H. BRAASCH.

WELL DRILLING APPARATUS.

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1,086,748.

Patented Feb. 10, 1914.

Fig. 1.

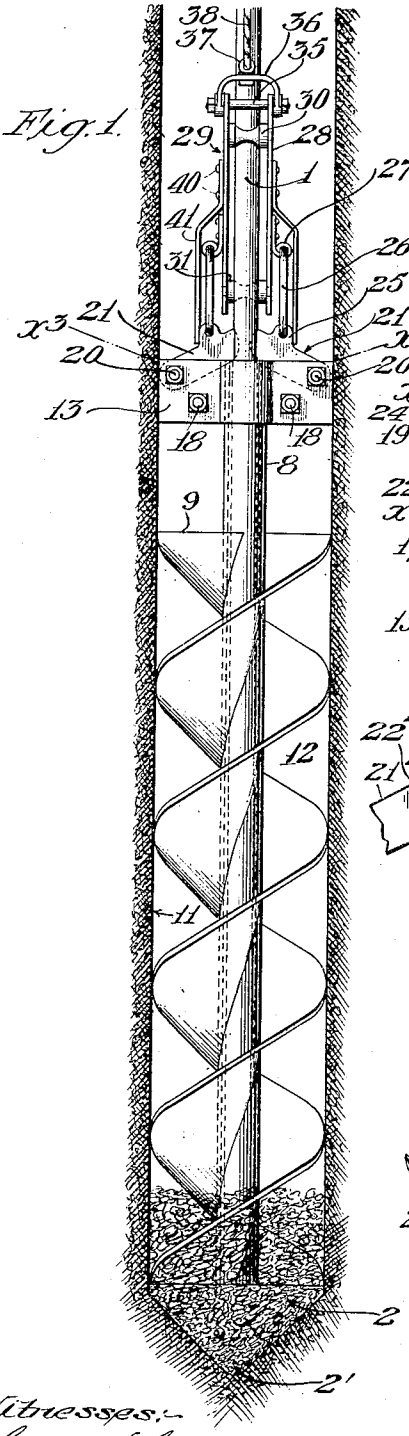


Fig. 3.

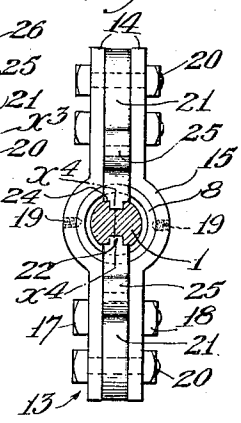


Fig. 4.

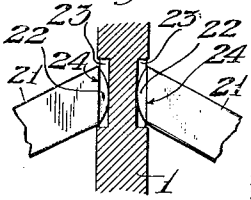


Fig. 5.

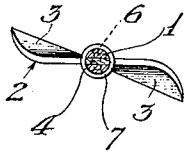
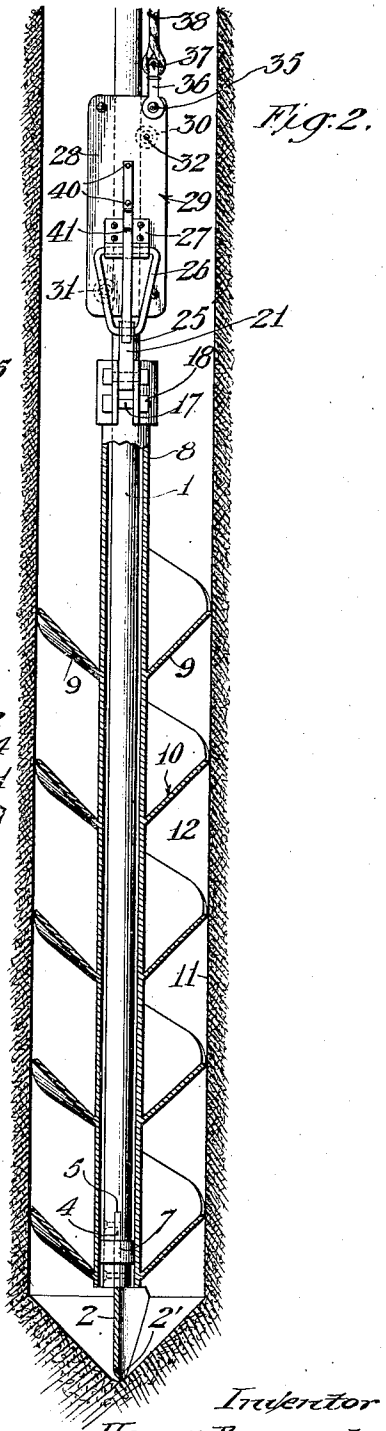


