L. M. KEITHLEY & A. E. SCHIEN.

ANGLE BORING MACHINE.

APPLICATION FILED AUG. 27, 1908.

960,097.

Patented May 31, 1910.

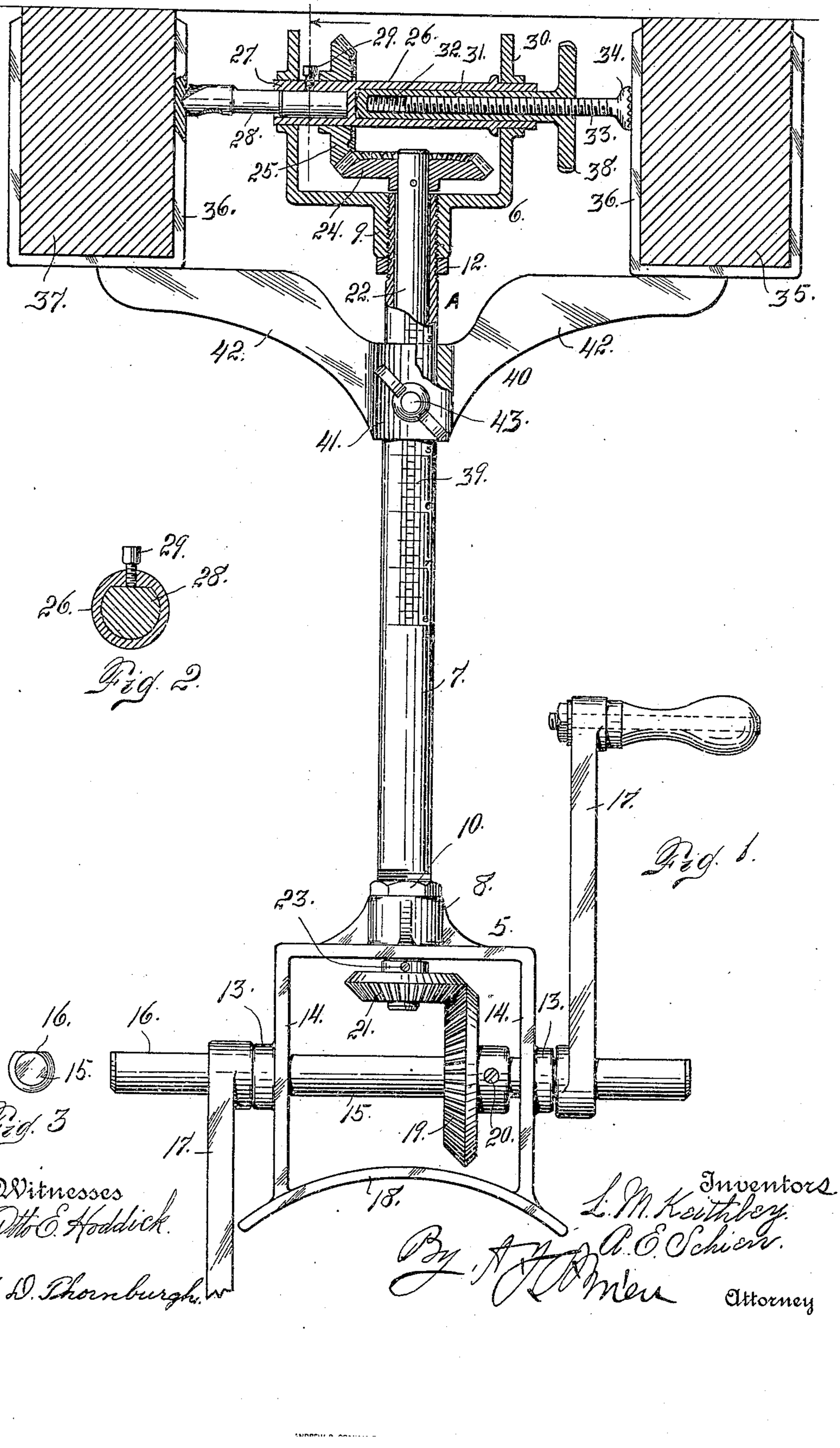

Fig. 2.

