

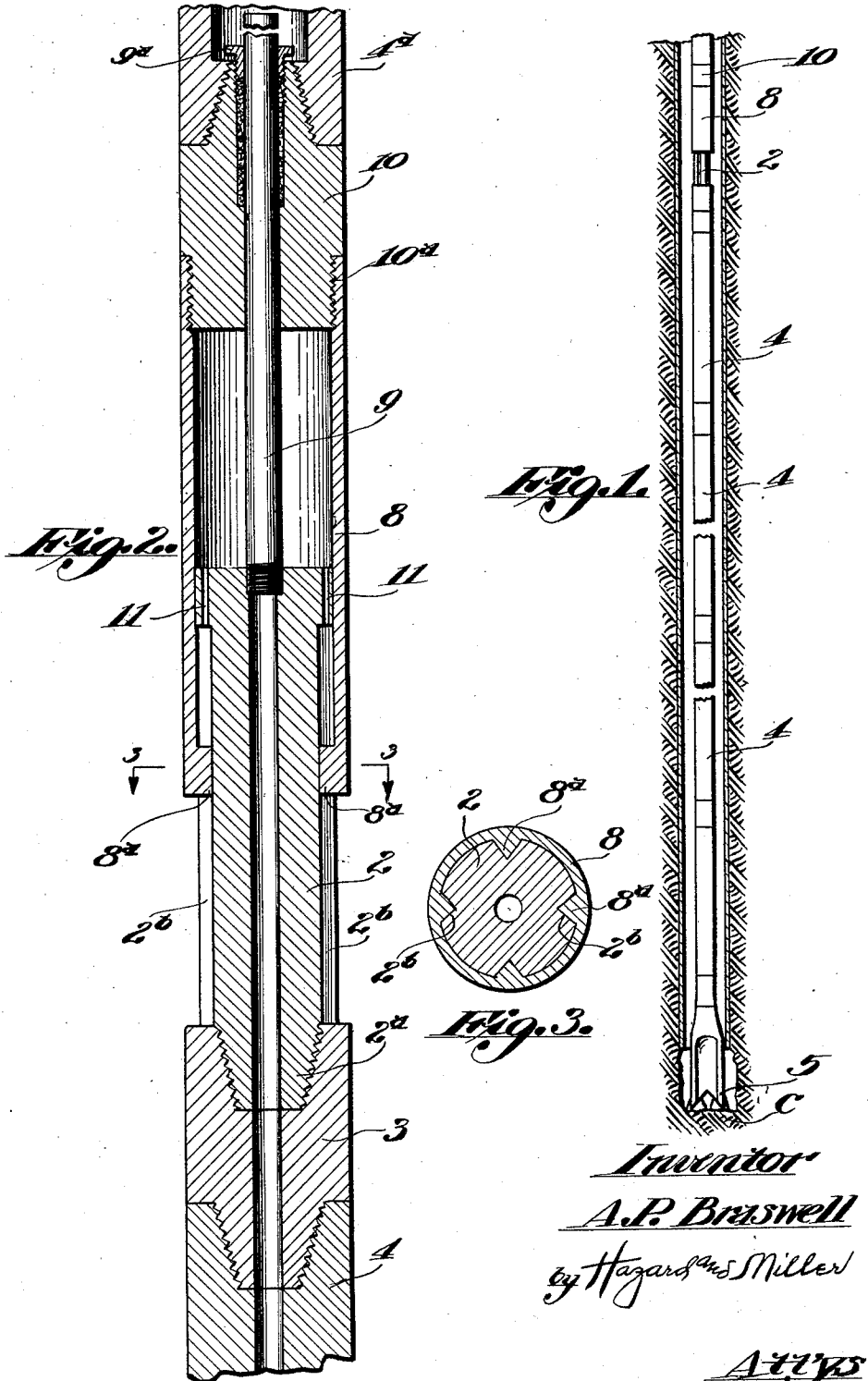
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WEIGHT REGULATOR FOR ROTARY DRILLS

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UNITED STATES PATENT OFFICE.

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WEIGHT REGULATOR FOR ROTARY DRILLS.

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This invention relates to means for insuring a constant and known degree of pressure on an earth-boring bit, such as is used in drilling deep wells.

5 An object is to provide a simple, effective, substantial and reliable means enabling the accurate determination of a degree of pressure to which a rotary deep well or other earth-boring bit may be subjected.

10 Another object is to provide a pressure form of joint section adapted to be readily introduced into a drill pipe string whereby when the drill has been lowered to full or bottom position, the drill will come to rest and be subjected to the load of any desired number of sections of drill pipe as determined according to the formation to be met and which load will be constant at all times during the operation of the lower drill, irrespective of the length or variation of the drill pipe string above a predetermined number of sections which are utilized to transmit to the drill the desired load or pressure to effect cutting.

25 As is well-known, when a drill pipe string for driving a drill is lowered, it is difficult to prevent an excess of pressure upon the bit because of the great weight which is the result of the great length of drill string. By my invention, irrespective of the length of the string, it is possible to have a constant and given weight effective on the drill in the hole.

