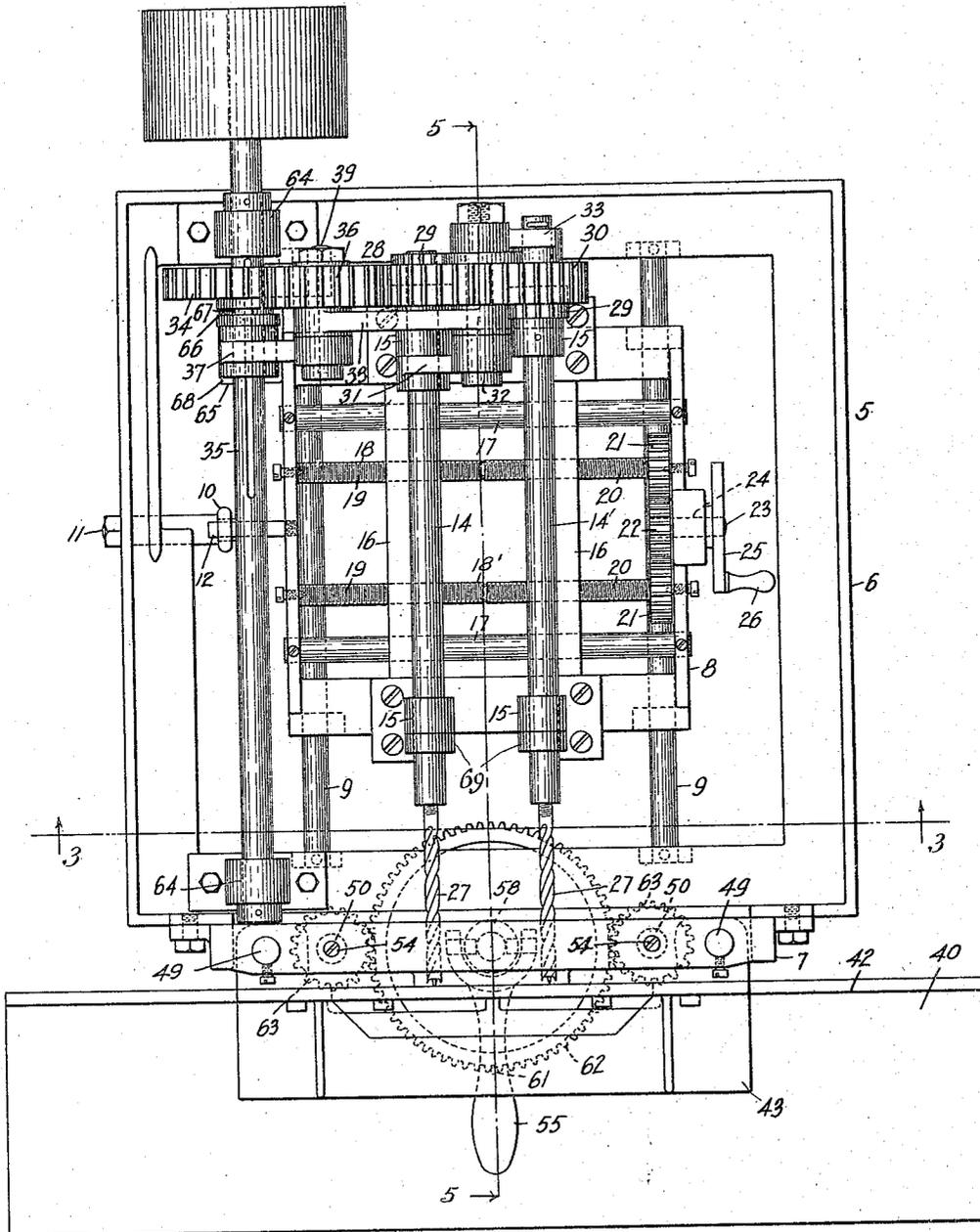


H. HANSON.
BORING MACHINE.
APPLICATION FILED JUNE 11, 1913.

1,228,110.

