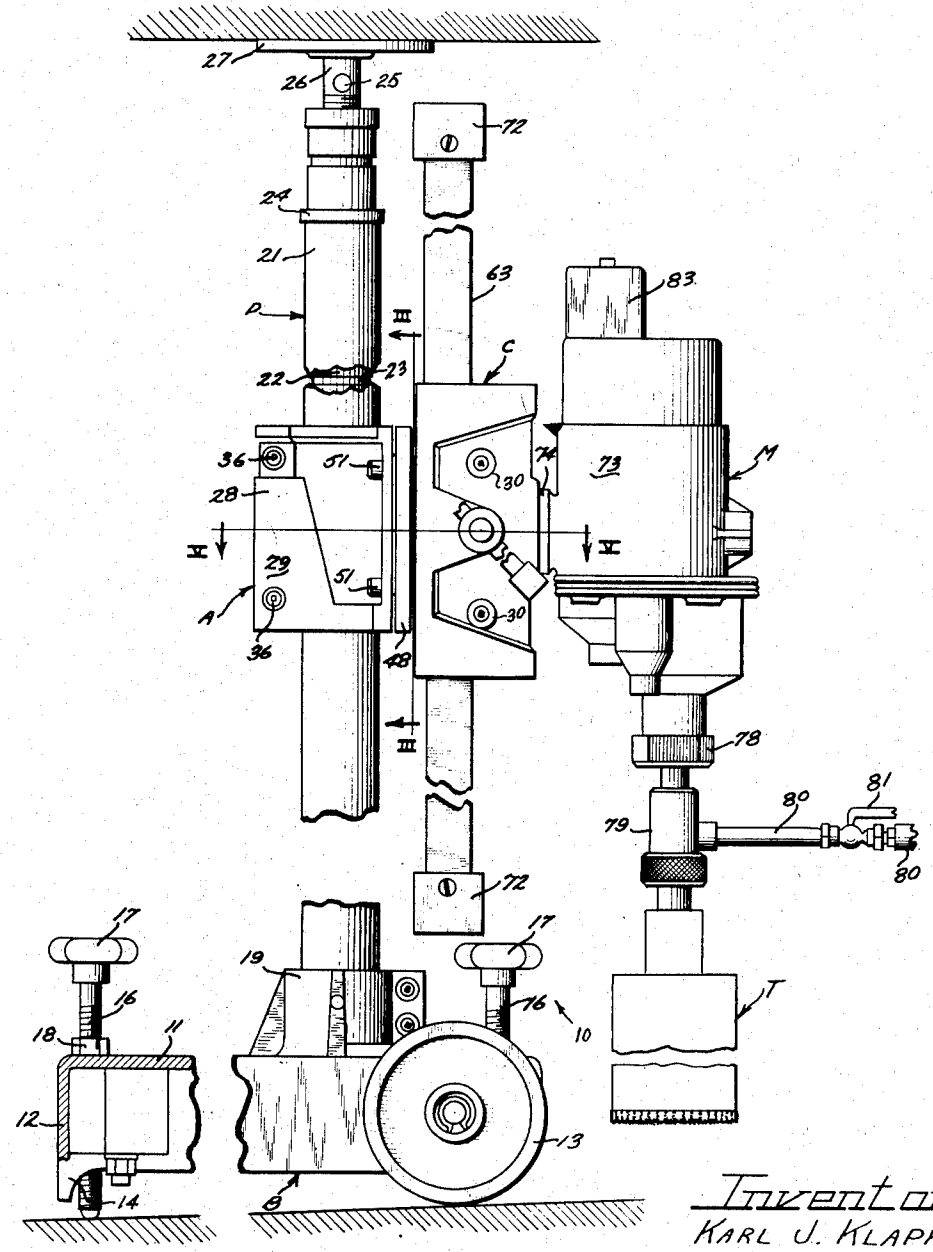
Jan. 27, 1959 K. J. KLAPKA 2,870,994

DRILLING MACHINE

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Fig. 1



