

R. B. CRUMP & W. M. ROBERTSON.

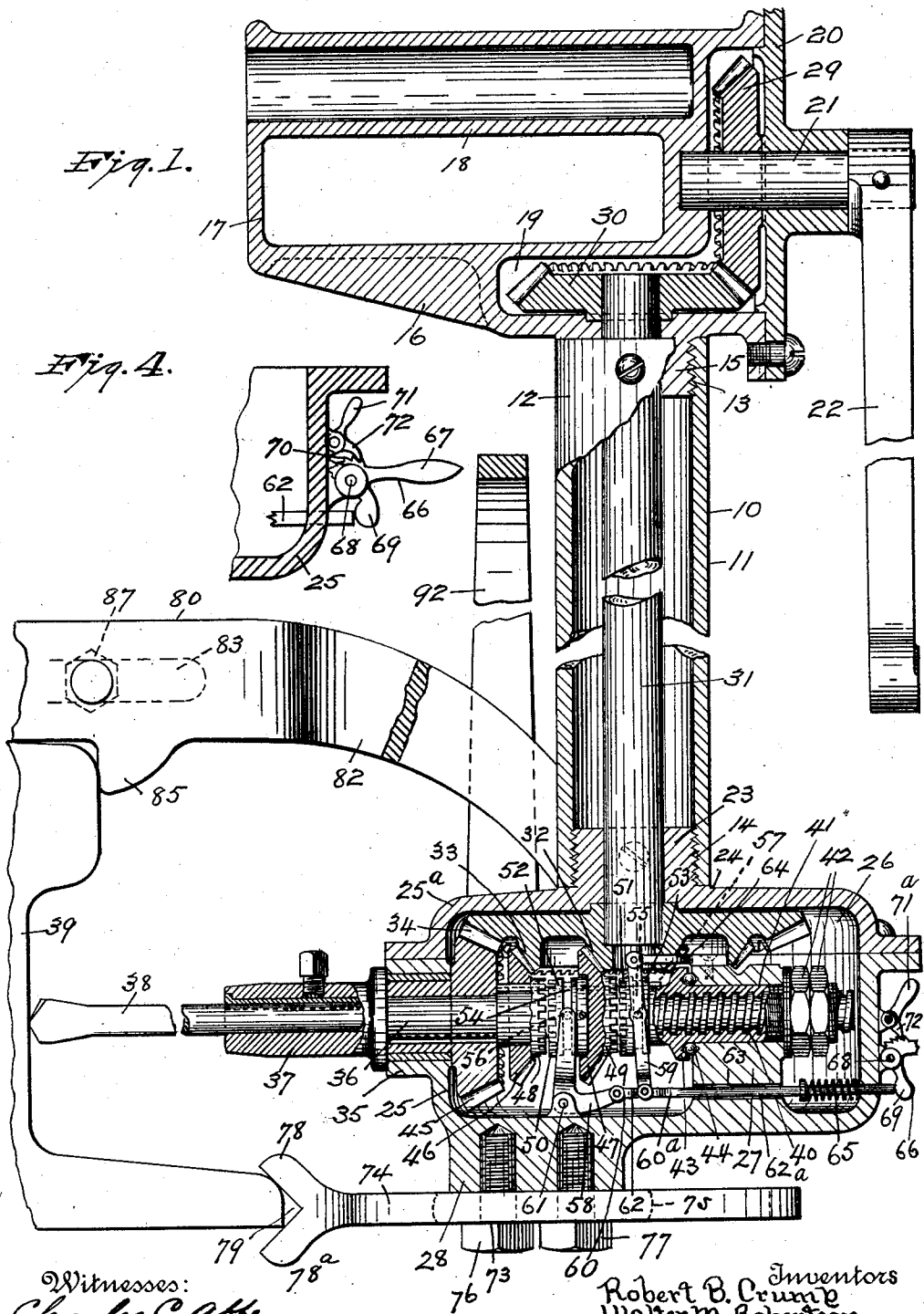
DRILL.

APPLICATION FILED JUNE 16, 1911.

Patented Sept. 3, 1912.

2 SHEETS—SHEET 1.

1,037,449.



Witnesses:
Charles C. Abbe
E. M. Jerke.

