Feb. 4, 1930. J. BISHOP 1,745,351

DRILL BIT AGITATOR

Filed Oct. 1, 1928

Fig. 1.

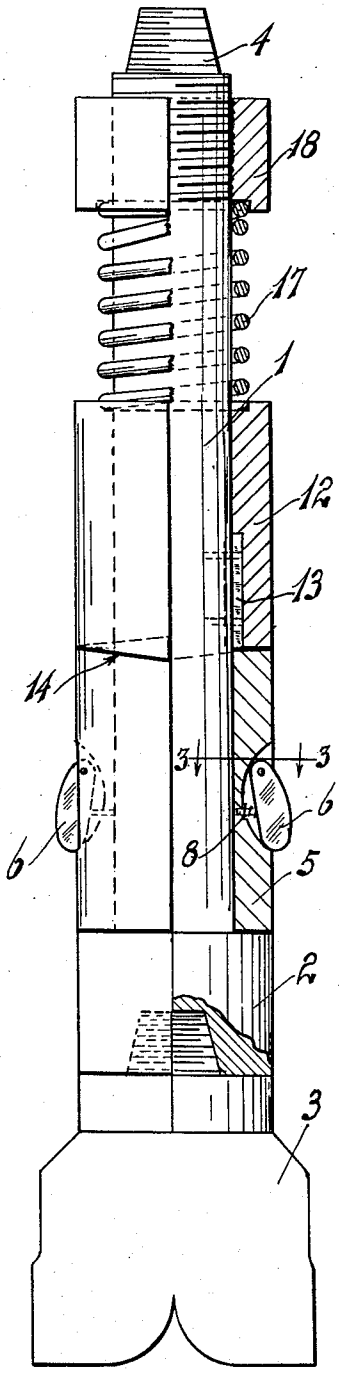


Fig. 2.

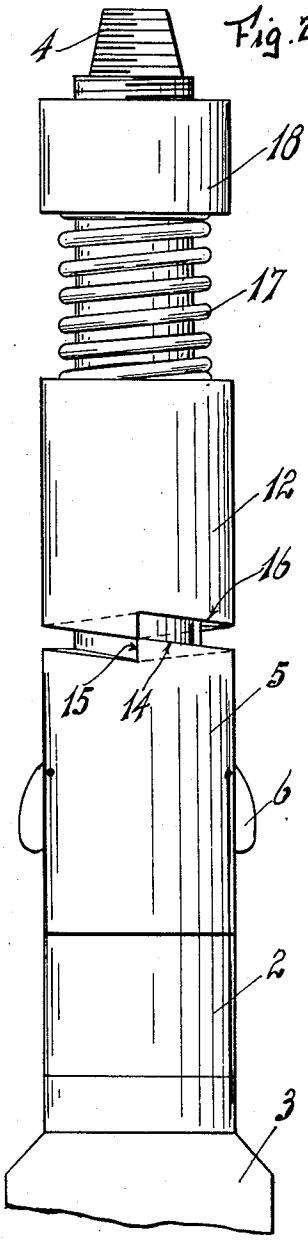
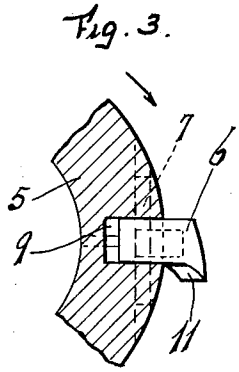


Fig. 3.



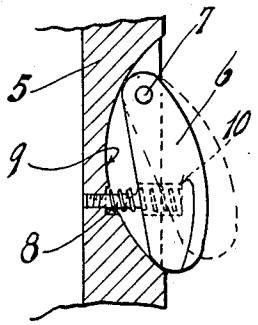


Fig. 4.

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UNITED STATES PATENT OFFICE

JOHN BISHOP, OF LONG BEACH, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO GEORGE G. OSBORN, OF LONG BEACH, CALIFORNIA, AND ONE-HALF TO THEODORE ALBERT PONTING, OF NEWPORT BEACH, CALIFORNIA

DRILL-BIT AGITATOR

Application filed October 1, 1928. Serial No. 309,434.

This invention relates to an agitator whereby a shock is imparted to a drilling bit during the drilling operation so that the bit will more effectively penetrate a hard or rock formation.

An object of my invention is to provide an agitator which is operated by the rotation of the drill pipe during the drilling operation and which will strike a series of blows upon the bit at each revolution thereof.

A further object is to provide an agitator which is automatically set when the bit is run into the hole and is therefore available at all times and at any depth in the hole.

Other objects, advantages, and features of invention may appear from the accompanying drawing, the subjoined detailed description, and the appended claims.

Figure 1 is a side elevation, partly in section, of my agitator.