Other objects and advantages will be made manifest in the following specification of an embodiment of the invention illustrated in the accompanying drawings, wherein:

Fig. 1 is a vertical section illustrating diagrammatically a drill string in a hole, with the present invention in place in the string.

Fig. 2 is a detailed longitudinal section of the improved connector.

Fig. 3 is a cross-section on line 3—3 of Fig. 2.

45 The present invention consists of a tubular body 2, which may be of any desired length and of any desired diameter according to the size of the drill pipe with which it is to be combined. The lower end of the body is provided with a tool joint pin 2^a to thread into a tool joint 3 of standard or well-known form, and below which may extend any number of drill pipe sections 4, Fig. 1, the lowermost of which may be provided with any type of rotary drill bit 5.

It is desirable that a constant and prede-

termined load be subjected to the drill bit so as to prevent the excess pressure from too rapidly breaking down the small teeth of the usual rotary cutters C in bits having rotary cutters. It is well-known that rotary bits having rotary cutters have to be repeatedly pulled from the well-hole and sharpened because of the wearing off of the small sharp points of the teeth, or to enable re-grinding of the edges of disc cutters when such is the type. Because of the great cost of lowering in and pulling out a drill string of great length necessary for the purpose of sharpening or replacing the cutters, it is desirable that these cutters be protected against the entire load of the drill string. Therefore in my invention I connect any number of drill pipe sections 4 according to the weight to be imposed upon the bit cutters C. For instance, I may connect a string of about 15 sections and utilize their weight to press the bit down, and this irrespective of the number of sections above the selected lower 15 (or other number) sections.

80 Therefore, I provide the body 2 and upon this mount a sliding sleeve 8, the lower end of which is provided with key-lugs 8^a, sliding in key-ways or grooves 2^b, cut or formed longitudinally in the body 2, so that while the shell 8 may slide up and down telescopically on the body 2, the latter will be rotatively driven in the ordinary manner of rotary drill strings. The connector body 2 is attached at its upper end to a wash-down pipe 9, extending slidably through a tool joint 10 to the upper end of which is connected a contiguous drill pipe section 4^a, any number of which may be run to the head of the well.

85 The wash-down pipe 9 is provided with a gland 9^a in the joint 10.

The shell 8 is threaded on the pipe joint 10 in the usual manner at 10^a.

100 From the above it will be seen that the drill string can be lowered into the well in the normal manner; the connector body 2 resting in suspended position on the keying lugs 8^a of the shell 8, while the drill is being lowered. When the bit reaches land at the bottom of the well the drill string and shell above the connector body 2 is permitted to slide down a suitable distance, as is clearly shown in Fig. 2, with the result that the weight of the string above the connector body 2 is entirely removed from the drill and is carried by the brake system at the

head of the well. Therefore, while the upper portion of the drill string is rotated in the usual manner, this will result in the rotation of the bit 5 while this is subjected only to the load of the parts extending from the drill connector 2 down to the bit, and therefore insure a constant and normal pressure on the bit. The desired downward movement of the bit during cutting is readily permitted by the sliding of the body 2 down in the shell 8 during rotation; the suspended portion of the drill string being intermittently lowered as drilling proceeds. Suitable and appropriately arranged ports may be provided to provide for the escape of water which may be trapped within the shell. Such ports are indicated at 11.

Further embodiments, modifications and variations may be resorted to within the spirit of the invention.

What is claimed is:

1. A weight regulator for rotary drills comprising in combination with a string of drill-pipe, a connector composed of a hollow member adapted to be secured at one end to a section of the string, said member being provided at the opposite end with an internal shoulder, a second member adapted to be secured to another section of the string and slidably keyed against rotation to the first mentioned member, said second member being provided with an external shoulder engageable with said internal shoulder, there being passages extending through one of said shoulders, whereby a predetermined weight may be applied to a bit in the drilling operation, said predetermined weight being determined by the mass of the drill-pipe beneath said connector.

2. A weight regulator for rotary drills comprising in combination with a string of drill-pipe, a connector composed of a hollow member adapted to be secured at one end to a section of the string, said member being provided at the opposite end with an internal shoulder, a second member adapted to be secured to another section of the string and slidably keyed against rotation to the first mentioned member, said second member being provided with an external shoulder engageable with said internal shoulder, there being passages extending through said external shoulder, whereby a predetermined weight may be applied to a bit in the drilling operation, said predetermined weight being determined by the mass of the drill-pipe beneath said connector.

3. A weight regulator for rotary drills comprising in combination with a string of drill-pipe, a connector composed of a hollow member adapted to be secured at one end to a section of the string, said member being provided at the opposite end with an internal shoulder, a second member adapted to be secured to another section of the string and slidably keyed against rotation to the first mentioned member, said second member being provided with an external shoulder engageable with said internal shoulder, there being passages extending through said external shoulder on said second member whereby a predetermined weight determined by the weight of said second string of drill-pipe may be applied to the bit at all times during the drilling operation.

In testimony whereof I have signed my name to this specification.

ALFRED P. BRASWELL.