May 20, 1930. C. ZIGENHEIM 1,759,726

PORTABLE BORING TOOL

Filed Nov 14, 1929 2 Sheets-Sheet 1

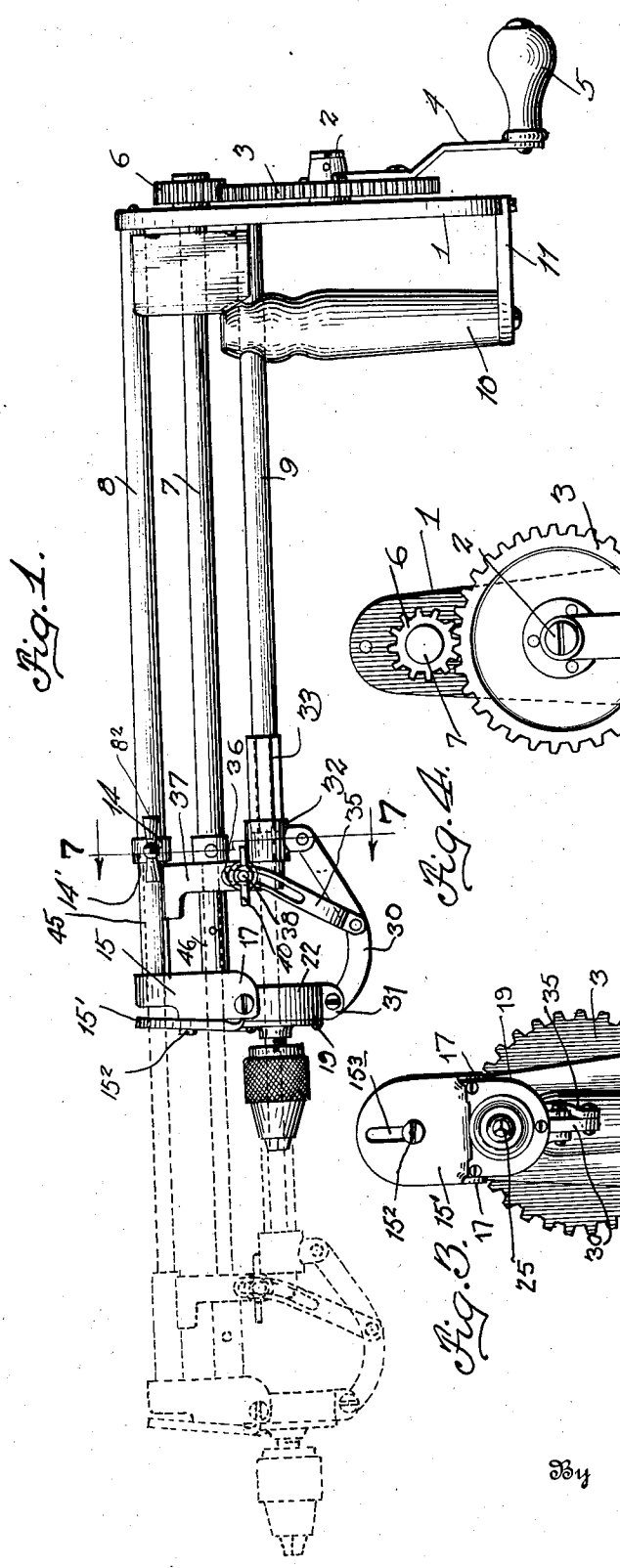

Fig. 1.

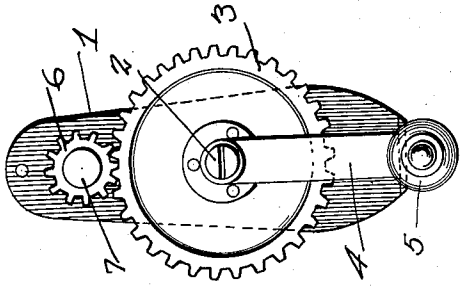

Fig. 4.

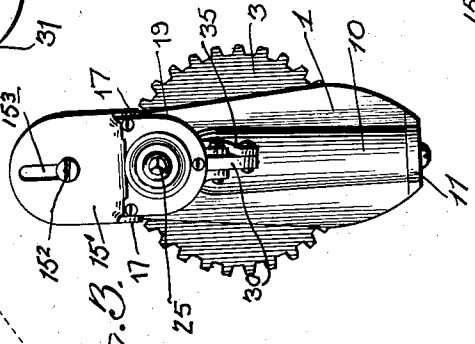

Fig. 3.