Fig. 2.



Witnesses:-

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UNITED STATES PATENT OFFICE.

HENRY BRAASCH, OF LOS ANGELES, CALIFORNIA.

WELL-DRILLING APPARATUS.

1,086,748. Specification of Letters Patent. Patented Feb. 10, 1914.

Application filed October 3, 1911. Serial No. 652,639.

To all whom it may concern:

Be it known that I, HENRY BRAASCH, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Well-Drilling Apparatus, of which the following is a specification.

My invention relates to a device for drilling wells, being particularly designed for use in what is commonly termed a rotary rig.

In the common practice of drilling wells, it is customary to use water for placing the loose material in the bottom of the well in proper condition to be extracted from the well by means of a sand pump, or other suitable apparatus. The use of water for this purpose not only entails the installation of special machinery, but loosens the sides of the well which necessitates driving casing during the drilling operation, and one of the main objects of the present invention is to do away with the use of water and sand pumps and the operation of driving casing during the drilling of the well.

Another object of my invention is to construct a device of the character described which will enable the driller or operator to drill a straight well.

Another object of the present invention is to provide means whereby the loose material in the bottom of the well may be removed therefrom with a minimum amount of labor.

Another object of the present invention is to produce a device of the character described of simple and economical construction having great efficiency for the purposes for which the device is designed.

Other objects and advantages will appear hereinafter from the following specification.

Referring to the drawings, which are for illustrative purposes only; Figure 1 is a side elevation of a drilling device embodying my invention. Fig. 2 is a vertical sectional view of the device shown in Fig. 1. Fig. 3 is a sectional plan view on line x^3—x^3 Fig. 1. Fig. 4 is a vertical sectional view on line x^4—x^4 Fig. 3. Fig. 5 is a sectional plan view of the bit.

The apparatus consists of a central stem 1 which has connected thereto at its lower end any suitable drilling member or bit 2.

In the form shown the bit 2 consists of a pair of blades 3, tapered downwardly and inwardly, terminating in a point 2′. Extending upwardly from the blades 3 is an extension 4 which fits within a slot 5 formed in the lower end of the stem 1 in which the extension 4 is secured by means of rivets 6 and a collar 7, which collar surrounds the stem 1 and the extension 4 of the bit.

The stem 1 extends from the bit 2 to a point above the surface of the ground where the stem is engaged by any suitable means (not shown) for imparting a rotary motion to the stem and the bit 2 carried thereon.

Slidably mounted on the stem 1 is a sleeve 8, the internal diameter or bore of the sleeve being sufficiently larger than the diameter of the stem to permit a slight play between the stem and the sleeve to permit the sleeve to be readily moved longitudinally on the stem. The lower end of the sleeve 8 rests upon the upper face of the bit 2 and is provided with means in the general form of an auger having a pair of spiral blades or flanges 9 which dish inwardly to the stem, as indicated at 10 in Fig. 2. The lower ends of the blades 9 terminate in the same plane as the end of the sleeve, and the upper ends of the blades terminate at a point below the upper end of the sleeve. The spiral blades 9 are of the same diameter as the external diameter of the bit and bear against the sides 11 of the well 12.

