E. G. LINDHE.

PORTABLE RADIAL DRILL.

APPLICATION FILED APR. 19, 1919.

1,395,194.

Patented Oct. 25, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

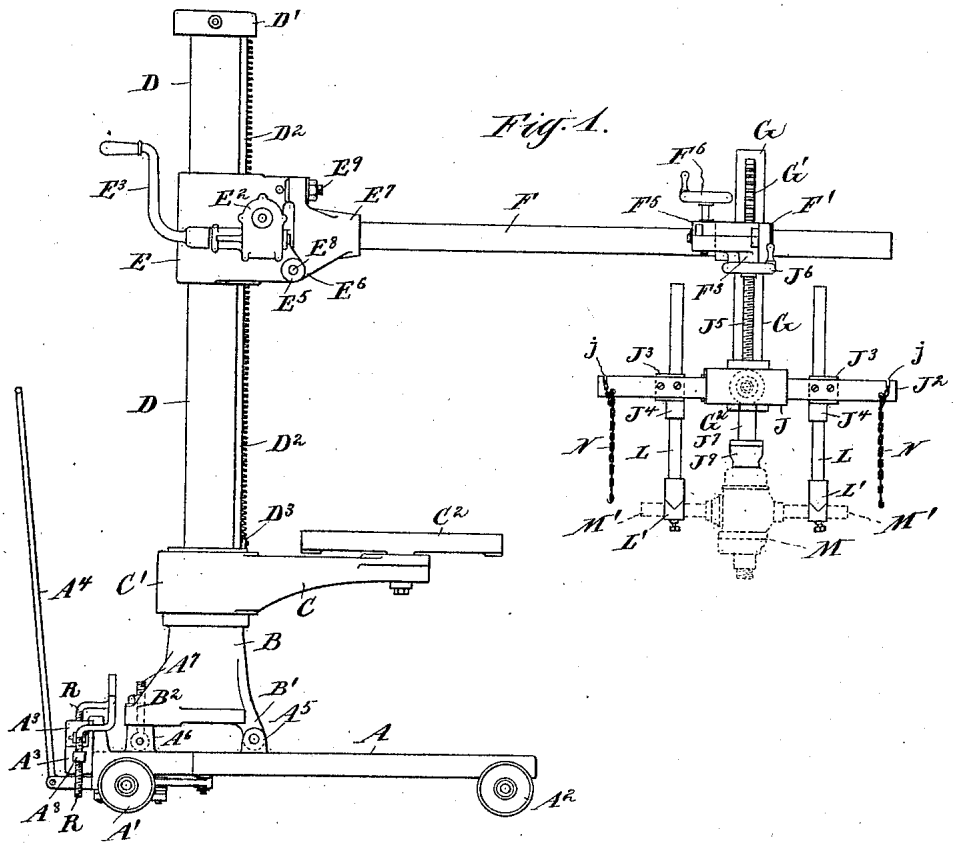
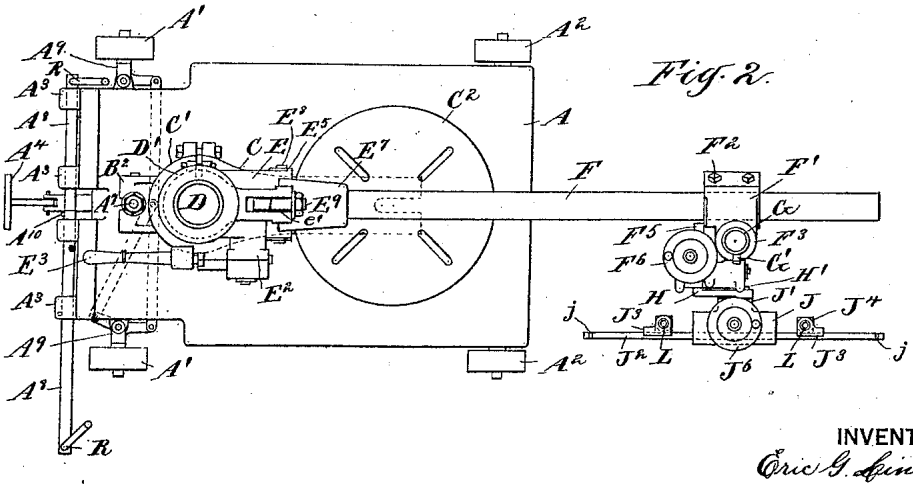


Fig. 2.



