Sept. 9, 1930. M. R. MALSBURY 1,775,134

SOIL TESTER

Filed May 16, 1929 2 Sheets-Sheet 1

Fig. 1.

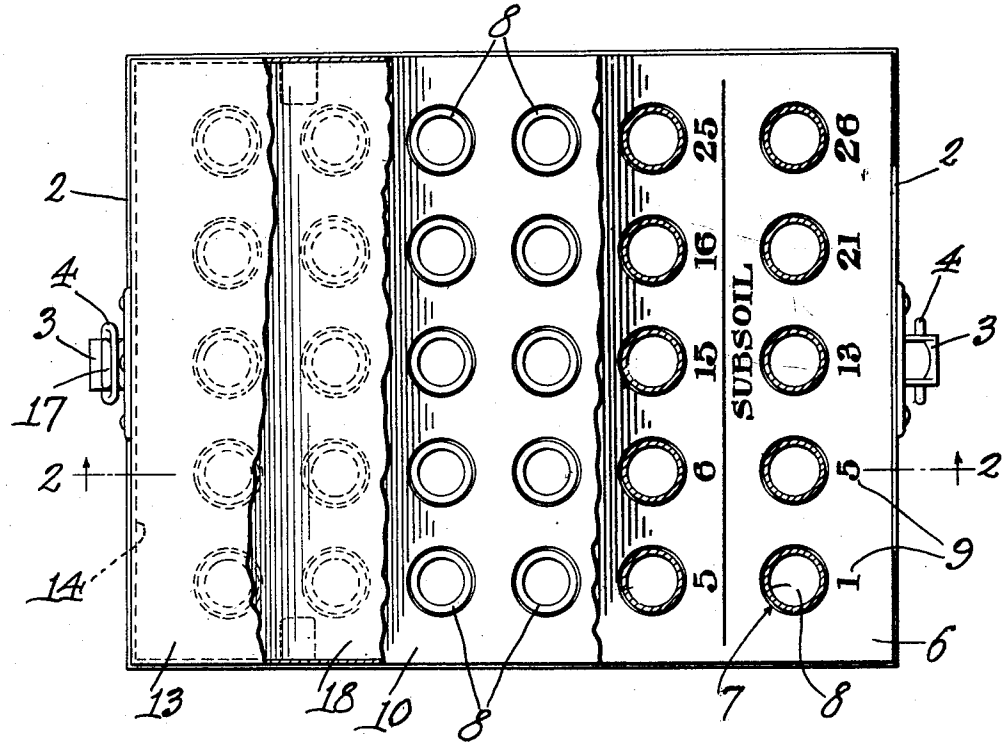
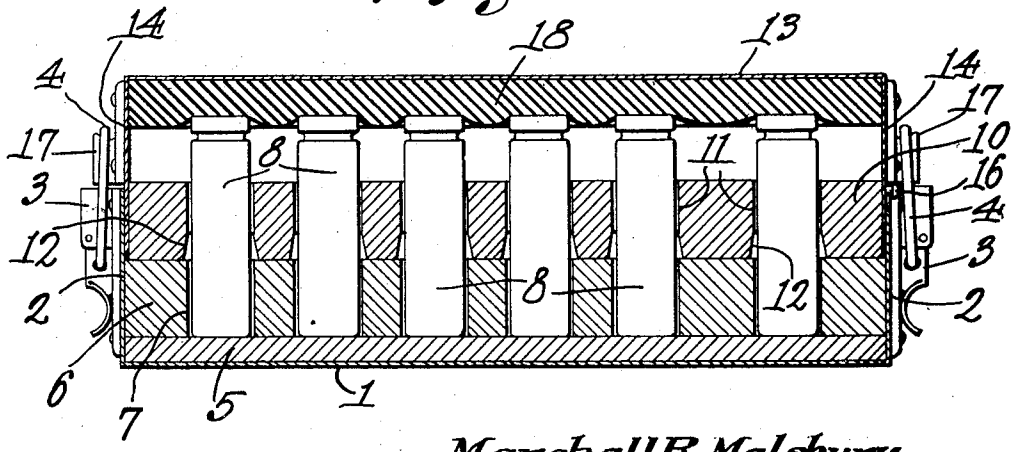


Fig. 2.



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Fig. 3.