Patented May 29, 1917.
3 SHEETS—SHEET 1.



Witnesses.
Franklin E. Low.
Leonard A. Powell.

Fig. 1. Inventor.
Harry Hanson.
by his attorney Charles S. Gooding.

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3 SHEETS—SHEET 2.

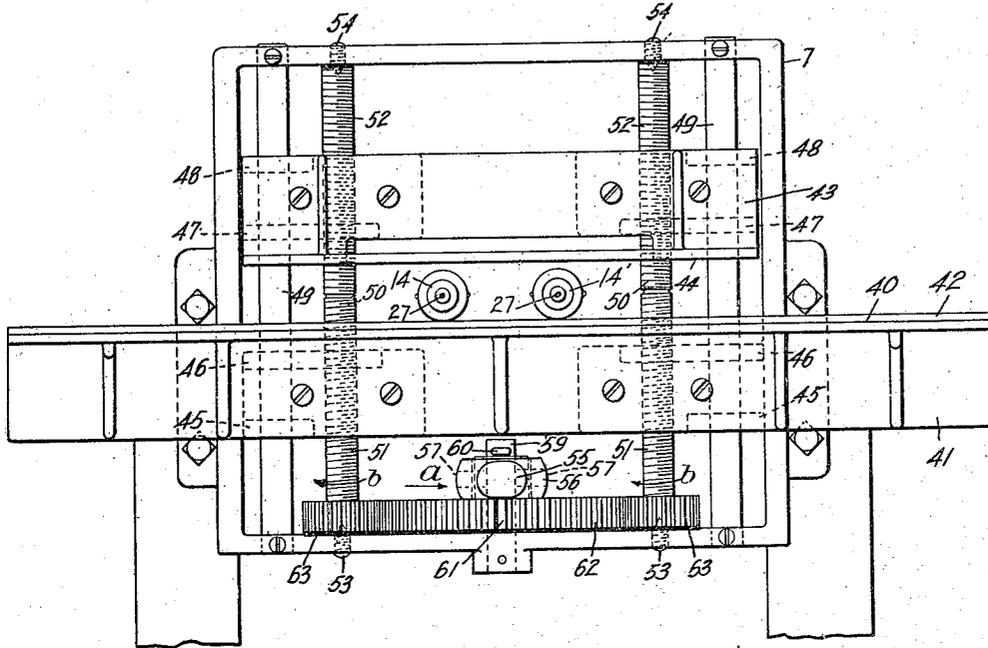


Fig. 2.

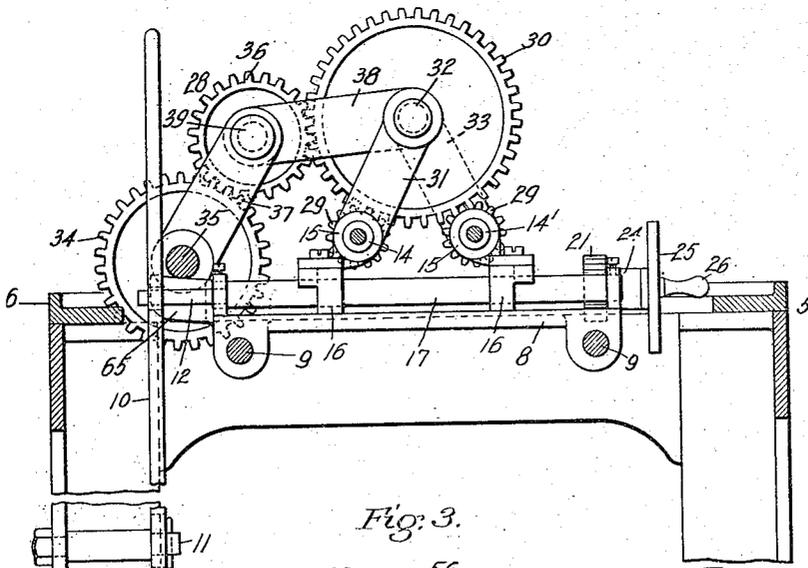


Fig. 3.

