J. S. GLENN.

DRILL BRACE.

APPLICATION FILED OCT. 1, 1908.

917,048. **Patented Apr. 6, 1909.**

2 SHEETS—SHEET 1.

Fig. 1.

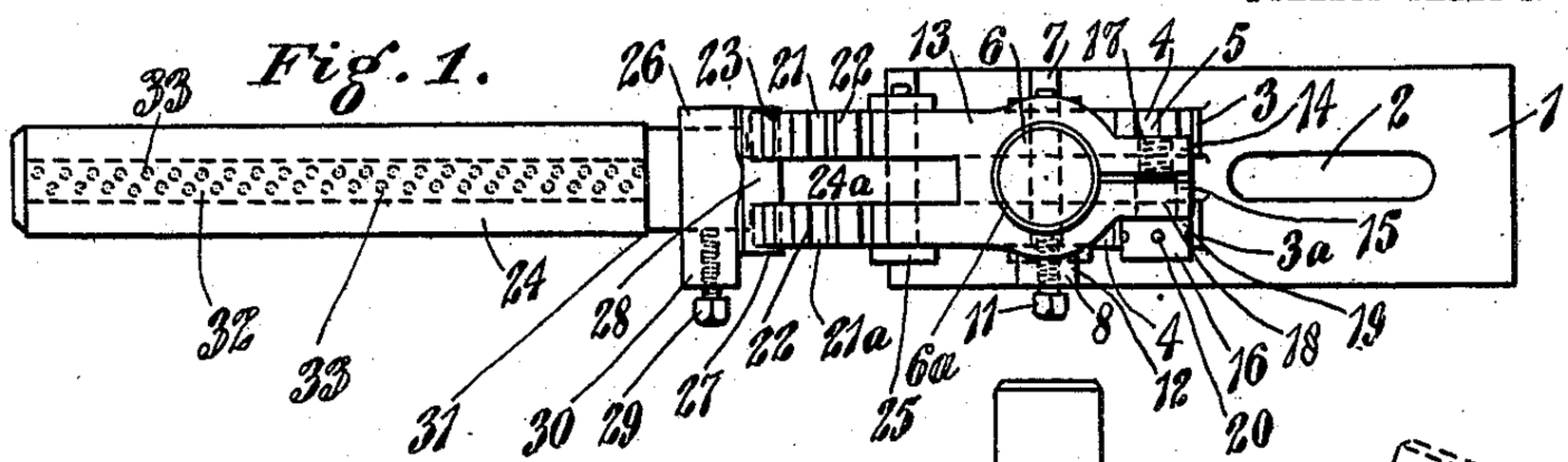


Fig. 2.

