March 21, 1933. W. C. REA 1,902,098

DRILL

Filed June 24, 1930

Fig. 1.

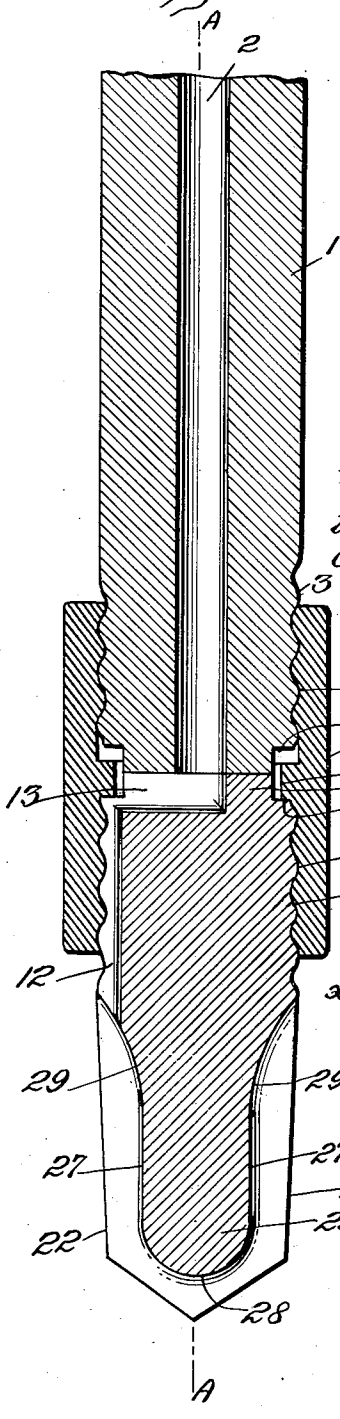


Fig. 2.

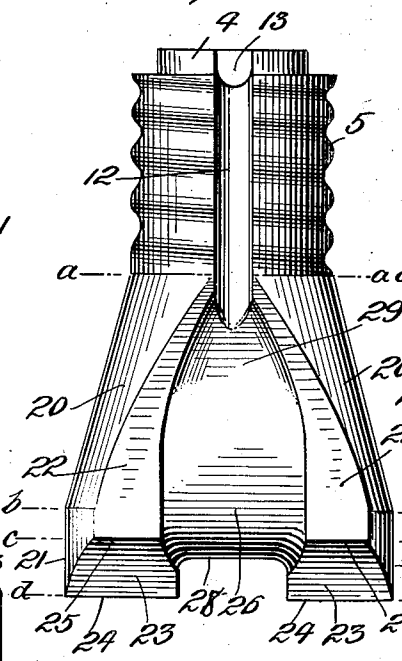


Fig. 3.

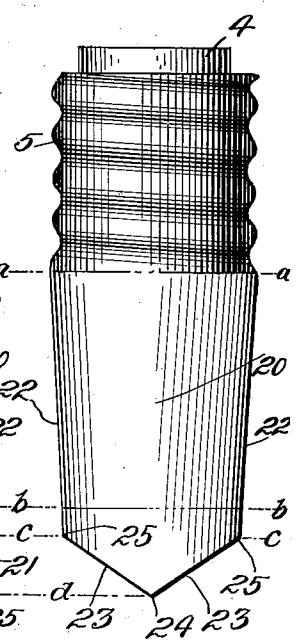


Fig. 4.

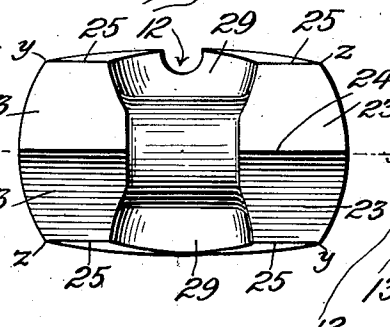
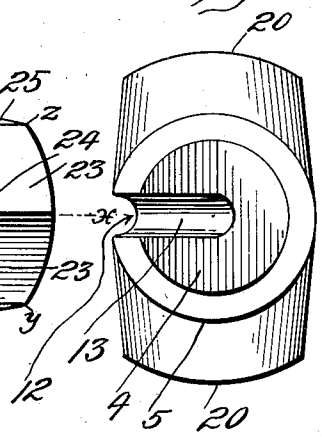


Fig. 5.



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UNITED STATES PATENT OFFICE

WALTER C. REA, OF NEW YORK, N. Y., ASSIGNOR TO DETACHABLE BIT CORPORATION OF AMERICA, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

DRILL

Application filed June 24, 1930. Serial No. 463,391.

This invention relates to drills and more particularly to novel, improved constructions of bits especially with reference to their cutting edges, and its principal object resides in the provision of bits which are simple and inexpensive to manufacture and efficient in operation.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being had to the accompanying drawing wherein; Fig. 1 is a vertical section through the center of the construction, showing a bit, drill rod and coupling member for securing the bit to the rod. Fig 2 is a front view of my novel bit. Fig. 3 is a side view of the construction as shown in Fig. 2. Fig. 4 is an end view of the bit, looking towards the cutting edges from below with reference to Fig. 2, and Fig. 5 is a view looking down from above with reference to Fig. 3.

