

No. 622,365.

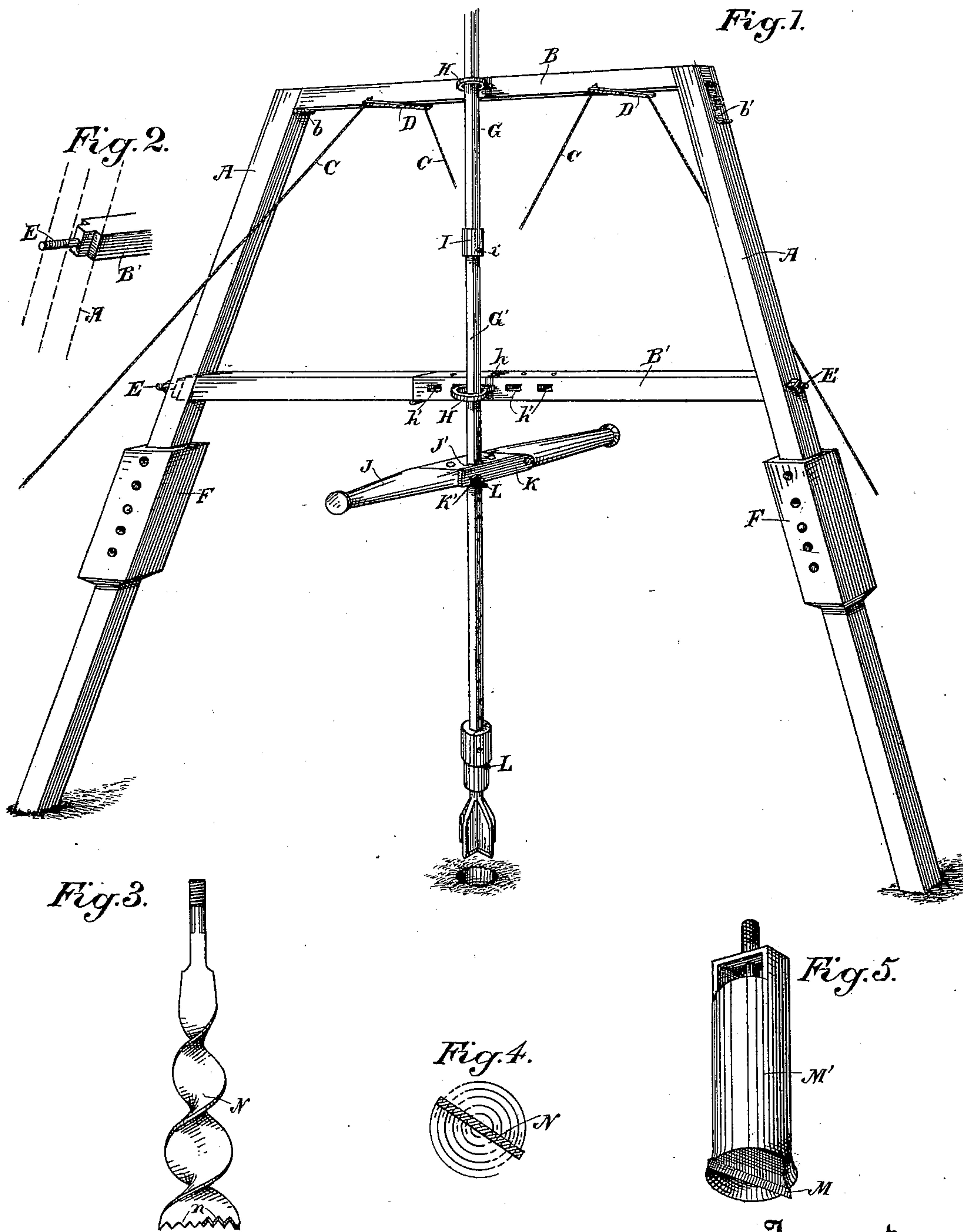
Patented Apr. 4, 1899.

T. J. HUBBELL.

DEVICE FOR PENETRATING FROZEN EARTH OR GRAVEL.

(Application filed Oct. 19, 1898.)

(No Model.)



Witnesses,  
J. H. Morse  
H. F. Aschbeck

Inventor  
Thomas J. Hubbell  
By Dudley Strong & Co.  
attys



# UNITED STATES PATENT OFFICE.

THOMAS J. HUBBELL, OF SANTA CRUZ, CALIFORNIA, ASSIGNOR OF ONE-HALF TO FRANK FISHER, OF SAN FRANCISCO, CALIFORNIA.

## DEVICE FOR PENETRATING FROZEN EARTH OR GRAVEL.

SPECIFICATION forming part of Letters Patent No. 622,365, dated April 4, 1899.

