June 21, 1927.

1,633,370

S. HUNTER

DOORLOCK MORTISING MACHINE

Filed July 5, 1923

3 Sheets-Sheet 1

Fig. 1.

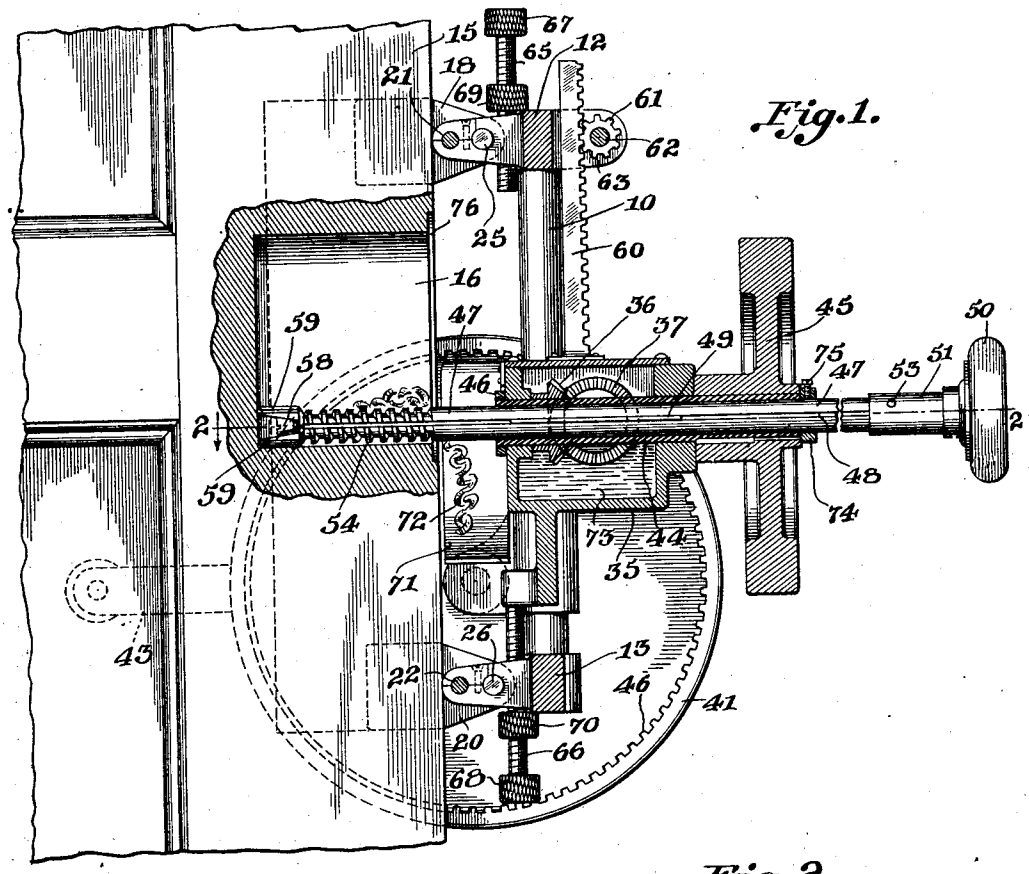
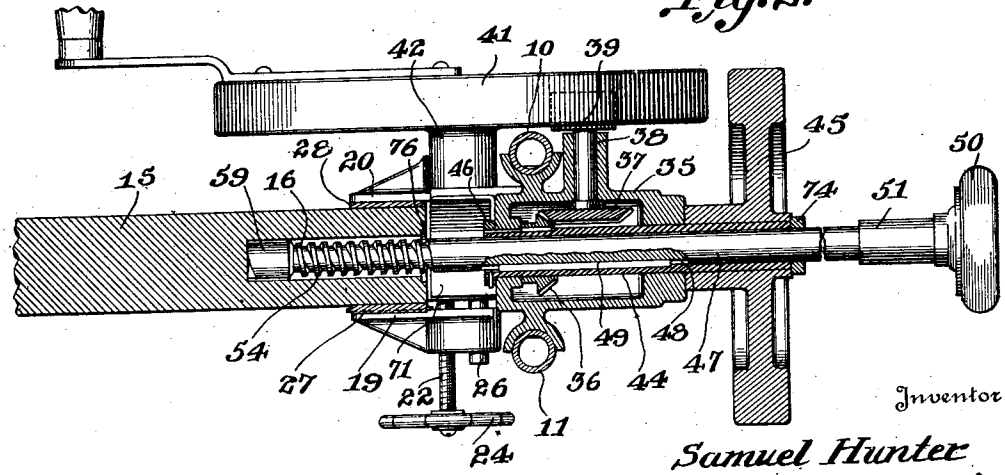


Fig. 2.