INVENTOR

Eric G. Lindhe.

BY Charles R. Searle.

ATTORNEY

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2 SHEETS—SHEET 2.

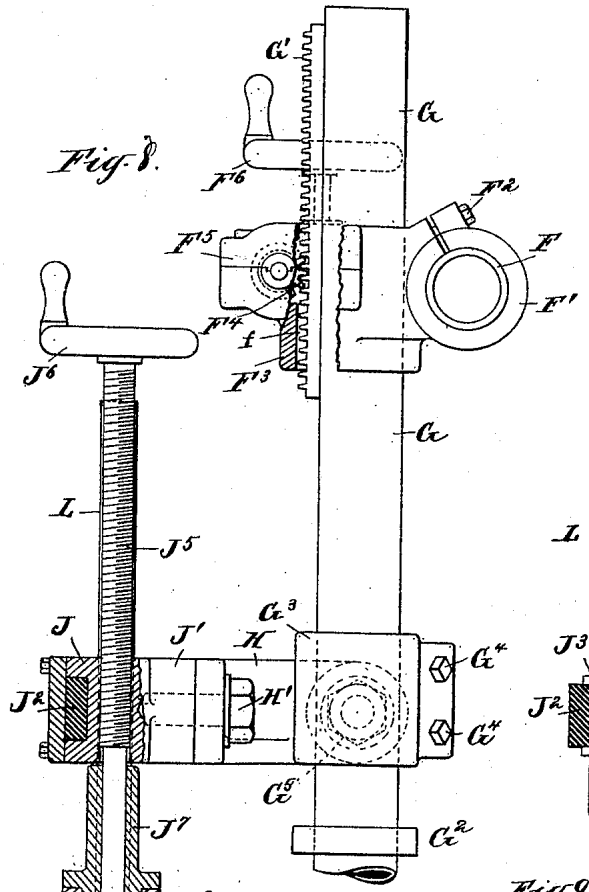

Fig. 8.

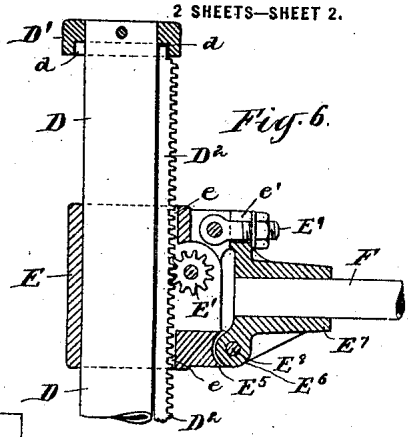

Fig. 6.

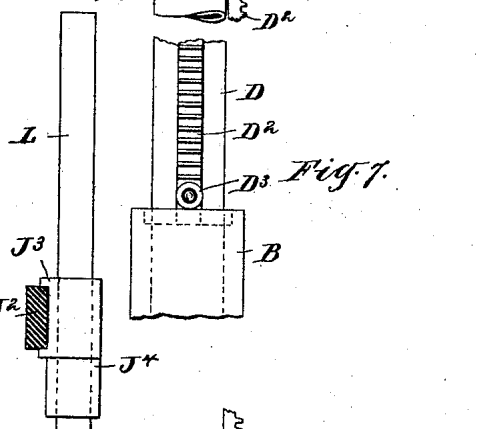

Fig. 7.

