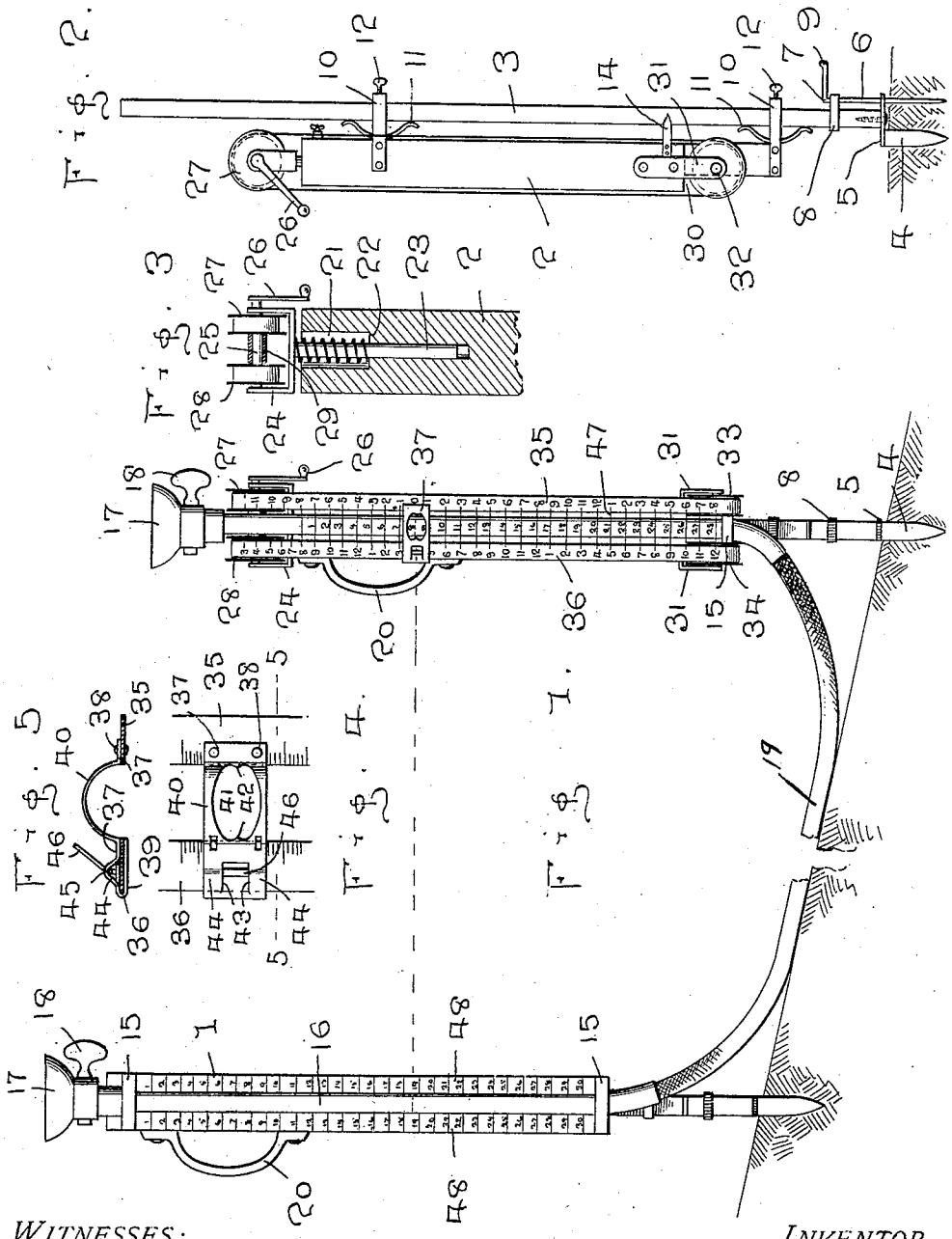
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DRAINAGE LEVEL.

