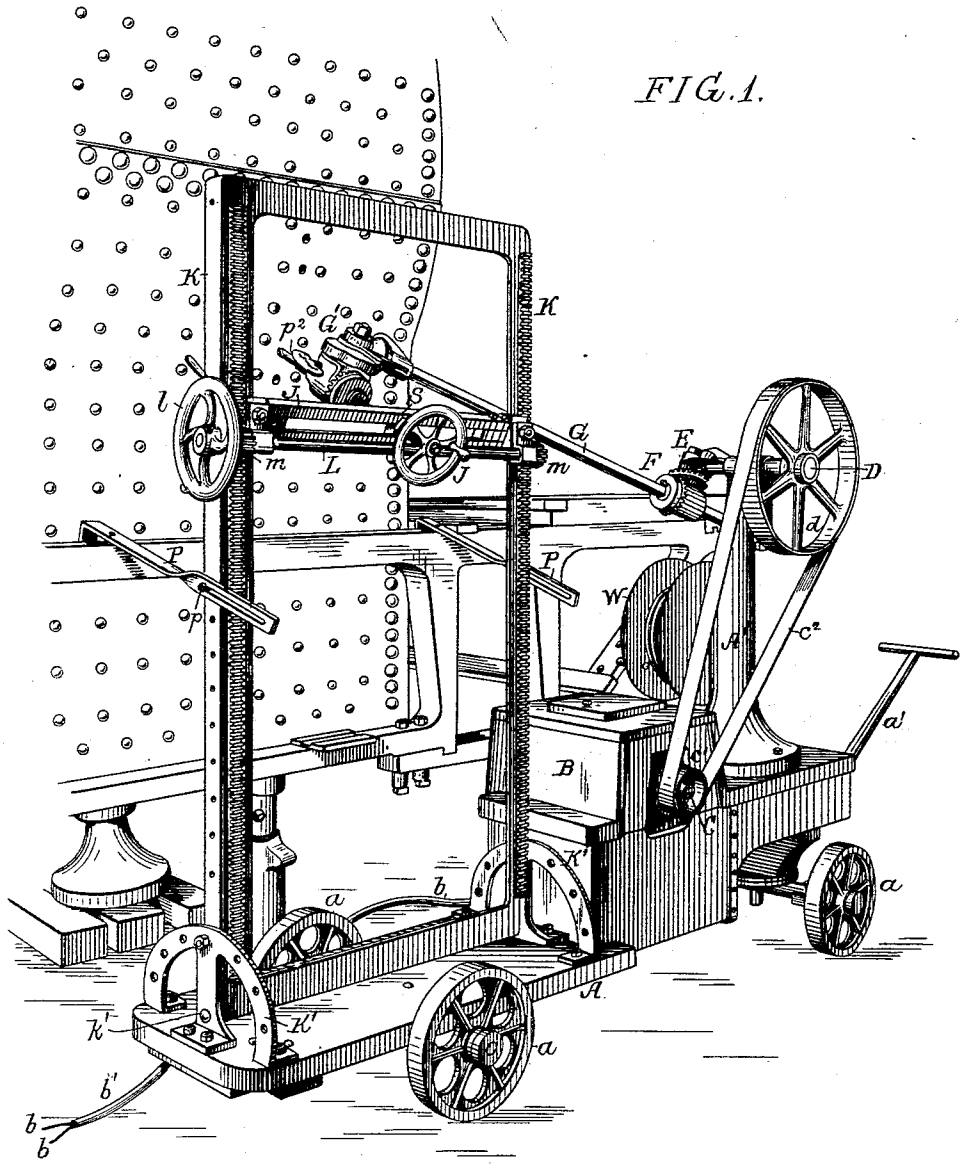
(No Model.) 3 Sheets—Sheet 1.

J. R. SAYLOR.

PORTABLE MACHINE FOR DRILLING.

No. 480,040. Patented Aug. 2, 1892.

FIG. 1.



Witnesses:

Eugene Eltorich

Alex. Barkoff

Inventor:

John R. Saylor

by his Attorneys

Howson & Howson

(No Model.) 3 Sheets—Sheet 2.

J. R. SAYLOR.

PORTABLE MACHINE FOR DRILLING.

No. 480,040. Patented Aug. 2, 1892.

FIG. 2.