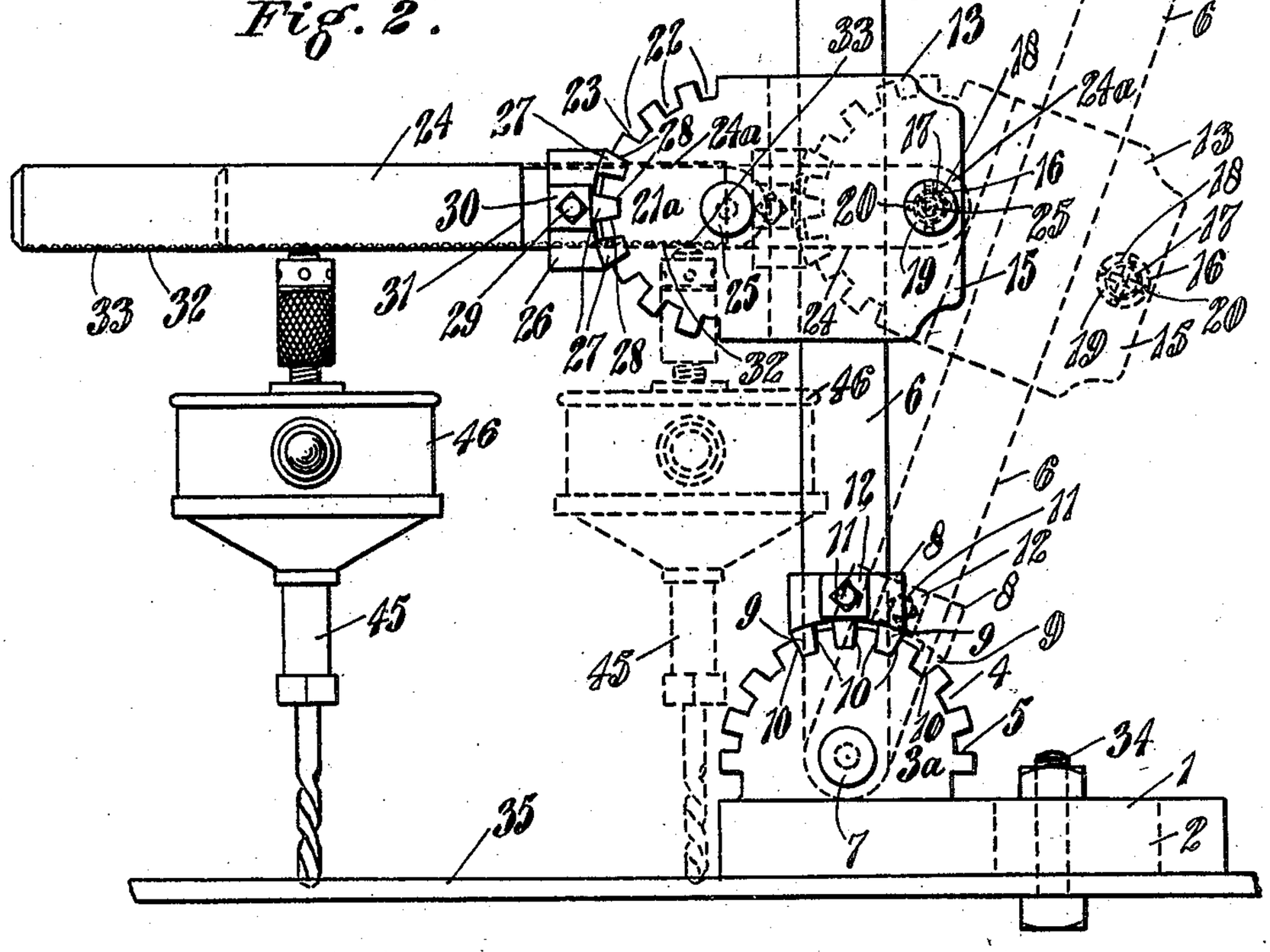


Fig. 3.

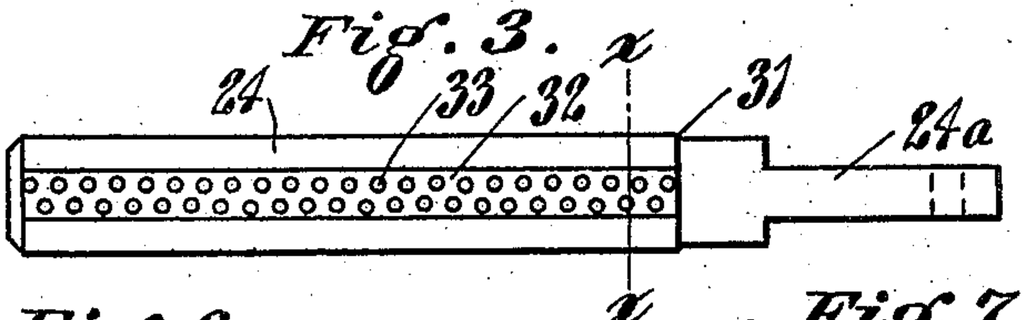


Fig. 4.

Fig. 5.

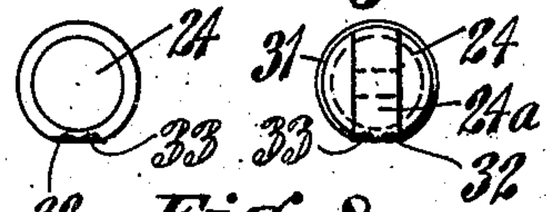


Fig. 6.