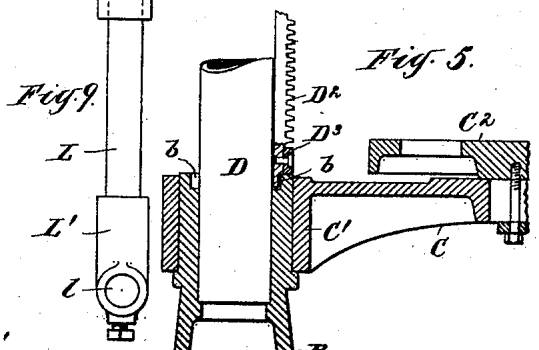

Fig. 9.

Fig. 5.

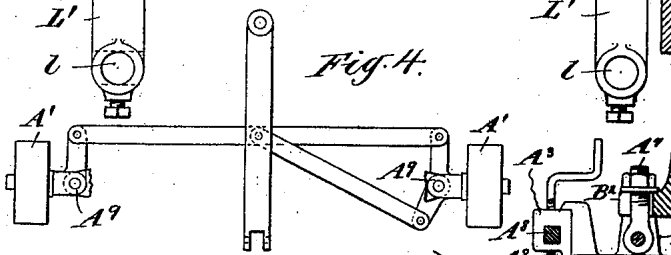

Fig. 4.

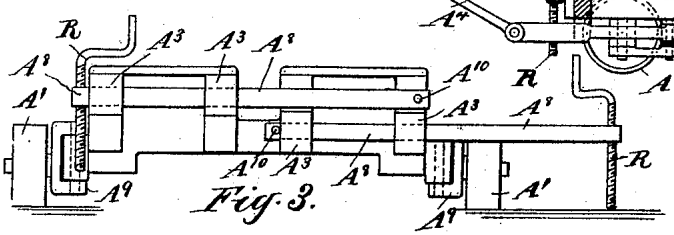

Fig. 3.

Inventor:
Eric G. Lindhe
by Charles R. Searle,
attorney.

UNITED STATES PATENT OFFICE.

ERIC G. LINDHE, OF NEW YORK, N. Y.

PORTABLE RADIAL DRILLS.

1,395,194. Specification of Letters Patent. Patented Oct. 25, 1921.

Application filed April 19, 1919. Serial No. 291,218.

To all whom it may concern:

Be it known that I, ERIC G. LINDHE, a citizen of the United States, residing in the city of New York, borough of Manhattan, in the county and State of New York, have invented a certain new and useful Improvement in Portable Radial Drills, of which the following is a specification.

The invention relates to movable apparatus in which a portable drill of the usual electric or analogous type may be mounted and operated, and the main object of the invention is to provide such apparatus in a simple economically constructed form with provisions for adjustment and presentation of the drill-point in all directions with greater accuracy than can be attained when such drill is directed manually.

Another object is to provide the truck on which the drill is mounted, with means for locking and leveling to insure stability, and a further object is to supply such truck with a drill-table to permit the apparatus equipped with a portable drill, to be used as a drill-press.

Another important object is to provide means for folding the main column upon the truck, and for folding the radius arm upon the column for economy of space in packing for transportation, and for moving the apparatus in situations of restricted height.

A further object is to provide a universal adapter-head in which the portable drill is detachably mounted, permitting the portable drill to be removed and used manually when desired.

The invention consists in certain novel features and details of construction and arrangement by which the above and other objects are attained, to be hereinafter described and claimed.

The accompanying drawings form a part of this specification and show the invention as it has been carried out in practice.

Figure 1 is a side elevation of the complete machine, with the portable drill shown in outline in dotted lines.

Fig. 2 is a corresponding plan view.

Fig. 3 is a front elevation of the truck alone, on a larger scale, showing the leveling and locking means.

Fig. 4 is a plan view of the forward draft mechanism of the truck.

Fig. 5 is a vertical central section through the forward portion of the truck, showing the lower end of the vertical column and the hinged base therefor, and partly in elevation.

Fig. 6 is a similar view of the upper end of the column and the carrier for the radius-arm.

Fig. 7 is an elevation of the lower portion of the column at its junction with the base, seen at a right angle to Figs. 5 and 6.

Fig. 8 is an end elevation of the radius-arm, showing the universal adapter-head in which the portable drill is carried, and partly in vertical section.

