures mounted at the opposite sides of said mining machine for adjustment downwardly along the sides of said mining machine relative to said mining machine and said motor, drilling tools swivelly mounted on the outer extremities of said supporting structures, and driving connections between said motor and said drilling tools operative irrespective of the adjusted position of said supporting structures relative to said mining machine and the swivelled position of the drilling tools relative to said supporting structures.

7. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position to cut a kerf near the mine floor and into a top cutting position to cut a kerf a substantial distance above the mine floor, a pair of independently adjustable elongated supporting structures mounted at their rear ends on the opposite sides of the mining machine and extending forwardly along the sides of the mining machine, a drilling tool supported at the outer extremity of each supporting structure, said supporting structures being adjustable along the sides of the mining machine to move said tools into different relatively high parallel drilling positions to drill holes near the mine roof when said kerf cutting mechanism is in its bottom cutting position, into different relatively low parallel drilling positions to drill holes near the mine floor when said kerf cutting mechanism is in its top cutting position and into different lateral drilling positions relative to the mining machine in either of aforesaid cutting positions to enable said tools to drill holes above, below and at either side of the mining machine.

8. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position to cut a kerf near the mine floor and into a top cutting position to cut a kerf a substantial distance above the mine floor, a pair of independently adjustable elongated supporting structures mounted at their rear ends on the opposite sides of the mining machine and extending forwardly along the sides of the mining machine, a drilling tool supported at the outer extremity of each supporting structure, said supporting structures being adjustable along the sides of the mining machine to move said tools into different relatively high parallel drilling positions to drill holes near the mine roof when said kerf cutting mechanism is in its bottom cutting position, into different relatively low parallel drilling positions to drill holes near the mine floor when said kerf cutting mechanism is in its top cutting position and into different lateral drilling positions relative to the mining machine when said kerf cutting mechanism is in either of aforesaid cutting positions to enable said tools to drill holes above, below and at either side of the mining machine, a motor on the mining machine, and driving connections between said motor and both of said drilling tools.

9. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position to cut a kerf near the mine floor and into a top cutting position to cut a kerf a substantial distance above the mine floor, a pair of independently adjustable elongated supporting structures mounted at their rear ends on the opposite sides of the mining machine and extending forwardly along the sides of the mining machine, a drilling tool supported at the outer extremity of each supporting structure, said supporting struc-

tures being adjustable along the sides of the mining machine to move said tools into different relatively high parallel drilling positions to drill holes near the mine roof when said kerf cutting mechanism is in its bottom cutting position, into different relatively low parallel drilling positions to drill holes near the mine floor when said kerf cutting mechanism is in its top cutting position and into different lateral drilling positions relative to the mining machine when said kerf cutting mechanism is in either of aforesaid cutting positions to enable said tools to drill holes above, below and at either side of the mining machine, a motor on the mining machine, driving connections between said motor and both of said drilling tools, and mechanism driven by said motor for propelling the mining machine.

10. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position to cut a kerf near the mine floor and into a top cutting position to cut a kerf a substantial distance above the mine floor, a pair of independently adjustable elongated supporting structures mounted at their rear ends on the opposite sides of the mining machine for swinging movement along the sides of the mining machine about horizontal transversely extending alined axes and extending forwardly along the sides of the mining machine, a drilling tool supported on the outer extremity of each supporting structure, said supporting structures being adjustable to move said tools into different relatively high parallel drilling positions near the mine roof when said kerf cutting mechanism is in its bottom cutting position, into different relatively low parallel drilling positions near the mine floor when said kerf cutting mechanism is in its top cutting position and into different lateral drilling positions relative to the mining machine in either position of the kerf cutting mechanism to enable said tools to drill holes above, below and at either side of the mining machine, and motor operated devices for driving said tools.

11. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position to cut a kerf near the mine floor and into a top cutting position to cut a kerf a substantial distance above the mine floor, a pair of independently adjustable elongated supporting structures mounted at their rear ends on the opposite sides of the mining machine to swing about angularly related axes for swinging movement along the sides of the mining machine about horizontal transversely extending alined axes and extending forwardly along the sides of the mining machine, a drilling tool supported on the outer extremity of each supporting structure, said supporting structures being adjustable to move said tools into different relatively high parallel drilling positions near the mine roof when said kerf cutting mechanism is in its bottom cutting position, into different relatively low parallel drilling positions near the mine floor when said kerf cutting mechanism is in its top cutting position and into different lateral drilling positions relative to the mining machine in either position of the kerf cutting mechanism to enable said tools to drill holes above, below and at either side of the mining machine, and motor operated devices for driving said tools.

12. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a position to cut a vertical kerf between the mine roof and mine floor, a pair of independently adjustable elongated supporting structures mounted at their rear ends on the opposite sides of said mining machine and extending forwardly along the sides of the mining machine, a drilling tool supported on the outer extremity of each supporting structure, said supporting structures being adjustable to move said tool into different lateral positions relative to the mining machine to drill holes at opposite sides of the vertical kerf when said kerf cutting mechanism is in said vertical cutting position, a motor carried by the mining machine and relative to which said supporting structures are adjustable, and driving connections between said motor and both of said tools.

13. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position to cut a kerf near the mine floor, into a top cutting position to cut a kerf a substantial distance above the mine floor and into a position to cut a vertical kerf between the mine roof and mine floor, a pair of independently adjustable elongated supporting structures mounted at their rear ends on the opposite sides of the mining machine and extending forwardly along the sides of the mining machine, a drilling tool mounted on the outer extremity of each supporting structure, said supporting structures being adjustable to position said tools into different elevated positions along the sides of the mining machine to drill holes near the mine floor when said kerf cutting mechanism is in its top cutting position, to drill holes near the mine roof when said kerf cutting mechanism is in its bottom cutting position and into different lateral positions relative to the mining machine to enable the tools to drill holes at opposite sides of said vertical kerf when said kerf cutting mechanism is in vertical cutting position thereby to enable said tools to drill holes above, below and at either side of the mining machine, a motor carried by the mining machine and relative to which said supporting structures are adjustable, and driving connections between said motor and both of said tools.

14. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a vertical cutting position to cut a vertical kerf between the mine roof and mine floor, a pair of independently adjustable elongated supporting structures mounted on the opposite sides of the mining machine and extending forwardly along the sides of the mining machine, and a drilling tool supported on the outer extremity of each supporting structure, said supporting structure being adjustable to move said tools into different lateral and vertical positions relative to the mining machine to drill horizontal holes in the coal face at opposite sides of said vertical kerf when said kerf cutting mechanism is in said vertical cutting position, said supporting structures being adjustable to position said tools to drill horizontal holes in the coal face near the mine floor and near the mine roof.

15. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position to cut a kerf near the mine floor

and into a top cutting position to cut a kerf a substantial distance above the mine floor, a pair of independently adjustable elongated supporting structures mounted on the opposite sides of the mining machine and extending forwardly along the sides of the mining machine, and a drilling tool mounted on the outer extremity of each supporting structure, said supporting structures being adjustable to position said tools into different elevated positions along the sides of the mining machine to drill holes near the mine floor when said kerf cutting mechanism is in aforesaid top cutting position and to drill holes near the mine roof when said kerf cutting mechanism is in aforesaid bottom cutting position.

16. In combination, a mining machine adapted to effect its cutting function while supported and guided by a mine trackway and having kerf cutting mechanism adjustable into a bottom cutting position to cut a kerf near the mine floor, into a top cutting position to cut a kerf a substantial distance above the mine floor and into a vertical cutting position to cut a vertical kerf between the mine roof and mine floor, a pair of independently adjustable elongated supporting structures mounted on the opposite sides of the mining machine and extending forwardly along the sides of the mining machine, and a drilling tool mounted on the outer extremity of each supporting structure, said supporting structures being adjustable to position said tools into different elevated positions along the sides of the mining machine and into different lateral positions relative to the mining machine to enable said tools to drill holes near the mine floor when said kerf cutting mechanism is in aforesaid top cutting position, to drill holes near the mine roof when said kerf cutting mechanism is in aforesaid bottom cutting position and to drill holes at either side of said vertical kerf when said kerf cutting mechanism is in aforesaid vertical cutting position.

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