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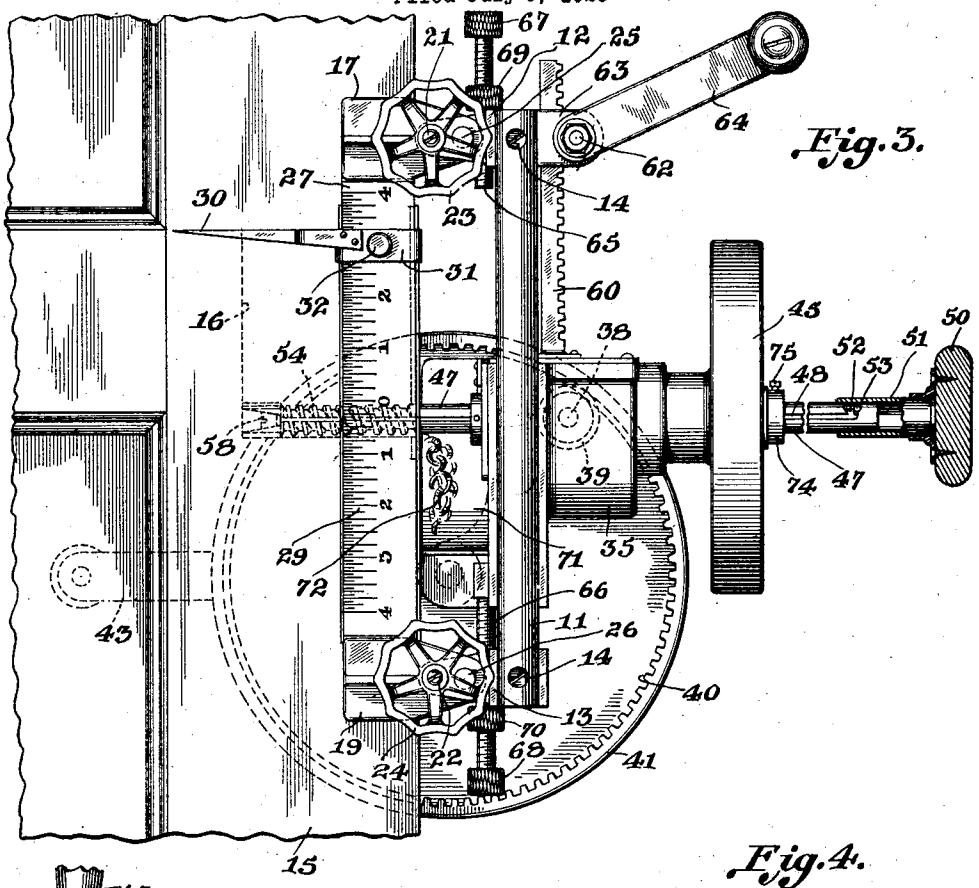


Fig. 3.