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Fig. 2

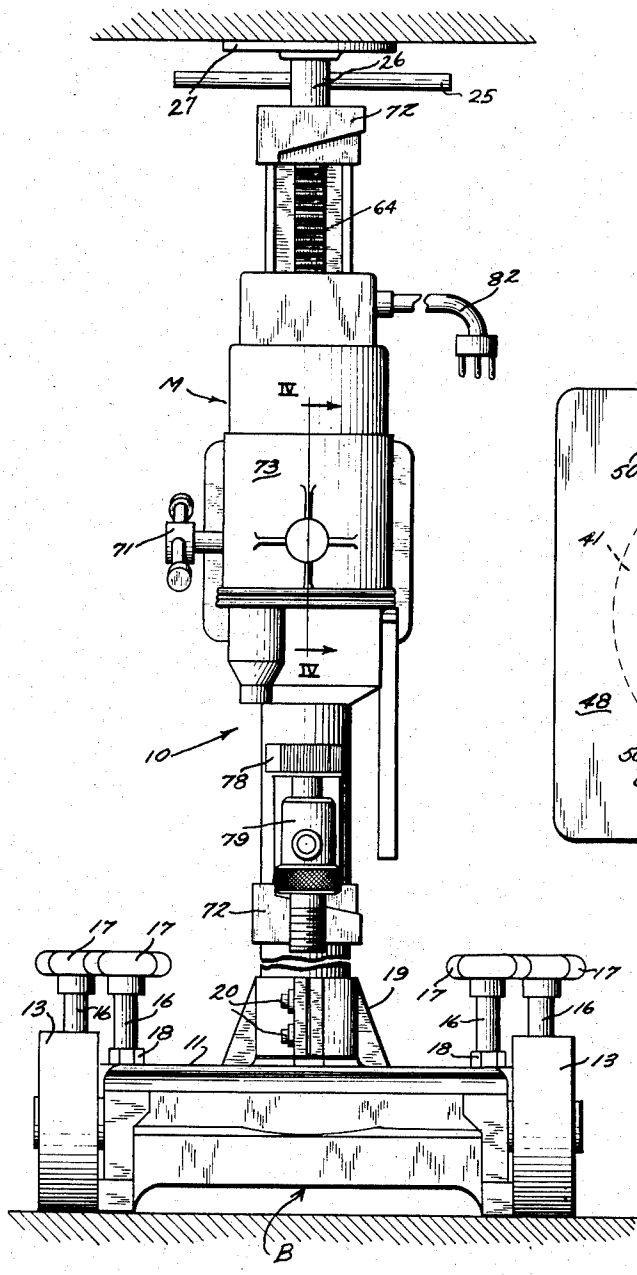
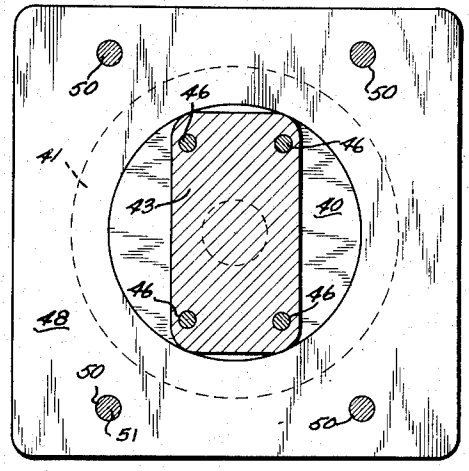