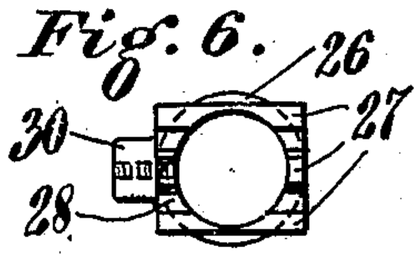


Fig. 7.

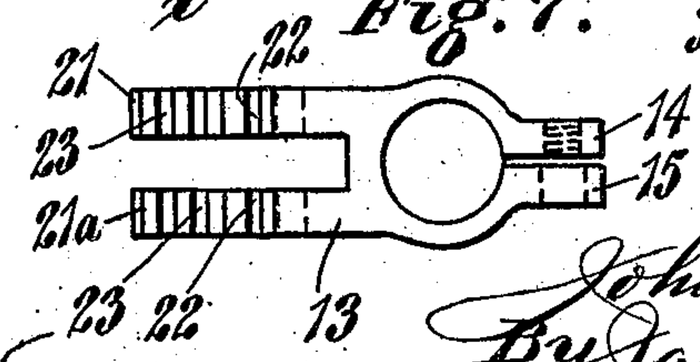
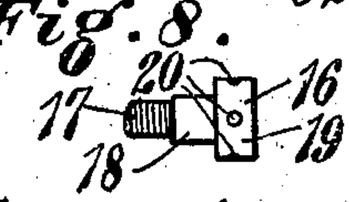


Fig. 8.



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2 SHEETS—SHEET 2.

Fig. 10.

