

W. R. FOX.
MULTIPLE DRILL.

APPLICATION FILED DEC. 20, 1909. RENEWED SEPT. 4, 1912.

1,058,045.

Patented Apr. 8, 1913.

2 SHEETS—SHEET 1.

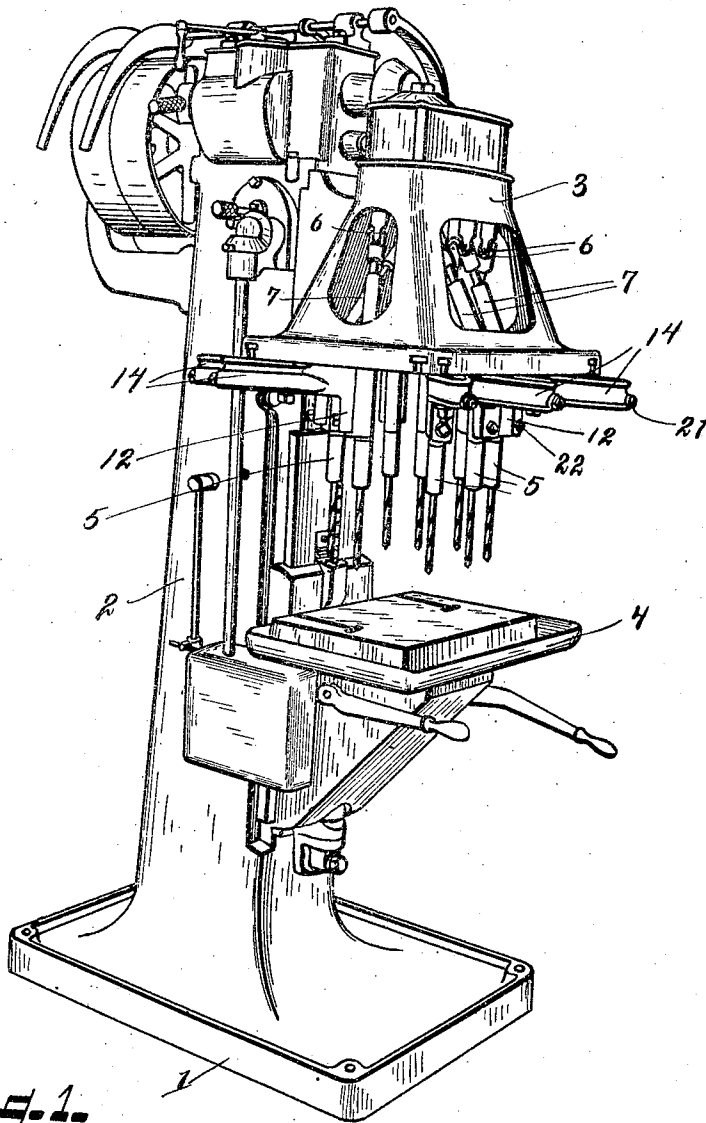


Fig. 1.

Witnesses

F. Gertrude Tallman
Oliver E. Braden

Inventor

William R. Fox

By

Chappell & Co.