Figure 2 is a side elevation of the same.

Figure 3 is a sectional view, taken on line 3, 3, of Figure 1.

Figure 4 is an enlarged fragmentary side elevation of the stationary ring and holding dog therefor.

Referring more particularly to the drawing, the numeral 1 indicates a mandrel, the lower end of which is enlarged to form a head 2. The bit 3 of any desirable type screws into the head 2 in the usual and well-known manner. A threaded pin 4 is provided on the upper end of the mandrel 1 and the drill pipe, or the like, (not shown) is screwed thereon. A ring 5 fits upon the mandrel 1 and rests against the top of the head 2. This ring is held stationary when the tool is in the hole and the mandrel rotates therein.

The ring 5 is held stationary when in the hole by means of a plurality of dogs 6. These dogs are pivotally mounted in the ring 5 on a pin 7 and are normally urged outwardly into engagement with the wall of the hole by a spring 8. This spring bears against the wall of a recess 9 in which the dog fits and extends into a bore 10 in the dog. The outer surface of the dogs are curved so that when the tool is pulled upwardly in the casing the dogs engaging said casing will be urged inwardly and will not impede the upward movement of the tool.

A toe 11 is formed on each of the dogs which digs into the wall of the hole as the tool is rotated to the right, thus holding the ring 5 stationary relative to the mandrel 1. A striker collar 12 is mounted on the mandrel 1 and is slidably keyed thereon by the key 13. The striker collar rests against the top of the ring 5 and strikes thereon, as will be further described.

On the top of the ring 5 I provide a plurality of cam surfaces 14, which cams terminate in an abrupt drop 15 to cause the striking action. The collar 12 is provided with similar co-acting cam surfaces 16 which co-act with the surfaces 14 to raise the collar during the rotation of the tool. That is, the mandrel 1 rotates with the drill pipe and the ring 5 is held stationary, and thus the collar 12 will be moved over the cam surfaces 14 to alternately and abruptly drop the collar upon the top of the ring 5.

A coil spring 17 surrounds the mandrel 1 and bears against the top of the collar 12. A nut 18 screws onto the upper end of the mandrel 1 and against the top of the spring 17. Thus the tension of the spring against the collar 12 can be regulated. The spring 17 acts to forcibly move the collar 12 downwardly against the ring 5 and this shock is imparted through the head 2 and thence to the bit 3, thus assisting the bit in forcing its way through a hard or rock formation.

Having described my invention, I claim:

1. An agitator for a drilling bit comprising a mandrel, a bit secured to the lower end of the mandrel, said mandrel being adapted to be secured to the drilling pipe, and means on the mandrel adapted to strike upon the bit during rotation of the mandrel, said means comprising a ring journaled on the mandrel, means engageable with the wall of the bore whereby said ring is held stationary, a collar on the mandrel, co-acting means on the collar and ring whereby the collar is alternately raised and dropped, and means forcibly urging said collar downwardly upon the ring whereby a shock is imparted to the bit.

2. An agitator for drilling bits comprising a mandrel, a bit secured to the lower end of the mandrel, a ring on the mandrel, dogs on the ring adapted to engage the wall of the bore whereby the ring is held stationary, a collar on the mandrel, means slidably keying said collar to the mandrel, spring means engaging said collar whereby it is forcibly urged against the ring, and co-acting means on the collar and ring whereby said collar is alternately raised and dropped upon the ring to impart a shock to the bit.

3. An agitator for drilling bits comprising a mandrel, a bit secured to the lower end of the mandrel, a ring on the mandrel, dogs on the ring adapted to engage the wall of the bore whereby the ring is held stationary, a collar on the mandrel, means slidably keying said collar to the mandrel, spring means engaging said collar whereby it is forcibly urged against the ring, and co-acting means on the collar and ring whereby said collar is alternately raised and dropped upon the ring to impart a shock to the bit, said last named means comprising a plurality of inclined cam surfaces on the upper facing of the ring, said cam surfaces terminating in an abrupt drop, said collar having co-acting surfaces co-operating with the first named cam surfaces whereby the collar is alternately raised and dropped upon the ring.

4. An agitator for drilling bits comprising a mandrel, a bit secured to the lower end of the mandrel, a ring mounted on the mandrel, a plurality of dogs pivotally mounted on the ring, spring means urging said dogs outwardly into engagement with the wall of the bore whereby said ring is held stationary, a striker collar slidably keyed to the mandrel, a plurality of cam surfaces on the upper face of the ring, a plurality of co-operating cam surfaces on the lower face of the collar, a spring encircling the mandrel and bearing against the top of the collar, and a nut screwed onto the mandrel against said spring.

In testimony whereof, I affix my signature.

JOHN BISHOP.