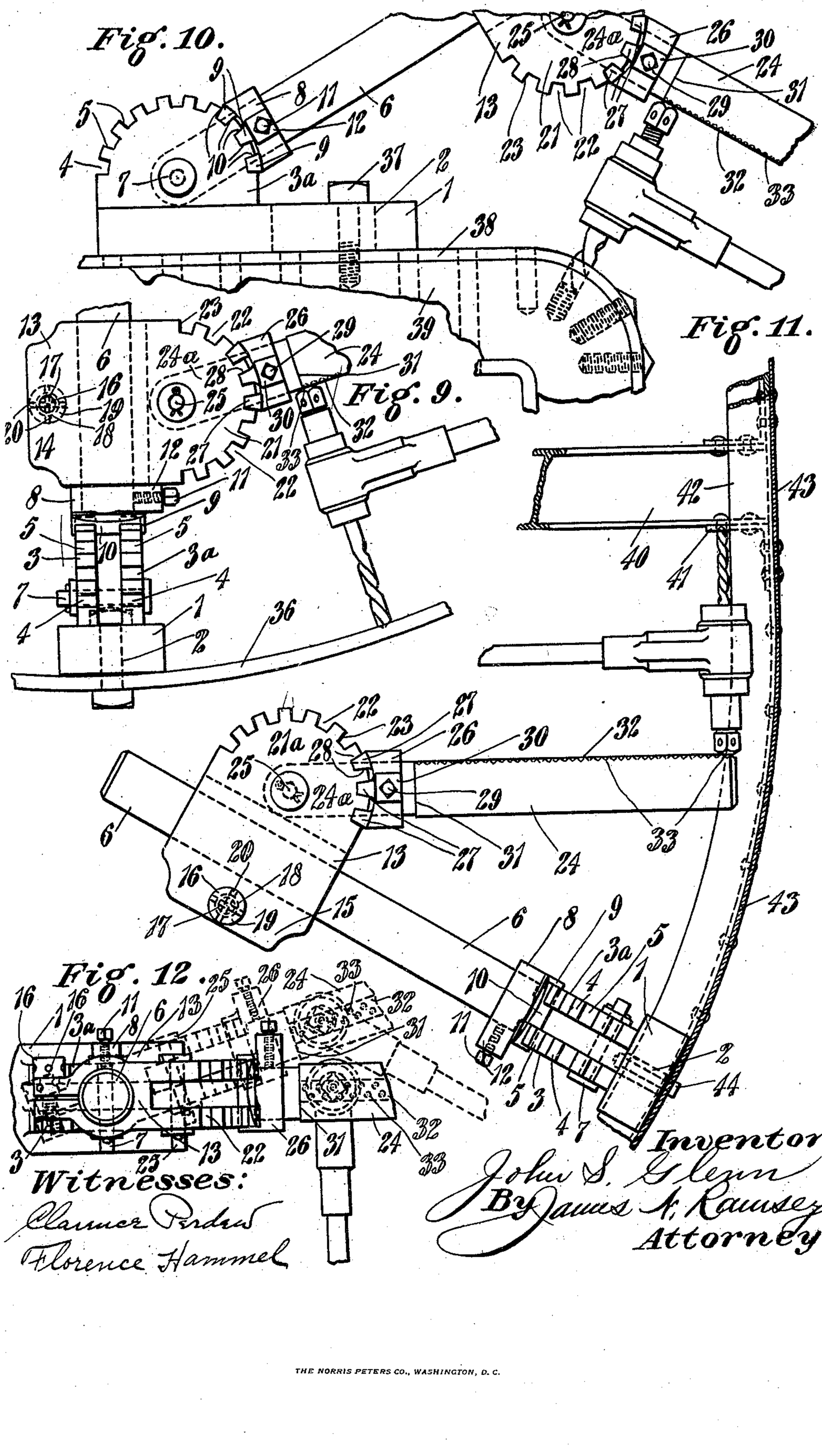

Fig. 11.

Fig. 9.

Fig. 12.

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UNITED STATES PATENT OFFICE.

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DRILL-BRACE.

No. 917,048. Specification of Letters Patent. Patented April 6, 1909.

Application filed October 1, 1908. Serial No. 455,611.

To all whom it may concern:

Be it known that I, JOHN S. GLENN, a citizen of the United States, residing at West Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Drill-Braces, of which the following is a specification.

My invention relates to drill braces, and has for its object the provision of a drill brace which shall be adjustable for use in various positions, and which shall be sufficiently rigid when adjusted for use in any of such positions.

My invention consists in a base, a standard articulately mounted on the base by means of a segment, a detent slidable on the standard, an arm articulately mounted on the standard by means of a segment slidable on the standard, and a detent slidable on the arm.

My invention also consists in the details of construction and arrangement of parts as will hereinafter be more fully described and claimed.

In the drawings: Figure 1 is a plan view of a device embodying my invention. Fig. 2 is a side elevation illustrating the use of my invention, the dotted lines indicating the position in which the device may be adjusted for boring with a power drill closely adjacent to the base. Fig. 3 is a bottom plan view of the arm. Fig. 4 is a front elevation of the arm. Fig. 5 is a rear elevation of the arm. Fig. 6 is a detail view of one of the detents. Fig. 7 is a plan view of the head. Fig. 8 is a detail view of the binding screw for the head. Fig. 9 is a partial side elevation illustrating the use of my improved device in boring through a plate from the concave side thereof at an angle inclined to the axis of the drill clamp. Fig. 10 is a partial side elevation, illustrating the use of the device in removing bolts from the outside plates and mud ring of a fire box at the corner thereof. Fig. 11 is an elevation illustrating the use of the device in boring through the flange of an I-beam, close to the junction thereof with a wall which curves under the point at which it is desired to do the boring. Fig. 12 is a partial plan view, illustrating the use of the device in boring a series of holes on the arc of a circle.

Constructed as illustrated, my improved drill brace comprises a base 1, of oblong formation, which is provided with an opening 2, through which a suitable fastening device such as a bolt may be passed for securing the device firmly to the work. Preferably, this opening 2 is elongated so that it takes the form of a slot extending longitudinally of the base 1, and is nearer to the rear end of the base than it is to the front end. This opening 2, thus elongated, allows a certain degree of adjustment of the base of the device with respect to the work. Forwardly of the elongated opening 2, the base is provided with two segments 3 and 3ª preferably formed integral with the base. These segments are spaced apart laterally of the base and extend parallel to each other longitudinally of the base and each is provided with a series of notches 4 extending radially in it and coincident with the notches in the other. These notches are formed so that their sides 5 are divergent radially outward from the centers of their respective segments.

A standard 6, preferably of elongated cylindrical formation in its main part above the segments 3 and 3ª, has an extension 6ª reduced from the size of the main cylindrical part so that it is of oblong cross section of a width allowing it to fit movably between the parallel segments 3 and 3ª on the base 1. Central openings are provided in the segments 3 and 3ª and an opening of corresponding size is provided through the reduced extension 6ª of the standard 6, and through these openings a pin 7 passes, whereby the standard is pivotally mounted concentric to the segments and to the radial notches 4 therein.