There is shown at 1 a drill rod having a central passage 2 formed therein and threads 3 formed at the lower end thereof. A bit 4 having a shank is provided with threads 5, and is secured to the rod by means of a coupling member 6 having threads 7 and 8 for engagement respectively with the threads of the rod and bit. The coupling member is provided with a flange 9 adapted to lie between the shoulders 10 and 11 on the rod and bit, respectively, and to abut against one of them, and is of greater height than the height of either shoulder but less than the combined heights of the two shoulders. This construction permits the rod to abut directly against the bit. The several threads are such that the coupling is reversible and that on rotation of the drill in a given direction, there is a tendency for the bit shank to be screwed into the coupling and the coupling onto the rod. The bit is provided with a groove 12 along one side thereof and a groove 13 at its upper end at right angles to the groove 12 for communication with passage 2 in the drill rod. The coupling means is fully described in my co-pending application, Serial No. 450,629, and forms no part of my present invention which resides in the particular bit construction which will now be described.

For convenience in description, the face of the bit shown in Fig. 2 is termed the front of the bit and the opposite face the back, while the face illustrated in Fig. 3 and the opposed face are termed the sides of the bit. The term thickness, as used herein, intends a dimension from front to back, and width, from side to side. The planes hereinafter referred to are perpendicular to the central axis A—A of the bit. From a plane *a*—*a* adjacent the lower extremity of the shank or threaded portion, the sides of the bit extend in generally frusto-conical shape, increasing in diameter to plane *b*—*b*, and from the latter to plane *d*—*d* are of cylindrical form. The front and back faces of the bit are formed flat from the plane *a*—*a* to a plane *c*—*c*, at a suitable distance from parallel plane *d*—*d*, in which lie apex cutting edges, hereinafter described, and incline slightly towards each other from shank to cutting edges. There are thus formed frusto-conical surfaces 20, cylindrical surfaces 21 and flat surfaces 22. From the plane *c*—*c* to plane *d*—*d*, the bit is tapered so as to form V-shaped surfaces 23, terminating in a pair of aligned cutting edges 24 at the apex of the V, and pairs of aligned cutting edges 25 in a plane spaced therefrom. Inasmuch as the sides of the bit below plane *b*—*b* are arcs of circles, it will be seen that the diameters *x*—*x*, *y*—*y* and *z*—*z* are all equal.

I have found it advantageous not to extend the cutting edges clear across the bit but rather to form the bit with spaced side portions (each comprising the material between surfaces 20, 21, 22 and 23) and a web 26 extending therebetween, and having parallel faces 27, said web being of considerably less thickness than the thickness of said portions, and not intersecting the planes determined by said surfaces, whereby depressions are formed between said portions and between the cutting edges. This web is centrally located both with respect to the thickness of the bit and its width, and has parallel front and back faces 27. It may extend within the V or somewhat below plane *c*—*c* of cutting edges 25, but should terminate above

plane *d*—*d* and not intersect the planes of the V-shaped surfaces, in order to leave ample space for the proper operation of the bit. The web is preferably rounded as at 28 for the same purpose, but its construction may be modified in different bits for use under various conditions. The portion of the web adjacent the shank of the bit and above the faces 27 rounds out in smooth concavely curved surfaces 29 which meet the front and back faces 22. On the front face of the bit, one of these surfaces is necessarily slightly cut away by reason of the groove 12 which enters the depression formed by the web in order to discharge fluid adjacent the cutting edges.

It will thus be seen that I have provided a drill bit having cutting edges arranged in a V-shape and diametrically situated with spaces between those on opposite sides (with respect to Fig. 2) of the central axis of the drill. That is, none of the cutting edges extend entirely across the width of the bit. The space below the web between cutting edges 25 in addition to the spaces between cutting edges 24 resulting from the relative thinness of the web 26 greatly aid in the effective operation of the drill by permitting of the disposal of fragments of material from between the cutting surfaces. Moreover, I have found that my improved construction of the cutting edges of the bit are superior not only from the manufacturing standpoint but also in operation. While I have described one embodiment of my improved bit in detail, I do not wish to be limited thereto except as particularly pointed out in the appended claim.

I claim:

A drill bit including in axial alignment an upper portion constituting a threaded shank, and a body portion, said body portion having a front, a back and sides, the upper portion of the sides forming part of a frusto-conical surface, increasing in diameter from the lower extremity of the threaded shank towards the lower portion and the lower portion of the sides forming part of the surface of a cylinder, the front and back being of similar configuration and each including an upper flat surface converging downwardly and a lower flat surface with the lower flat surfaces at front and back intersecting each other to form aligned apex cutting edges of the bit, and the flat surfaces on both the back and front meeting at an angle and coacting to form thereon aligned cutting edges on the front and back each extending parallel to the apex cutting edges, the front and back being recessed in spaced relation to the side portions to form a web of less thickness than said portions and not intersecting the planes determined by said flat surfaces and said web terminating in spaced relation to the line of the apex cutting edges.

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