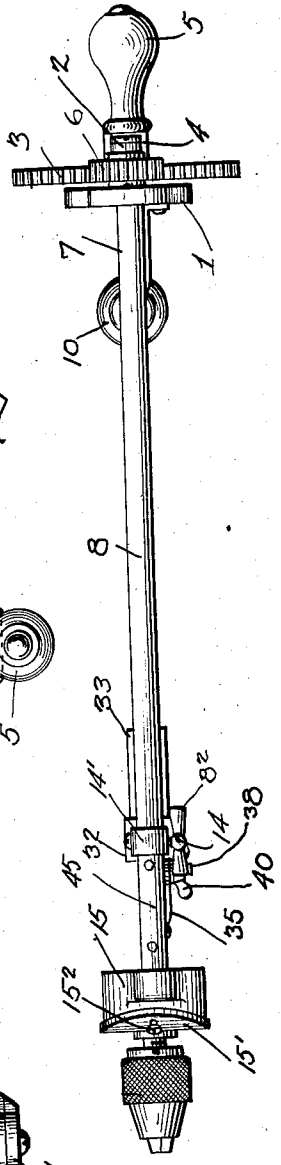

Fig. 2.

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May 20, 1930. C. ZIGENHEIM 1,759,726

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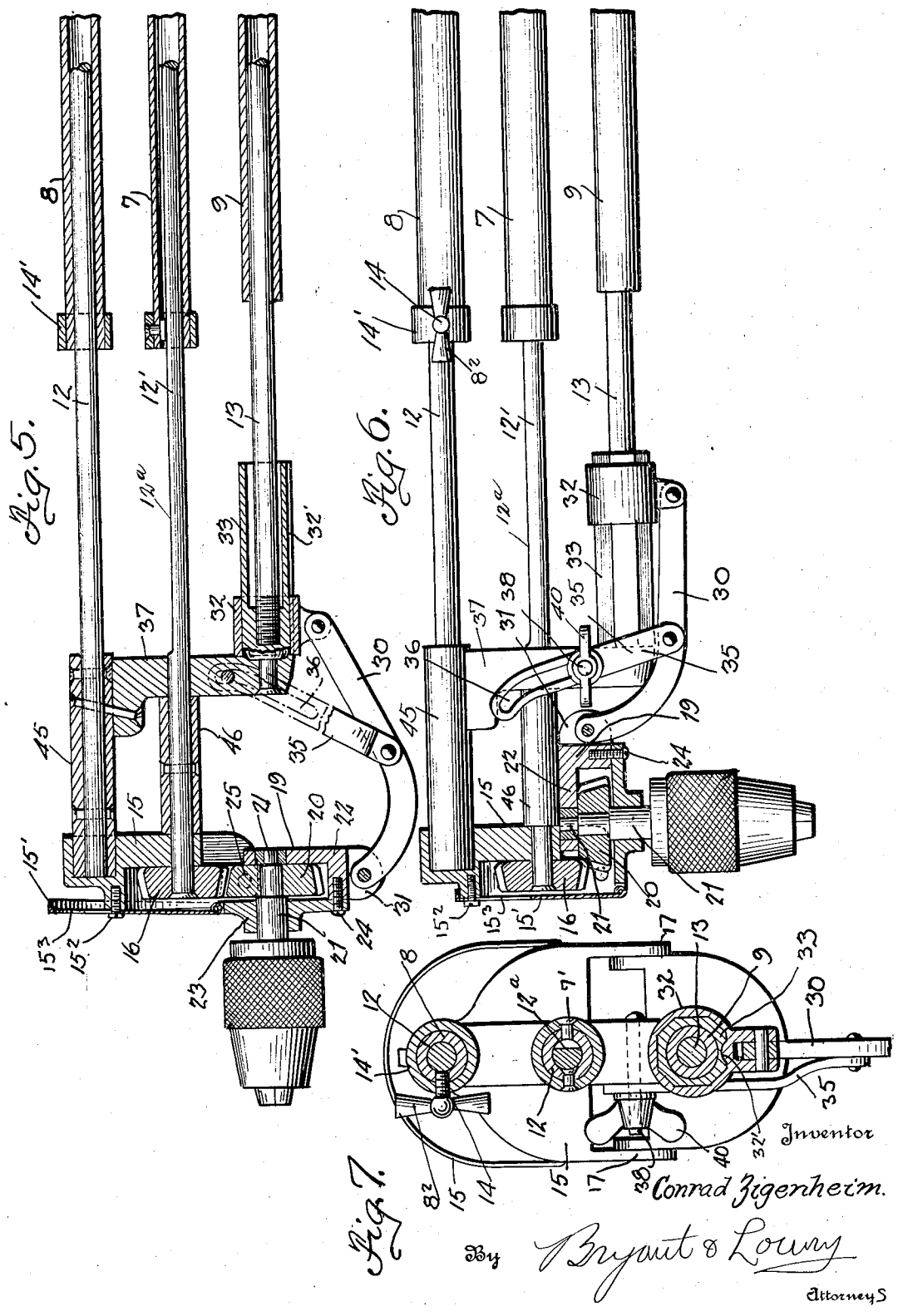

