A. E. CRANDELL.

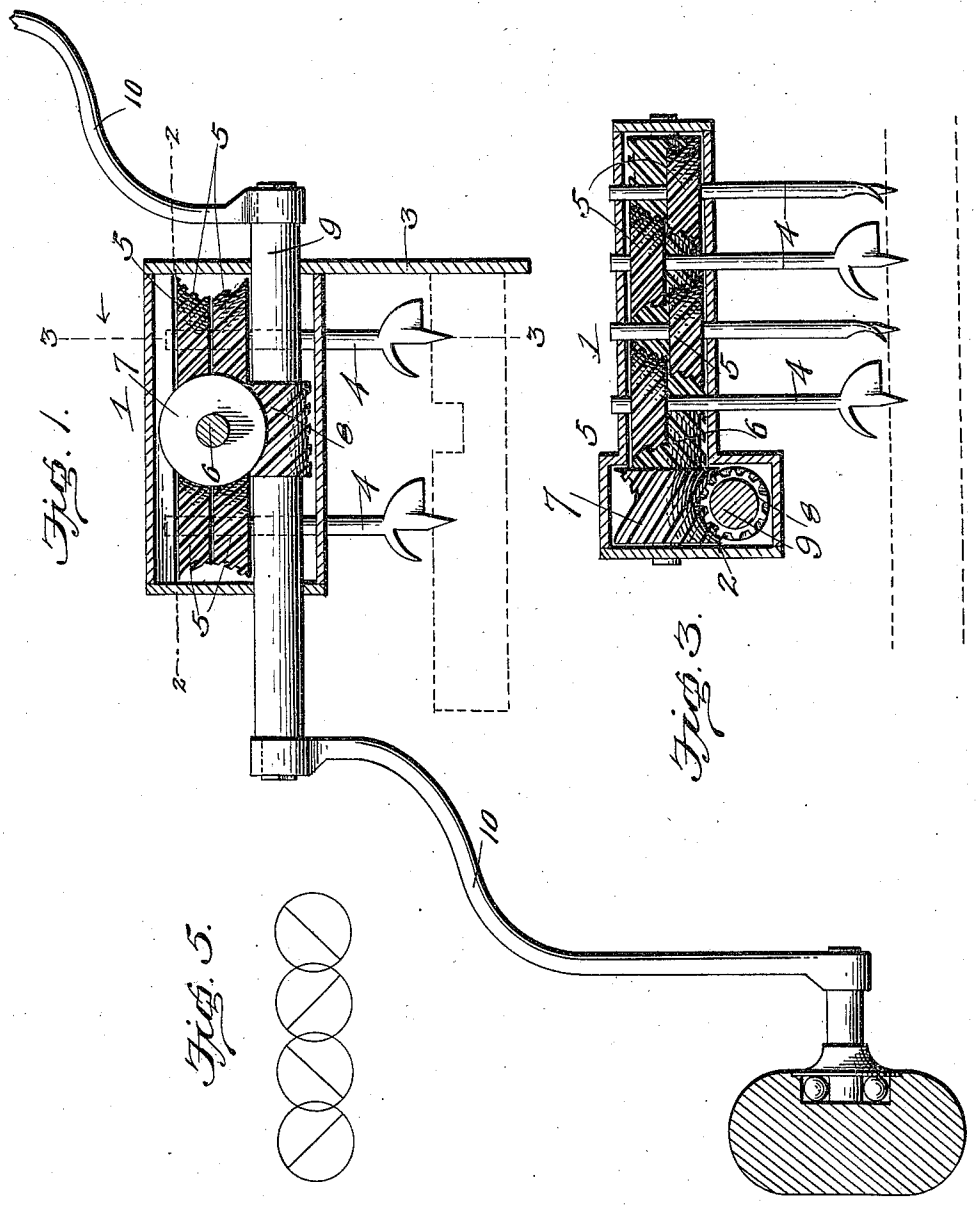
MULTIPLE BIT BORING MACHINE.

APPLICATION FILED JUNE 16, 1910.

989,486.