Fig. 9 is an elevation of one of the guide-rods for supporting the portable drill, showing the supporting bar in vertical section.

Similar letters of reference indicate the same parts in all the figures.

A is the platform of the truck suitably ribbed to provide the required strength and rigidity, supported on low wheels A' A^2, those at the rear A^2 mounted on fixed centers, and those at the front mounted on swiveling brackets A^3 having arms and links connecting the brackets and drawbar in such manner as to permit the truck to be turned in curves of short radius, as will be understood, by means of the tongue A^4.

On the upper face of the platform are lugs A^5 and bosses A^6; the lugs receive a pin extending transversely through them and a lug B' on the hollow vertical base B to form a hinge for the latter, and the bosses are arranged to support the ends of a bifurcated projection B^2 on the front of the base, in which is secured a swing-bolt A^7 by which the base is firmly held in the upright position. The upper portion of the base is cylindrical and receives a collar C' forming part of a bracket C carrying at its outer end a removable drill-table C^2, slotted as usual and adapted to receive and support a piece to be drilled.

In the upper end of the base is firmly fixed the tubular standard or column D extending vertically and surmounted by a cap D' having a rabbet *d* on its under face, see Fig. 6. The upper face of the base B is similarly rabbeted at *b*, see Fig. 5, to form an annular groove in which is received the reduced lower end of a loose rack D^2 the reduced upper end of which is received in the groove formed by the rabbet *d*. Thus mounted the rack D^2 may move circumferentially about the column while held and guided in the rabbets. The rack extends

through a vertical groove *e* in a carrier E shaped to inclose the column and slide vertically thereon, with the teeth of its pinion E′ engaged with the rack. The pinion is turned by any suitable means, not shown, in a casing E^2 on the carrier, operated by a crank E^3 through which the carrier is raised or lowered on the column. The long vertical groove *e* in the carrier supports the rack laterally and carries it around the column as the carrier is rotated on the latter, with the teeth of the pinion always in engagement. It will be noted that the rack supports the weight of the carrier and its connections, and in order to lessen the friction of the lower end of the rack upon the fixed base, a roller D^3 is mounted on the outer face of the rack at the lower end, which rides upon the base and sustains the load.

Lugs E^5 on the carrier receive between them a lug E^6 on a laterally extended tubular socket-piece E^7, and form a hinge therefor upon the pin E^8; and a swing-bolt E^9 engages in a notch *e′* in the upper portion of the socket-piece and holds the latter. In the socket-piece E^7 is fixedly set the tubular radius-arm F extending at a right angle horizontally from the carrier E and supports the adapter-head in which the portable drill M is mounted. The hinge at E^8 permits the radius-arm to fold down upon and parallel with the column.

F′ is a split tubular slide inclosing the radius-arm F, rotatable thereon and clamped in position by the bolts F^2. It is provided with a sleeve F^3 at a right angle, having a groove *f*, and a pinion F^4 turned by worm gearing not shown, inclosed in a casing F^5 on the sleeve, operated by a handwheel F^6; a rack G′ on a cylindrical bar G slidably mounted in the sleeve, is engaged by the teeth of the pinion F^4. By turning the handwheel F^6 the bar G is raised or lowered, as will be understood. At the lower end of the bar G is a collar G^2 above which is an adjustable clamp G^3 controlled by the bolts G^4.

H is an L-shaped bracket disposed horizontally with one end bolted to the clamp G^3 as at G^5, see Fig. 8, and at the other end at H′ to a boss J′ on a transverse head J. The outer face of the head J is cut away to provide a wide groove or way in which is secured a horizontally disposed rectangular bar J^2 projecting on each side of the head; the overhung ends of the bar J^2 each carries a guide J^3 grooved to match to the bar and secured thereto by screws or other suitable means.

Each guide J^3 has a vertical boss or sleeve J^4 in which slides freely a vertical tubular suspension rod or guide-bar L each of the latter terminating in a head L′ having a transverse opening *l*, see Figs. 8 and 9, in which the arms or handles M′ of the portable electric drill M are securely held, as shown in dotted lines in Fig. 1.