APPLICATION FILED AUG. 25, 1908.

914,945. Patented Mar. 9, 1909.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 7.

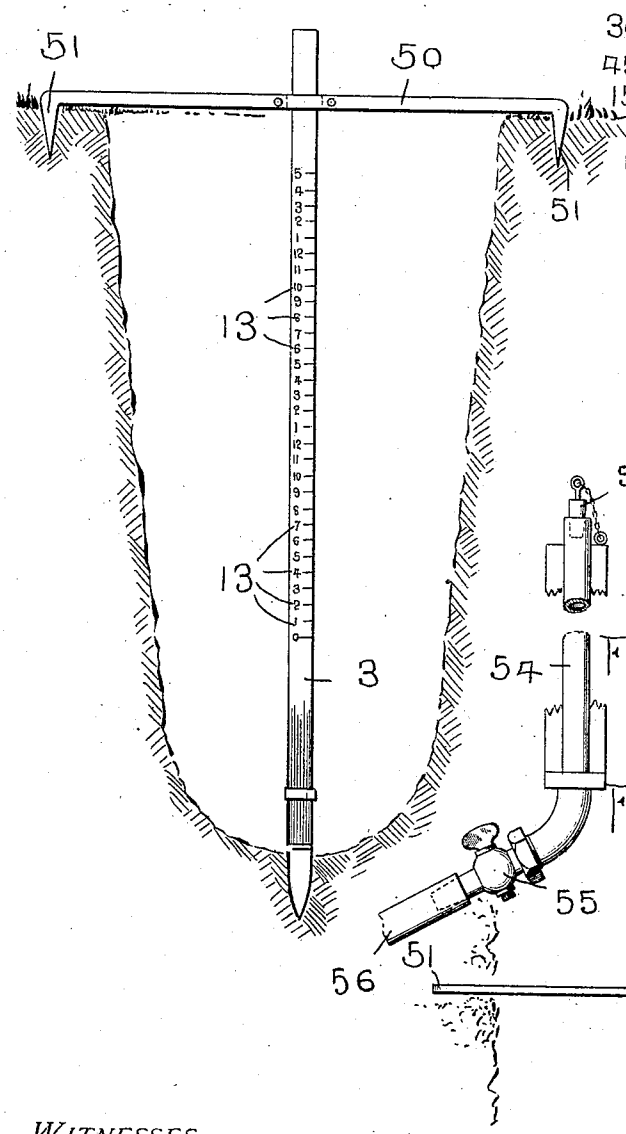


Fig. 6.

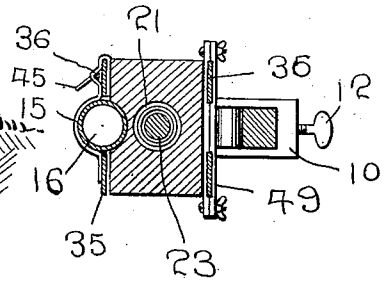


Fig. 9.

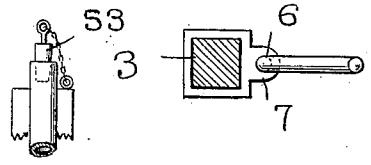
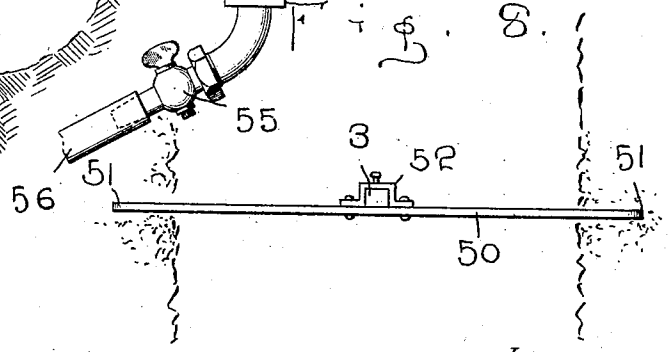


Fig. 10.