Inventors
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By their Attorney
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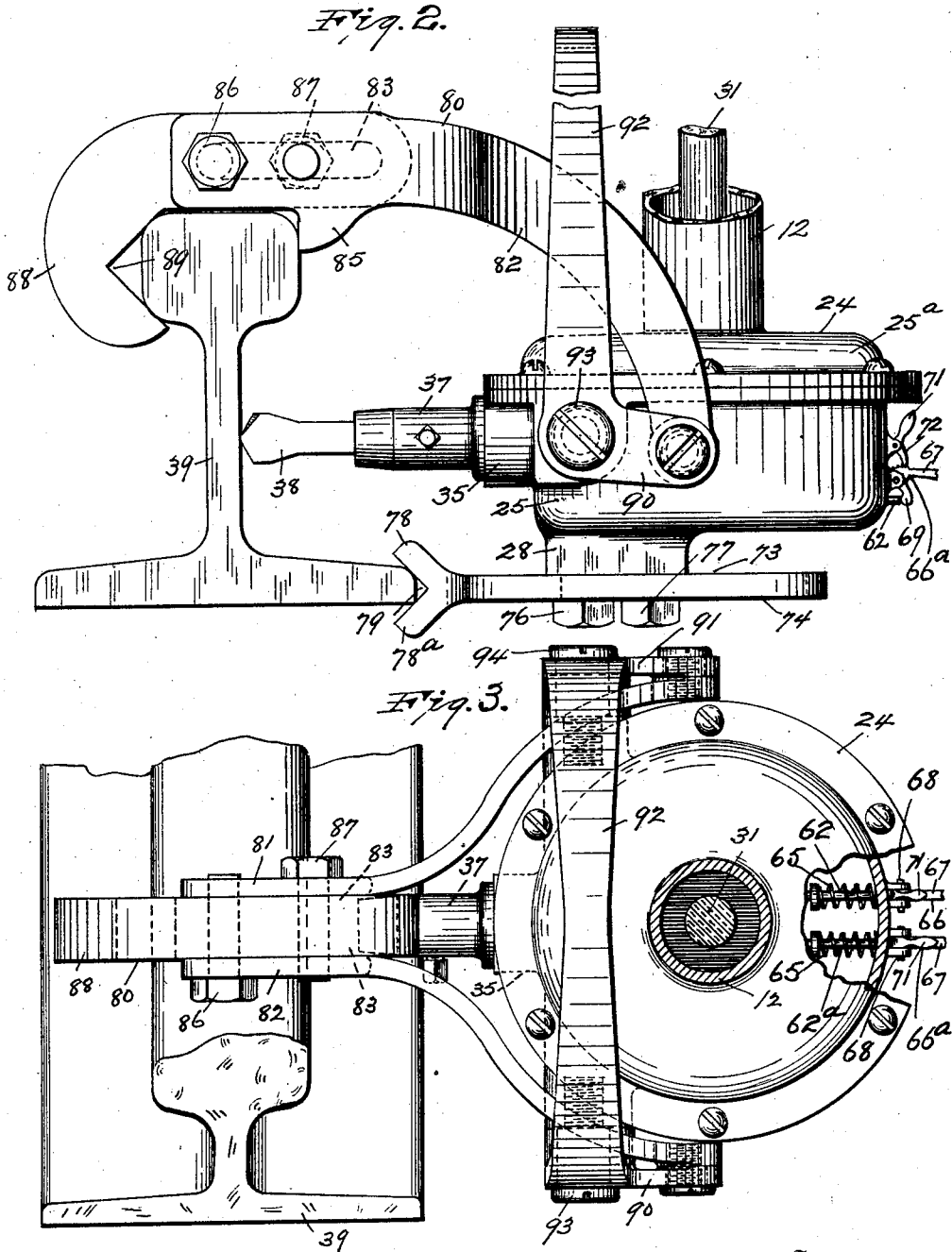
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UNITED STATES PATENT OFFICE.

ROBERT B. CRUMP AND WALTER M. ROBERTSON, OF NEW YORK, N. Y.

DRILL.

1,037,449.

Specification of Letters Patent.

Patented Sept. 3, 1912.

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To all whom it may concern:

Be it known that we, ROBERT B. CRUMP and WALTER M. ROBERTSON, both citizens of the United States, and residents of New York, borough of Brooklyn, county of Kings, and State of New York, have invented a certain new and useful Improvement in Drills, of which the following is a full, clear, and exact specification.

This invention relates to a class of drills or devices adapted to cut openings particularly through metal.

Our invention has for its object primarily to provide an efficient form of drill designed to be employed for facilitating the work of cutting openings of various sizes especially through the webs of railway rails and which is operated by a crank at an elevation, thus permitting the operator to use the drill while in a standing position thereby overcoming the disadvantage of being required to crouch upon the ground in order to operate implements of this class in ordinary use.