A feed screw J^5 extending vertically through the head J parallel with the guide-bars L L, is operated by a handwheel J^6 and carries a sleeve J^7 held by a collar J^8 pinned upon the lower end of the screw-shaft, see Fig. 8. To the face of the sleeve J^7 is secured a boss J^9 to which the drill shaft, not shown, is attached. The sleeve J^7 and its boss J^9 revolve with the drill-shaft, and in the boss is a hardened disk J^{10} which receives the thrust of the feed screw. The drill is raised or lowered by the feed screw, the guide-bars L L serving to prevent rotary movement while sliding freely up or down in the sleeves J^4 to permit the vertical movement.

Attached to the rectangular bar J^2 at each overhung end, is a chain N, and the bar is notched on the upper edge as at *j* to receive and hold the chain in a loop by engaging a link. The chains may each carry a hook, clamp, or magnet, or other means not shown, for attachment to the piece to be drilled, thus serving to hold the drill firmly to its work.

Blocks A^3 bolted on the front of the truck serve as guides for a pair of anchor-bars A^8 of rectangular cross-section, each received in a pair of the blocks, and located one above the other. Each bar A^8 has a stud or stop-pin A^{10} serving to prevent the complete withdrawal of the bar, and the outer end of each bar carries a vertically disposed screw R adapted to rest upon and engage the floor and thus steady the platform. The bars draw out oppositely and when thus drawn and engaged offer a base of large area for the apparatus and permit the platform A to be leveled.

By loosening the tubular slide F′ it may be adjusted on the radius-arm F to bring the drill to any required radial position, or above the drill-table C^2. By rotating the slide F′ on the radius-arm F the drill may be presented at any angle radially to the arm. By raising or lowering the carrier E on the column D the radius-arm and its drill may be correspondingly raised or lowered. By rotating the carrier E on the column D the drill may be swung to any position in the horizontal circle thus described, and the drill-table C^2 may be similarly swung.

In packing for transportation the tubular slide F′ and its connections are removed by sliding over the free end of the radius-arm F, the latter swung to one side of the column, the swing-bolt E^9 released and the arm folded down alongside the column; the drill-table C^2 removed and the bracket C swung to the side of the column opposite the folded radius-arm. The swing-bolt A^7

is then loosened and the column with its connections folded down on its hinge B′ to the platform A. The table and head and the removed tongue A^4 are then arranged on the platform and the whole is ready to be crated for shipment.

The folding feature permits the apparatus to be rolled through low door openings or other spaces of restricted height in locating the drill in proximity to the piece to be drilled.

By mounting the rack D^2 loosely in the cap D′ and base B the column is fixedly secured in the latter and the rack rotates with the carrier.

Any of the usual types of portable drills may be held in the adapter-head and easily and quickly removed therefrom for service in the hands of the operator. The slight alterations or changes in fittings required for the accommodation of various drills are easily made, or such fittings may be supplied for the best known types.

In holding the portable drill to the work the drill is located in alinement with the point to be drilled and the chains N secured to the piece. The cylindrical bar G is then raised by the rack G′ and pinion F^4 until the chains are taut. The drill is then started and fed down to the work.

I claim:

1. In an apparatus of the character described, a platform, a column hinged thereto and adapted to fold upon said platform in the direction of the length of the latter, means for holding said column in its vertical operative position, and a radius arm mounted on said column to fold in the direction of the length of the platform.

2. In an apparatus of the character described, a platform, a column hinged thereto and adapted to fold upon said platform in the direction of the length of the latter, means for holding said column to its vertical operative position, and a radius arm mounted on said column to fold in the direction of the length of the platform and having its fulcrum disposed parallel with that of the column, whereby the radius arm when folded will lie parallel with the column.

3. In an apparatus of the character described, a platform, a column thereon, hinged thereto, adapted to fold upon said platform, means for holding said column in the operative vertical position, a radius-arm hinged on said column and adapted to fold thereon parallel therewith, and means for holding said radius-arm in the operative horizontal position.