Secured to the upper end of the sleeve 8 is a yoke 13 consisting of two cross arms 14 curved at their central portions 15 to engage the sides of the sleeve 8 and are provided with bolts 17 which extend through the cross arms 14 having their ends engaged by suitable nuts 18 for the purpose of tying the arms 14 of the yoke together. Set screws 19 are also provided which extend through the central portion 15 of the arms 14 to engage with the sleeve 8 for the purpose of preventing any sliding movement of the yoke 13 on the sleeve 8. Pivotally mounted at 20 between the arms 14 and the yoke 13 are two dogs 21 which terminate at their inner ends in a reduced curved projection or tooth 22 which engages in recesses 23 formed in each side of the stem 1, as indicated in Fig. 4, for the purpose of locking the yoke and sleeve carried thereby to the stem, thereby causing the sleeve 8 to rotate with the stem 1 when the dogs are in engagement with the stem, as above described. For the purpose of preventing the yoke and sleeve from riding upwardly on the stem when the dogs are in engagement with the

recesses 23 of the stem, shoulders 24 formed on the dogs 21 engage the stem 1 at each side of the tooth 22 of the dog in such a manner that any upward movement of the yoke and sleeve 8 on the stem causes the shoulders 24 to wedge against the stem, thereby preventing any such upward movement of the yoke and sleeve on the stem. For the purpose of lifting the sleeve and parts carried thereby from the well, each dog is provided with an ear 25 projecting upwardly therefrom and perforated to receive a link 26 pivotally supported at its upper end in a bracket 27 attached in any suitable manner to one of the side plates 28 of a carriage 29. The carriage 29 consists of two plates 28 having mounted therebetween an upper and lower roller 30 and 31 respectively mounted on suitable studs or pins 32 which extend through the side plates 28. The rollers 30 and 31 engage opposite sides of the stem 1 and are provided with concave central portions to permit a free riding movement of the rollers on the stem, the rollers being arranged to engage opposite sides of the stem, as illustrated, for the purpose of equalizing the riding of the carriage on the stem and distributing the weight carried by the stem.

At the upper end of the carriage 29 is provided a bolt 35 having mounted thereon a yoke 36, which yoke is provided with an eye 37 for the purpose of securing a cable or rope 38, or other suitable elevating means, thereto. Bolted or riveted to each side plate 28 of the carriage 29, as indicated at 40, is a downwardly extending flat spring 41, the lower end of each spring pressing against the outside face of an ear 25 on the dog 21 under the respective springs which causes the dogs 21 to be pressed inwardly into engagement with the stem 1.

The device is operated in the following manner: The sleeve 8 is placed over the upper end of the stem 1 and permitted to slide downwardly thereon until the teeth 22 on the dogs 21 come into engagement with the recesses 23 formed in the sides of the stem 1, as shown in Fig. 1. When the dogs are in engagement with the stem, as above described, the sleeve 8 is locked to the stem 1, and any rotary movement of the stem 1 is imparted to the sleeve through the dogs 21 and yoke 13. When the dogs are in the position above described, the shoulders 24 on the dogs engage the sides of the stem 1, as above described, and prevent any upward movement of the sleeve 8 and parts carried thereby on the stem 1. The upward movement of the sleeve on the stem 1 and the rotating movement of the sleeve 8 on the stem 1 being prevented, as above described, the rotary movement of the stem 1 causes the sleeve 8 and spiral blades or auger carried thereby to rotate with the stem and the bit 2 carried thereby. It being understood that the stem 1 may be rotated by any suitable mechanism above the ground, such as is found on the common rotary rig, or other means, the bit cutting into the earth is followed by the spiral blades or auger which receive the loose material from the bit, and the rotary movement of the spiral blades causes the loose material to ride upwardly on the blades of the auger until the auger from top to bottom is packed with loose material thrown up by the bit. When the auger becomes thus packed with loose material, the cable 38 is pulled upwardly, which upward movement of the cable causes the carriage 29 to ride upwardly on the stem 1, and the links 26 on the carriage to exert an upward pull on the dogs 21, which upward pull on the dogs causes the same to open outwardly from each other so that the tooth 22 on each dog disengages from its associated recess 23 in the stem, thereby permitting the yoke 13, sleeve 8 and the blades 9 of the auger to be drawn upwardly out of the well, when the dirt and loose material on the blades 9 may be readily removed, after which the sleeve 8 may be lowered on the stem 1 until the dogs again become engaged with the stem 1, as above described, at which time the blades are in position to receive loose material from the bit, and the drilling operation may be continued until the blades 9 of the auger again becomes packed or loaded with the material from the bottom of the well.