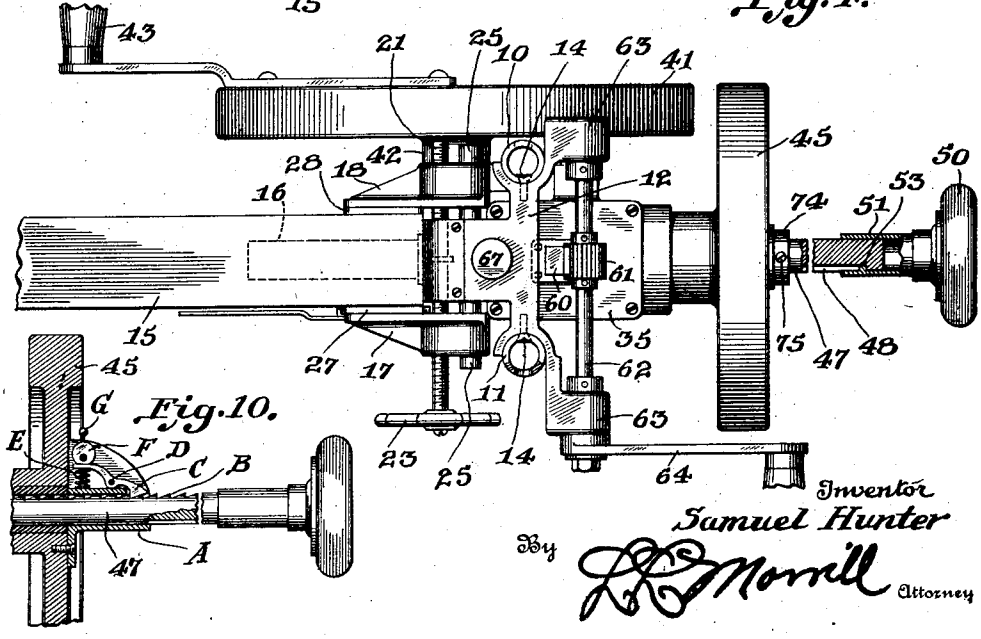


Fig. 4.

Fig. 10.

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Fig. 5

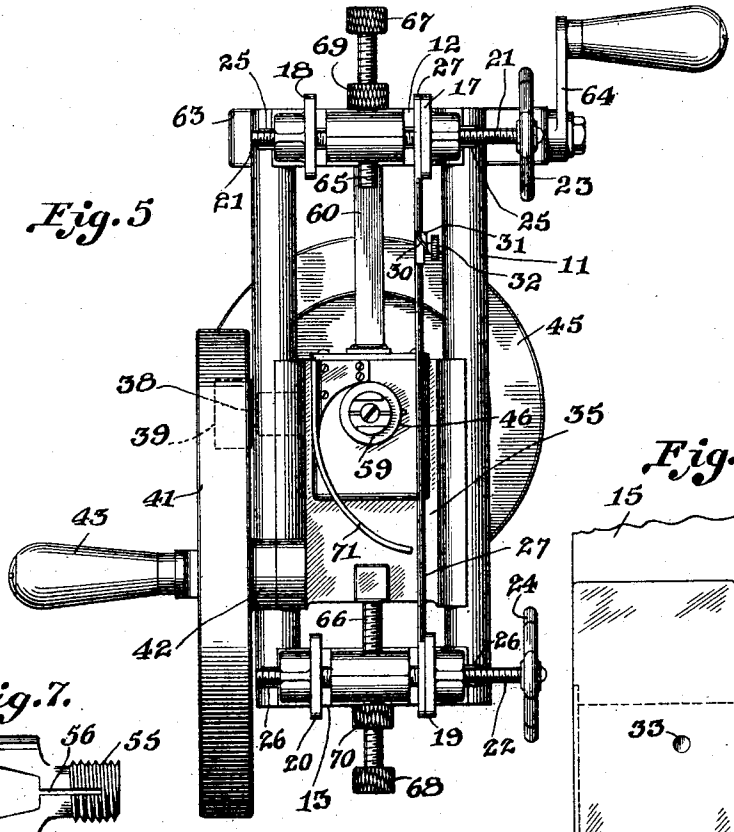


Fig. 6.

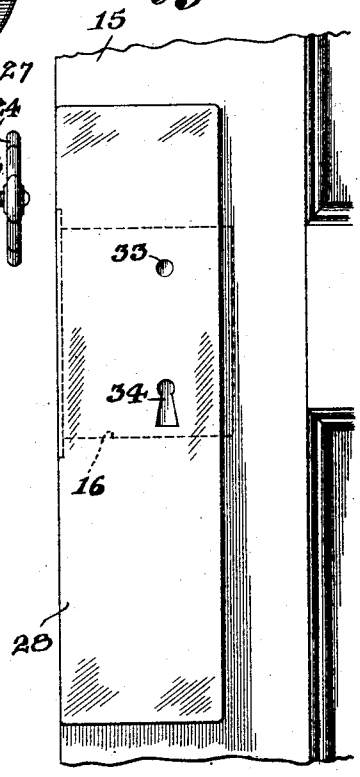


Fig. 7.

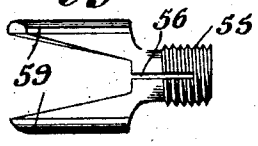


Fig. 9.