Other objects of the invention are to provide means adapted to move the bit of the drill forward as the depth of the opening increases; to provide a trip adapted to throw into action the bit moving means at intervals; to provide a gripping element adapted to engage the base-flange of a rail for supporting the drill in position; and to provide a toggle or clutch for engaging the head of a rail whereby the drill may be held in proper position when in use.

A practical embodiment of the invention is represented in the accompanying drawing forming a part of this specification in which similar characters of reference indicate corresponding parts in all the views, the said invention being more fully described hereinafter and then pointed out in the appended claims.

In the drawing, Figure 1 is a sectional view, partly in detail and partly fragmentary, of one form of drill embodying our invention. Fig. 2 is a detail side view of the base of the drill showing the manner of its use for cutting an opening through the web of a rail. Fig. 3 is a top plan thereof, and Fig. 4 is a detail side view, partly fragmentary and partly in section, of the means for operating the trip employed in conjunction with the drill.

The drill 10 has a casing 11 consisting of a jacket 12, which is vertically disposed

when the device is in use, and both ends of said jacket are interiorly threaded, as at 13 and 14. In the threaded end 13 of the jacket 12 is screwed the threaded boss or bearing 15 of a head 16. The head 16 is elongated in form, and has a substantially rectangular opening 17 therethrough whereby a handle portion 18 is provided at its top. At one end of the head 16 is a substantially L-shaped chamber 19 which is closed by a front plate 20 detachably connected to the end of said head which is opposite to the handle 18, and in said front plate and adjacent wall of the head is journaled a short shaft 21. The end of the shaft 21 extends some distance beyond the plate 20, and upon said end is a crank handle 22 by which the drill may be manually operated. In the threaded end 14 of the jacket 12 is screwed the threaded boss or bearing 23 of a base 24 of the casing 11. The base 24 may be substantially circular or of any preferred shape and is composed of a bowl shaped body 25 and a top plate 25^a whereby a chamber 26 is provided within the base. Interiorly of the chamber 26 and upon the bottom of the bowl shaped body 25 is a projecting part 27, and upon the underside of the bottom of said body is a boss or extending portion 28.

Within the vertical section of the L-shaped chamber 19 of the head 16 is a bevel gear 29 which is keyed upon the shaft 21, and in the transverse section of said chamber is a second bevel gear 30 in mesh with the gear 29. The bevel gear 30 is keyed upon the upper end of a vertical shaft 31 within the jacket 12. Said shaft 31 is journaled in the bearings 15 and 23 of the head 16 and base 24 respectively of the casing 11. When the crank handle 22 is turned the shaft 31 will be rotated through the medium of the bevel gears 29 and 30, and upon the lower end of the vertical shaft 31 are a plurality of bevel gears 32, 33, 34. The bevel gears 32, 33, 34 are preferably of three different diameters and integrally formed so as to be revolved simultaneously with the rotation of the shaft 31.

Journaled in a bearing 35 provided at one end of the hollow base 24 is a shaft 36 which is longitudinally disposed through the chamber 26 of said base, and upon one end of the shaft 36 exteriorly of the base 24 is a chuck 37 adapted to carry a bit, as 38, of a suitable size and form for cutting open-

ings in metal, or other material, for instance a railway rail 39, as shown in the drawings. A large portion of the longitudinal shaft 36 opposite to the chuck 37 is threaded, at 40, and upon said threaded portion is an interiorly threaded sleeve 41 which is revolvably held in the projecting part 27 of the bowl 25 of the base 24. The sleeve 41 is held against displacement within part 27 between two nuts 42, engaging one face of the projecting part 27 and an annular flange 43 provided upon said sleeve. Between the annular flange 43 and the opposite face of the projecting part 27 is a ball bearing 44 for receiving any thrust of impact upon the shaft 36 when the drill is in use.