4. In an apparatus of the character described, a truck, a column foldable thereon in the direction of the length thereof, a drill table carried thereby, a radius arm mounted on said column to fold in the direction of the length of the latter, and drill supporting means carried by the radius arm for supporting a drill mechanism for coöperation with said table.

5. A drilling machine comprising a platform, a column thereon, a carrier embracing said column, and a rack for raising and lowering said carrier movable around said column as the carrier is rotated on the latter.

6. In an apparatus of the character described, a platform, a column thereon, a carrier inclosing said column and rotatable thereon, a rack extended parallel with said column and through said carrier to rotate with the latter, arm raising means on the carrier engageable with the rack and means for holding said rack against endwise movement.

7. In an apparatus of the character described, a head adapted to receive and hold a portable drill and present the same in position for service, and vertical guiding means supported by said head and serving to prevent rotary movement of such drill as it is raised and lowered.

8. In an apparatus of the character described, a head adapted to receive and hold a portable drill and present the same in position for service, vertical guiding means supported by said head and serving to prevent rotary movement of such drill as it is raised and lowered, and means for holding the arms of such drill.

9. In an apparatus of the character described, a head adapted to receive and hold a portable drill and present the same in position for service, vertical guiding means supported by said head and serving to prevent rotary movement of such drill as it is raised and lowered, and a transverse bar carried by the head and supporting said guiding means.

10. A universal head adapted to be supported on a radius-arm and comprising an adjustable slide rotatable on said radius-arm and carrying a bar arranged transversely of said radius-arm, a clamp encircling said bar and rotatable thereon, and a head carried by said clamp independent of and in a plane offset from said bar for supporting a portable drill.

11. A drilling machine comprising a universal head adapted to be supported on a radius-arm and comprising an adjustable slide rotatable on said radius-arm, a tubular bar arranged transversely of said radius-arm and extending through said clamp, a rack on said tubular bar, and operating means carried by said clamp for engaging said rack, means carried by said clamp for supporting a portable drill, and a feed screw for said drill.

12. In an apparatus of the character described, a head, a transverse bar thereon,

guide-bars slidably mounted on said transverse bar, means carried by said guide-bars for engaging the laterally extended handles of a portable drill, means for feeding said portable drill, and chains on said transverse bar for engaging the piece to be drilled and holding said drill to its work.

13. In an apparatus of the character described, a head, a transverse bar thereon, slidably mounted guide bars on the transverse bar and having means to engage means on a portable drill, and means carried by said transverse bar to engage the work to be drilled and hold the drill firmly to such work.

14. In an apparatus of the character described, a base having an annular rabbet, a column mounted in said base to extend vertically, a cap on said column having an annular rabbet, a loose rack engaged at its ends in said rabbet, a carrier encircling said column and rotatable thereon, having a vertical groove receiving said rack to cause the latter to rotate with said carrier, and means on said carrier for engaging said rack and raising or lowering said carrier upon said column.

15. In an apparatus of the character described, a base having an annular rabbet, a column mounted in said base to extend vertically, a cap on said column having an annular rabbet, a loose rack engaged at its ends in said rabbets, a carrier encircling said column and rotatable thereon, having a vertical groove receiving said rack to cause the latter to rotate with said carrier, means on said carrier for engaging said rack and raising or lowering said carrier upon said column, and a roller on said rack arranged to ride upon said base.

16. In an apparatus of the character described, a cylindrical base, a column mounted therein, a bracket mounted to swing horizontally on said base, a drill-table supported by said bracket, means carried by said column for supporting a portable drill in operable relation to said table, and a portable drill carried by said means and mounted to be presented at an angle to said table and maintained rigidly at such angle.

17. A wheeled truck, a base hinged thereon, and locking means therefor, a column on said base, a carrier on said column, a radius-arm hinged to said carrier to fold parallel with the column, and means carried by said arm for supporting a drill.

In testimony that I claim the invention above set forth I affix my signature.

ERIC G. LINDHE.