Attorney

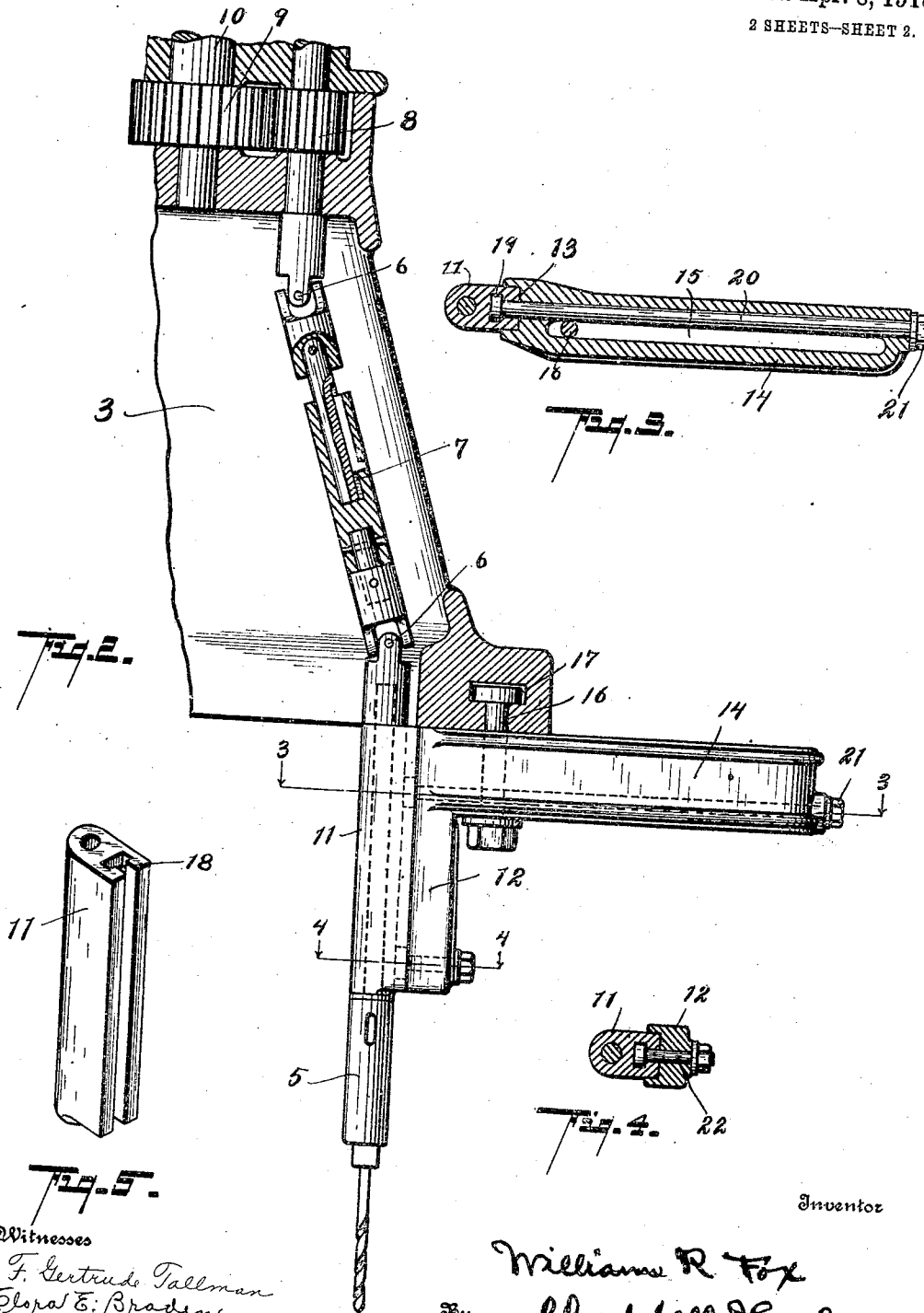
W. R. FOX.
MULTIPLE DRILL.

APPLICATION FILED DEC. 20, 1909. RENEWED SEPT. 4, 1912.

1,058,045.

Patented Apr. 8, 1913.

2 SHEETS—SHEET 2.



Witnesses

F. Gertrude Tallman
Clara E. Braden

Inventor

William R Fox
By Chappell & Earl

Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM R. FOX, OF GRAND RAPIDS, MICHIGAN.

MULTIPLE DRILL.

1,058,045.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed December 20, 1909, Serial No. 534,130. Renewed September 4, 1912. Serial No. 718,552.

To all whom it may concern:

Be it known that I, WILLIAM R. FOX, a citizen of the United States, residing in the city of Grand Rapids, county of Kent, State of Michigan, have invented certain new and useful Improvements in Multiple Drills, of which the following is a specification.

This invention relates to improvements in multiple drills.

The main objects of this invention are to provide an improved multiple drill in which the parts are so arranged as to be capable of complete adjustment and one in which the adjusting means are readily accessible.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The structure described constitutes one effective embodiment of my invention.

The invention is clearly defined and pointed out in the claims.

A structure constituting an effective and preferred embodiment of the features of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure 1 is a perspective view of a structure embodying the features of my invention. Fig. 2 is an enlarged detail vertical section through the drill supporting head, parts being shown in full line to better illustrate their form. Fig. 3 is a detail section taken on a line corresponding to line 3—3 of Fig. 2. Fig. 4 is a detail section taken on a line corresponding to line 4—4 of Fig. 2. Fig. 5 is a perspective view of one of the spindle bearings.

In the drawings, similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, the frame preferably consists of the base, 1, column 2, and spindle supporting head 3 which form the supports for the operating mechanism. The table 4 is adjustably mounted upon the column, but as the details for adjusting this table form no part of the present invention, they are not here illustrated or described in detail.