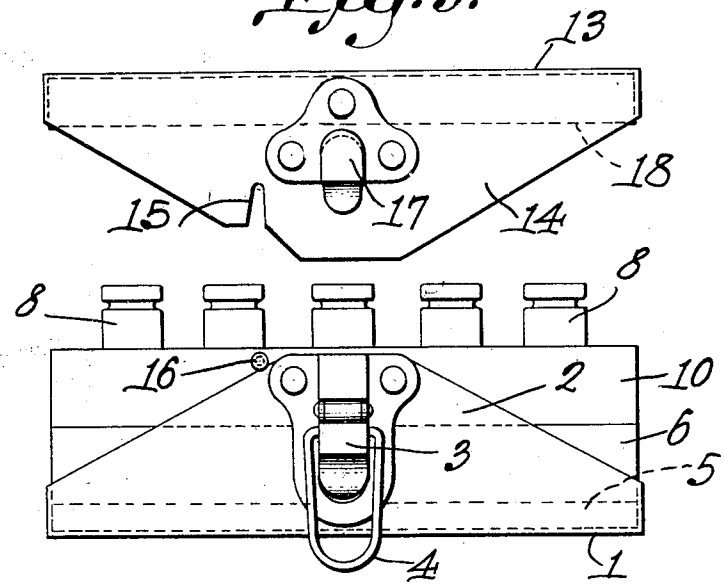
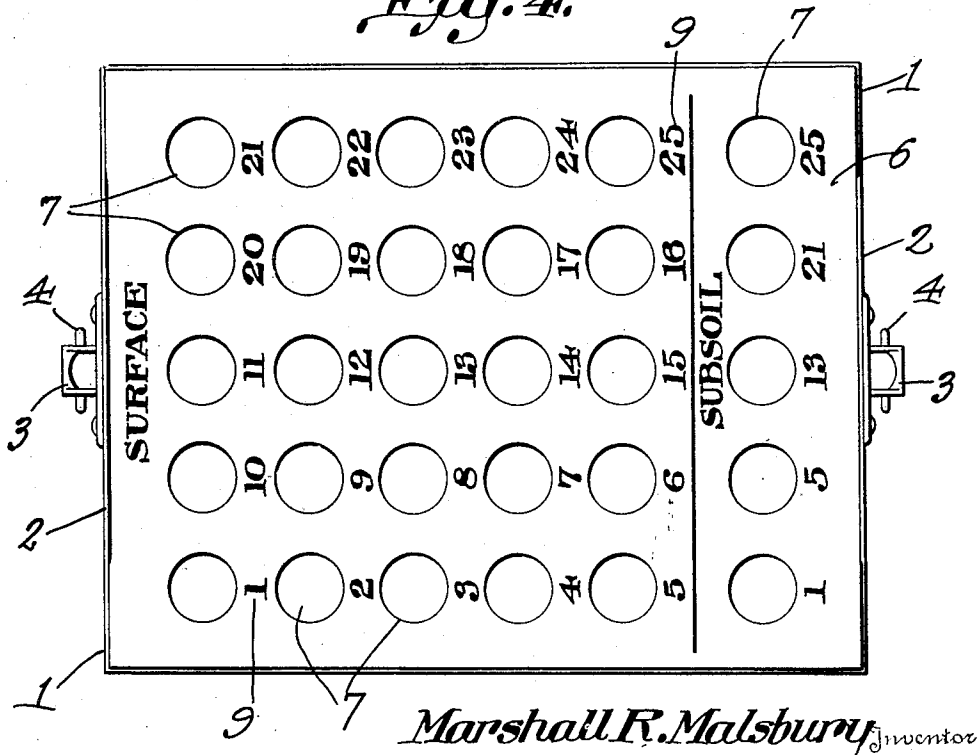


Fig. 4.



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UNITED STATES PATENT OFFICE

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SOIL TESTER

Application filed May 16, 1929. Serial No. 363,704.

This invention relates to a device for use in testing soils and is primarily for determining soil acidity.

One of the objects of the invention is to provide a simple, compact, and efficient structure in which can be placed specimens of soils taken from different parts of a field or other area, the said device having combined with it a means for gaging the amount of soil tested, the amount of reagent employed, and the relative conditions of the different portions of soil tested.

Another object is to provide a device of this character in which the different specimens will be tested uniformly, all of them being subjected not only to the same quantity of reagent but also being subjected to a uniform agitation and to a uniform settling period.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings,

Figure 1 is a top plan view of the testing device, several parts thereof being broken away so that a portion of every part is shown in plan.

Figure 2 is a section on line 2—2, Figure 1, said section being taken through the complete device, the bottles being in elevation.

Figure 3 is an end elevation of the device showing the upper and lower portions separated.

Figure 4 is a top plan view of the soil gage member.

Referring to the figures by characters of reference, 1 designates a tray that can be formed of sheet metal or any other suitable material, the ends of this tray being provided with upstanding tongues 2 to which may be secured a fastener member comprising a pivoted lever 3 having a loop 4 extending therefrom. On the bottom of the tray may be arranged a lining 5 of fiber, wood, metal, paper, or the like, adapted to support a combined bottle holder and soil gage block 6. This block can be formed of wood or other desired material having openings 7 therethrough each of which is adapted to receive the lower portion of a bottle 8.

The several bottles 8 are adapted to rest on the bottom of the tray 1 or on the lining 5 carried thereby. Block 6 is held against lateral or longitudinal displacement by the walls of the tray but can be lifted readily from the tray. The upper surface of the block 6 is preferably provided with numbers or other characters indicated at 9 for designating the different openings 7 in which the bottles 8 are seated. These openings 7 may be disposed in rows and one or more rows can be designated by a title such as "Subsoil" while other rows can be designated by other titles such as "Top soil" although this latter designation would not be essential if the designation "Subsoil" is used with some of the openings.

