

(No Model.)

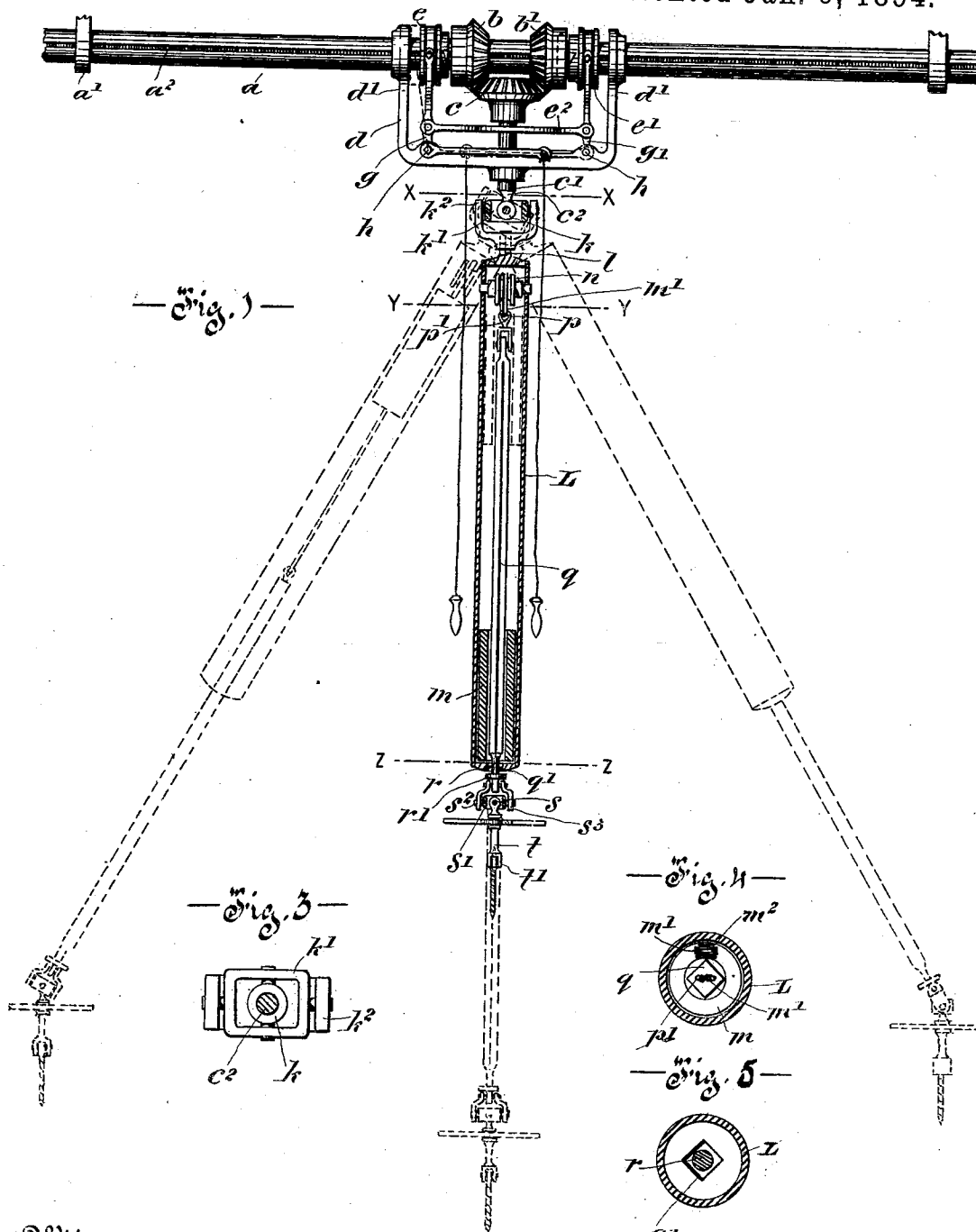
2 Sheets—Sheet 1.

W. ROSS.

PORTABLE AND VARIABLE SHAFTING FOR DRILLING MACHINES.

No. 512,486.

Patented Jan. 9, 1894.



Witnesses
W. H. H. H.
F. H. H. H.

Inventor
William Ross
By *his* Attorney
W. H. H. H.

(No Model.)

2 Sheets—Sheet 2.

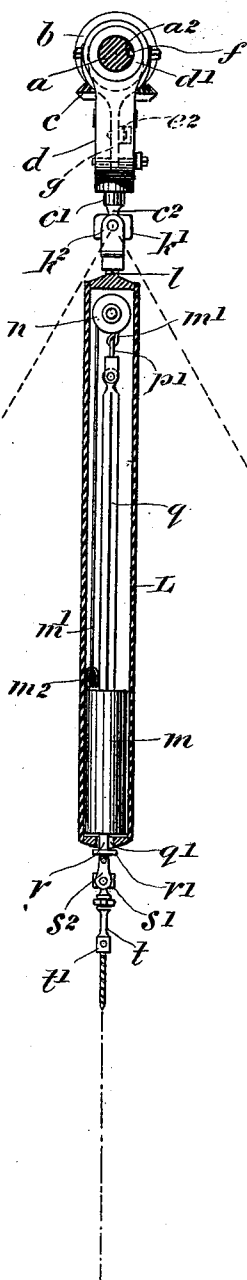
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—Fig. 2—



Witnesses

William H. Ross
Robert H. Ross

By his Attorney

William H. Ross
W. H. Ross

Inventor

UNITED STATES PATENT OFFICE.