Fig. 1.

Witnesses

Otto E. Hoddick.

J. D. Thornburgh.

Inventors

L. M. Keithley.

A. E. Schien.

By A. H. Bates

Attorney

UNITED STATES PATENT OFFICE.

LUTHER M. KEITHLEY AND ANDREW E. SCHIEN, OF DENVER, COLORADO.

ANGLE-BORING MACHINE.

960,097. Specification of Letters Patent. **Patented May 31, 1910.**

Application filed August 27, 1908. Serial No. 450,466.

To all whom it may concern:

Be it known that we, LUTHER M. KEITHLEY and ANDREW E. SCHIEN, citizens of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Angle-Boring Machines; and we 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in boring machines adapted to operate and bore holes in either wood or metal in a direction at right angles to a supporting column which serves to connect the operating shaft with the boring mechanism proper. This column is hollow and through it passes a shaft whose lower extremity is geared to the operating or power shaft and whose upper extremity is geared to the chuck carrying the boring tool, whether for metal or wood boring purposes.

Mounted upon the hollow column of our improved construction, is an adjustable abutment. The column is graduated and provided with numerals to indicate distances from the axis of the boring tool downwardly upon the column. Our improved machine is very often employed to bore holes in timbers or beams forming a part of the frame-work of cars or other structures requiring that the machine be raised from below into the boring position. The distance above the bottom of the beams to the point where the hole is to be bored may be measured. Then by adjusting the abutment upon the column by the aid of the graduation thereon, the boring tool may be elevated to the precise point or height required since when the abutment comes in contact with the lower surfaces of the beams, the tool will be properly elevated.

In the drawing it is assumed that the boring operation is carried on by introducing the boring mechanism proper into the space between two beams.

Having thus briefly outlined our improved construction, we will proceed to describe the same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a view of our improved machine the boring mechanism being shown partly in section. Fig. 2 is a section taken on the line 2—2 Fig. 1. Fig. 3 is an end view of the operating shaft.

The same reference characters indicate the same parts in all the views.

Let the numerals 5 and 6 designate two frame members which are connected by a hollow column 7, whose opposite extremities are threaded to engage threaded openings formed in reinforced parts 8 and 9, with which the frame members 5 and 6 are respectively provided. The column is also provided with lock nuts 10 and 12 which are screwed against the parts 8 and 9 of the frames, whereby they are locked against turning upon the column. The sides 14 of the frame 5 are provided with openings adapted to receive an operating shaft 15. The frame parts 14 are reinforced as shown at 13, whereby the bearing surface for the shaft 15 is increased. The opposite extremities of this shaft are flattened on one side as shown at 16, making it practicable to mount a small electric motor (not shown) thereon, if desired. In the drawing we have shown hand cranks 17 for operating the shaft. It will be understood, however, that any suitable power may be employed. It will also be understood that our improved machine is portable, but this does not interfere with the use of a motor upon the shaft for operating the same, if desired. One extremity of the frame 5 is provided with a curved part 18 adapted to rest upon the leg of the user above the knee, whereby the machine may be supported in this manner during the boring operation, since it is assumed that the device is in this manner held in position for boring purposes.

The operating shaft is provided with a bevel gear 19 which is made fast thereon by a set screw 20. This gear meshes with a similar but smaller gear 21 fast on the lower extremity of a shaft 22 which passes through the hollow column and also through the hubs or reinforced parts 8 and 9 of the two frames. The gear 21 is secured to the shaft 22 by a fastening screw 23.

The extremity of the shaft 22 remote from that to which the gear 21 is attached, protrudes into the space inclosed by the U shaped frame 6, and to which is attached a bevel gear 24 which meshes with a similar gear 25 fast upon a shaft 26, one extremity

of which is formed hollow, as shown at 27, to receive the shank of a boring tool 28, the tool being secured in place by a set bolt 29. The part 27 of the shaft 26 may be termed the tool chuck. The shaft 26 is journaled in the opposite side parts 30 of the frame 6.