Above the segments 3 and 3ª on the cylindrical main part of the standard 6, an annular detent 8 surrounds the standard, and has its interior opening of sufficient diameter to allow it to slide freely on the cylindrical part of the standard. This annular detent 8 is provided, on its side presented toward the segments 3 and 3ª, with a series of teeth 9 having their sides 10 converging inwardly toward the center of the segments so that they correspond to the notches 4 with their outwardly diverging sides 5 and are adapted to engage therein. Thus, when the teeth 9 engage within the notches 4, the standard 6 will be held stationary with respect to the segments 3 and 3ª and the base 1 on which they are mounted. Then, the base being held stationary with respect to the work, the standard will also be held stationary with respect

to the work. For holding the detent 8 stationary on the standard 6 and preventing the disengagement of its teeth 9 from within the notches 4 in the segments, it is provided with a set screw 11, which takes through a boss 12 on the detent and engages with the convex surface of the cylindrical part of the standard 6 on which the detent is adapted to slide.

Above the detent 8 a bifurcated head 13 has its members 14 and 15 embracing the standard 6, this head being interiorly formed so that it has a longitudinal circular opening of sufficient diameter to allow it to slide freely on the cylindrical part of the standard 6 when the members 14 and 15 are not drawn together. For the purpose of binding the head 13 on the standard 6, a binding screw 16 is provided which has a threaded part 17 adapted to take into a threaded opening in the member 14 of the bifurcated head 13 but has a larger plain part 18 which passes through a plain opening in the member 15 of the head. This plain part 18 of the screw is intermediate between the threaded part 17 and the head 19, which the screw is provided with and which bears against the outside of the member 15 when the threaded part 17 is screwed into the threaded opening in the member 14. For conveniently turning this screw its head 19 is provided with a series of diametrical openings 20 into which a pin may be inserted. Thus the head 13 may be clamped on the standard 6 at any point longitudinally thereof, and it also may be swung around the standard 6 in a plane at right angles to the longitudinal axis of the standard and clamped in position at any point throughout such an extent. On the side of the opening in the head through which the standard 6 is adapted to pass, opposite to the member 14 and 15, the head is provided with two segments 21 and 21ª which are spaced apart and parallel to each other in the direction of the length of the head and are preferably formed integral with the head. Each of these segments is provided with a series of notches 22 extending radially thereof and coincident with the notches of the other. These notches 22 are similar to the notches 4 in the segments 3 and 3ª in that their sides 23 are divergent outwardly from the centers of their respective segments.

An arm 24 is of cylindrical formation in its main part and has an extension 24ª reduced from the size of the cylindrical main part so that it is of oblong cross section of a width allowing it to move freely between the segments 21 and 21ª in a manner similar to that in which the reduced part 6ª of the standard 6 moves between the segments 3 and 3ª. This extension 24ª extends between the segments 21 and 21ª. The segments 21 and 21ª are provided with central openings and the reduced extension 24ª of the arm 24 is provided with a corresponding opening. Through these openings in the segments and the arm a pin 25 is passed, whereby the arm is pivotally mounted in the head, concentric to the segments 21 and 21ª and to the radial notches 22 therein.