Fig. 8.



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UNITED STATES PATENT OFFICE.

PHILIP GUTWEIN, JR., OF FRANCESVILLE, INDIANA.

DRAINAGE-LEVEL.

No. 914,945. Specification of Letters Patent. Patented March 9, 1909.

Application filed August 25, 1908. Serial No. 450,149.

REISSUED

To all whom it may concern:

Be it known that I, PHILIP GUTWEIN, Jr., a subject of the Emperor of Austria-Hungary, residing at Francesville, in the county of Pulaski and State of Indiana, have invented certain new and useful Improvements in Drainage-Levels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in drainage levels and it is primarily an object of the invention to provide a novel device of this character whereby the results of a reading can be obtained without the necessity of complicated computations.

It is also an object of the invention to provide a novel device of this character employing two rods, one of said rods being provided with movable tapes having thereon proper indications, one of said tapes being provided with a pointer which is adapted to act in conjunction with a second of the tapes.

It is also an object of the invention to provide a novel device of this character wherein the rods may be suitably positioned within a ditch for obtaining the per cent. of grade thereof.

It is also an object of the invention to provide a novel device of this character provided with movable tapes, said tapes being capable of movement independently one of the other or of movement in unison.

It is also an object of the invention to provide a device of this character including novel means whereby the rod may be supported, the rod being adjustable on its supporting means.

Furthermore it is an object of the invention to provide a novel device of this character whereby the supporting means may be held at its station.

It is also an object of the invention to provide a novel device of this character which will be simple in construction, efficient and advantageous in practice and comparatively inexpensive to manufacture.

With the above and other objects in view the invention consists of the details of construction and in the novel arrangement and combination of parts to be hereinafter more particularly referred to.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this specification wherein like characters of reference denote corresponding parts in the several views and in which,

Figure 1 is a view in elevation of a device in operative position. Fig. 2 is a side elevation of the main rod of the device in position. Fig. 3 is a view partly in section and partly in elevation illustrating a detail of the invention. Fig. 4 is a fragmentary view in elevation, enlarged, illustrating the pointer or indicator employed in the invention. Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4. Fig. 6 is a cross sectional view illustrating a further detail of the invention. Fig. 7 is a view in elevation of a supporting means for the device when using the same within a ditch. Fig. 8 is a top plan view of Fig. 7, and, Fig. 9 is a sectional view illustrating a further detail of the invention. Fig. 10 is a fragmentary view illustrating a slightly modified form of the invention.

In the drawings, 1 denotes one of the blocks of the apparatus while 2 denotes a second block. Each of these blocks is adapted to be held by a carrying rod 3 which, in the operation of the device is intended to rest upon a station 4, preferably a stake. The lower end of the carrying rod 3 is provided with the cross arm 5, one end of which is adapted to rest on the station 4 while the opposite end has passing loosely therethrough an anchoring pin 6. This pin 6 also passes through a perforated ear 7 projecting from a collar 8, embracing the carrying rod 3. The upper end portion of the pin 6 above the collar 8 is bent at approximately right angles to provide an operating medium 9. To anchor the carrying rod 3 in position, it is only necessary that pressure be given by the foot on the medium 9 when the pin 6 will be embedded within the ground and it is thought to be obvious to remove the pin 6, it is only necessary to insert a pull on the medium 9. The rod or instrument acting in conjunction with a carrying rod 3 is provided with straps 10 which pass around the carrying rod 3 and the said instrument or rod is provided with the leaf springs 11 which are adapted to contact with the carrying rod 3 to frictionally hold the instrument against movement thereon. To assure proper frictional contact, the straps 10 have threaded therethrough, the winged bolts 12 which contact with the car-

rying rod 3 and when properly rotated, draw the instrument toward the carrying rod as is believed to be obvious. By this arrangement, the instrument can be adjusted longitudinally of the carrying rod 3 and in order that the position of the instrument on the carrying rod 3 may be determined, said carrying rod is provided with the indications 13 having acting in conjunction therewith the pointer or indicator 14 carried by the instrument adjacent the lower end thereof.