Witnesses:
Franklin E. Low
Leonard A. Powell.

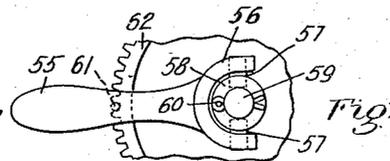


Fig. 4.

Inventor:
Harry Hanson
By his attorney,
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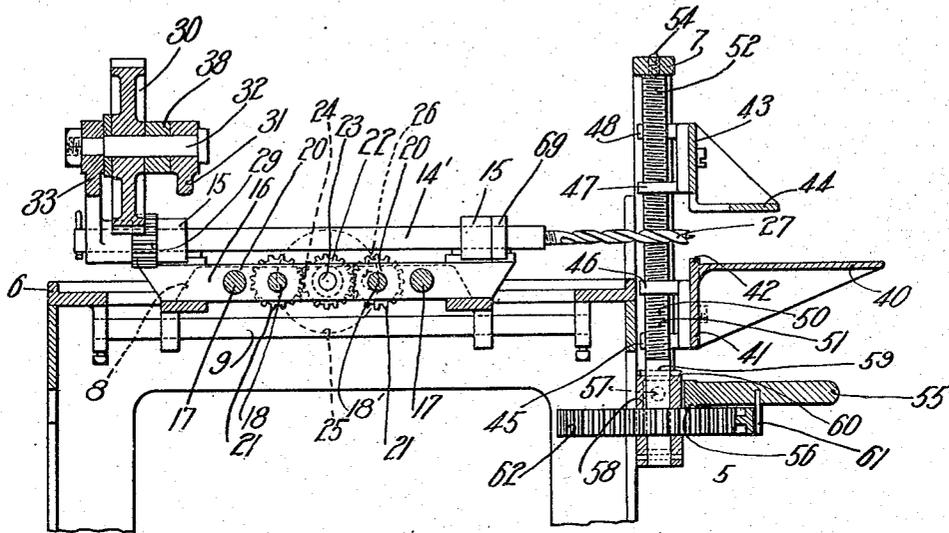


Fig. 5.

Inventor
Harry Hanson
by his attorney
Charles J. Gooding.

UNITED STATES PATENT OFFICE.

HARRY HANSON, OF REVERE, MASSACHUSETTS.

BORING-MACHINE.

1,228,110.

Specification of Letters Patent.

Patented May 29, 1917.

Application filed June 11, 1913. Serial No. 772,941.

To all whom it may concern:

Be it known that I, HARRY HANSON, a citizen of the United States, residing at Revere, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Boring-Machines, of which the following is a specification.

This invention relates to boring machines, the object being to provide a simple, light and fast running machine especially adapted to boring holes in dowels and the like where it is necessary that the holes shall pass exactly through the center of the work.

The object of this invention is further to provide a machine in which the work may be easily placed and correctly located in relation to the boring tool and firmly clamped in place.

The object is still further to provide a machine in which the boring tools may be adjusted transversely toward and away from each other while the machine is running and, if so desired, while the tools are in the work, whereby the holes may be elongated.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings:

Figure 1 is a plan view of my improved boring machine.

Fig. 2 is a front elevation of the same, partly broken away to save space.

Fig. 3 is a section taken on line 3—3 of Fig. 1.

Fig. 4 is a detail plan view of the work-support and clamp plate actuating lever and a portion of the actuating gear.

Fig. 5 is a section taken on the line 5—5 of Fig. 1.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 5 is the main frame mounted upon a suitable base and preferably consisting of two portions, a horizontal rectangular portion 6 and a vertical portion 7. Arranged upon the horizontal portion 6 is a slide 8 adapted to be moved along rods 9, 9 which serve as guides for said slide, said rods being secured to the portion 6 of the frame 5.

Suitable means are provided to operate said slide upon said rods, preferably consisting of a hand lever 10 pivoted on a stud 11 secured to said base and engaging a stud 12 on the side of said slide.