Adjacent to the segments 21 and 21ª, an annular detent 26 surrounds the arm 24 and has its interior opening of sufficient diameter to allow it to slide freely on the part of the arm 24 adjacent to the segments. This detent is similar to the detent 8 on the standard and has teeth 27 on its sides presented toward the segments 21 and 21ª, and sides 28 of which teeth converge toward the center line of the segment, so that the teeth 27 correspond with the notches 22 and are adapted to engage therein. Thus, when the teeth 27 of the detent 26 are engaged within the notches 22 of the segments 21 and 21ª, the arm 24 will be held stationary with respect to the head 13. Then, the head 13 being held stationary on the standard 6 and the standard 6 being held stationary on the base 1, which is in turn held stationary on the work, the arm 24 may be held in stationary position with respect to the work to form a means of engagement with the end of a drill stock. For holding the detent 26 stationary on the arm 24 when its teeth engage within the notches in the segments 21 and 21ª it is provided with a set screw 29 which takes through a boss 30 on the detent 26 and engages with the convex surface of the cylindrical part of the arm on which the detent is adapted to slide. The cylindrical part of the arm on which the detent 26 is adapted to slide is continued only a sufficient distance from the notches in the segments 21 and 21ª to allow the detent 26 to be drawn away from the notches sufficiently to disengage its teeth from within the notches. At this point, where the cylindrical part upon which the detent 26 is adapted to slide ends, the arm 24 which has an enlargement 31, beyond which the cylindrical formation of the arm continues but is of such diameter that the detent cannot slide upon it. Thus the enlargement 31 limits the movement of the detent 26 away from the notches 22 in the segments 21 and 21ª. On one side of the enlarged cylindrical part of the arm 24, which side, in most operations in which my improved device will be used, will be the bottom side, a segmental section of this enlarged cylindrical part of the arm is removed throughout its length, so that a plane surface is presented. This plane surface 32 is provided with a series of indentations 33, preferably conical in formation similar to center punch marks and about the size such marks usually have, to form means for receiving the end of a drill stock and holding it stationary. As is well known, drill stocks

are provided with conical points on their ends which indentations of such shape are adapted to receive. It is not desirable that the segmental section which is removed from the enlarged cylindrical part of the arm 24 should be large relatively thereto, since the arm should have a large cross section in order that it may be thoroughly rigid. On the other hand, it is desirable that the number of the indentations 32 should be as large as possible in order to give the greatest possible number of adjustments of the position of the drill stock along the length of the arm 24. Such an arrangement is provided by staggering the indentations 33 as illustrated.

In using my improved drill clamp, the base 1 may be secured to the work by passing a bolt through the work, such as the bolt 34 illustrated in Figs. 2 and 9 of the drawings, where it passes through plates 35 and 36 respectively. The range of adjustment allowed by articulately mounting the standard on the base and articulately mounting the arm on the standard, as well as providing the base with the elongated opening, makes it possible to set up the drill clamp with great accuracy, to form a holding means for the drill stock and drill most efficiently, by passing a bolt 34 through such openings as may usually be found in work of the character upon which these tools are used. Where it is not practicable to pass a bolt entirely through the work, a tap screw, such as the tap screw 37 illustrated in Fig. 10 of the drawings may be used. In this case, the tap screw 35 is screwed into one of the openings left by the removal of the bolts from the plate 38 and mud ring 39. Here, it will be noted, that as the work progresses out of the range of the clamp it may be removed forward, securing it by passing the tap screw 37 into successive holes formed in the course of the boring. The change of adjustment of the positions of the standard and arm in such successive operations will be readily understood and the various positions into which the clamp may be brought to adapt it to the varying conditions under which the boring must be performed is well illustrated by Fig. 11 of the drawings, where, to remove the rivet from the lower flange of the I-beam 40 and the bracket 41, by which it is secured to the channel 42 forming a rib for the wall 43, would be impracticable by operating from above, owing to the obstruction presented by the upper flange of the I-beam. From below, the wall 43 curves under the point at which the boring must be performed and thus also obstructs the application of an ordinary drill brace. However, my improved drill brace may have its base 1 clamped to the curved wall 43 at some distance below the I-beam 40 by passing a bolt 44 through a rivet hole; inverting the head 13 on the standard 6 so that the plane surface 32 of the arm 24 will be presented upwardly; swinging the head 13 so that its length is at right angles to the length of the base 1, thereby permitting the base 1 to make the most stable engagement with the wall 43; and then adjusting the arm 24 in the segments on the head 13 so that the plane surface 32 of the arm 24 is brought substantially parallel to and is presented toward the lower surface of the flange of the I-beam 40, upon which the ratchet drill stock may be brought into inverted position, with its pointed end engaging in one of the indentations 33 near the free end of the arm 24, and with the drill bit presented at right angles to the lower surface of the flange, as required.