WILLIAM ROSS, OF MONTREAL, CANADA.

PORTABLE AND VARIABLE SHAFTING FOR DRILLING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 512,486, dated January 9, 1894.

Application filed February 14, 1893. Serial No. 462,351. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROSS, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Portable and Variable Drills and Shafting; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to portable drills and shafting or mechanism for conveying the rotary motion of a main driving shaft or other rotatory part in a number of different directions from a single point of connection with the main shaft to a working tool such as a drill piece, reamer or the like secured to the opposite and free end of the mechanism and which can be applied or held to work at various angles such as required during the construction of large metal boilers, girders, &c.

The object of the invention is to secure first a greater latitude of free movement for the device; secondly, the automatic shortening and lengthening of the parts so as to render the mechanism more compact and convenient to handle particularly at times when the work is situated close to the point of connection with the main shaft, and thirdly to allow of the stoppage of the tool when desired without necessarily stopping the main shaft also.

The invention may be said to consist first in a free sliding or movable connection of the portable shaft mechanism proper with the main shaft; secondly, in the construction of the portable shaft mechanism itself this comprising in the main a rotatory guide section having in turn a universal joint connection with the part having a movable connection with the main shaft and carrying an extension spindle or bar adapted to project for some distance from the free end of said guide and be rotated with it or be drawn within such guide for some distance so as to shorten the length of the mechanism as a whole without however interfering with its rotation or that of the tool, and thirdly in a special construction of the outer end of the extension spindle and of its connections with the guide whereby upon moving it for an extreme distance into the guide its rotation with same can be prevented and the tool held stationary if so desired for any purpose.

For full comprehension however of the in-

vention, reference must be had to the annexed drawings forming a part of this specification in which like symbols indicate corresponding parts and wherein—

Figure 1 is a side elevation of the shafting partly in section; Fig. 2 an elevation of same taken at right angles to Fig. 1 and also partly in section; Figs. 3, 4 and 5 being transverse sections respectively on the lines xx ; yy ; and zz , Fig. 1.

a is the usual main shafting carried by hangers $a'a'$ and in this case having a longitudinal groove a^2 .

$b b'$ are two bevel gear wheels mounted loosely on the shaft a and in reverse positions so that their toothed surfaces will face each other and each be in mesh with a third bevel gear wheel c mounted on the upper end of a second shaft or spindle c' suspended vertically at right angles below the main shaft a in a forked hanger d the forked ends $d' d'$ of which are perforated to fit loosely on the shaft a at a short distance in the rear of the respective gear wheels $b b'$.

On the shaft a between the respective gear wheels $b b'$ and the forked ends $d' d'$ of the hangers d , clutch blocks or collars $e e'$ are mounted and provided with feathers f to fit the groove a^2 of the shaft a as well as having their surfaces which face the gear wheels $b b'$ clutch-faced or toothed to engage with the like surfaces of the rear faces of the gear wheels $b b'$ in any of the usual ways, bell-crank levers $g g'$, pivoted at h to the hanger d , having upwardly projecting ends or arms connected respectively with the collars $e e'$ and also connected together by bar e^2 and their opposite or horizontal projecting ends adapted to be operated as may be desired by the operator for the purposes hereinafter set forth.

The vertically hanging shaft c' which is suitably journaled in the hanger d extends for a short distance below the same and terminates in a thin neck c^2 on the end of which is the ball part of a ball-link-and-fork-joint of the usual type the several parts of which including that just mentioned are lettered respectively $k k' k^2$.

The body of the fork portion k^2 has a square aperture formed in it to receive the square neck piece l projecting from the upper blocked

end of a length of tubing L which forms a guide for a counterbalance weight m of tubular form suspended by a cord m' over a grooved pulley n axially mounted at the upper end of such tube. The cord m' is looped at one end around a pulley m^2 secured on the weight while the opposite ends are attached to the eye p of a swiveling connection p' with which is connected the upper end of a square bar q , free to work through the weight m , extending down and outward through a square aperture q' in the lower blocked end of the tube L, the lower end of such bar being diminished in size and made circular in section as shown at r for a purpose hereinafter described, and further extended to carry a collar r' and a second ball-link-and-fork-joint the parts of which are lettered respectively s s^2 s^3 from which ball part s a holder t extends and terminates in a squared socket t' adapted to have removably secured in it any desired tool such as a reamer, drill or the like, the first named being shown in place.