Fig. 3



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Fig. 4

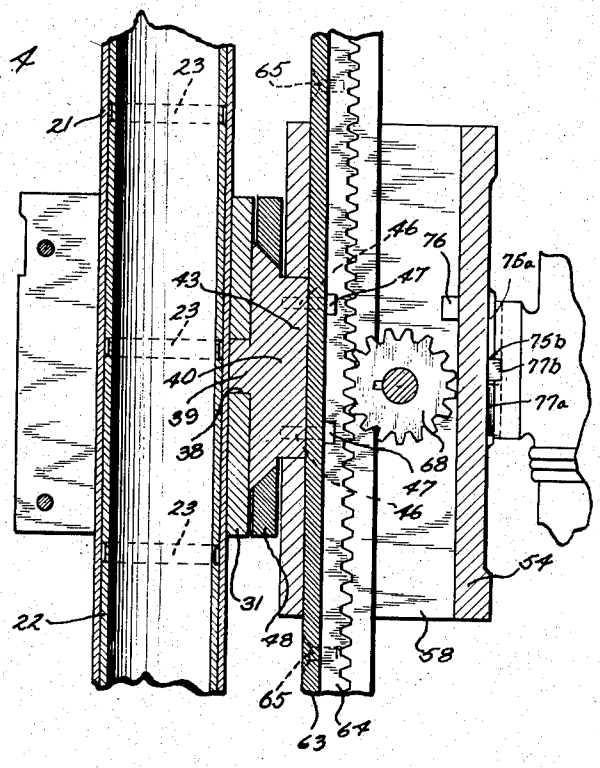
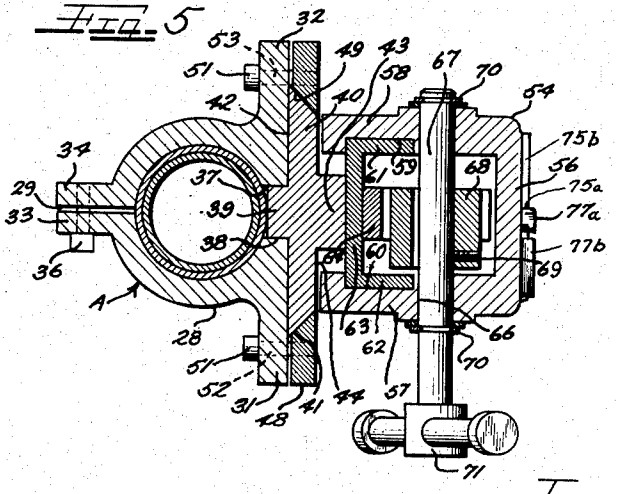


Fig. 5



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2,870,994

DRILLING MACHINE

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Application August 6, 1956, Serial No. 602,134

3 Claims. (Cl. 255—53)

This invention relates to a portable drilling machine that is adapted for operation at any desired drilling angle, and which is provided with an adjustable base and support column to accommodate operation in a diversified number of locations having varying surface conditions.

Specifically, this invention relates to a portable drilling machine having a drilling head swivel mounted on a telescoping support column, which may be extended or retracted as necessary to establish a rigid contact with adjacent walls, and which is also provided with an adjustable base to compensate for irregularities of the supporting surface.

An object then of the present invention is to provide an improved portable drilling machine having a fully swivelling drill head so as to be adaptable for operation at any desired drilling angle.

Another object of the present invention is to provide a portable drilling machine with a base having a series of vertically adjustable leveling screws to permit a compensating adjustment for small variations in the surface on which the drilling machine is operated.

Still another object of the present invention is to provide a portable drilling machine with an adjustable drill head support column, which may be rapidly extended or retracted to engage the ceiling and floor or opposite walls of the drilling location, to thereby provide a more rigid support for the machine during the drilling operation.

A further object of the present invention is to provide a drilling machine which is adapted for operation in relatively inaccessible locations.

Many other objects and advantages of the present invention will become manifest to those versed in the art upon making reference to the drawings and the detailed description which follows:

On the drawings:

Figure 1 is a fragmentary side elevational view of the present invention, with some parts broken away for clarity;

Figure 2 is a front elevational view, of the present invention with some parts broken away for clarity;

Figure 3 is an enlarged cross-sectional view, with some parts omitted for clarity, taken substantially along the line III—III of Figure 1;

Figure 4 is an enlarged cross-sectional view of the mounting collar and pivoted drill head assembly of the present invention, with some parts omitted for clarity, taken generally along the line IV—IV of Figure 2; and

Figure 5 is a fragmentary top cross-sectional view of the adjustable collar, pivoted mounting plate, and rack and pinion gear assembly, of the present invention, taken substantially along the line V—V of Figure 1.

As shown on the drawings:

As best shown in Figures 1 and 2, the drilling machine **10** of the present invention is comprised generally of an adjustable base B, a telescoping support column assembly P, a slidable motor support collar assembly A, a swivelling motor carriage assembly C and an electric motor assembly M.