Each of the blocks 1 and 2 has held to the face thereof by the straps 15, a glass tube 16 extending longitudinally thereof. The upper end of the tube has fixed thereto the cup 17 so that suitable liquid may be inserted within the tube and said cup is provided with a controlling valve 18 to prevent accidental discharge of the liquid. The lower ends of the tubes 16 are united by a flexible tube 19 making a continuous passage of the fluid from one of the tubes 16 to the other and it is the relative positions of the fluid within the tubes that determine the per cent. of the grade.

Each of the blocks 1 and 2, has fixed to the side thereof adjacent to the top, a hand grasp 20 to permit the proper manipulation of the instrument and to afford convenient means for carrying the same. The block 2 has formed in its upper end, the stepped recess 21 providing the shoulder 22. Projecting within the recess 21 is a stem 23 arranged centrally of a fork or bracket 24 and encircling said stem is a helical spring 23^a adapted to deliver its tension or pressure upon said bracket for a purpose presently indicated. In the free end portion of the bracket is mounted a shaft 25, one end portion of said shaft projecting beyond the bracket and to this projected portion is fixed a rotating medium 26, in this instance shown as a crank. Fixed to the shaft 25 adjacent one end thereof is the flanged pulley 27 while loosely mounted on the shaft adjacent its opposite end is a second flanged pulley 28. In order that the pulley 28 may be prevented from undue longitudinal movement on the shaft 25, a sleeve 29 embraces said shaft between the pulleys 27 and 28 as is particularly shown in Fig. 3. The opposite end portion of the block 2 is reduced in thickness as at 30 and projecting from the sides of the instrument over said reduced portion are the arms or brackets 31 in which is mounted the shaft 32 projecting loosely through the reduced portion of the instrument 2. To each side of the block 2 within the reduced portions thereof are the flanged pulleys 33 and 34 in alinement with the pulleys 27 and 28 respectively, said pulleys 33 and 34 being loosely mounted on the shaft 32.

Over the pulleys 27 and 33 passes an endless tape 35 while the pulleys 28 and 34 have traveling thereover a second endless tape 36. The tape 35 is numbered from a point "O" in opposite directions and at this "O" point is fixed an indicator 37. This indicator 37 is secured to the tape 35 by rivets 38 at one end portion while its opposite end portion is bent as at 39 to straddle the tape 36. The intermediate portion 40 of the indicator or plate is bowed to pass the tube 16 and this bowed portion 40 is provided with an oval opening 41 having the opposed inwardly extending points 42 at the ends thereof. The upper face of the plate or indicator is slit as at 43 to permit the formation of the bearings 44. In the bearings 44 are inserted the trunnions 45 of the cam-lever 46 which is intended to clamp the indicator or plate 37 to the tape 36 to cause said plate, when desired, to move in unison or simultaneously with the tape 35. The tape 36 is numbered from a point marked "O" continuously in one direction only. The portion of the block 2 beneath the tube 16 is also provided with indications numbered in succession from adjacent the top thereof as is indicated at 47. It will be noted that by means of the delivery of the pressure or tension of the spring 23^a upon the bracket 23 the endless tapes 35 and 36 will be held in properly stretched position upon their carrying pulleys.

The block 1 is devoid of the tapes as described in connection with the block 2, the only indicia thereon being that arranged adjacent each side of the tube 16, said indicia 48 corresponding with the indicia 49 on the block. A clamp 49 is suitably applied to the block 2 near its extreme upper end and comprises plate-like members having spaced apart facing recesses therein, each of the facing recesses adapted to form a passage for the reception of tapes 35 and 36, respectively, as clearly seen in Fig. 6, said clamp members being held together by means of thumb nut-equipped screws.