Arranged to move with said slide are spindles, preferably two, 14, 14' which are rotatably mounted in bearings 15, 15 carried by carriers 16, 16', said carriers being slidably mounted on rods 17, 17 secured in the slide 8 by screws. Suitable means are also employed whereby said carriers may be moved along the rods 17, 17 toward and away from each other, said means preferably consisting of a pair of shafts 18, 18', each having oppositely threaded portions 19, 20 engaging the carriers 16 and 16' respectively. Pinions 21, 21 are secured to said shafts 18, 18' respectively, both of said pinions meshing with the gear 22 fast at one end of a shaft 23 rotatably mounted in a bearing 24 on said slide.

A crank-disk 25 is secured to said shaft 23 at the end opposite to that upon which said gear is secured, said crank-disk having a handle 26 by means of which said gear may be manually rotated.

The spindles 14, 14' have at their forward ends boring tools 27, 27 having screw-threaded engagement therewith, rotary motion being imparted thereto by suitable means, preferably a train of gears 28 consisting of pinions 29, 29 secured to said spindles, respectively. A gear 30 meshing with both of said pinions is retained in mesh therewith by a link 31 connecting the spindle 14 with a stud 32 upon which said gear is rotated and a link 33 connecting said stud at the opposite face of said gear to the spindle 14'.

A driving gear 34 is splined upon a driving shaft 35 and imparts a rotary motion to the gear 30 through an intermediate gear 36, said intermediate gear being retained in mesh with the gears 30 and 34 by the links 37 and 38, the link 37 connecting the driving shaft 35 with a stud 39 upon which said gear 36 rotates, and the link 38 connecting said stud 39 with the stud 32; said links 37, 38, 31 and 33 form a flexible connection between said driving shaft and said pinions 29, 29, whereby said spindles may be moved transversely toward and away from each other and at the same time be rotated.

In order that the driving gear 34 of the train of gears 28 may be positively moved along the driving shaft simultaneously with the movement of the slide 8, without throwing said gears out of alinement, a U-shaped bracket 65 is secured to said slide, one arm 66 of which engages an annular groove 67 in

the hub of said gear 34, the other arm 68 engaging the outer face of the link 37.

The work to be bored is placed in front of the boring tools 27, 27 resting upon the supporting face 40 of the work-support 41, said supporting face lying parallel to the plane in which the axes of said boring tools are located. A stop 42 is secured to said work-support and is adapted to locate the work on said support longitudinally of said boring tools. A clamp plate 43 is arranged to clamp said work to said work-support by suitable means, but preferably as hereinafter described.

The work-support 41 and clamp plate 43 are each preferably provided with horizontal surfaces 40 and 44, respectively, which constitute the supporting faces thereof and are placed parallel to each other and equidistant from the plane in which the axes of said tools are located. Extending rearwardly from said work-support and said clamp plate are lugs 45, 46 and 47, 48 which have sliding engagement with rods 49, 49 secured by screws to the vertical portion 7 of the frame 5. The lugs 46 and 47 are also screw-threaded to engage the spindles 50, 50, each of which has a right hand threaded portion 51 and a left hand threaded portion 52 engaging said work-support and said clamp plate, respectively. Set-screws 53 and 54 are provided in the portion 7 of the frame, whereby said spindles 50 may be properly adjusted to bring said work-support and clamp plate into their correct locations. Rotary motion is imparted to the spindles 50, 50 simultaneously by a hand lever 55, forked at 56 and provided with pins 57, 57 which engage a collar 58 loosely mounted on a stud 59, said stud being secured to the portion 7 of the frame 5.

The collar 58 is prevented from sliding upwardly on said stud by a cotter pin 60. A pin 61 upon the under side of the lever 55 engages the teeth of a gear 62 rotatably mounted upon the stud 59 and adjacent to said lever, and pinions 63, 63 secured to said spindles 50, 50, respectively, engage said gear 62.