The base B, is comprised generally of a channelled flat plate member **11** having downwardly extending flanged side portions **12**. A pair of wheels or rollers **13** are mounted at one end of the base B, and a pair of feet **14** are similarly mounted at the opposite end of the base.

As shown in Figures 1 and 2, the base B is provided with a plurality of leveling screws **16** which are positioned substantially adjacent the rollers **13** and feet **14** and extend through the base B to engage the supporting surface. The leveling screws **16** are provided with an operating handle **17** and lock nut **18**, and are individually adjustable to maintain the base B in a level plane, regardless of the degree of inclination or irregularities on the surface on which the machine is to be operated.

It should be noted that additional weights may be added to the base B to compensate for the increased weight of heavier drill motors, as will be explained more fully later.

The support column assembly P is detachably mounted on the base B, in a column support collar member **19**, which is provided with screws **20** to rigidly clamp the column assembly P in a vertical position, or permit adjustable movement of the column about its longitudinal axis to any desired position.

Thus, the support column assembly P, motor carriage assembly C and electric motor assembly M, may be readily demounted from the base B, by loosening the screws **20** and sliding the retained end of the post assembly P out of the column support collar member **19**.

As best shown in Figures 1 and 4, the support column assembly P is comprised generally of an outer tubular shaft member **21** and an inner tubular shaft member **22**. The inner tubular shaft member **22** may be slidably elevated or lowered within the tubular member **21**, to any desired height, ranging from the telescoped height of the two shaft members to the extended height of the two members, when the inner shaft member **22** is at its fully raised position.

The inner tubular shaft member **22** is provided with a plurality of circumferential grooves or undercuts **23** at intermittent points along its outer periphery, which receive a lock ring or collar **24** (Figure 1), to thereby provide a rapid rough height adjustment for the telescoping support column assembly P.

The fine height adjustment of the support column assembly P, is obtained by a screw **26**, which is threaded into the end of the inner tubular shaft member **22**. The screw **26** is connected to a swivel plate **27**, and means are provided to extend or retract the screw **26** and plate **27** from the tubular shaft **22**, as for example by diametrically boring the screw shaft **26** and inserting a suitable lever or handle **25**.

The plate **27** is of sufficient size and surface area to distribute the thrust load of the extended post assembly P and thus prevent indentation or damage to the supporting surface.

A small base plate (not shown), similar to the base plate **27**, may be substituted for the base B, in some operations where space conditions are limited.

Thus it will be appreciated that the telescoping support column assembly P may be rapidly adjusted to any desired height by loosening the locking collar **24**, extending the inner tubular shaft member **22** to the approximate height of the overhead surface, inserting the ring **24** in the most proximate groove **23**, and then making the final adjustment to the supporting surface by manipulating the fine adjustment screw **26**. The reverse procedure is followed when the drilling operation is completed, or the machine is to be dismantled.

As best shown in Figure 5, the slidable collar assembly A is comprised of a sleeve member **28**, which is formed with a split portion **29**, integral transverse pivot retaining flange portions **31** and **32**, respectively, and diametrical carriage locking flanges **33** and **34**, respectively.

Suitable fasteners **36** are provided across the split portion **29** of the sleeve member **28**, to lock the collar assembly A at any desired position along the telescoping support column assembly P, when the sleeve **28** tightens on the post P.

The sleeve member **28** is centrally diametrically bored as at **37** (Figure 5) to form a journal surface **38** for a stub shaft projection **39** of a pivot plate **40**.

As shown in Figures 3, 4 and 5, the pivot plate **40** is of a generally disc-shaped configuration having a circumferential beveled edge **41** tapering generally toward the motor carriage assembly C. The stub shaft **39** projects axially out of an inner face **42** on the plate **40**, and a generally rectangular boss **43** projects axially out of an outer face **44** on the plate **40**, the stub shaft **39** and boss **43** being in substantially coaxial alignment.

The rectangular boss **43** is transversely bored and threaded as at **46** (Figs. 3 and 4) to receive a plurality of suitable fasteners **47**.