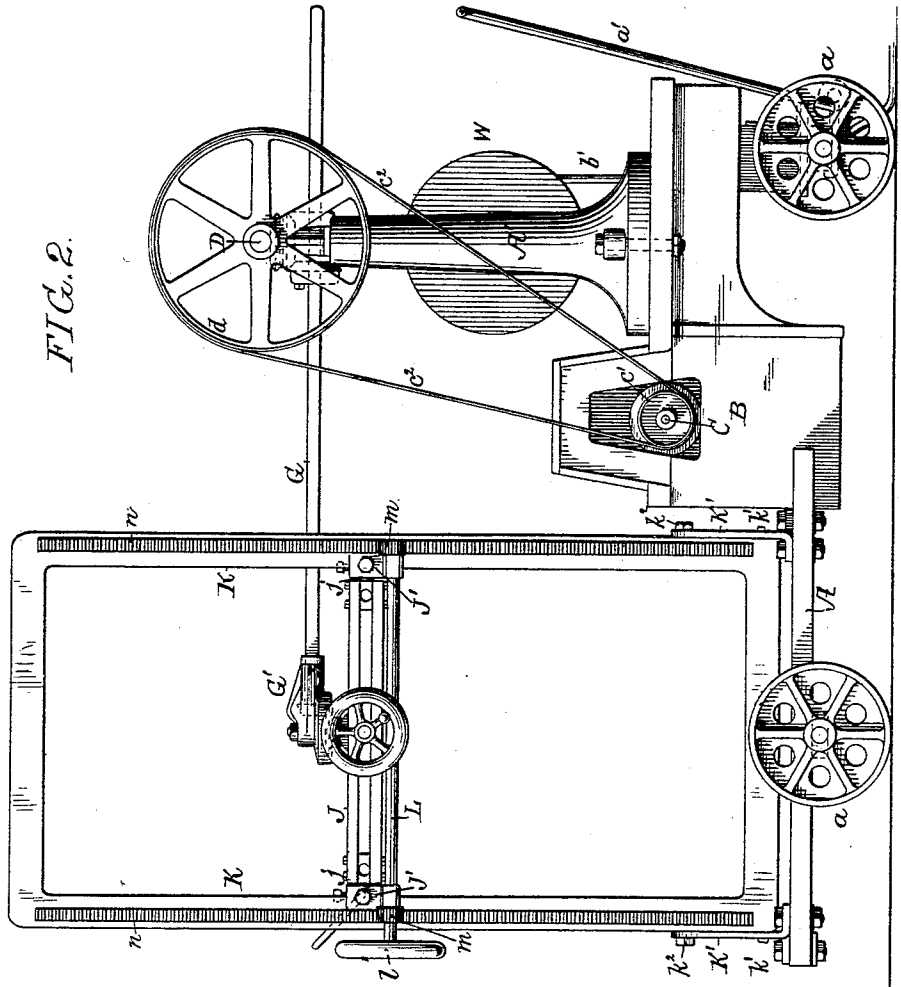
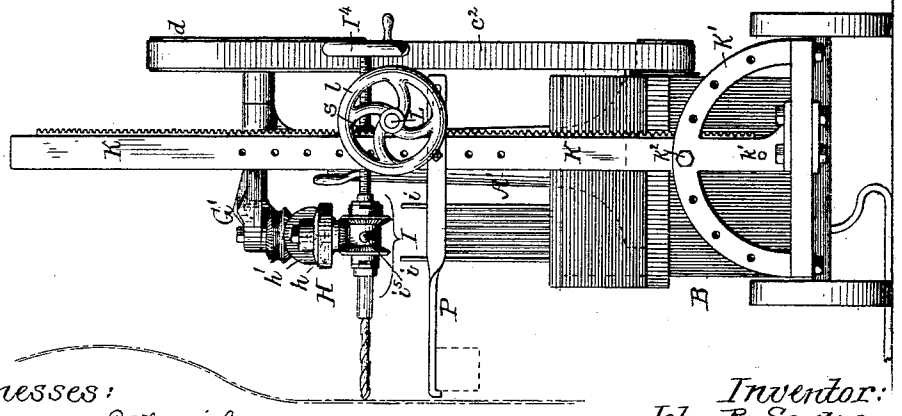


FIG. 3.



Witnesses:
Eugene Eltorich
Alex. Bartoff

Inventor:
John R. Saylor
by his Attorneys
Howson & Howson

(No Model.) 3 Sheets—Sheet 3.

J. R. SAYLOR.

PORTABLE MACHINE FOR DRILLING.

No. 480,040. Patented Aug. 2, 1892.

FIG. 4.