Fig. 5.

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE

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PORTABLE BORING TOOL

Application filed November 14, 1929. Serial No. 407,183.

This invention has relation to portable boring tools, such as hand drills, augers and the like, in which the boring bit, fastened in a suitable chuck or holder is arranged and adapted to be operated by means of a crank and gearing mounted in a suitable brace or frame. The object of the invention is to provide a tool which is adapted to use in boring holes at various angles with reference to the axis of the brace or main shaft through which motion is transmitted from the crank to the chuck or bit holder so that holes may be bored in situations not accessible to the ordinary boring tool, and at angles which are incapable of being bored accurately or uniformly by means of a bit operating in alignment with or parallel to the axis of the stock.

In carrying my invention into effect, I provide a frame or brace having an appropriate hand grip and having, mounted at one end a main gear wheel, to which is secured a crank lever, and a pinion with which said gear wheel is in mesh. Secured at their ends to a plate in which the gear and pinion shafts have their bearings are three tubular members, two of which are stationary while the third, located between the stationary members, is keyed to the pinion and adapted to be rotated through the operations of the crank, the larger gear and the pinion.

Telescoping into these tubular members are three rods, the middle rod being splined in and rotatable with the middle member. This rod has, keyed to its outer end, a pinion located within a box or housing and engaging with another pinion, the shaft of which carries a chuck or bit holder, the said shaft being mounted in a head section or housing similar to the head or housing in which the first named pinion is located, but pivotally attached thereto so that the pinion and shaft may be rotated in the arc of a circle so as to adjust the bit and holder to different angular positions with relation to the main shaft of the brace.

Means are provided, for rigidly securing the bit and holder in the desired positions, and means are also provided whereby the frame or brace may be lengthened or shortened and its telescopically arranged members secured at different degrees of lengthening or shortening.

The invention consists in the novel features of construction and in the combination hereinafter more specifically described, with reference to the drawings forming part of this specification in which,

Figure 1 is a side view of a tool embodying a preferred form of construction;

Figure 2 is an edge view;

Figure 3 is a front end view;

Figure 4 is a rear end view;

Figure 5 is a longitudinal central sectional view;

Figure 6 is a side view partially in section; and

Figure 7 is a transverse sectional view on the line 7—7 of Figure 1.

The numeral 1 designates a metallic plate of elongated form, upon which is mounted the shaft 2 of a relatively large sized gear wheel 3 to which is attached a suitable crank lever 4, provided with a handle 5. The numeral 6 designates a toothed pinion which is keyed on the end of a tubular shaft member 7, which is rotatable through the operation of the gears and crank. On either side of and in the same plane with the member 7 are the tubular members 8 and 9. The members 8 and 9 are rigidly secured at one end to the plate 1. The numeral 10 designates a grip handle which is conveniently attached at one end to the member 9 and, at the other end to a bracket 11 secured to and projecting from one end of the plate 1.

The numerals 12, and 12′ and 13 designate rods which are telescopically arranged with reference to the members 7, 8, and 9 and are arranged and adapted to slide or telescope into the latter.

The main operating rod 12′ has a flattened side as shown at 12ª, and is secured in operative relation to the member 7 by a set screw 7′ which allows the rod 12′ to be telescoped into the member 7, but holds the rod 12′ in operative engagement with the rod 7, so that the latter turns therewith.

