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DRILL BIT

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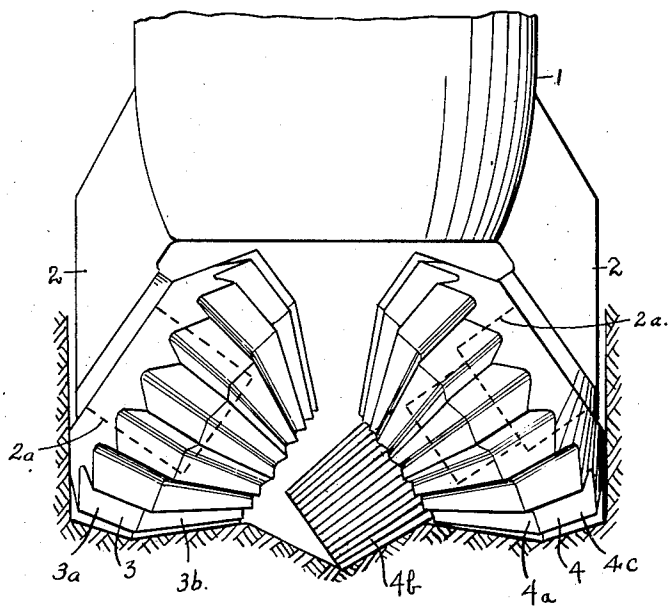


Fig. 1.

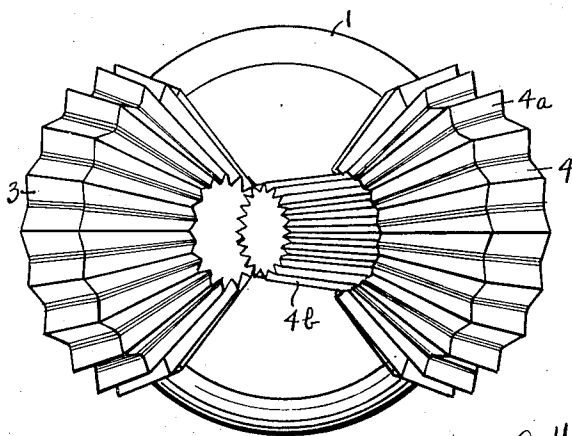


Fig. 2.

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DRILL BIT

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7 Claims. (Cl. 255—71)

This invention relates generally to deep well drilling apparatus and specifically to roller bits.

Some conventional deep well rock bits have substantially conical cutters rotatable on axes extending downwardly and inwardly substantially toward the longitudinal axis of the head. The point portions of the conventional cutters are small and incapable of efficiently cutting away the central portion of the hole, and this results in a most inefficient operation of the drill.

The general object of this invention is to provide in a bit of this type a new and improved construction and arrangement of cutters to efficiently cut the entire area of the bottom of the hole, and particularly the central portion thereof.

The embodiment of the invention is illustrated by the accompanying drawing wherein Fig. 1 is a fragmentary elevation of the bit, and Fig. 2 a bottom plan thereof.

In the drawing the bit head is indicated at 1, the substantially oppositely disposed depending bearing projections at 2, conventional bearings by dotted lines 2a, and the cutters at 3 and 4. The cutter 3 is substantially frustoconical and has an outer portion 3a and an inner portion 3b, the teeth of the former being at a lesser angle to the axis of rotation of the cutter than are the teeth of the latter. The cutter 4 has a substantially frustoconical base with inner and outer portions 4a and 4c, respectively, the teeth of the latter being at a lesser angle to the axis of rotation of the cutter than are the teeth of the former. The cutter 4 also has a relatively large point portion 4b which extends to the longitudinal axis of the head to remove the central portion of the bottom of the hole. The point portion 4b is substantially cylindrical and the teeth thereof extend upwardly and outwardly from a point substantially at the longitudinal axis of the head. The teeth on the base portion 4c are relatively large to provide ample traction to drive the point portion 4b at the desired speed of rotation.