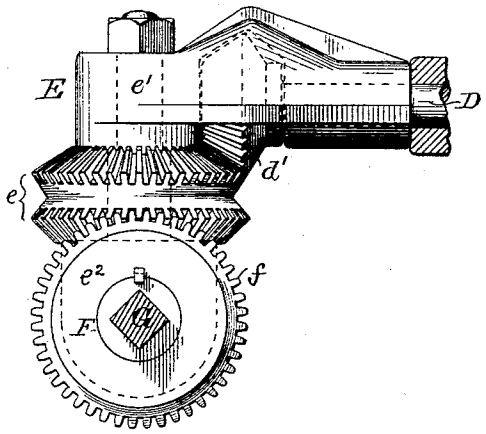


FIG. 6.

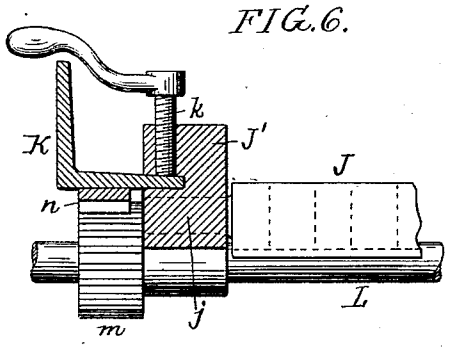


FIG. 5.

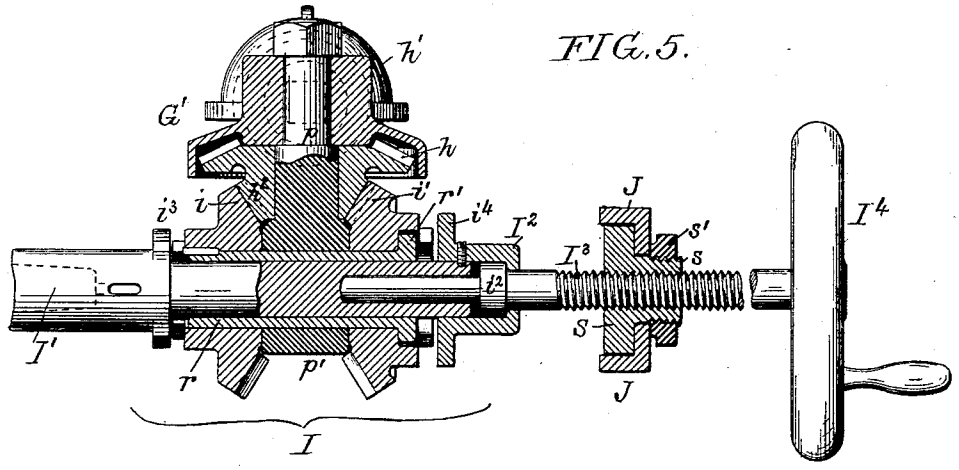
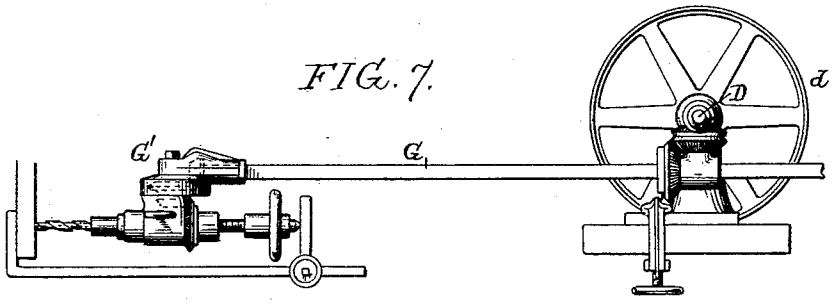


FIG. 7.



Witnesses:
Eugene Eltenich
Alex. Barkoff

Inventor:
John R. Saylor:
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

JOHN R. SAYLOR, OF PHILADELPHIA, PENNSYLVANIA.

PORTABLE MACHINE FOR DRILLING.

SPECIFICATION forming part of Letters Patent No. 480,040, dated August 2, 1892.

Application filed January 7, 1892. Serial No. 417,298. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. SAYLOR, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Portable Machines for Drilling, &c., of which the following is a specification.

The object of my invention is to so construct a portable drilling, reaming, and tapping machine that it can be quickly adjusted to its work and can be readily moved from one part of a shop to another, as fully described hereinafter.

In the accompanying drawings, Figure 1 is a perspective view of my improved portable drilling, reaming, and tapping machine. Fig. 2 is a side view. Fig. 3 is an end view. Figs. 4, 5, and 6 are views of details of the machine; and Fig. 7 is a view of the drilling mechanism detached from the carriage.

While my invention is intended mainly for a drilling-machine, it will be understood that by changing the tool it can be used for reaming or for tapping.