Keyed upon the shaft 36 interiorly of the chamber 26 and adjacent to the bearing 35 of the base 24 is a bevel gear 45 which is in mesh with the bevel gear 34 upon the vertical shaft 31. Loosely held upon the end of the sleeve 41 in proximity to the bevel gear 45 is a second bevel gear 46 which is in mesh with the bevel gear 33 of said vertical shaft and loosely held upon the sleeve 41 is a third bevel gear 47 which is in mesh with the bevel gear 32 of the vertical shaft 31. A toothed ring or annular flange, as 48 and 49, is formed upon the smaller face of the second bevel 46 and upon the smaller face of the third bevel gear 47, and both of said toothed annular flanges are adapted to be engaged by the teeth 50 and 51 of the clutches 52 and 53. Each of the clutches 52 and 53 is keyed upon the sleeve 41 so as to be slidable thereon. The spindle 36 is given a constant speed of rotation by gears 33 and 34 which normally rotate the sleeve 41 along therewith. The gears 33, 46 and 32, 47 which rotate the sleeve 41 are so proportioned that when in mesh the sleeves receive a less speed of rotation than the spindle 36 whereby the threaded engagement of the sleeve 41 and spindle 36 thrusts the spindle forward and feeds it into the metal as the drilling progresses. Each pair of gears 33 and 46 or 32 and 47 may be clutched or applied independently to effect the sleeve 41 to feed the drill, and as said pairs of gears are differently proportioned, a variable pressure of thrust, or degree of feed of the drill may be produced at the will of the operator. Each of the clutches 52 and 53 may be of the usual form of a circular band having an annular groove 54 and 55 in the exterior surface thereof, and in each of said grooves are disposed pins 56 and 57 provided upon levers 58 and 59 of two trips 60 and 60^a adapted to throw at intervals one or both of the clutches 52 and 53 singly or simultaneously into engagement with the bevel gears 46 and 47 for rotating the sleeve 41 to force the shaft 36 and bit 38 forward when desired.

The lever 58 of the trip 60 is substantially L-shaped and has a pronged arm carrying the pins 56. The corner of said lever is pivotally held, at 61, to the interior surface of the bottom of the base 24, and the other arm of the lever 58 is pivoted to a longitudinally disposed rod 62 which is guided through a passage formed in the projecting part 27 within the chamber 26 and passes through an opening in the wall of the base 24. The lever 59 is composed of a pronged arm carrying centrally thereof the pins 57, and upper ends of said arms are pivoted to two short bars, as 64, held upon the top of the projecting part 27. The lower end of the lever 59 is pivoted to a second rod 62^a which is guided through a second passage formed in the projecting part 27 and upon each of the rods 62 and 62^a interiorly of the chamber 26 is a spring 65 normally serving to force said rods outwardly of the base 24. In order to force the rods 62 and 62^a inwardly of the chamber 26 we provide upon the exterior of the base 24 opposite to the chuck 37 two levers 66 and 66^a. Each of the levers 66 and 66^a has a foot-bar 67 which is pivotally held, at 68, to the base 24, and upon both of the foot-bars is a heel 69 which engages with the end of each of the rods 62 and 62^a when the foot bars are swung downwardly upon their pivots. The rods 62 and 62^a will then be moved against the tension of the springs 65 and throw the clutches 52 and 53 into engagement with the toothed annular flanges 48 and 49 of the bevel gears 46 and 47. The bevel gears 46 and 47 will be held so as to be revolved by the operation of the drill for rotating the sleeve 41 so as to force the longitudinal shaft 36 and bit 38 forwardly at desired intervals. In order to hold the trip 60 into action, upon each of the foot-bars 67 is a ratchet or a plurality of teeth 70 which are adapted to be engaged by a pawl or dog 71 and 71^a pivotally held upon the exterior of the base 24, and each of said dogs has a finger or arm 72 adapted to be moved for releasing the dog from engagement with the ratchet 70.

As a means to hold the drill rigidly in a proper position when employed for drilling an opening through the web of a railway rail, as shown in the drawing, upon the underside of the extending portion 28 of the base 24 is a gripping element 73. The gripping element 73 has a bar or plate 74 having an elongated opening 75. Through the elongated opening 75 and into threaded openings in the extending portion 28 are passed screws 76 and 77 for adjustably holding the gripping element to said extending portion. At one end of the bar 74 are two fingers 78 and 78^a which are formed so as to provide therebetween a notch 79 of substantially a V-shape so as to firmly grip the edge of the base flange of a railway rail.

For the purpose of engaging the head of a railway rail to also maintain the drill in proper position, we provide a toggle or clutch, as 80. The toggle 80 has two arms 81 and 82, both of which are curved in a manner so that one of the ends thereof are spaced apart in parallel relation, and in said ends of the arms are alined slots or openings 83. Upon the underside of each of the curved arms 81 and 82 is a heel, as 85, adapted to engage one end of the head of a railway rail, as shown in Fig. 4, and in the slots 83 are movably held bolts 86 and 87. Upon the bolts 86 and 87, and between the arms 81 and 82 is adjustably held a hook, as 88, having a substantially V-shaped notch 89 whereby the opposite edge of the head of the railway rail may be tightly seated therein for holding the rail between said hook and the heels 85 of the arms 81 and 82. The opposite ends of each of the arms 81 and 82 are pivotally held to one end of short arms 90 and 91 of an angular handle 92 adapted to hold the toggle 80 in locked engagement with the head of a rail. The handle 92 is pivotally held to the base 24 by screws or bolts 93 and 94 so that by moving said handle in a direction toward the vertical jacket 11 the toggle 80 will be tightened upon the head of the rail, and by moving the handle 92 in an opposite direction the toggle will be released from engagement with said head.