It will be understood that the axis of rotation of the drill and the longitudinal axis of the head are substantially coincident.

The various advantages of this invention will be apparent to those skilled in the art.

I claim:

1. A roller bit having a head and a pair of roller cutters mounted on said head, rotatable on axes inclined downwardly and inwardly toward the longitudinal axis of said head and arranged to traverse substantially the entire area of the bottom of the hole, each of said cutters extending beyond the periphery of the head; one of said cut-

ters being substantially frusto-conical and having an inner and an outer portion, the teeth on the outer portion being at a lesser angle to the axis of rotation of said cutter than the teeth on the inner portion; and the other of said cutters having a point portion and a base, said base having inner and outer portions, said point portion being frustoconical and having cutting teeth extending upwardly and outwardly from a point substantially at the longitudinal axis of the head, the teeth of said inner base portion extending at a greater angle to the axis of rotation of said cutter than the teeth of said point portion, and the teeth of said outer base portion extending at a lesser angle to the axis of rotation of said cutter than the teeth of said inner base portion; those portions of said teeth which cut at the longitudinal axis of the head being substantially spaced from the axis of said other cutter.

2. A roller bit having a head and roller cutters mounted on said head, rotatable on axes inclined downwardly and inwardly toward the longitudinal axis of said head and arranged to traverse substantially the entire area of the bottom of the hole, each of said cutters extending beyond the periphery of the head; one of said cutters having a point portion and a base, said base having inner and outer portions, said point portion having cutting teeth extending upwardly and outwardly from a point substantially at the longitudinal axis of the head, the teeth of said inner base portion extending at a greater angle to the axis of rotation of said cutter than the teeth of said point portion, and the teeth of said outer base portion extending at a lesser angle to the axis of rotation of said cutter than the teeth of said inner base portion; those portions of said teeth which cut at the longitudinal axis of the head being substantially spaced from the axis of said one cutter.

3. A roller bit having a head and roller cutters mounted on said head, rotatable on axes inclined downwardly and inwardly toward the longitudinal axis of said head and arranged to traverse substantially the entire area of the bottom of the hole, each of said cutters extending beyond the periphery of the head; one of said cutters having a point portion and a substantially frusto-conical base, said point portion having cutting teeth extending upwardly and outwardly from a point substantially at the longitudinal axis of the head, the teeth of said base extending at a greater angle to the axis of rotation of said cutter than the teeth of said point portion; those portions of said teeth which cut at the longitudinal axis of the

head being substantially spaced from the axis of said one cutter.

4. A roller bit including a head, and roller cutters mounted on said head and arranged to traverse substantially the entire area of the bottom of the hole; one of said cutters having cutting parts extending inwardly substantially from the periphery of said head to the axis of the same, the inner cutting teeth of said cutter defining a frustum of a cone, the lower inner extremity of which is substantially at the longitudinal axis of the head, and the apex of which is substantially beyond the longitudinal axis of the head.

5. A roller bit including a head, and roller cutters mounted on said head and arranged to traverse substantially the entire area of the bottom of the hole, one of said cutters having a base portion adjacent the periphery of said head, and a substantially cylindrical point portion, the cutting edges of said point portion extending inwardly from the base portion to a point substantially at the longitudinal axis of the head.

6. A roller bit including a head, and a roller cutter having a toothed base portion of relatively large diameter and a relatively small diameter point portion having cutting teeth thereon, portions of which are adapted to cut the center of the bottom of the well, the portions of said teeth adapted to cut the center of the bottom of the well being substantially spaced from the axis of said cutter.

7. A roller bit including a head having a pair of depending bearing projections, and a pair of roller cutters mounted on said projections and arranged to traverse an area substantially equal to the transverse area of said head; one of said cutters traversing an area adjacent the periphery of said head and the other of said cutters having cutting parts extending substantially from the longitudinal axis of said head to the periphery of said head the portions of said cutting parts adapted to cut at the longitudinal axis of said head being substantially spaced from the axis of said cutter.

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