The operation of my invention is as follows:—By pulling downward the horizontal arm of the pivoted lever g , the clutch e , keyed on shaft a is thrown into contact with the bevel gear b which, through gear c and ball-link-and-fork-joint k k' k^2 imparts a rotary motion to the guide tube L and when the square portion of the bar q is projected through the aperture q' in the lower end of the guide it is also rotated and with it of course the remaining parts including the tool, but when the bar is drawn sufficiently within the guide to locate its circular portion r in the aperture q' the tube rotates around it without disturbing it, its swiveling connection p' preventing the cord m' from being twisted. Whenever it is desired to bring the tool into action the bar q is drawn outward against the inward pull of the counterbalance weight by means of the handle w mounted loosely in a groove on the holder t so that the holder can be rotated while the handle can be held and used to set the position of the tool. When the tool is not required it is automatically drawn up into its normal position by the counter weight m the extension bar entering the guide till its circular portion r enters the square hole q' in the lower stopped ends of the guide as before mentioned. The tube thereby loses its hold on same, allowing the bar to become stationary and the tube free to rotate around it. To reverse the direction of the rotation of the drill the lever g' is operated similarly to the one g and throws clutch e out of contact with bevel gear b by means of bar e^2 and simultaneously the clutch e' into contact with bevel gear b' which consequently reverses the direction of rotation of the gear wheel c . To stop the drill altogether without stopping the main shafting it is only necessary to draw down whatever horizontal arm of the levers is above its normal or horizontal position to such normal or horizontal position, as shown in Fig. 1, and both

clutches will be thrown out of contact with their bevel gears, when, as it will be readily seen, the portable shafting and its operating gears will become stationary. As all the parts mounted on the main driving shaft are mounted loosely so far as movement longitudinally of such shaft is concerned the apparatus as a whole can be moved backward and forward along said shaft between the hangers thereby giving it, together with its universal joint and telescopic connections, an extensive working area. Of course it is not necessary that the reversing gear and clutch mechanism should be provided in every case, as a single bevel gear on the main shaft without any clutch mechanism can be used although this necessitates the continuous rotation of the rotary guide.

What I claim is as follows:

1. The combination with a main driving shaft invariable as to position; of a portable shafting with a free sliding tool-carrying extension therefrom, a free pivotal sleeved hanger and devices connecting said hanger with said main driving shaft whereby it may be freely rotated about same.

2. The combination with a main driving shaft invariable as to position,—of a portable shafting with a free sliding tool-carrying-extension therefrom, and a free sliding sleeved hanger connection between said main driving shaft and said portable shafting whereby the latter is variable in position longitudinally of same, by direct pulling upon it in line with said main shaft.

3. The combination with a main horizontal driving shaft invariable as to position,—of a portable shafting with a free sliding tool-carrying-extension therefrom and suspended from said driving shaft by a sleeved hanger free to rotate about and slide along same unchecked and freely variable in position relatively to same, by direct pulling upon it in line with said main shaft or laterally thereto.

4. The combination with a main driving shaft, of one or more bevel gear wheels b , b' , mounted thereon; a spindle c' arranged at right angles to said main driving shaft; a bevel gear wheel on one end of said spindle adapted to intermesh with the gear wheels on said shaft; a rotatable guide with universal joint connection between one end of same and said spindle; and a tool carrying extension from the opposite end of said guide adjustable, without rotation, relatively to, and adapted to be rotated by such guide, as set forth.

5. In a portable shafting the combination with a rotatable guide and means for rotating same; of a tool carrying extension movable in and out of said guide and being for the greater part of its length of an angular cross section corresponding to that of an aperture in the end of said guide, through which it works and whereby it is rotated, and of a circular cross section toward its outermost end for the purpose set forth.

6. In a portable shafting the combination with a rotatable guide and means for rotating same; — of a tubular counterbalance weight, suspending cord and pulley, and a tool carrying extension movable in and out of said guide and connected by a swiveling attachment with one end of said suspending cord as set forth.

7. The combination with a main horizontal driving shaft invariable as to position, of a portable shafting comprising a hanger having a pivotal and sliding connection with said main shaft; one or more bevel gears mounted upon and adapted to slide on and be rotated by said shaft; a vertical spindle carried by said hanger and having a bevel gear on its upper end adapted to mesh with said bevel gear or gears on said main shaft; a rotary guide, a ball-link-and-fork-joint connection between said guide and spindle, a tubular counterbalance weight suspended within or without said rotatory guide; a rod extension

attached to one end of the suspending cord for said weight and a tool holder at the end of said rod extension with ball-link-and-fork-joint connection between it and said extension, the said rod extension being square in cross section and adapted to project through a square aperture in the lower end of said rotatory guide as set forth.

8. In a portable shafting the combination with a main horizontal driving shaft invariable as to position a sleeved hanger having a pivotal and sliding connection with said main shaft, a rotatable guide and means for rotating same,—of a suspended sliding tool-carrying-extension, adjustable longitudinally without rotation relatively to and adapted to be rotated by said guide for the purposes set forth.

WILLIAM ROSS.

Witnesses:

OLDMN. EVANS,
FRED. J. SEARS.