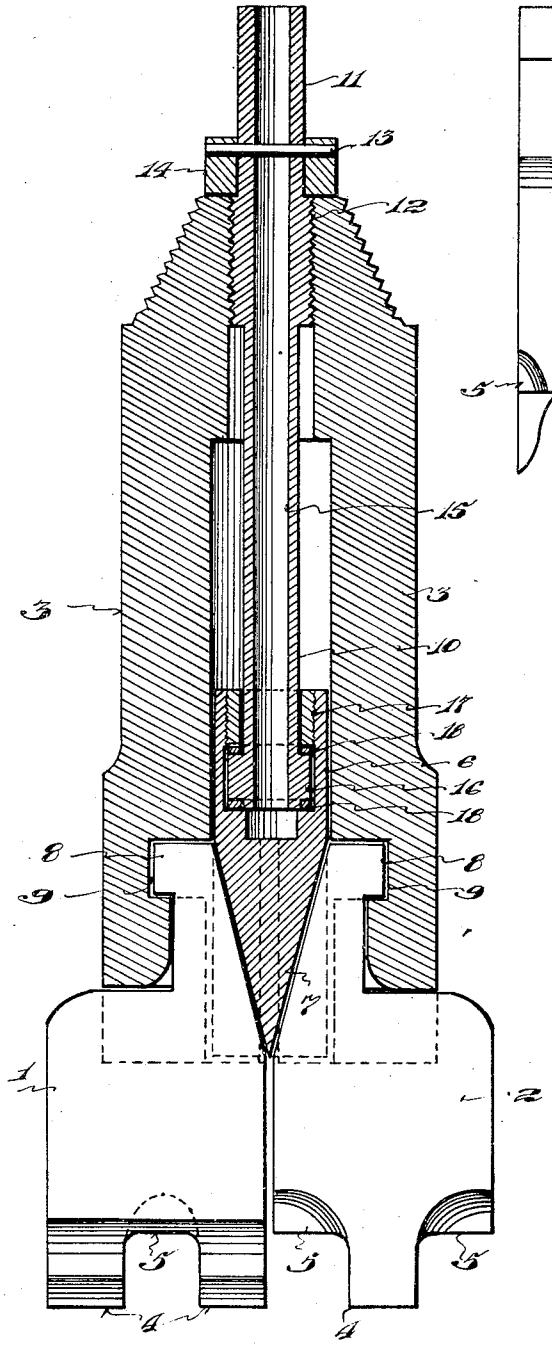
Feb. 2, 1932. J. E. LE BUS 1,843,136

INTERCHANGEABLE BLADE FOR DRILL BITS

Filed July 5, 1929

FIG. 1. FIG. 2. FIG. 3.



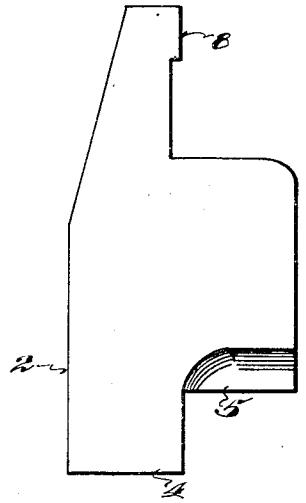
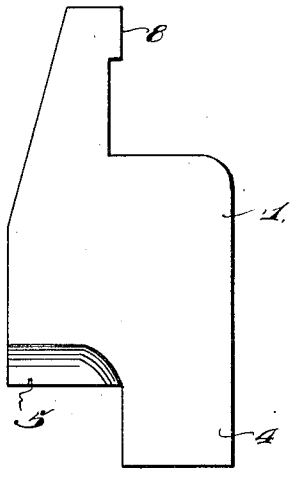


FIG. 4.



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UNITED STATES PATENT OFFICE

JOHN E. LE BUS, OF ELECTRA, TEXAS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO O'DONOHOE DETACHABLE BLADE DRILLING BIT COMPANY, OF WICHITA FALLS, TEXAS, A CORPORATION

INTERCHANGEABLE BLADE FOR DRILL BITS

Application filed July 5, 1929. Serial No. 376,103.

This invention relates to earth boring and drilling tools and equipment and it has particular reference to new and useful improvements in detachable blades for bits and drills and the principal object of the invention resides in the provision of blade in which the maximum of cutting efficiency is obtained by means of relatively staggered cutting points, each point being so arranged relative to the companion points as to provide an individual cut as the drill is operated.

Another object of the invention resides in improved detachable blades wherein the cutting points, in being arranged in the manner aforesaid, maintain true gauge of the hole and quickly dispense with the cuttings released thereby.

A still further object of the invention resides in the provision of an improved means for locking the blades in operative position and which means may be effectively applied to operatively lock the blades in a minimum of time as well as to release the same to effect their removal for resharpening or replacement.

