May 29, 1962 P. J. PARSONS 3,036,638

MULTIPLE SAMPLER FOR SOILS

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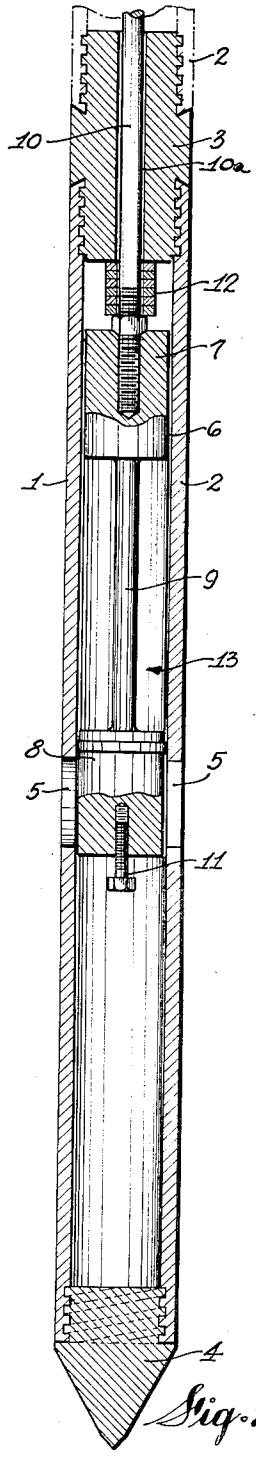

Fig. 2.

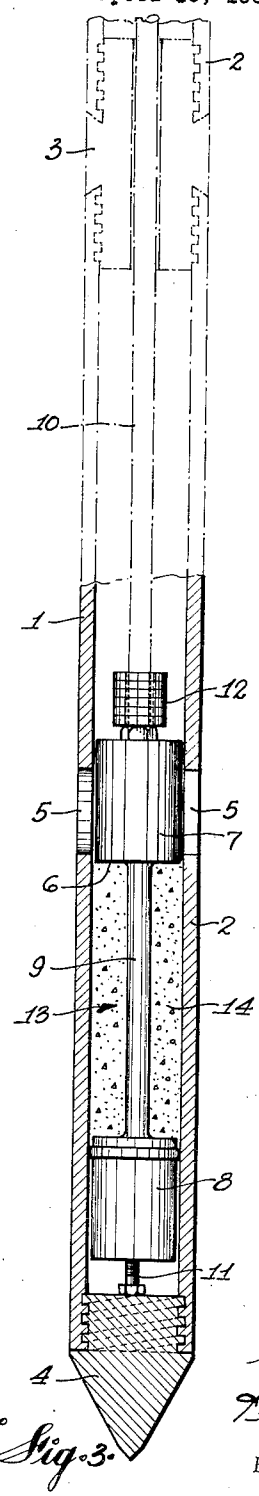

Fig. 3.

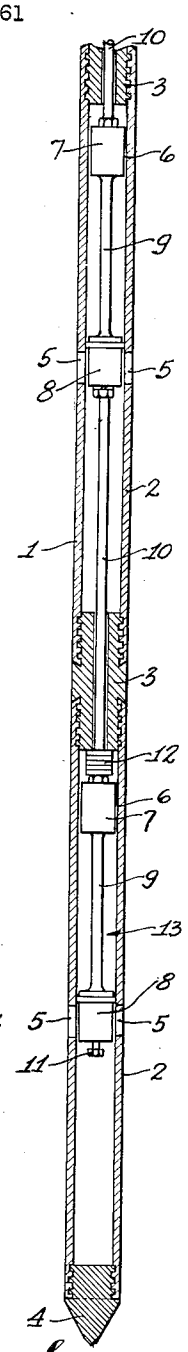

Fig. 1.

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MULTIPLE SAMPLER FOR SOILS

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This invention relates to a soil sampling device.

It is frequently desirable to obtain samples of soils in various areas and at varying depths for analysis. In most operations in which the soil sample is required, speed and convenience in obtaining the sample whereby a large number of samples may be obtained in a short period of time are prime factors.

It is an object of this invention to provide a soil sampling device which is of simple structure, and which has improved efficiency and speed of operation.

The invention resides in a soil sampling device comprising a tubular drill rod having at least one soil sample-receiving opening in the side wall thereof, a piston assembly in said drill rod and having a pair of spaced connected pistons providing a soil sample-receiving chamber therebetween, and an axially extending tie bar connected to said piston assembly, said piston assembly being reciprocally mounted in said drill rod for closure of said opening by a selected one of said pistons.

The invention will be described with reference to the accompanying drawing, in which;

FIGURE 1 is a sectional elevation of a soil sampling device in accordance with the invention,

FIGURE 2 is an enlarged sectional elevation of a portion of the device, and

FIGURE 3 is an enlarged sectional elevation of a portion of the device showing another position thereof.

