ABSTRACT: A clean-out drill for filing and cleaning out the residue of drilling from blind holes is provided by the combination of a drill shank having helical relief flutes and with a reduced-diameter cutting terminal section of selected diameter and length providing a shoulder spaced from the cutting tip, and with a simple washer fitted over the reduced-section drill shank and welded to the abutment lands between the relief flutes on the drill shank. The circular hole of the washer cooperates with the relief flutes to provide discharge passageways through which the residue of drilling is moved from one side to the other side of the washer for effecting discharge by centrifugal force laterally of the blind hole.
BACKGROUND OF THE INVENTION

This invention relates to a clean-out drill for drilling and cleaning out the residue from blind holes.

In drilling blind holes in material such as concrete, it is frequently desirable to limit the depth of the blind hole and to insure that the dust-like residue of drilling is substantially completely evacuated from the hole. Heretofore it has been an additional expense to clean out drilling residue from blind holes in concrete after the drilling has been effected.

Accordingly, it is an object of this invention to provide an improved tool which not only provides for drilling blind holes of a proper depth in concrete and the like but which also effects cleaning out of the drilling residue from the blind hole.

Another object of this invention is to provide a tool that is characterized by simplicity and inexpensiveness of construction and by efficiency of operation.

Further objects and advantages of this invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

A preferred embodiment of the invention is shown in the accompanying drawing.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a view showing in side elevation the improved drill of this invention and illustrating in cross section the use of the drill in concrete.

FIG. 2 is a fragmentary view of the improved drill, enlarged to more clearly illustrate the details of construction; and

FIG. 3 is a cross-sectional view taken on line 3-3 of FIG. 2.

Referring now to the drawings, 10 illustrates generally a clean-out drill for use in drilling blind holes of a selected diameter and depth, such as at H, in a concrete body C. The drill 10 has an elongated cylindrical shank, generally indicated at 12, of a length greater than the selected depth of hole H.

The drilling end of drill 10 is formed with a plurality of helical, hole-sizing, edges 14 that bound a pair of helical, relief flutes 16. Between the ends of drill shank 12 there is provided an abutment shoulder 18 that faces in a direction toward the drill's cutting end. The shank 12 is normally selected of a diameter greater than the selected diameter of the blind hole, so that in order to provide for sizing the hole H to the desired size, the tip length of shank 12 below shoulder 18 is selected to correspond with the depth of hole H and the diameter is reduced relative to the remainder of cylindrical shank 12. The reduced-diameter portion of the shank is indicated at 12a, the helical hole-sizing edges of shank 12a indicated at 14a, and the helical relief flutes of reduced dimension are indicated at 16a.

The tip end of the drill is provided with cutting edges 20. The spacing of the cutter edges 20 from the plane of shoulder 18 corresponds to the depth of hole H by being slightly greater than the depth of the hole so as to provide for an abutment mounted on the drill 10. In the specific form shown, the abutment is in the form of a simple annular washer 22 with a central hole 24, slip-fitted over the reduced shank portion 12a, the size of central hole 24 being such as to be just slightly greater than the diameter of reduced shank portion 12a and less than the diameter of shoulder 18. This permits one side of the flat washer 22 to abut against the shoulder 18, with portions of the central hole 24 spaced from the concavity of each relief flute 16a so as to provide, by cooperation between the washer and the helical flutes, a plurality of continuous, unobstructed, passageways which communicate spaces on opposite sides of the washer through the plane of the washer 22. The washer 22 is secured to the drill shank 12 by any appropriate means, such as by the spaced webs 26 located only at points of abutment between the lands of shank 12 and the upper, or back, surface of washer 22.

From the foregoing and from reference to FIG. 1, the usage and operation of the device will be readily understood. When using the drill 10 to drill blind holes H, as illustrated in FIG. 1, the front side of washer 22 serves as an abutment which engages the surface of body C to limit the depth of penetration of the reduced shank portion 12a. As the drill 10 continues to be rapidly rotated after the washer 22 has engaged the surface of body C, a centrifugal force is imparted to the residue of drilling and causes such residue to move longitudinally away from the cutter edges 20 helically rearwardly along the flute portions 16a and through the openings partially bounded by the central hole 24 of washer 22 to a point above washer 22, where the rapid rotation of the shank 12 operates to discharge the drilling residue by centrifugal force outwardly of the region of hole H.

While the abutment for limiting depth of penetration has been shown in the form of a washer, it will be understood that the shoulder 18 itself could serve the same purpose, and other structures could be used for the same purpose. Thus, if the washer is considered as one or a plurality of arms extending radially outwardly of the shank and being joined together in a plane, then it can be seen that the same advantage could be obtained by other forms of the invention. Included in my concept is the use of an elongated pinlike member secured in a bore provided in the shank of the drill transversely to the longitudinal axis of the drill.

It will be obvious to those skilled in the art that various other changes and modifications may be made in the invention without departing therefrom and, therefore, it is intended in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

I claim:

1. A clean-out drill for drilling in concrete, and cleaning out the dust and residue of drilling concrete from, blind holes of a selected diameter and depth comprising, in combination: an elongated cylindrical drill shank of a length greater than the selected depth of the blind hole and terminating at a cutting tip in cutter edges sized to provide a hole of the selected hole diameter, relief flutes extending helically of the drill shank from the cutter edges a distance greater than the selected depth of the blind hole, a flat, rigid washer providing a flat front side that serves as an abutment for automatically limiting depth of penetration of the drill shank, said washer having a central circular hole of a dimension only slightly greater than the selected diameter of the blind hole to provide a slip fit of the washer onto the drill shank to surround the drill shank and the relief flutes, and web means rigidly mounting the washer concentrically of the fluted drill shank to impart the cutting tip corresponding to the selected depth of the blind hole, whereby the circular hole of the washer cooperates with the relief flutes surrounded by the washer to provide passageways through which the residue of drilling is caused to be discharged upon continuing the rotation of the drill after the flat front side of the washer abuts the surface of the body being drilled to terminate cutting by the drill's cutting tip.

2. A clean-out drill for drilling in concrete, and cleaning out the residue of drilling from, blind holes of a selected diameter and depth comprising, in combination: an elongated cylindrical drill shank of a length greater than the selected depth of the blind hole and terminating at a cutting tip in cutter edges sized to provide a hole of the selected hole diameter, relief flutes extending helically of the drill shank from the cutter edges a distance greater than the selected depth of the blind hole, a washer with a central circular hole of a dimension slightly greater than the selected diameter of the blind hole, and means mounting the washer concentrically of the drill shank and at a distance from the cutting tip corresponding to the selected depth of the blind hole, whereby the circular hole of the washer cooperates with the relief flutes surrounded by the washer to provide passageways through which the residue of drilling is caused to be discharged upon continuing the rotation of the drill after the flat front side of the washer abuts the surface of the body being drilled to terminate cutting by the drill's cutting tip, said drill shank being initially of greater diameter than the selected diameter of the blind hole, the
cutting tip and adjacent shank portion of the drill being reduced from said greater diameter to the selected diameter of the blind hole to provide shoulder means in a plane spaced from the cutting tip of the drill, the washer's central circular hole being of lesser diameter than said shoulder means, and the washer being positioned to abut said shoulder means and being welded only at points of abutment between the washer and shoulder means so as to leave the passageways defined between the washer and relief flutes unobstructed.