With the foregoing objects as paramount, the invention has particular reference to its salient features of construction and arrangement of parts to become manifest as the description proceeds, taken in connection with the accompanying drawings, wherein:—

Figure 1 is a side elevational view of the improved blades showing in vertical section the means by which the blades are secured to the shank.

Figure 2 is a side elevational view of a blade constructed according to the present invention.

Figure 3 is a face view of one of the blades, showing a modified form of the structure, and

Figure 4 is a companion blade to that shown in Figure 3.

Drill bits of the variety used in drilling oil wells are subjected to considerable rough usage and much is expected of them from the standpoint of drilling efficiency, endurance and their ability to remain in the well under adverse conditions. Moreover, there is a great demand for bits having detachable cutting elements in which such elements are capable of interchangeability and which may be quickly removed for sharpening and as readily replaced.

Accordingly, the present invention comprehends the provision of a bit having all the above features and is comprised primarily of companion elements 1 and 2, as shown in Figures 1 and 2, the latter figure being a side elevation. These elements, as apparent, are shown to have an operative face on a plane parallel to the axis of the shank 3, but it is obvious that this surface may be curved if found to be desirable.

A particularly important feature of the invention resides in the staggered relationship of the points 4 on each of the blades, which, as will be noted in Figure 1 are so disposed that the points on the blade 1 will score the earth concentrically. An intermediate score being made by the single point integral with the other blade, the cuttings being conveyed upwardly through the flutes 5.

Obviously, the toothed ends of the blades 1 and 2, while they collectively span the entire area of the hole and are operative to bring about maximum displacement of earth in drilling, only a minimum of the blade surface actually engages the earth thereby minimizing wear. The weight of the shank 3 and the drill stem assembly is enabled to more readily urge the points or teeth 4 into the earth, which fact, combined with the rotary movement applied to the tool effectively displaces and removes cuttings from the hole to be dispensed with in the conventional manner.

In locking the blades 1 and 2 in the head or shank 3, a wedge or tapered mandrel 6 is inserted into the shank, the tapered end 7 engaging the blades jointly in the recess defined by the diverging shanks of the blades. It will be noted that each blade has a protuberance 8 which enters a recess 9 in the body of the drill shank 3. Obviously, when the mandrel 6 which has rotatable connection with a stem 10, is urged downwardly, the tapered portion 7 of the mandrel 6 will effect a spreading of the blades, thereby locking the same firmly in the shank. To so urge

the mandrel into operative position, a squared portion 11 is provided on the upper end of the stem 10 which may be engaged by a suitable wrench and turned, causing the mandrel to travel into the position shown in Figure 1.

In order to lock the stem 10 in position to maintain locked position of the mandrel and blades, the stem has a threaded portion 12 which threads correspond with internal threads in the taper of the drill shank 3. A further locking means in the form of a lateral key 13 is provided to prevent backing of the stem when operative position of the blades is obtained. This key is inserted through the stem over a castellated cap 14, as in Figure 1.

A water course 15 passes through the axis of the stem 10 and passing through the mandrel 6 is directed upon the blades 1 and 2.

The swivel connection between the mandrel 6 and stem 10 is obtained through the medium of an enlargement 16 on the lower end of the stem 10 entering the hollow body of the mandrel 6 and so held by a thrust washer 17 threaded into the top of the mandrel. Bronze washers 18 are arranged between the frictional elements in this swivel connection to alleviate wear therein.

It is very apparent that by simply removing the lock pin 13 and rotating the squared upper end of the stem the mandrel 6 may be moved into and out of operative position to respectively lock and unlock the blades 1 and 2.

Regarding the modified forms of blades shown in Figures 3 and 4, it will be noted that each blade carries only one tooth, each being of such width as to extend one half the full diameter of the cutting area of the blades, making, as does the previously described structure a concentric cut, one cutting, point cutting successively the area undisturbed by the other, thus minimizing the area of the blades actually engaging the earth, yet without the wear to which the ordinary bit is subjected.

Manifestly, the construction shown is capable of considerable modification, and such modification as is considered within the scope and meaning of the appended claim is also considered within the spirit and intent of the invention.

I claim:

A drill bit having in combination a drill shank provided with an axial opening, lateral recesses formed in the lower end of said drill shank which connect with said axial opening, earth cutting elements provided at their upper ends with lateral projections which interlock with said lateral recesses in said drill shank for detachably securing the cutting elements in the drill shank, the upper ends of said cutting elements having upwardly diverging surfaces, a plunger adjustably mounted within the axial opening of said drill shank and projecting above the upper end of the shank, a wedge shaped mandrel rotatably mounted on said plunger and secured against axial movement on said plunger, the mandrel being adapted to be forced downwardly relative to the shank so that the wedge shaped faces of the mandrel will cooperate with the upwardly divergent faces of the cutting elements to secure them in said shank.

In testimony whereof I affix my signature.

JOHN E. LE BUS.