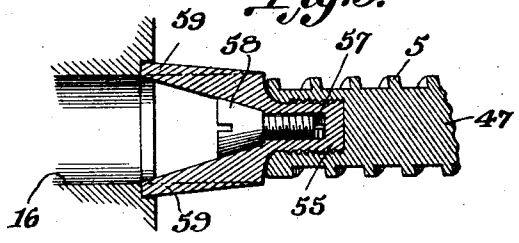
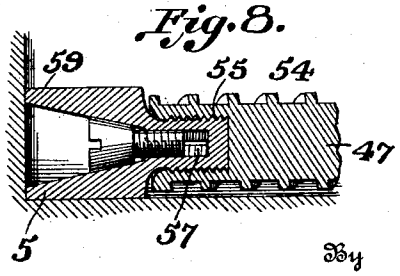


Fig. 8.



Inventor

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By

Attorney

Patented June 21, 1927. 1,633,370

UNITED STATES PATENT OFFICE.

SAMUEL HUNTER, OF BELLEVUE, PENNSYLVANIA, ASSIGNOR TO WAPPAT GEAR WORKS, A CORPORATION OF PENNSYLVANIA.

DOOR-LOCK-MORTISING MACHINE.

Application filed July 5, 1923. Serial No. 649,522.

This invention relates to door lock mortising machines and has for an object to provide a device of improved type embodying new and improved mechanical features, functions and movements.

A further object of the invention is to provide in a door lock mortising machine improved means for clearing the mortise of accumulated shavings and cuttings.

A further object of the invention is to provide improved means for employing the bit for producing the mortise and expanding the bit for producing the flange cut.

A further object of the invention is to provide improved adjustable means for varying the length of the bit-carrying shaft which is manually propelled.

A further object of the invention is to provide improved mechanical means for carrying out and carrying forward the several instrumentalities above outlined.

With these and other objects in view, the invention comprises certain novel parts, elements, units, combinations, arrangements, mechanical movements, interactions and functions, as disclosed in the drawings, together with mechanical and functional equivalents thereof, as will be hereinafter more fully described and claimed.

In the drawings:

Figure 1 is a view in vertical section of the machine as applied to a door with a lock mortise completed.

Figure 2 is a horizontal transverse sectional view taken on line 2—2 of Figure 1.

Figure 3 is a view of the machine in side elevation attached to a door.

Figure 4 is a view of the machine in top plan.

Figure 5 is a view of the machine in elevation, viewed from the edge normally applied to the door.

Figure 6 is a view of one of the projecting strips employed as a templet in the marking of positions for boring transversely through the mortise.

Figure 7 is a view of the bit in side elevation with the expanding screw removed.

Figure 8 is a view of the bit in diametrical section shown attached to the driving shaft, also in diametrical section.

Figure 9 is a view of the bit in diametrical section, similarly attached to the driving shaft shown in position expanded for producing the flange cut.

Figure 10 is a detail sectional view of a modification of the machine.

Like characters of reference indicate corresponding parts throughout the several views.

The improved door lock mortising machine, which forms the subject matter of this application, comprises a frame composed of side bars 10 and 11, here shown as composed of tubes, it being understood, however, that tubes are not essential to the present construction. These side bars 10 and 11 are joined by a yoke 12 at the top and an equivalent yoke 13 at the bottom, the connection being by any approved means, as for instance the screws 14.

The frame thus constructed is adapted to be secured rigidly to the edge of a door, shown conventionally at 15, into which a lock mortise 16 is to be formed. The attaching means for the frame comprises self-centering jaw members 17 and 18 connected with the upper yoke and similar jaw members 19 and 20 connected with the lower yoke. The connection is by means of a right and left screw 21 for the upper jaws and 22 for the lower jaws, provided respectively with hand wheels 23 and 24. The upper jaws 17 and 18 slide upon a guide pin 25 and the lower jaws upon a similar guide pin 26 so that, in conjuction with the screws 21 and 22, such jaws are always maintained in parallelism and properly centered relative to the frame. By the manipulation of the hand wheels 23 and 24, the jaws are, therefore, actuated to clamp upon the edge of the door as indicated. To prevent marring the door by the use of the jaws in the usual well known manner, a strip 27 of some yielding material, such as wood, is carried by the jaw members extending between the upper and lower jaws and a strip 28 upon the opposite side of some material, such as paste board or the like.