Patented Apr. 11, 1911.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

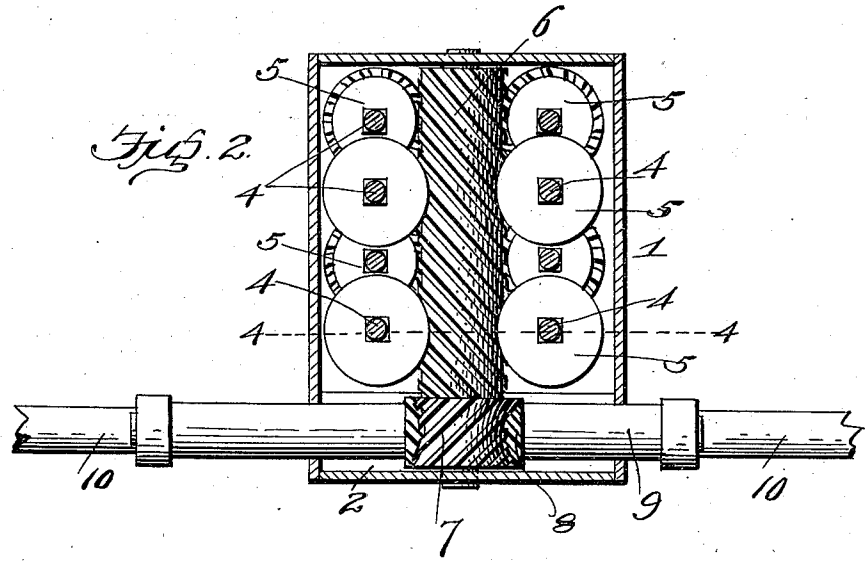
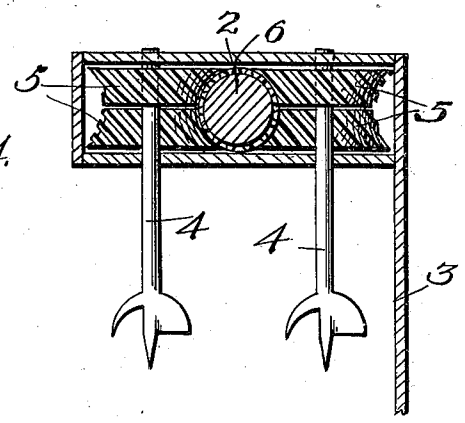


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MULTIPLE-BIT BORING-MACHINE.

989,486. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed June 16, 1910. Serial No. 567,194.

To all whom it may concern:

Be it known that I, AUSTIN E. CRANDELL, a citizen of the United States, residing at Everett, in the county of Snohomish and State of Washington, have invented certain new and useful Improvements in Multiple-Bit Boring-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in multiple bit boring machines.

One object of the invention is to provide a multiple bit boring machine having improved means for simultaneously operating all of the bits in the same direction.

Another object is to provide a machine of this character the bits of which are arranged to form a continuous hole said bits having their operating gears arranged to overlap whereby a larger, stronger and more easily operated gear may be provided.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1 is a vertical sectional view of a boring machine constructed in accordance with my invention; Fig. 2 is a horizontal sectional view of the same taken on the line 2—2 of Fig. 1; Fig. 3 is a vertical sectional view taken at right angles and on the line 3—3 of Fig. 1; Fig. 4 is a vertical cross sectional view on the line 4—4 of Fig. 2; Fig. 5 is a diagrammatic view showing the manner in which the holes are bored by the drills and the relative position of the cutting edges of the bits as they operate to form the hole.

In the embodiment of the invention I provide a suitable casing 1 which is here shown of flat rectangular form having on one end an enlarged portion 2 which forms a chamber for the main operating mechanism of the machine. The casing 1 is preferably formed fluid tight to contain lubricating oil in which the bit operating gears work. The casing 1 if desired may be provided on one side with a gage or guide plate 3.

Revolubly mounted in the casing 1 are a series of drill bits 4 of which there may be any desired number said bits being here shown as arranged in parallel rows and are arranged the proper distance apart for forming a continuous hole in the object with which they are engaged. The cutting or working portions of the bits may be of any suitable construction and are here shown in the form of center bits and the bits are arranged to operate in such manner that their cutting blades will not interfere. The upper ends of the shanks of the bits project through the casing 1 and on the upper end of said shanks within the casing are fixedly mounted suitable operating gears which are here shown in the form of worm gears 5. The gears 5 are of such width that they may be arranged one above the other in the casing 1 and as here shown the gear of each alternate bit is arranged above the gear of the intermediate bits said upper and lower gears overlapping thus permitting the same to have a diameter corresponding to the space between two of the bit shanks. By thus arranging the gears they may be constructed of larger size than would be possible in any other arrangement.

In order to operate the gears to drive the bits in unison and in the same direction I provide a worm screw 6 which is arranged in the casing 1 between the parallel rows of gears 5 and in operative engagement therewith. The shaft of the worm screw is revolubly mounted in the opposite ends of the casing and on the end of the worm screw in the chamber 2 of the casing is fixedly mounted a worm gear 7 which is in operative engagement with a worm 8 formed on an operating shaft 9 which is revolubly mounted in the ends of the chamber or enlarged portion 2 of the casing as shown.

The shaft 9 is here shown as having secured to its opposite ends crank handles 10 whereby said shaft may be turned to drive the worm gears connected therewith and thus operate the bits. Instead of employing the crank handles 10 the shaft 9 may be provided with an operating pulley or gear (not shown) whereby power may be applied thereto for operating the gears. Any suitable means (not shown) may be employed for bracing and holding the machine down to the work.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion

and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended claim.

Having thus described my invention, what I claim is:

The herein described bit boring machine comprising a casing, a plurality of drill bits mounted in said casing in parallel series, frusto-conical worm gears fixedly mounted on said shanks within the casing, said gears of each alternate bit being arranged in a different plane from and overlapping the adjacent gears, a worm screw revolubly mounted in said casing and engaging said gears whereby the bits are revolved in unison and in the same direction, and means for operating said worm screw.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

AUSTIN E. CRANDELL.

Witnesses:
G. W. ADAMSON,
THOS. A. STIGER.