In the foregoing description, we have embodied the preferred form of our invention, but we do not wish to limit ourselves thereto, as we are aware that modifications may be made therein without departing from the principle or sacrificing any of the advantages of this invention, therefore we reserve to ourselves the right to make such changes as fairly fall within the scope thereof.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In a drill, a vertically disposed jacket, a head provided upon the upper end of the jacket and having a chamber therein, a base held to the lower end of the jacket and having a chamber therein, said base having a bearing in one part thereof, a vertically disposed shaft rotatable in the vertical jacket, a bevel gear held upon the upper end of the shaft within the chamber of the head, a second bevel gear arranged within said chamber and meshing with the first bevel gear, a crank adapted to revolve the second bevel gear, three bevel gears provided upon the lower end of the vertical shaft, a longitudinally disposed shaft journaled in the bearing of the base, said shaft having a threaded portion interiorly of the chamber of the base, a chuck provided upon one end of the longitudinal shaft and

adapted to carry a bit, a bevel gear held upon the longitudinal shaft and meshing with one of the bevel gears upon the lower end of the vertical shaft, an interiorly threaded sleeve provided upon the threaded portion of the longitudinal shaft, two bevel gears loosely keyed upon the sleeve and meshing with the second and third bevel gears upon the vertical shaft, a toothed annular flange provided upon the smaller face of each of the bevel gears upon said sleeve, two toothed annular bands, slidably held upon the sleeve and rotatable with said sleeve, each of said bands being adapted to engage the teeth of one of the annular flanges of the bevel gears, and each of said bands having a groove formed in the exterior surface thereof, two levers, each having a pin in one of its ends which is disposed in the groove of one of the annular bands, a rod disposed through an opening in the wall of the base and having one of its ends pivotally held to the opposite end of each of the levers, a spring provided upon the rod and normally serving to force said rod outwardly of the chamber of said base, a foot bar pivotally held upon the base and adapted when moved to move the rod for forcing the toothed annular bands into engagement with the toothed flanges of the bevel gears upon said sleeve.

2. In a drill, a vertically disposed jacket, a head provided upon the upper end of the jacket and having a chamber therein, a base held to the lower end of the jacket and having a chamber therein and an opening through one part of its wall, said base having a bearing opposite to said opening, a boss formed upon the underside of the base, a projecting part provided upon the base within the chamber thereof and having an opening therethrough, a vertically disposed shaft rotatable in the vertical jacket, a bevel gear held upon the upper end of the shaft within the chamber of the head, a second bevel gear arranged within the chamber and meshing with the first bevel gear, a crank adapted to revolve the second bevel gear, three bevel gears provided upon the lower end of the vertical shaft, a longitudinally disposed shaft journaled in the bearing of the base, said shaft having a threaded portion interiorly of the base, a chuck provided upon one end of the longitudinal shaft exteriorly of the base and adapted to carry a bit, a bevel gear held upon the longitudinal shaft and meshing with one of the bevel gears upon the lower end of the vertical shaft, an interiorly threaded sleeve provided upon the threaded portion of the longitudinal shaft, two bevel gears loosely keyed upon the sleeve and meshing with the second and third bevel gears upon the vertical shaft, a toothed annular flange provided upon the smaller face of each of the bevel

gears upon said sleeve, two toothed annular bands slidably held upon the sleeve and rotatable with said sleeve, each of said bands being adapted to engage the teeth of one of the annular flanges of the bevel gears, and each of said bands having a groove formed in the exterior surface thereof, two levers, each having a pin in one of its ends which is disposed in the groove of one of the annular bands, two rods guided through openings in the projecting part in the chamber of the base and through the openings in the wall of said base, each of said rods having one of its ends pivotally held to the opposite end of each of the levers, a spring provided upon both of the rods and normally serving to force said rods outwardly of the

chamber of the base, two foot-bars pivotally held upon the base and each having a heel adapted to engage the end of one of the rods for forcing the toothed annular bands into engagement with the toothed flanges of the bevel gears, a ratchet provided upon both of the foot-bars, and two pawls, each pivotally held upon the base and adapted to engage one of the ratchets of the foot-bars.

This specification signed and witnessed this fifteenth day of June A. D. 1911.

ROBERT B. CRUMP.

WALTER M. ROBERTSON.

Witnesses:

ROBT. B. ABBOTT,

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