When the rods 12, 12′ and 13 are adjusted to their proper positions they are fixed in such positions by means of a set screw 14

threaded through a collar 14′ at the open end of the member 8 and provided with a thumb piece 8^2. The members 8 and 9 constitute, together, the main frame of the tool. The outer portion of the rod 12′ is journalled in the bottom or inner wall of a recessed head piece or box section 15 and has keyed to its end a gear wheel 16 which is slightly beveled or tapered on its periphery. The head piece or box 15 is formed with cheeks 17 and to these cheeks is pivoted a housing 19 in which is arranged another beveled gear wheel 20, which is also beveled on its periphery but in an opposite direction to the bevel of the gear 16. The wheel 20 is keyed on a short shaft 21 having its bearings in the base 22 of the housing 19, and in the cover plate 23 which is secured to the housing 19 by screws 24. As will be seen, the housing 19 is rotatable in the arc of a circle around the pivotal screws 25 connecting the housing 19 and the head piece or housing 15 together. The gear wheels 16 and 20 are normally in mesh side by side as shown in Fig. 5 with their faces on parallel planes and this is the position they will occupy when the tool is used for the ordinary boring or drilling of holes in directions parallel to the axis of the main shafts 12, 12′ and 13.

The short shaft 21 projects through the cover plate of the housing 19 and is screw threaded for the reception of a chuck or other holder for a boring bit.

To bore holes at different angles the housing 19 is adjustable to different required angles and this is accomplished by turning it on its pivotal mounting 25, while retaining the bevel gears in engagement with each other. For this purpose the gear 20 is formed with a rounded angle as shown in Figs. 5 and 6, which construction permits the gear 20 when being adjusted for angular boring past the inner angle of the gear 16, while the teeth of the two gears remain in mesh with each other.

In Fig. 6 the parts are shown as adjusted for boring holes at right angles or perpendicular to the axis of the main shaft, but they may be adjusted to any intermediate angle and, by means hereinafter described, secured in working position.

The numeral 30 designates a curved lever or bar pivotally attached at one end to ears 31 projecting from the housing 19, and at the other end pivotally attached to a collar 32 which is slidingly splined on the enlarged section 33 fixed on the outer end of the member 13. Midway of the ends of the bar or lever 30 a link 35 is pivoted thereto and is formed with an arcuate slot 36. A brace bar or bridge 37 connects the two members 12—13 together, and to such bar or bridge the link 35 is coupled by means of a screw 38 which projects from the bar or bridge, through the slot 36, and carries a thumb nut 40.

As will be seen, when the housing 19 with its attachments is turned on its pivot, the collar 32 will be moved along the member 33 and the link 35 if loose will be moved inwardly on the screw 38. When the proper angle of adjustment is reached, the nut 40 will be tightened, thus interlocking the parts together and preventing the boring bit from being thrown out of position.

The head piece or housing 15 is provided with a protective lid or cover 15′ which is hinged at its inner edge to the top plate of the housing 19, and moves with the latter. This lid is held closed by a screw 15^2 to accommodate which, the lid is slotted as at 15^3 so that it can freely move. This lid can be released and raised by removing the screw 15^2, and access had to the gearing to oil the same.

The rod 12 has secured to its outer end a long collar 45, which sockets in a recess in the housing 15, and is secured to the bar or bridge 37. The rod or shaft section 12′ passes through a hole in said bridge and carries a collar 46, secured thereto and located between the bridge and the housing 15.

I claim:—

A manually operable boring tool of the character described comprising a frame having a rear end mounting for a grip handle, a grip handle secured thereto, manually operable gearing carried by said mounting, a forward mounting, a power shaft journalled at its opposite ends in said mountings, rods connecting said mountings rigidly together, a housing pivotally attached to the forward mounting, a bit holding shaft journalled in said pivoted housing, and geared to said power shaft, a lever connected to said pivotally attached housing, a sleeve mounted slidably on one of said rods, and connected to one end of said lever, an adjustable link connection between said lever and a stationary part of the said frame, and means for interlocking said link at different positions, according to the angular adjustment of the bit holding shaft, the latter being arranged and adapted for different angular adjustments relatively to the axis of the power shaft.

In testimony whereof I affix my signature.

CONRAD ZIGENHEIM.