A generally square face plate **48** receives a tapered bore **49**, which is substantially complementary to the annular tapered edge **41** on the pivot plate **40**, such that when the pivot plate **40** is positioned in adjacent assembled relationship with the face plate **48**, the respective plates will substantially lie in the same plane.

As better shown in Figures 3 and 5, the face plate **48** is symmetrically bored and threaded as at **50** (Figure 3), to receive a plurality of locking fasteners **51** (Figure 5) which project through the flanged portions **31** and **32** to axially engage the respective plates **40** and **48** along their beveled contacting surfaces, **41** and **49**, respectively.

The respective locking flange portions **31** and **32** are bored as at **52** and **53** respectively, to receive the shaft portions of the fasteners **51**.

It will thus be appreciated that the amount of frictional contact between the pivot plate **40** and face plate **48** along the tapering engaging surfaces **41** and **49**, and the consequent degree of pivotal freedom of the pivot plate **40**, may be varied by loosening or tightening the fasteners **51**.

When the face plate **48** is in a relatively loose frictional contact with the pivot plate **40**, the pivot plate **40** may be rotated to any desired angular position, relative to the face plate **48** and sleeve member **28**, and rigidly retained in this position by tightening the fasteners **51** to cause a locking frictional contact between the respective tapered faces **41** and **49**.

The pivot plate **40** may thus be rotated through a full 360° arc and locked in any desired position along the arc, depending upon the particular drilling angle.

Referring now more particularly to Figures 4 and 5, the swivelling motor carriage assembly C is comprised generally of a U-shaped channel member **54**, having a base portion **56** and side portions **57** and **58**, respectively. The internal faces of the side portions **57** and **58** are longitudinally recessed as at **59** and **60** to slidably receive a similar pair of side portions **61** and **62** respectively of a channelled guide member **63**. A rack **64** is centrally positioned between the sides **61** and **62** of the channel member **63**, and is secured to the guide member **63** by a plurality of spaced fasteners **65**.

As best shown in Figure 4, the channelled guide member **63** and rack **64** are rigidly secured to the pivot plate **40** by the fasteners **47**, thus preventing any relative rotation between the guide member **63** and pivot plate **40**. A pair of lock bolts **30** are provided in carriage C, to adjust the sliding friction of the carriage on the channel member **63**.

The side faces **57** and **58** of the channel member **54** are transversely bored as at **66** to receive and journal a spindle

shaft **67**. A spur gear **68** (Figures 4 and 5) is rigidly secured to the spindle shaft **67** by a set screw **69** and is positioned in toothed engagement with the rack **64**. Suitable spindle retainers **70**, as for example a washer and snap ring, are provided on the spindle shaft **67**, adjacent the outer side faces **57** and **58** of the channel member **54** to axially position the spindle **67** in the channel member **54**.

An operating handle **71** is provided at one end of the spindle shaft **67**, to permit the application of torque to the spindle shaft **67** and spur gear **68**, and thereby raise or lower the carriage assembly **54** along the channelled guide member **63**, as desired.

Suitable end stops **72** are provided at the extremities of the guide member **63**, to prevent the carriage assembly C from being completely moved off of the guide member **63** and out of engagement with the rack **64**.

Thus it will be appreciated that the slidable collar assembly A and rack **64** on the guide member **63**, permit a wide latitude of adjustment of the motor carriage assembly C, by a selective adjustment of each of these particular components.

It will also be appreciated that, as the rack **63** will pivot with the motor carriage assembly C when the locking fasteners **51** are loosened, the motor assembly M may be advanced or returned along the guide member **63**, regardless of the angular position of the electric motor assembly M and motor carriage assembly C.

This feature is particularly advantageous in that the electric motor assembly M may be readily raised or lowered into its operating position by loosening the screws **36** and sliding the collar assembly A to the desired position on the support column P. The motor assembly M may then be rotated to the proper drilling angle and then moved along the rack by manipulation of the operating handle **71** to advance the drill through the work.

Referring now more particularly to Figures 1 and 2, the motor assembly M is comprised generally of a standard electric or air motor **73**, of sufficient size and rating for the particular operating requirements to be encountered, and is provided with a mounting bracket **74**, which is integrally formed in the casing of the motor **73**. Suitable fasteners **76** secure the motor **73** to the outside face portion of the carriage **54**, and a pair of keys **77***a* and **77***b* in a corresponding pair of 90° spaced relationship keyways **75***a* and **75***b*, respectively prevent any relative rotation between the motor assembly **73** and carriage assembly C.