The general operation of the machine hereinbefore specifically described is as follows: The work is placed upon the supporting face 40 of the work-support 41 and against the stop 42. The operator then grasps the handle of the lever 55, swinging it upwardly on the pivotal pins 57, 57 until the pin 61 has been disengaged from the teeth of the gear 62. Said lever is then moved to the left in Fig. 2 to a point just short of the pinion 63, when said pin 61 is again lowered into engagement with said teeth. The handle is then moved toward the right to a point just short of the pinion 63 on the other side thereof, thus rotating said gear in the direction of the arrow *a* and rotating the

pinions 63, 63 and spindles 50, 50 in the direction of the arrows *b*, whereby said work-support and said clamp plate are moved toward the axes of said boring tools and toward each other, thereby firmly clamping the work therebetween.

It is evident that where a slight movement of the clamp plate and work-support toward or away from each other is desired, such, for instance, as would be necessary in unclamping and clamping pieces of substantially the same diameter, the operation hereinbefore described for disengaging the pin 61 from the teeth of the gear 62 is unnecessary. In such cases the handle of the lever 55 is rocked to rock the gear 62 and the pinions 63, 63 sufficiently only to cause the spindles 50, 50 to be rotated sufficiently to move the work-support and clamp plate slightly away from each other or toward each other, according as to whether it is desired to unclamp the piece of work or to clamp it.

The boring tools 27, 27 are rotated from the driving shaft 35, (said driving shaft rotating in bearings 64, 64 on the portion 6 of the frame 5), through the train of gears 28, pinions 29, 29 and spindles 14, 14'. The operator having clamped the work then adjusts the boring tools to the desired distance apart by rotation of the crank 25, shaft 23 and gear 22, said gear, in turn, rotating the pinions 21, 21 and spindles 20, 20, whereby the carriers 16, 16' upon which said spindles are mounted are moved toward or away from each other, as desired. The tools are then fed forward into the work by the rocking of the lever 10 which moves the slide 8 forward upon the rods 9, 9 and in turn moves the spindles 14, 14', said spindles being provided with collars 69, 69 adapted to receive the end thrust from said tools.

It will also be seen that boring tools of any form may be attached to said spindles and may be moved transversely toward and away from each other while said tools are in the work, thereby causing the said tools to cut holes of greater width than the diameter of the boring tool, so that the machine could be used for boring holes which are cylindrical in cross section or which are of greater diameter in one direction than the other in cross section, and thus the machine can be utilized for boring slots and key seats in addition to boring holes in dowels and the like, as hereinbefore set forth.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. A boring machine having, in combination, a work-support, a plurality of boring tools, mechanism adapted to rotate said tools, means to impart a longitudinal motion to said rotating mechanism, whereby said boring tools may be advanced into the work

or withdrawn therefrom, and means to adjust said tools transversely.

2. A boring machine having, in combination, a plurality of boring tools, mechanism adapted to impart a rotary motion thereto, a work-support, the supporting face thereof lying parallel to a common plane in which the axes of said tools are located, a clamp plate and means to move said work-support and said clamp plate in parallel relation toward said common plane to clamp the work.

3. A boring machine having, in combination, a work-support, a plurality of boring tools, mechanism adapted to impart a rotary motion thereto, means for imparting a longitudinal movement to said mechanism and said tools, and mechanism adapted to simultaneously adjust said boring tools transversely toward and away from each other.

4. A boring machine having, in combination, a work-support, a slide, a plurality of spindles mounted thereon, boring tools carried by said spindles respectively, mechanism adapted to impart a rotary motion to said spindles and means for imparting motion to said slide to move said spindles longitudinally.

5. A boring machine having, in combination, a work-support, a slide, a plurality of carriers mounted thereon, spindles rotatably mounted on said carriers respectively, boring tools carried by said spindles respectively, mechanism adapted to rotate said spindles, means for imparting motion to said slide to move said spindles longitudinally, and mechanism for imparting simultaneous transverse motion to each of said carriers.

6. A boring machine having, in combination, a work-support, a slide, a pair of carriers adjustably mounted thereon, spindles journaled upon said carriers respectively, boring tools carried by said spindles respectively, mechanism for imparting simultaneous transverse motion to each of said carriers, pinions secured to said spindles respectively, a driving shaft, gearing forming a driving connection between said shaft and said pinions, whereby a rotary motion is imparted to each of said spindles, and means to impart motion to said slide to move said spindles longitudinally.