Referring to the drawing, 1 is a drill rod comprising a plurality of tubular sections 2 connected to each other as by means of screw-threaded connectors 3. A driving shoe 4 has a screw-threaded mounting on the free end of the first section.

Each drill rod section has a plurality of circumferentially aligned slots or openings 5 in the side wall thereof intermediate its ends. As shown, such openings are positioned in the midsection area of the drill rod section.

Reciprocally mounted in each drill rod section is a piston assembly 6 comprising spaced upper and lower pistons 7 and 8 connected together by an axial bar 9. Means for imparting reciprocation to each piston assembly comprises an axially extending tie bar 10 which, as shown, has a screw-threaded connection with the upper piston 7, and which extends through an axial bore 10*a* in the connector 3. The axial extent of each piston is sufficient to close each series of openings 5 when the piston is reciprocated into overlying relation therewith. The axial extent of the bore in each drill rod section is sufficient to permit selective closure of the series of openings therein by either of the pistons 7 and 8 in each piston assembly.

The lowermost piston assembly is provided with stop means defining a first position wherein the lower piston 8 closes the openings 5 and a second position wherein the upper piston 7 closes the openings 5. Such stop means comprises an adjustable pin 11 carried by the lower piston 8 and engageable with the driving shoe 4 to define the first position and a plurality of spacer washers 12 on the tie bar 10 above the upper piston 7 and engageable with a connector 3 to define the second position.

In operation, with a piston assembly inserted in the first drill rod section and with the piston assembly in its first position whereby the openings 5 are closed by the lower piston. A connector 3 is slid over the protruding tie bar and tightened onto the drill rod section. The drill rod section is now driven into the soil, such driving action being performed in any suitable manner as by screwing a driving rod onto the connector 3, the driving rod being of sufficient length to extend above the tie bar. A second piston assembly is now screwed onto the protruding tie bar and is thus connected to the first piston assembly. A second drill rod section is then passed over the second piston assembly and screwed onto the first connector 3. The second drill rod section with its contained piston assembly is now driven into the soil, the first drill rod section advancing accordingly. The procedure is repeated with additional piston assemblies and drill rod sections until the desired depth in the soil is achieved.

When the required depth is reached, the protruding tie bar 10 is driven down a predetermined amount, i.e., sufficient to move the piston assemblies to an intermediate position wherein each series of openings 5 are opened and in communication with the sample receiving chamber 13 between the pistons of each piston assembly. Soil with ground water thus enters these chambers through the openings 5. Entry of the soil may be assisted by imparting a twisting action to the drill rod sections. A received sample is indicated at 14.

The tie bar is now again driven down to a position where its total displacement is, say, 8 inches below its starting point, such position corresponding to the aforementioned second position wherein the upper pistons 7 cover the entry openings 5. In such position, the samples are isolated from the surrounding soil.

The sampler is then jacked up and disassembled as it comes to the surface whereby each soil sample may be collected from the respective drill rod section.

I claim:

1. A soil sampling device comprising a tubular drill rod having at least one soil sample-receiving opening in the side wall thereof, a piston assembly in said drill rod and having a pair of spaced connected pistons providing a soil sample-receiving chamber therebetween, said piston assembly being reciprocally mounted in said drill rod for closure of said opening by a selected one of said pistons, and means for imparting reciprocation to said piston assembly comprising an axially extending tie bar connected to said piston assembly.

2. A soil sampling device comprising a tubular drill rod having a series of circumferentially aligned soil sample-receiving openings in the side wall thereof, a piston assembly reciprocally mounted in said drill rod and having a pair of spaced connected pistons providing a soil sample-receiving chamber therebetween, and means for imparting reciprocation to said piston assembly comprising an axially extending tie bar connected to said piston assembly, said piston assembly having a first position wherein one of said pistons closes said openings, a second position wherein the other of said pistons closes said openings, and an intermediate position wherein said openings are in communication with said soil sample-receiving chamber.

3. A soil sampling device comprising a plurality of tubular drill rod sections, a screw-threaded connector removably connecting said sections in axially aligned relation, each said section having a soil-sample receiving opening in the side wall thereof, a piston assembly reciprocally mounted in each said section and having a pair of pistons and a rod connecting said pistons in fixed spaced relation to each other and providing a soil sample-receiving chamber therebetween, means releasably connecting each said piston assembly with an adjacent one of said piston assemblies comprising an axially extending tie bar

having a screw-threaded connection with one of said pistons of each of said adjacent assemblies, each said piston assembly having a first position in said section wherein one of said pistons closes said opening therein, a second position in said section wherein the other of said pistons closes said opening therein, and an intermediate position in said section wherein said opening therein is in communication with one of said soil sample-receiving chambers, and means for imparting reciprocation to said piston assemblies comprising an axially extending tie bar connected to one of said piston assemblies.

4. A soil sampling device as defined in claim 3, including a stop carried by one of said pistons defining said first position, and a stop carried by one of said tie bars defining said second position.

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