It is understood that the bit 2 and the stem 1 remain in the well both during the drilling operation and the operation of removing the loose material from the bottom of the well by elevating the blades 9 carried on the sleeve 8, as above described. The exterior face of the blades 9 bearing against the sides of the well for a considerable distance above the bit insures the bit traveling straight downwardly. This result is also facilitated by the central stem 1 of the bit which remains in the well during the entire operation of drilling the well and serves as means for alining the parts of the device.

It is also understood that if it is desired the central stem 1 may be made square in cross section and that the sleeve 8 carrying the spiral blades 9 may also be made with a square opening therethrough to engage the stem without departing from the spirit of my invention. The central stem 1 may be either solid or hollow as may be desired, the hollow form being particularly adapted for use in deep wells for the purpose of lightening the weight of the stem.

It is also understood that the central stem 1 may be made in any number of sections connected in such a manner that the sleeve 8 may be passed freely up and down over the stem without departing from the spirit of my invention.

It is further understood that my invention is not limited to the mounting of any specific means on the sleeve for removing loose material from the well, but that my invention covers the use of a central stem, a sleeve slidable on the stem, upon which sleeve may be mounted various kinds of tools, such as reamers, chisels, or other well tools.

What I claim is:

1. A well drilling device comprising a rotatable central stem having a plurality of recesses therein, elevating means thereon consisting of a sleeve slidable on said stem, spiral blades extending outwardly from said sleeve, a yoke secured to the upper end of said sleeve, a pair of dogs pivotally mounted in said yoke adapted to releasably engage the recesses in said stem, a link secured to each dog, a carriage pivotally supporting said links, and means for raising and lowering said carriage.

2. A well drilling device comprising a rotatable stem, elevating means mounted on said stem consisting of a sleeve slidable thereon, spiral blades extending outwardly from said sleeve, a yoke secured to the upper end of said sleeve, a pair of dogs pivotally mounted in said yoke, a link secured to each dog, a carriage for pivotally supporting said links, an upper and lower roller on said carriage engaging respectively opposite sides of said stem, and means for raising said carriage to disengage said dogs from the stem and raise the sleeve thereon.

3. A well drilling device comprising a rotatable central stem having a pair of recesses therein, a bit carried on the lower end of said stem, elevating means consisting of a sleeve slidable on said stem, spiral blades on said stem extending outwardly therefrom, a yoke fixed to the end of said stem, a pair of dogs pivotally mounted in said yoke, a tooth on each dog adapted to engage a recess in said stem, shoulders on each of said dogs adapted to engage the stem at each side of the recess therein, means for elastically holding said dogs in engagement with said stem, and means for raising said dogs to disengage the dogs from said stem and elevate the sleeve thereon.

4. A well drilling device comprising a rotatable central stem having a pair of recesses therein, a bit carried on the lower end of said stem, elevating means consisting of a sleeve slidable on said stem, spiral blades on said stem extending outwardly therefrom, a yoke fixed to the upper end of said stem, a pair of dogs pivotally mounted in said yoke, a tooth on each dog adapted to engage a recess in said stem, shoulders on each of said dogs adapted to engage the stem at each side of the recess therein, a link mounted on each dog, a carriage pivotally secured to the upper end of said links, elastic means carried on said carriage for holding said dogs in engagement with said stem, and means for raising and lowering said carriage.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 22nd day of September, 1911.

HENRY BRAASCH.

In presence of—
FRANK L. A. GRAHAM,
LOUIS W. GRATZ.