7. A boring machine having, in combination, a work-support, a slide, a pair of carriers adjustably mounted thereon, spindles journaled upon said carriers respectively, boring tools carried by said spindles respectively, mechanism for imparting simultaneous transverse motion to each of said carriers, pinions secured to said spindles respectively, a driving shaft, a train of gears forming a driving connection between said shaft and said pinions, links forming a flexible connection between said shaft and said spindles to retain said gears in operative relation, means to impart a longitudinal move-

ment to said slide, and means adapted to move said gears longitudinally of said shaft simultaneously with said slide.

8. A boring machine having, in combination, a work-support, a slide, a pair of carriers adjustably mounted thereon, spindles journaled upon said carriers respectively, boring tools carried by said spindles respectively, a shaft having oppositely threaded portions, one of which engages one of said carriers the other portion engaging the other of said carriers, means to rotate said shaft whereby said carriers are moved toward and away from each other, means to impart motion to said slide to move said spindles longitudinally and means to impart a rotary motion to each of said spindles.

9. A boring machine having, in combination, a work-support, a slide, a pair of carriers adjustably mounted thereon, spindles journaled upon said carriers respectively, boring tools carried by said spindles respectively, a pair of shafts, each having oppositely threaded portions, one portion of each of said shafts engaging one of said carriers and the other portion of each of said shafts engaging the other of said carriers, pinions secured to said shafts respectively, a gear meshing with each of said pinions, means to manually operate said gears whereby said shafts are rotated to move said carriers transversely toward and away from each other, mechanism adapted to rotate said spindles during the transverse movement thereof and means for imparting motion to said slide to move said spindles longitudinally.

10. A boring machine having, in combination, a plurality of boring tools having their axes arranged to move toward and away from each other in a common plane, a work-support, the supporting face thereof lying parallel with said common plane, a clamp plate located at the opposite side of said plane from said work-support and means to move said work-support and said clamp plate toward and from said plane.

11. A boring machine having, in combination, a plurality of boring tools having their axes arranged to move toward and away from each other in a common plane, a work-support, the supporting face thereof lying parallel with said common plane, a clamp plate located at the opposite side of said plane from said work-support, the supporting faces of said clamp plate and said work-support being equidistant from said plane and means to simultaneously move said work-support and said clamp plate toward and from said plane.

12. A boring machine having, in combination, a plurality of boring tools having their axes arranged to move toward and away from each other in a common plane, a work-support, the supporting face thereof lying parallel with said common plane, a clamp

plate located at the opposite side of said plane from said work-support, the supporting faces of said clamp plate and said work-support being equidistant from said plane and means to simultaneously and uniformly move said work-support and said clamp plate toward and from said plane.

13. A boring machine having, in combination, a boring tool, a work-support, a clamp plate, said work-support and said clamp plate being located on opposite sides of the axis of said boring tool with their supporting faces equidistant from said axis, a plurality of shafts, each having right hand and left hand threaded portions, said shafts adapted to engage said work-support and clamp plate, pinions secured to said shafts respectively, a spur gear meshing with both of said pinions, a hand lever, and a pin carried by said lever adapted to be moved into engagement with the teeth of said spur gear to impart a rotary motion to said gear.

14. A boring machine having, in combina-

tion, a boring tool, a work-support, a clamp plate, said work-support and said clamp plate being located on opposite sides of the axis of said boring tool with their supporting faces equidistant from said axis, a plurality of shafts, each having right hand and left hand threaded portions, said shafts adapted to engage said work-support and clamp plate, pinions secured to said shafts respectively, a spur gear meshing with both of said pinions, a lever coaxially mounted relatively to said gear and adjacent thereto, and means on said lever adapted to engage the teeth of said gear, whereby said gear may be rotated in either direction.

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

HARRY HANSON.

Witnesses:

SYDNEY E. TAFT,
SADIE V. McCARTHY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."