The flexible driving connections for the drill spindles preferably comprise the universal joints 6 and the slip joints 7, see Fig. 2. The pinions 8 for these shafts are arranged in mesh with a driving gear 9 on the driving shaft 10. The driving connections for this shaft 10 are not illustrated as they may be of any form desired.

The drill spindles are provided with bearing blocks 11, which are mounted upon the supports 12, the supports being preferably provided with groove-like seats 13 to receive the bearings, see Fig. 3. The supports 12 are provided with arms 14 having longitudinal slots 15 therein, through which the supporting and clamping bolts 16 for the supports are arranged. The heads of the bolts 16 are arranged in the T-slots 17 in the head so that the supports may be adjusted thereon transversely and longitudinally, the bolts 16 serving to clamp the supports to their adjusted position.

The bearing blocks 11 are preferably provided with T-grooves 18 in which the heads 19 of the clamping bolts are engaged. These bolts are arranged longitudinally through the arms 14 so that their nuts 21 are at the outer ends of the arms and in a convenient position for manipulation. Coacting clamping bolts 22 are preferably provided, the same being arranged below the arms 14. These bolts 22 are also always accessible no matter what position the supports may be adjusted to, as the nuts are always away from the center of the machine so that a wrench can be readily engaged therewith. This manner of arranging these bolts is of very great advantage on account of the ease and facility with which they may be adjusted with the supports in any position.

In my improved drilling machine, the parts are, as previously stated, very accessible so that the drills can be adjusted to any position which they are capable of filling very readily and easily, and I desire to remark that the adjustment is very complete. The parts are also very securely and effectively held when adjusted.

I have illustrated my invention in detail in the form in which I have embodied it in practice. I am aware, however, that it is capable of considerable variation in structural details within the scope of the appended claims without departing from my invention, and, as such variations will read-

ily occur to those skilled in the art to which this invention relates, I have not attempted to illustrate or describe the same herein.

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

1. In a multiple drill, the combination with the drill spindles, of driving connections therefor including a plurality of flexible shafts provided with slip joints; a head with which said flexible shafts are grouped, faced on one side and provided with vertical T-slots; bearing blocks; bearing block supports provided with longitudinally-slotted adjusting arms and seats for said bearing blocks; clamping bolts for said bearing blocks disposed longitudinally through said support arms with their nuts at the outer ends thereof; and clamping bolts for adjusting said bearing block supports arranged through the slotted arms of said bearing block supports to clamp the same to said head.

2. In a multiple drill, the combination with the drill spindles, of driving connections therefor including a plurality of flexible shafts provided with slip joints; a head with which said flexible shafts are grouped, faced on the under side; bearing blocks for said drill spindles faced on one side and provided with vertical T-slots; bearing block supports provided with adjusting arms and seats for said bearing blocks; clamping bolts for said bearing blocks disposed longitudinally through said support arms with their nuts at the outer ends thereof; and means to secure said bearing block supports adjustably to said head.

3. In a multiple drill, the combination with the drill spindles, of driving connections therefor including a plurality of flexi-

ble shafts provided with slip joints; a head with which said flexible shafts are grouped, faced on the under side; bearing blocks for said drill spindles faced on one side and provided with vertical T-slots; bearing block supports provided with adjusting arms and seats for said bearing blocks; clamping bolts for said bearing blocks disposed with their heads in said T-slots parallel with said support arms; and means to secure said bearing block supports adjustably to said head.

4. In a multiple drill, the combination of the drill spindle; flexible driving connections therefor; a fixed carrying head; adjustable bearing blocks for said drill spindles faced on one side and provided with a vertical T-adjusting slot; a bearing block support with adjusting arm and seat for said bearing block; clamping bolts parallel to the adjusting arm disposed in said support and cooperating with the T-slot to clamp the bearing block in place; and means for securing said arm adjustably to said head.

5. In a multiple drill, the combination with the drill spindles; driving connections therefor; bearings for said spindles; supports for said bearings having groove-like seats therein adapted to receive said bearings, said spindle bearings having vertical T-grooves in their seat-engaging faces; clamping bolts of said bearings engaged in said grooves therein and a head for carrying said supports.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

WILLIAM R. FOX. [L. S.]

Witnesses:

EARL STOKOE,
LENA CHURCH.