

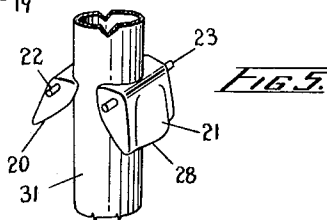
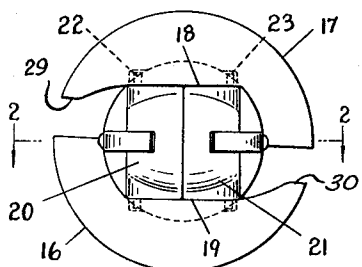
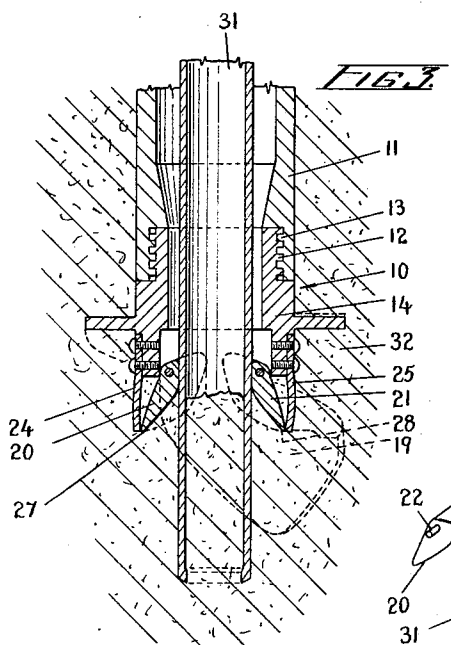
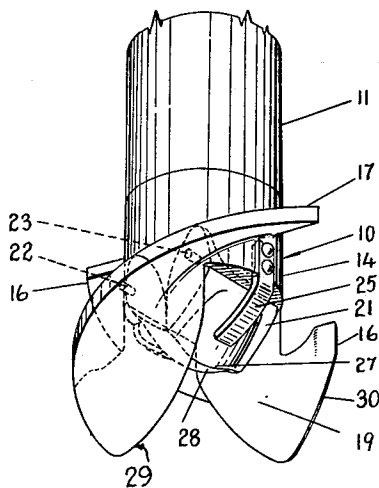
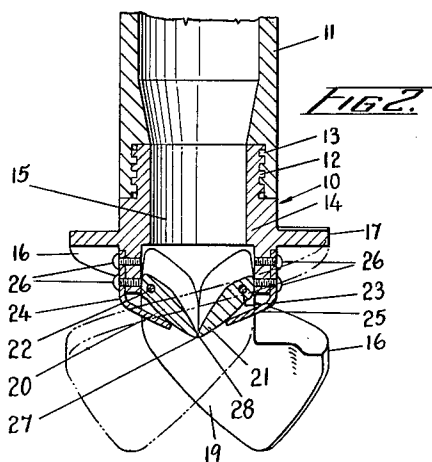
June 9, 1964

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3,136,376

CUTTER HEAD FOR HOLLOW STEM AUGER

Filed May 12, 1961



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3,136,376

CUTTER HEAD FOR HOLLOW STEM AUGER

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Filed May 12, 1961, Ser. No. 109,673

1 Claim. (Cl. 175—318)

This invention relates to a hollow stem continuous auger and in particular to an auger for obtaining soil samples at depth below ground level.

Auger tools and bits presently in use for soil sampling are of a type which require the tool and bit to be raised out of the hole which is being drilled in order to lower a tool for obtaining a sample of the soil in advance of the auger or rock at the bottom of the hole.

Another method presently in use consists of a hollow stem auger which is closed by a plug carried on the end of a second rod enclosed within the stem, the rod being the same length as the stem. This however, requires the rod and plug to be removed in order to insert the soil sampler or drill as the case may be.

An object of the present invention is to provide the soil sampling industry with a tool constructed in a manner that makes it possible to obtain samples of the yet untouched virgin soil below the cutter head without removing the auger from the hole or the use of a plug.

Further objects are to reduce the cost of manufacturing the auger by reduction of the flights and by providing the valves with arcuately curved lips which will close embrace several sizes of sampling tools, sealing off most of the void and thus preventing the inflow of material into the hollow stem during sampling.

In copending application Serial Number 101,286 filed April 6, 1961, now abandoned, there is described an auger for carrying out the above objects, said auger comprising a hollow auger which has its lower end closed by a clam-like valve arrangement normally closed by a spring action to prevent the material cut by the bit from passing up through the hollow stem during the boring operation. This valve arrangement permits the insertion of a soil sampler or rock drill through the hollow stem, forcing the clam-like valves which open against the tension of the springs and thus permit the sampler or drill being driven into the yet untouched virgin soil below the cutter head to obtain the sample of such soil. When the sampling tool or drill has obtained the sample and the tool withdrawn, the valves automatically close.