Application filed October 19, 1898. Serial No. 693,950. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS J. HUBBELL, a citizen of the United States, residing at Santa Cruz, county of Santa Cruz, State of California, have invented an Improvement in Devices for Penetrating Frozen Earth or Gravel; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device which is especially designed to penetrate frozen earth, gravel, and like material which is united in a solid mass.

It consists in the parts and the constructions and combinations of parts hereinafter described and claimed.

Figure 1 is a general view of the apparatus. Fig. 2 is an end view of the intermediate cross-timber. Fig. 3 is a view of the auger-tool. Fig. 4 shows the working of it. Fig. 5 is a view of the root-cutting tool.

The object of this invention is to provide a simple easily-adjusted apparatus so constructed that it may be folded into small compass for transportation and which when set up is adapted to penetrate ground filled with small roots, gravel, or rock, or it may be frozen hard, and which is in other ways difficult to penetrate, and it is especially adapted for the drilling of prospect-holes to ascertain whether the particular location contains gold or other valuable substance which it is desirable to obtain.

The frame of my apparatus consists of side timbers A, a top cross-bar B, and an intermediate bar B', and when set up these timbers are held in position by means of guy ropes or cables C, the ends of which are connected with a transverse bar D, fixed to the lower part of the upper frame-timber B and having eyes or suitable connections at the ends to receive the ropes C. The frame when set up thus consists of the timbers A and B and the guy-ropes C, extending at right angles with the upright frame-timbers, so that the structure is rigidly supported and can at any time be taken down and folded into a small compass.

In order to hold the frame, the top bar B is tenoned at each end and fits into corresponding mortises in the tops of the posts A.

The bar B has a hinge on the inside at one

end, as shown at *b*, and this allows the bar to be folded down against the post A. When opened out, the tenon at the opposite side fits the corresponding mortise in its post A, and by means of a latch *b'*, fitting over a corresponding staple in the post A and the pin passing through it, the parts are rigidly united.

The bar B' may be jointed and hinged and has short tenons at the ends fitting corresponding mortises in the sides of the timbers A, and by means of lock-screws E it is secured, so that the frame will be perfectly rigid. When packed for traveling, this bar is removed and folded up with the others, and the bar D is turnable upon its pivot attachment to the beam B, so that it will lie beneath and parallel with the beam.

The posts A may be made in any suitable or desired lengths and may be extended as found necessary by means of rectangular socket-pieces F, into which the lower ends of the upper part of the posts A are fitted, and the extensions fit into the same sockets and may be as long as may be desired—as, for instance, if working upon a steep hillside, where it is necessary to have one leg longer than the other, it can be accomplished by means of such an extension on the lower side.

In order to support and guide the drill or perforator shaft G, guides H are fitted to the timbers B and B' by making horizontal mortises in the timbers, and the socket-pieces have corresponding plates or tenons, which enter these mortises horizontally and may be secured by pins passing through the timbers and the plates, as shown at *h*.

In order to retain the shaft G in an approximately vertical position when the device is set upon an incline, so that the framework A B is tilted considerably to one side, I have shown a series of mortises *h'*, made in one or the other of the transverse timbers B B', and the corresponding guide H can be shifted to either of the said mortises, so as to bring it approximately in a vertical line with the other guide.

The rod G may be lengthened at any time by means of socket-pieces I, which admit of extensions of the rod, as at G', these extensions being slipped into the lower ends of the



sockets and secured by pins *i* passing through the socket and the upper end of the extension.

I have shown the rod *G* made rectangular in cross-section for the purpose of receiving  
 5 a handle *J*, by which the various devices employed therewith are operated. This handle-piece *J* has a vertical mortise or channel made in it, as shown at *J'*, and this mortise being open at one side the handle-piece *J* can be  
 10 slipped upon the rod at any point by simply turning back the keeper-plate *K*, which is pivoted to the side of the handle-piece, so that it may be turned up to expose the slot or turned down to cross the slot, and thus  
 15 close the open side. The opposite end of the keeper from the pivot has a slot opening upward from the bottom, and this when the keeper is closed drops over a bolt or screw *K'*, which may be tightened to hold it in place,  
 20 and thus permanently unite the handle *J* to the rod. The handle is prevented from slipping up or down by means of a pin or pins passing through the rod above or below the handle, or both, as shown at *L*. While the  
 25 tool is being worked downwardly, the pins would naturally be below the handle, but if the tool is to be lifted the pin would be placed above the handle, or one might be placed above and one below, if preferred.