For boring holes at intervals along the arc of a circle my improved drill brace may be used by clamping it into position so that the axis of the cylindrical standard 6 is brought coincident with the center of the arc upon which the holes are to be bored, and securing the standard in position at right angles to the surface upon which the work is to be done. Then, by merely maintaining the end of the drill stock in the same indentation in the arm 24 and turning the head 13 on the standard 6 the radial distance of the drill from the center will be maintained, the head 13 being clamped in the various positions to which it is adjusted around the standard by means of the binding screw 16, as hereinbefore described.

The drill brace is illustrated as being used with a ratchet drill adapted to be operated by hand in Figs. 9 and 10 11 and 12 of the drawings, but it will be understood that it is equally adapted for use with a drill stock operated by some form of power, such as a pneumatic or an electric drill stock. similar in general formation to the drill stock 45 as illustrated in Fig. 2 of the drawings. As indicated by the dotted lines, when it is desired to drill closely adjacent to the base of the brace without unclamping the base from the work, the standard 6 may be swung backward and the arm 24 swung downward to make room for the somewhat bulky gear case 46 of the drill stock 45. Thus the rapid operation of the power driven drill stock is made available in many places where the lack of proper adjustment of the drill brace would render its use impracticable. It will also be understood that either the power driven drill stock or the ratchet drill stock, driven by hand, may be used in a great number of other difficult positions not herein illustrated, but the adjustments for which will readily be suggested to the operator in the use of the drill brace.

It may be observed that by having the segments upon which the standard is ad-

justed in combination with the segments upon which the arm is adjusted, a sufficiently great number of angles of adjustment of the standard and the arm may be obtained without increasing the number of notches in the segments to such an extent that the size of the teeth on the detents would be undesirably decreased and weaken the structure. With such provision, the base, standard and arm, and the segments and detents used in adjusting these parts may all be of heavy construction and the brace as a whole may be provided with sufficient strength for the heaviest work without increasing its weight to such an extent as would be undesirable in connection with an adjustable and portable tool.

The possibility of designing the tool so as to impart to it great rigidity without undesirably increasing its weight and bulk renders it useful throughout the entire range of its adjustment.

It may be noted from observation of the illustration in Fig. 10, that by tilting the standard forward and the arm upward, boring may be done at a considerable distance from the base of the tool, thus avoiding the necessity of relocating the tool in a great many instances.

The notches in the segments with their sides diverging outwardly from the centers of the segments and the teeth on the detents with their sides converging inwardly toward the centers of the segments permit the teeth to readily enter the notches and be disengaged therefrom.

It will be understood that the size of the tool as a whole as well as the relative sizes of the various parts may be varied to adapt it for use for varying conditions. Thus the size and number of the teeth in the segments on the base may be the same as the size and number of the teeth in the segments on the head, as shown, or they may be greater or less in various proportions to permit various angles of adjustment which may be found desirable in particular lines of work.

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

1. In a drill brace, a base, a segment on the base, a standard pivoted concentric with the segment on the base, a segment on said standard, the segment being slidable on the standard, an arm pivoted on the segment on the standard concentric with said segment, means for holding the standard stationary with respect to the base and the segment thereon, means for holding the arm stationary with respect to the segment slidable on the standard, and means for holding the segment on the standard stationary, substantially as and for the purposes set forth.

2. In a drill brace, a segment on the base provided with notches, a standard pivoted in the segment concentric thereto, a segment slidable on the standard and also provided with notches, an arm pivoted in the segment which is slidable on the standard, concentric to the segment, means for clamping the segment on the standard, a detent slidable on the standard and adapted to enter the notches in the segment on the base to hold the standard stationary, and a detent slidable on the arm adapted to engage within the notches in the segment on the standard to hold the arm stationary, substantially as and for the purposes set forth.

3. In a drill brace, a standard, a head mounted on the standard, segments on the head parallel to each other and each provided with radial notches coincident with the notches in the other, an arm having an extension between the segments, a pin passing through the segments and through the extension on the arm, whereby the arm is pivotally attached to the segments concentric thereto, an enlargement of the arm near the notches in the segments, a detent, mounted on the arm and slidable between the enlargement thereon and the notches in the segments, provided with teeth corresponding with the notches in the segments and adapted to engage therein, the enlargement being adapted to limit the movement of the detent away from the notches in the segments, substantially as and for the purposes set forth.

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Witnesses:
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