My invention is especially applicable for use in connection with large structures which have to be drilled, reamed, or tapped and which cannot possibly be mounted upon a fixed drilling-machine. I refer particularly to the manufacture of boilers, heavy girders, tanks, &c., in which holes have to be drilled for stay-bolts, &c. The position of these bolts cannot be determined until the structure has been put together. This is especially the case in work upon locomotive-boilers, in which a number of openings for braces, stays, supports, and tie-bolts have to be made after the boiler is practically finished.

A is a truck mounted upon wheels a and provided with a suitable handle a', by which it can be drawn from one part of the shop to another.

On the forward part of the truck is a motor B, preferably an electric motor, connected to the source of electrical supply through wires $b\ b$ in a suitable casing b'. This case is stiff and strong enough to allow it to be placed upon the floor of the shop without the danger of a person receiving a shock from the wires or the injuring of the wires by trucks or by any other means. The motor has a shaft C, on which is a driving-pulley c', connected by a belt c^2 to a wheel d on a shaft D. On the end of this shaft is swung a carrier E, Fig. 4, which is locked as regards longitudinal movement, but can turn upon the shaft. Mounted in this carrier E is a spindle e', carrying a bearing e^2 for a sleeve F. Between the bearing and the carrier E is a double-faced bevel-wheel e. The one face of this wheel meshes with a bevel-pinion d', secured to the shaft D. The other face of the wheel e meshes with a bevel-wheel f, secured to a sleeve F.

The sleeve F has in the present instance a square opening, to which is adapted a square shaft G. This shaft can slide longitudinally in the sleeve, but must turn with it, so as to give motion to the drilling mechanism. The shaft need not necessarily be square, as it can be of any shape in cross-section, or it may be splined to the sleeve, so long as the connection between the two parts is such that the sleeve will turn the shaft. It will thus be seen that the above-described joint is a universal joint, the carrier E can be moved around the shaft D, and the bearing e^2 can be turned around upon its pivot in the carrier E. Thus the drilling mechanism can be turned in any position in respect to the shaft D. The outer end of the shaft G carries a bevel-pinion h', which meshes with a bevel-wheel h on a spindle p, carried by a head G', which is mounted on the shaft G in a manner similar to the mounting of the head E on the shaft D. At the lower end of the spindle is a bearing p', carrying the drilling mechanism proper. On the hub of the gear-wheel h is a bevel-pinion h^2, which meshes with the two bevel-wheels $i\ i'$. The wheel i is secured to a sleeve r, which passes through the bearing p' and has a head r', which confines the bevel-wheel i' in gear with the pinion h^2. This pinion, however, is loose upon the sleeve r. It will be seen by the above description that this joint is also a universal joint and the tool can be turned to any direction for drilling, reaming, or tapping.

I will now describe the tool-carrier I, referring particularly to Fig. 5.

I' is the tool-carrying spindle, having a suitable socket for the reception of the tool. This spindle passes through the sleeve r, and to the inner end of the spindle is secured a head

I^2. Passing into this end of the spindle is the feed-screw I^3, having a collar i^2, fitting in the head I^2. Thus, while the screw can be turned without turning the tool-spindle, the tool-spindle will be moved longitudinally as the feed-screw is turned. Each bevel gear-wheel $i\,i'$ has clutching-jaws on its hub, which are adapted to engage with clutching-faces i^3 i^4, the former on the tool-spindle proper and the latter on the head i^2 of the spindle, so that by moving the bearing p' by a handle i^5 (shown in Fig. 3) the driving mechanism can be thrown in gear with one or the other of the clutching-faces i^3 i^4 to turn the spindle either in one direction or the other.

In Figs. 1, 2, and 3 of the drawings I have shown my apparatus in the preferred form, the drill being mounted upon suitable frame-work, which is carried by a truck; but it will be evident that the drilling mechanism proper may be mounted as shown in Fig. 7, using simply what is termed an "old man" to hold the drill to the work and mounting the shaft D on a suitable bearing, which can be clamped to a table or otherwise fastened, the power being conveyed from suitable shafting by belting to the belt-wheel d.