The auger described in the present application is an improvement on the foregoing device described in the aforementioned application for a hollow stem continuous auger comprising a hollow tubular cutting head open at both ends and having one end arranged for attachment to a hollow stem auger, a pair of flights encircling the body, and having extensions terminating a substantial distance beyond the other end, said extension having oppositely disposed flat and substantially parallel faces, a pair of separatory valve members pivotally mounted between the opposing faces of the flights, said valve members terminating in normally engaging lips, springs biasing valve members to normally hold said lips in engagement and an auger type cutter edge on the free end of said flights.

In the drawings;

FIGURE 1 is a perspective view of a cutter head constructed in accordance with the present invention;

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FIGURE 2 is a vertical cross-sectional view taken on the line 2—2 of FIGURE 4, showing the valve in its normal position during the boring of the hole;

FIGURE 3 is a cross-sectional view similar to FIGURE 2 showing a soil sampling tool entered through the hollow stem for obtaining a soil sample below the cutter head;

FIGURE 4 is an underneath plan view of the cutter head; and

FIGURE 5 is a perspective fragmentary view of the valves with a tool inserted between them.

The cutter head is generally indicated by the numeral 10 and it is mounted on the lower end of a hollow stem 11. It will be seen that the stem and the cutter head are substantially equal in diameter and that the cutter head has a threaded extension 12 which is threaded into and mates with a threaded bore 13 formed on the lower end of the hollow stem 11.

The cutter head 10 consists of a cylindrical body 14 of substantially the same circumference as the stem 11 and having an axial bore 15 therethrough which has a diameter that will allow a sampling tool or rock drill to pass therethrough. The outside surface of the cylindrical body 14 is formed with a pair of flights 16, 17 which extend a substantial distance below the body, the oppositely disposed faces of the flights being flattened as indicated at 18, 19 and arranged substantially parallel to each other. The opposing faces 18, 19 are separated by a distance equal to the diameter of the bore 15 although the diameter or spacing is not critical. Valve members or gates 20, 21 are pivotally mounted and snugly fit between the flat faces 18, 19 by means of hinge pins, 22, 23 which are entered through the body. The valve members are biased to the closed position shown in FIGURES 1, 2 and 4, by a pair of leaf springs 24, 25 which are fastened to the body by screws 26. It will be noted that the springs are arcuately curved to underly their respective valve member or gate and hold it closed. The valve members 20, 21 as will be seen, have their inner faces concave shaped and their lips 27, 28 arcuately curved to embrace the curved outer surface of a tubular sampling tool or drill rod when inserted therethrough as shown in FIGURES 3 and 5. The flights 16, 17 terminate in cutters, 29, 30 positioned below the lips 27, 28.

FIGURES 1 and 2 show the cutter head with the relative parts in the position they will assume under normal boring operation. When it is desired to obtain a sample of the yet untouched virgin soil below the cutter head as illustrated in FIGURE 3 a sampling tool or drill 31 is inserted down the stem 11, separates the valve members 20, 21 and enters the soil diagrammatically illustrated and identified as the numeral 32. When the sampling tool has penetrated into the soil or rock, as the case may be, the necessary distance to obtain the required sample, the same is withdrawn and the valve members close automatically to bring the lips 27, 28 again into contact with each other. The cutter is then ready for the continuation of the boring of the hole, if necessary. The sampling tool 31 is of conventional design and is used in the conventional manner well known to those skilled in this industry for obtaining a sample of soil which soil may be obtained either by rotating the sampling tool or by impact. The sampling tool forms no part of the present invention.

What I claim as new and desire to protect by Letters Patent of the United States is:

For a hollow stem continuous auger, a hollow tubular body forming a cutting head open at both ends and having one end arranged for attachment to a tubular stem, said head terminating at the other end in a pair of spaced apart diametrically opposite extensions having cutters and having inner opposed parallel plane surfaces, a pair of rigid valve members pivotally mounted between the plane surfaces and having parallel edges in scraping relationship with the plane surfaces, said valve members having normally engaging lips in closed position, the inner opposing faces of the valve members and the lips being concaved to substantially conform to receive the peripheral surface of a tubular rod inserted therebetween, a spring biasing each valve member to normally closed

position wherein said lips engage with each other and in open position said valve members encircle a rod entered therethrough and form a seal thereby preventing material entering the body when the rod is entered there-through.

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