30 The tools to be operated by this device are of various descriptions. In some parts of the country, and especially in the frozen regions of the high latitudes, where gold is found there is a surface coating of moss, small roots, and  
 35 material which is strongly bound together in addition to being frozen solid, this cutting amounting variously to from twelve inches to two or more feet in depth. In order to work through this, I have shown a tool such as represented at *M*, consisting of a cutting-blade  
 40 inclosed in a cylindrical jacket or casing *M'*, which is slightly bell-mouthed and has its lower edge made sharp. The cutting-plate *M* is fixed transversely and centrally across  
 45 this cylindrical cutter, and when the device is to be used the shank at the upper end is secured or coupled to the operating-rod *G*. For this first operation it is only necessary to raise and drop the apparatus with a churning  
 50 motion, the guides *H* retaining it in proper line as it works, and the material will be chopped small and can then easily be removed. To assist this operation, I employ a detachable weight slotted on the side like the  
 55 handle, and this weight may be slipped over the rod *G* and rest upon a pin *L*, so that when the tool is lifted the weight assists in forcing it down.

When the gravel, conglomerate, or other  
 60 hard material is reached, the tool *N* is substituted and attached to the operating-rod. This tool comprises a twisted auger-shaped plate of a diameter essentially equal to that of the hole to be bored. The auger is here  
 65 shown as formed of a single flat plate twisted into a spiral and having a straight lower edge without any center-bit. This lower edge is

cut into angular V-shaped teeth *n*, the teeth upon one side of the center traveling in circles when the device is turned, which coincide 70 with the spaces between the teeth upon the opposite side of the center. Thus the teeth upon one side of the center will form a series of circular ridges and depressions, and the teeth upon the opposite side of the center fol- 75 lowing will cut out the ridges formed by the first set of teeth and form corresponding depressions and ridges, which are again excavated by the action of the teeth upon the opposite side during the rotation of the device. 80

For the operation of the cutter *M M'* it is only necessary to raise and drop the rod which carries the cutters by means of the handle *J*.

For the operation of the tool *N* the handles 85 *J* are turned around, and by reason of the rectangular form of the shaft the latter and the tool will be turned with it.

Any amount of weight may be brought upon the handles or upon the shaft which is 90 desirable to insure a cut being made, and when the hole has reached a depth which necessitates a change the handle may be slipped up along the bar and by means of the holding-pins *L* fixed at a new point. In order to 95 lift the tool out of the ground, the handle may be slipped down to a convenient point for lifting and again retained by a pin or pins.

If in the progress of the boring a large rock 100 or rounded cobble, such as is frequently met with in this class of ground, should be encountered, a cutting-tool having crossed cutting edges at the lower end may be substituted for the tools *M* or *N*, and by continuously raising 105 and dropping this drill it will break up or perforate the rock, so that when passed the boring can again proceed through the ordinary material.

For ordinary gravel the teeth of the tool *N* 110 will act so as to cut and break the gravel up to such an extent that it can be easily removed from the hole from time to time.

The apparatus is easily set up at any point where work is to be done and is capable of 115 being packed into small compass for transportation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is— 120

1. An earth-perforating apparatus comprising a perforating-tool, a shank and means connecting it therewith, a framework having upper and lower cross-timbers, and upper and lower guides carried by said cross-timbers 125 and through which guides the shank loosely passes, one of said guides fixed and the other adjustable to bring it in the vertical line of the fixed guide when the frame of the apparatus is set upon an incline. 130

2. An earth-perforating apparatus comprising perforating-tools, a shank and means for removably connecting them therewith, a framework including side members and upper



and lower connecting cross-timbers, and means for supporting and bracing the same, and upper and lower guides on said cross-timbers in which the shank is loosely turnable, one of  
5 said guides adjustable transversely to bring it substantially in the vertical line of the other guide when the frame is set upon an incline.

10 3. In an apparatus of the character described, a supporting-frame including foldable side members and connecting cross-timbers, a boring-tool and a shank to which it is detachably connected, upper and lower guides on said timbers through which the shank  
15 loosely passes, one of said guides fixed and the other adjustable transversely to bring it substantially in the vertical line of the fixed guide when the frame is set upon an incline, a transverse handle having a vertical slot or  
20 channel in one side to fit said shank, and a pivoted latch or keeper for closing said slot or channel and locking the shank in place.

4. In an apparatus of the character described, a supporting-frame having a cross-  
25 timber with a guide fixed therein, a second

cross-timber having a transverse series of mortises, and a guide to be fitted to either of said mortises whereby it may be brought in the vertical line of the fixed guide when the frame is set upon an incline, and a boring-tool  
30 shank loosely passing through said guides.

5. In an apparatus of the character described, a supporting mortised tenon and hinged frame capable of being folded or extended, guy-ropes and a foldable connection  
35 therefor upon the upper bar of the frame, guides for the drill-rod or shank, said guides adjustable upon the transverse frame-timbers to maintain their line of direction independent of the position of the frame, a sectional  
40 drill-rod or shank movable and turnable within said guides, and cutting and boring tools substantially as described adapted to be secured to said shank.

In witness whereof I have hereunto set my  
45 hand.

THOMAS J. HUBBELL.

Witnesses:

S. H. NOURSE,

JESSIE C. BRODIE.