Referring again to Fig. 5, the feed-screw I^3 passes through a nut S, confined between the two bars of the slide-frame J, so that, while it can be moved transversely on this slide-frame, it cannot turn with the feed-screw. On a projection s of the nut is a screw-thread, and adapted to this screw-thread is a locking-nut s' to lock the nut S to the frame J when the operator has adjusted the drill in position for drilling. On the outer end of the screw-shaft I^3 is a suitable feed-handle I^4. The frame J has at each end pivot-pins $j\,j$, adapted to blocks J', which slide on the supporting-frame K. (Shown clearly in Figs. 2 and 6.) The blocks can be secured to the frame K by a handled set-screw k, also shown in Fig. 6. Carried by the blocks J' is a shaft L, on which are mounted pinions m, meshing with racks n on the supporting-frame K. The shaft L has a suitable operating-wheel l, by which the shaft is turned to raise and lower the cross-frame J to vertically adjust the tool. The supporting-frame K is pivoted at k' at the base to segments K', mounted on the carriage A. Thus the frame can be swung toward or from the work and secured in position by bolts k^2, which pass through suitable openings in the segment and into the frame K.

In order to prevent the supporting-frame from backing away from its work, I clamp the frame to its work by bars P P, bent at their outer ends to engage with the work, as shown in Fig. 1, and having slots or perforations at their inner ends, through which pass the adjustable set-screws p. Thus when the apparatus is moved to its work the frame is adjusted at the angle required and the bars P hooked to the work and secured to the frame and the tool-carrier adjusted to the angle required. The machine is then set in motion.

The cable containing the wires for the electric motor is wound upon a drum W, mounted upon the standard A', the two wires being connected to suitable terminals, which are connected to contacts on the standard, coupled to the motor-terminals. Thus the carriage A can be moved from place to place without the necessity of coupling or uncoupling the wires.

There is one particular advantage in using this tool over and above those ordinarily used—that is, when the device is used for drilling holes and the operator starts the hole at one side of the punch-mark he can readily "draw the hole" to the mark by simply backing off the nut s' and setting the nut S to one side, so as to throw the tool out of line to direct the drill-point to the mark, and when the tool has cut to the mark a block or nut can be again adjusted so as to drill the hole at the proper angle to the face of the article.

I claim as my invention—

1. The combination, in a portable drilling-machine, of the carriage, a motor carried thereby, a supporting-frame also mounted upon the carriage, the tool-carrier mounted upon the supporting-frame, and the tool, with adjustable gearing between the motor and the tool, whereby the tool can be adjusted upon the frame without disengaging the gearing, substantially as described.

2. The combination, in a portable drilling-machine, of the carriage, a vertical frame pivoted to said carriage, a motor, a tool-carrier, and a cross-frame on which the tool-carrier is mounted, said cross-frame being pivoted to the vertical frame, with intervening gearing between the motor and the tool-carrier, substantially as described.

3. The combination of the carriage, motor thereon, a frame, vertically-adjustable slide mounted on said frame, a tool-spindle, feed-screw attached to the spindle and to the slide, a head carrying said tool-spindle, a shaft G, gearing with the said tool-spindle, and a head E, carrying a sleeve to which the shaft is adapted, said head carrying gear-wheels driven by the motor, substantially as specified.

4. The combination of the pivoted frame, racks thereon, a slide, pinions on said slide, a tool-carrier mounted on said slide and adjustably geared to a motor, means for locking the tool-carrier to the slide, and means for locking the slide to the frame, substantially as specified.

5. The combination of the carriage, motor thereon, gearing, a tool-carrier adjustably connected to said gearing, a slide to which the tool-carrier is attached, a vertical frame on which the slide is mounted, said frame being pivoted to the carriage, and cleats for securing the frame to the article to be drilled, substantially as described.

6. The combination of the tool-carrier, a sleeve thereon, right and left gear-wheels having clutch-faces adapted to engage with the clutch-faces on the drill-spindle, and a

head carrying gearing which meshes with the gear-wheel and which is adjustably connected to the driving mechanism, substantially as described.

7. The combination, in mechanism for drilling, &c., of the shaft D, mechanism for driving said shaft, a sleeve hung to said shaft, gear-wheel on the sleeve, and a gear-wheel on the shaft, and intervening gearing, and a shaft G, adapted to slide in but turn with the sleeve, with drilling mechanism at the end of said shaft G, substantially as described.

8. The combination of the shaft D, the shaft G, geared thereto, and drilling mechanism geared to said shaft G, a supporting cross-frame J, blocks in which said frame is pivoted, a supporting-frame K for the said blocks, and means for locking the blocks to the supporting-frame, substantially as described.

9. The combination of the shaft D, the drilling mechanism geared to said shaft, a carrying-frame for the said drilling mechanism, a shaft, pinions on said shaft, a supporting-frame on which the carrying-frame slides, and racks on the said supporting-frame with which the gear-wheels mesh, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN R. SAYLOR.

Witnesses:
EUGENE ELTERICH,
HENRY HOWSON.