A swivel retaining nut **78** is provided to retain a swivelled cooling assembly **79** to the motor **73**. A suitable liquid coolant, as for example water, is supplied to the swivelled cooling assembly **79** (from a source not shown) through a hose **80**, to thereafter flow through the swivel assembly onto and around a cutting tool T (Figure 1). A shutoff valve **81** is provided to regulate the flow of coolant to the swivel assembly as desired.

Electrical energy is supplied to the motor assembly M, through a conduit **82**, and a switch **83** is provided to activate the motor **73**.

It should be understood that various electric motors having different ratings and outputs may be substituted for the motor **73**, shown in Figures 1 and 2, depending upon the contemplated working requirements, and that any desired coolant having particularly advantageous cooling or lubricating properties might be used to cool a particular cutting tool, thereby to increase the cutting efficiency of the tool and extend its operating life.

While I have illustrated only one specific embodiment of my invention, it should be understood that many other modifications and variations may be effected without departing from the scope of the novel concepts herein disclosed.

I claim as my invention:

1. In a portable drilling machine, a base, a support column mounted on said base and adapted to be clamped

into engagement with a ceiling to retain said base in a stationary position on the floor, a support collar slidably mounted on said column for adjustable movement therealong and having a split portion, fastening means bringing said split portion together and clamping said collar in position on said column, a drill support plate having a stub shaft projecting therefrom and rotatably mounted on said collar to accommodate adjustable movement of said drill support plate about a horizontal axis, a drill carriage mounted on said plate, a drill carried by said carriage, said support plate having a beveled periphery beveled inwardly toward the outer side thereof, a stationary plate mounted on said collar and extending about said support plate and having a beveled surface engageable with the beveled periphery of said drill support plate, and means clamping said stationary plate to said support collar and increasing the frictional contact between the beveled surface of said support plate and said stationary plate and retaining said support plate and drill carried thereby in a selected position of adjustment about said shaft.

2. In a drilling machine, a base adapted to rest on the floor, a support column mounted on said base adapted to have clamping engagement with the ceiling and hold said base stationary on the floor and supported in fixed relation with respect thereto for drilling, a drill carriage having a drill thereon, means for mounting said drill carriage on said column for adjustable movement therealong and for rotatable adjustment with respect thereto about an axis extending transversely of the axis of said column comprising a support collar mounted on said column for adjustable movement therealong, means for clamping said collar in position on said column, a support plate having a vertically extending face mounted on said column for free rotation with respect thereto about a horizontal axis, a clamping plate retaining said support plate to said collar, means clamping said clamping plate to said collar and exerting frictional resistance to rotation against said support plate to hold said support plate in position, a channeled guide track secured to said support plate on the outer face thereof and having flanges

extending outwardly from said support plate, a rack extending along said guide track between the flanges thereof, said drill carriage being of a generally channel-like form in cross-section and having slidable engagement with the flanges of said guide track and having gibs extending inwardly along the base of said guide track, and means feeding said carriage along said guide track comprising a pinion meshing with said rack and means rotatably mounted on said carriage for rotatably moving said pinion.

3. In a drilling machine, a stationary support, a support plate rotatably mounted on said support for rotation about a horizontal axis and having a plane outer face, means retaining said support plate in a selected position of adjustment on said support, a channelled guide track secured to said plane outer face of said support plate and having parallel flanges extending outwardly of said support plate, a rack mounted on said channelled guide track between the flanges thereof and extending therealong, a drill carriage guided for movement along said channelled guide track, said drill carriage being of a generally channel-like form in cross-section and having slidable engagement with the outer faces of the flanges of said guide track and having gibs extending inwardly along the inner face of said guide track, a pinion meshing with said rack, a shaft extending across said drill carriage and having said pinion mounted thereon and rotatably mounted in said drill carriage, and means for rotatably moving said shaft and thereby feeding said drill carriage along said guide track.

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