Removably mounted on the gage block 6 is a reagent gage block 10 formed of wood or other suitable material and having openings 11 therein adapted to register with the openings 7. For the purpose of facilitating the positioning of the gage block 10 around the upstanding bottles 8, the lower ends of the openings 11 are preferably flared as shown at 12. This gage block 10, which is formed of metal, wood, or any other suitable material, is adapted to be employed to indicate the proper level to which the reagent in the bottles is to be brought while preparing for a test.

In connection with the parts thus far described there is provided a cover 13 formed of sheet metal or any other suitable material in the form of an inverted tray having end tongues 14 adapted to be inserted downwardly between the tongues 2. One of these tongues 14 has a slot 15 extending thereinto from its lower edge adapted to receive a pin 16 extending from one end of the gage block 10. Thus proper assembly of this block with the cover 13 is insured.

Lugs 17 are extended outwardly from the tongues 14 and are so located that, when the cover is properly placed relative to the tray-like base 1 with the tongues 14 between the tongues 2, the said lugs will engage the fastening members on the tongues 2 and be engaged by the loops 4. Thus by moving the levers 3 downwardly the loops 4 will draw the cover 13 toward the base 1.

Cover 13 is provided with a lining 18 in the form of a pad of soft rubber or the like of such thickness that when the cover 13 is drawn toward the base 1 as explained, this pad will press against and close the upper ends of all of the bottles 8 as shown particularly in Figure 2.

In practice the user makes a chart of the area to be tested and indicates thereon the different points from which surface soil and subsoil is to be removed. These different points can be designated by numbers corresponding with the numbers appearing on the upper surface of the gage block 6. Thereafter portions of the soil are removed from the points designated and placed in bottles 8 provided therefor. The soil when thus taken should be in such condition as to pulverize readily in the hand but at the same time have a small amount of moisture therein.

After the soil taken from different points in the field or other area has been placed in the properly designated bottles, said bottles are struck lightly so as to cause the soil to gravitate. It is essential that the top surface of the soil in each bottle be on a level with the top of the gage block 6. After this step has been completed the gage block 10 is placed on the block 6 and enough reagent is placed in each bottle to bring the level thereof to the top of the block 10. It is essential that all of the bottles contain the same amount of reagent. Thereafter the cover 13 is placed in position with the cushion 18 resting on all of the bottles and finally the cover 13 is drawn to the bottom 1 by means of the fastening devices. Thus all of the bottles will be sealed.

The device, after being filled and prepared as explained, is agitated for two or three minutes and then allowed to stand for about eight minutes or longer. This will give the solid matter in the several bottles a chance to settle, thereby to leave a clear liquid in the upper portion of each bottle. Cover 13 can then be removed and the gage block 10 is also lifted from position. By then examining the contents of the different bottles it can be determined readily, by the color of the reagent, the degree of acidity of the specimen of soil in each bottle.

In making a soil test it is essential that the same amounts of soil be used in the test of each portion of the field. For this reason the gage block 6 is used. It is also essential that the same amount of reagent be used in making each test. For this reason the gage block 10 is used. By providing the cover with its sealing cushion that can be drawn tightly against all of the bottles to close them, the entire device can be shaken so as to thoroughly agitate all of the bottles simultaneously, to the same extent, and for the same length of time. Furthermore, by having all of the bottles used in the collective test, seated in a single device, they will all be allowed to stand and settle for the same length of time.

From the foregoing it will be seen that the final result as determined by inspection of the reagent will be conclusive, and proper comparisons can be made between the soil taken from different area.

It is to be understood that any desired number of thicknesses of material such as indicated at 5 can be used for adapting this device for use with bottles or other containers of different lengths.

What is claimed is:

1. A soil testing device including a soil gage block having openings therein for receiving bottles of the same size, each of said openings having a designating character, a gage block adapted to rest upon the first-named block and having openings for the reception of portions of the bottles, said gage block being provided for determining the amount of a reagent used in each bottle, means extending over all of the bottles for sealing them, and means for connecting said sealing means to the bottle supporting means thereby to permit agitation of the entire device without accidental separation of the parts.

2. A soil testing device including a base, a soil gage block carried thereby having bottle-receiving openings suitably designated, a reagent gage block having bottle-receiving openings and adapted to rest upon the soil gage block, a cover for sealing the bottles, and means for holding the cover to the base, thereby to permit agitation of the device without accidental separation of the parts.

3. A soil testing device including a base, a soil gage member carried by the base and having bottle-receiving openings, a reagent gage member removably mounted on the soil gage member and having bottle-receiving openings, said openings being flared downwardly, and means for holding the bottles fixed relative to each other and with their ends sealed to permit simultaneous actuation of all of the bottles without accidental displacement relative to each other.

4. A soil testing device including a base, a soil gage element carried thereby and having openings for the reception of containers, a reagent gage member adapted to rest upon the soil gage element and having openings for the reception of said containers, a cover, a cushioning pad carried by the cover for engaging the open ends of containers in the openings,

thereby to seal said container, and means for binding the cover to the base and fastening it, thereby to hold the containers firmly in the gage members and against relative displacement during actuation of the device.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

MARSHALL R. MALSBURY.