When the machine is used for boring metal, the shaft 26 is formed hollow in the rear of the chuck, and in it is loosely inserted a hollow feed screw 31 which is provided with a longitudinally disposed threaded opening 32 adapted to receive a screw 33 whose outer extremity 34 is enlarged and toothed to engage a beam 35 or other stationary structure. In this event it is assumed that the tool 28 is employed to bore metal. As shown in the drawing the beam 35 is covered with a metal plate 36. This is also true of the opposite beam 37. As shown in the drawing the metal plate 36 of the beam 37 is engaged by the boring extremity of the tool 28.

If we assume that the boring operation is in progress, the operator as the tool 28 advances, will turn the hollow feed screw 31 by the use of a hand wheel 38, with which its outer extremity is provided. As this wheel is turned, the boring mechanism will be advanced laterally in the direction of the travel of the tool 28, this advance harmonizing with the movement of the tool into the metal plate 36. It will, therefore, be understood that when boring metal the feed screw mechanism and the screw 33 coöperating therewith, or equivalent mechanism, will be required. When boring wood, however, a proper wood boring tool or auger will be substituted for the metal boring tool 28. In this event, the screws 31 and 33 will not be required since the auger will advance into the wood automatically without pressure.

As shown in the drawing, the hollow column 7 is graduated as shown at 39 from its upper exposed extremity downwardly, the figures, numerals or other indicating characters being located accordingly. If it be assumed that the hole is to be bored in the beam 37 a certain distance above the bottom of the beam, the abutment 40 will be adjusted upon the column to produce this result. As shown in the drawing this abutment consists of a sleeve 41 having laterally projecting arms 42 extending from the sleeve on opposite sides. These arms serve to engage the lower surfaces of the beams 35 and 37. The sleeve is loose upon the column and held in the desired position of adjustment by means of a set screw 43. The arms 42 project somewhat abruptly upwardly from the top of the sleeve 41, as they leave the same forming a depression A between and below the portions of the arm which engages the beams. This depression makes room to receive the sleeve 9 and nut 12 of the frame 6, when it is desired to adjust the said frame and its attachments for boring holes in the beams near their lower surfaces.

Before commencing the use of the device, the distance above the bottom of the beam to the point where it is desired to bore the hole, will be determined. The abutment 40 will then be adjusted upon the column to harmonize with this distance so that when the tool is raised to bring the arms 42 of the abutment into engagement with the lower surface of the beams 35 and 37, the boring tool will be in alinement with the point where the hole is to be formed. It will then be necessary to adjust the feed screw 31 to bring the tool 28 into operative engagement with the metal part to be bored. After this is done the shaft 15 is rotated by the use of any suitable power. The rotation of this shaft imparts rotary movement to the connecting shaft 22 by virtue of the gearing connection between the two shafts. The shaft 22 imparts rotary movement to the shaft 36 by virtue of the gearing connection between the said shafts.

If it is desired to bore wood only, the screws 31 and 33 as heretofore stated, are not required.

Ordinarily the frame 5 will be lowermost and the frame 6 uppermost and these two frames may, therefore, be designated as lower and upper frames respectively. It will be understood, however, that the machine may be held in the horizontal position or in a position at any angle between the vertical and horizontal. Hence the terms rearward and forward as applied to these frames, is possibly more accurate.

Having thus described our invention what we claim is:

A machine of the class described comprising two separated frames, a hollow column forming a rigid connection between the two frames, an operating shaft journaled in one frame, a boring shaft journaled in the other frame, an operative connection between the two shafts, the lower frame extending below the operating shaft, a concavo-convex member integrally connecting the two sides of the extending portion of the said frame; and an abutment longitudinally adjustable upon the hollow column, the latter being graduated, the abutment having a central depression adapted to receive a portion of the boring frame, when the latter is properly adjusted, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

LUTHER M. KEITHLEY.
ANDREW E. SCHIEN.

Witnesses:
R. A. RAMEY,
A. RAMEY.