The strip 27 is provided with a scale, indicated at 29, with a pointer 30 slidable relative thereto by means of a clip 31 having means for clamping as the screw 32. The strip 28 is preferably employed as a templet for properly locating the transverse borings through the door, that for the door knob being indicated at 33 and for the key hole at 34, it being understood that this strip 28 may be any convenient material and that the position for the door knob and key hole

will be determined for each particular job. When the device is in place upon the door, therefore, by merely marking as indicated by the templet 28, the proper position for the transverse borings is provided.

Slidable upon the guide bars 10 is a gear housing 35, bevel gears 36 and 37 being located within said housing, the latter being connected by means of a shaft 38 with a pinion 39 intergeared with the internal gear 40 of the wheel 41. The wheel 41 is also journaled at 42 upon the gear housing 35 and is provided with means for driving the same, indicated as the crank 43.

The gear 36, intergeared with the gear 37, driven as just described, is mounted upon a sleeve 44 extending through the gear housing, carrying at one end a balance wheel 45 and at its opposite end a collar 46, which, coacting, retain the sleeve 44 in its position extending through the gear casing.

Slidable through the sleeve 44 is the bit driving shaft 47 provided with a spline groove 48 extending longitudinally thereof, a feather 49 being carried by the sleeve 44 to prevent rotation of the shaft 47 relative to the sleeve 44, but permitting longitudinal movement thereof.

To effect such longitudinal movement, a manually pressed head 50 is mounted to rotate freely relative to said shaft and is preferably provided for varying the length of the shaft by mounting the head 50 upon a sleeve 51 with a bayonet joint connection between said sleeve and shaft shown as providing an offset 52 at the end of the spline groove 48 with a pin 53 carried by the sleeve engaging in said slot so that, by rotating the sleeve 51 to disengage it from the offset 52, it may be moved longitudinally with the pin 53 moving in the spline slot 48 to shorten the combined length of the shaft and sleeve or by drawing outwardly and engaging in the offset 52 to increase such length.

The drive shaft 47 is provided with a clearing worm 54 and has a bit inserted into the working end of said shaft. This bit is provided preferably with a screw-threaded shank 55 engaging within a complementary socket in the end of the shaft 47. In general makeup, the bit is of a general "router" type but is slitted at 56 and threaded internally at 57 so that a tapered screw 58 inserted into the socket 57 will serve to expand the sides 59 of the bit. This provides for employing the bit at its minimum diameter for boring into the edge of the door.

For producing an elongated cut for mortising effect, a rack 60 is rigidly secured to the top of the gear housing 35 and engages a pinion 61 carried upon a shaft 62 which is journaled in ears 63, preferably formed integral with the upper yoke 12. To this shaft 62, a crank arm 64 is attached so that, by manipulating the crank 64 and rotating the shaft 62 and pinion 61, the gear casing and its connected and associated parts are raised and lowered. For limiting the movement of these parts to produce a mortise of exactly the right dimensions, stops 65 and 66 are provided, preferably in the form of screws, with knurled heads 67 and 68 respectively and lock nuts 69 and 70 whereby the limitations provided by the screws 65 and 66 may be maintained throughout its continued use.

Secured also to the gear housing is a deflector plate 71 upon which the shavings and cuttings, indicated at 72, are deposited by the clearance worm 54 and discharged at one side of the machine and out of the way of the user. It will also be noted that the gear casing 35 is wholly enclosed and provision, therefore, made for containing a lubricant, indicated at 73, so that the gears 36 and 37 "run in oil".

In operation, it will be understood that the device is clamped upon the edge of the door, the position of the machine being predetermined by setting the pointer 30 to coincide with some known part of the door structure. It is obvious that machines of this general type will be used upon construction operations embodying a very large number of doors of similar make and requiring similar treatment and the position of a lock mortise relative to some particular part of the door structure having once been determined, the pointer 30 is set whereupon all measurements are eliminated, the device being simply placed upon the door with the pointer 30 coinciding with some part of the structure and there clamped.

In its initial position, the bit will be at the outer edge of the door and the driving shaft 47 extend rearwardly to its limit. The driving wheel 41 is now rotated in any approved manner, as by the use of the crank 43, and through the gearing 37 and 36, the shaft 47 is driven with great speed. The bit is now forced into the wood of the door such a distance as practice will indicate as desirable, whereupon the rotation of the bit being continued, the gear casing and its associated parts, including the bit, will be moved upwardly and downwardly, the bit being fed in manually as the cutting progresses by pressing with the breast or other part of the body against the head 50.

In the type of feeding device shown at Figure 10, the hub is omitted from the wheel 45 and a sleeve A is preferably removably secured to the wheel and forms a guideway for the shaft 47. This shaft 47 in this particular modification is provided with a rack B which is also preferably formed upon the shaft opposite the splined groove.

For cooperation with the rack B, a pawl C is provided pivoted at D to spaced cheek

plates formed integral with the sleeve A. To hold the pawl C in proper operative relation, a spring E is provided.

At times it is desirable to provide means whereby the shaft 47 shall be free to move in both directions. For this purpose an eccentric F is arranged to bear upon the pawl C, a finger member G being provided for engagement by the hand of the operator to rotate the eccentric F to raise the pawl C out of engaging position.

With the device as shown therein, the breast or other part of the user will exert pressure as in the other types, advancing the shaft 47 one or more steps of the rack B which will be engaged by the pawl C and retained in that position so that it is unnecessary for the operator to maintain the pressure constantly.

In operation, ordinarily, the crank 43 will be manipulated by the right hand of the operator and the crank 64 by the left hand, the left hand producing the motion of raising and lowering the machine, the right hand producing the rotary motion for boring.

Before beginning the boring, the collar 74 upon the shaft is adjusted. To adjust this, the screw 75 is loosened and the collar moved backwardly along the shaft. The lock which is to be inserted in the mortise when completed is now inserted between this collar and the hub of the wheel 45 and the collar secured in that position thus conveniently insuring the correct depth of the mortise. The collar 74 is merely a stop for limiting the inward movement of the shaft 47 as described and performs no function except to stop the work when a mortise of sufficient depth has been produced.

At the outset, it is usually found desirable to have the shaft 47 as short as convenient which is accomplished by sliding the sleeve 51 inwardly along the shaft, but as the boring progresses it is desirable to lengthen the shaft, whereupon the sleeve 51 is moved outwardly and the pin 53 engaged in the offset slot 52.

The operation of the bit in the mortise, obviously, will produce cuttings which will drop down to the bottom of the mortise produced and, as the device descends in its downward cut, the loose shavings and cuttings are engaged by the worm 54 and removed and ejected from the mortise.

When the mortise has been completed by the final cut, in which position the collar 74 has engaged the hub of the wheel 45, the clearance worm 54 has wholly cleared the mortise of all shavings and cuttings so that the mortise presents an absolutely clean cavity. This cavity having been produced, the bit is expanded from the size and relation shown at Figure 8 to the size and relation shown at Figure 9, producing a cut of greater diameter than the original cut, whereby the flange cut 76, as shown in the drawings, is produced, it being understood that this flange cut may be made either preceding or succeeding the cutting of the mortise. In case it precedes, the initial cut is by the use of the expanded bit and the bit is then reduced to its smaller diameter for cutting the mortise. It is also obvious, of course, that bits of different diameters may be inserted in the end of the shaft 47 instead of expanding the bit as shown, whereby the mortise and the flange cut may be produced by different bits.

It is also obvious that bits of different diameters may be employed, either of the rigid type or expanding type, for producing mortises of different widths.

The mortise having been completed together with its flange cut, the position for the door knob and key hole are marked by using the templet 28 whereupon the machine is removed from the door by again manipulating the hand wheels 23 and 24 and the operation repeated upon another door.

What I claim to be new and desire to secure by Letters Patent is:

A door mortising machine, comprising a frame, means for clamping the frame in position, a driving mechanism slidable along the frame, a boring shaft carried by the driving mechanism, said shaft comprising a section having a shallow spiral groove, and a spline groove extending along the shaft, including said section, a feather carried by the driving mechanism engaging said spline groove, and a boring tool carried by the end of the shaft, said tool comprising a pair of opposing curved blades adapted to cut upon their front edge and also upon their side edges, and said shaft being of a diameter approximating that of the tool.

In testimony whereof I affix my signature.

SAMUEL HUNTER.