In practice the blocks 1 and 2 are secured to their respective carrying rods, care being taken that the indicator or pointer 14 of each of the blocks be positioned at similar indications 13. The block 1 or its carrying rod is placed on the upper station 4 while the carrying rod of the instrument 2 is placed on a lower station. The liquid in tubes 16 and 19 will then seek a level. The lever 46 is then positioned to cause the tapes to move in unison until the "O" indicator of the tape 36 is brought flush with the upper edge of the clamp 49 and held against movement by said clamp 49. Tape 36 is now ready to record the coming measurements. Lever 46 is then loosened and tape 35 is moved until the indicator 37 of said tape 35 is in alinement with the upper surface of the liquid within tube 16 of the block 1, said movements being effected by rotating the operating medium 26. The reading suggested by tape 35 at the surface of the water or fluid indicates the actual fall of

the grade if the fluid be above the O-point, and the corresponding raise of the grade will be indicated thereby if the water be below that point. Lever 46 is tightened and clamp 49 loosened and the tapes caused to move in unison until indicator 37 is in alinement with the upper surface of the liquid within the tube 16 of instrument 2. Tape 36 is then held against movement by clamp 49, said clamp being carried by the rear face of block 2 as is particularly shown in Fig. 6. To make a further reading, the block is positioned forward on the next station; indicator 37 is again brought into alinement with the upper surface of the liquid within the tube 16 of instrument 1 and the new fall or rise is indicated by the tape 35, reading at the upper surface of the liquid within the tube 16 of block 2. This indication again to be recorded by tape 36. This operation thus continues until all the stations have been occupied. The measurements of the tape 35 being added or subtracted on recording tape 36 as required. Thus a total rise or fall along an entire line is immediately disclosed by the indication on tape 36 appearing at the upper edges of clamp 49 and by the number of turns said tape made.

When the device is employed in a ditch, it has been found best that a holding means be employed for the upper end of the rod 3 and as illustrated in the drawings, a cross rod 50 is employed which terminates in the depending pointed fingers 51 which are adapted to be embedded in the ground adjacent the sides of the ditch. Intermediate its length and approximately centrally thereof and secured to a side of the rod 50 is a bracket 52, through which the upper end portion of the rod 3 passes as is particularly shown in Figs. 7 and 8.

In Fig. 10 is illustrated a form of the invention wherein in lieu of the valve 17 an ordinary stopper 53 is employed and the bases of the tubes 54 are provided with the stop cocks 55, which, when the apparatus is being moved from point to point, are closed and thereby retain the liquid within the tubes 54.

I claim:

1. A device of the character described, comprising blocks, tubes carried by said blocks, containing fluid, a flexible tube connecting the aforesaid tubes, endless movable tapes, means applied to one of said blocks for actuating said tapes.

2. A device of the character described, comprising blocks, tubes carried by said blocks containing fluid, a flexible tube connecting the aforesaid tubes, movable endless tapes, rotatable means applied to said blocks encompassed by said tapes, one of said rotatable means being adapted to be manually actuated, and one of said blocks having an indicating device for registering with indicia thereon.

3. In a device of the character described, the combination of two blocks, tubes carried by said blocks to contain fluid, a flexible tube connecting the tubes of the blocks, tapes carried by one of said blocks, said tapes being movable one independently of the other and means for causing said tapes to move in unison.

4. In a device of the character described, the combination of two blocks, tubes carried by said blocks to contain fluid, a flexible tube connecting the tubes of the blocks, movable tapes carried by one of said blocks and a clamping means for the tapes carried by said block.

5. In a device of the character described, the combination of two blocks, tubes carried by said blocks to contain fluid, a flexible tube connecting the tubes of the blocks, movable tapes carried by one of said blocks and carrying rods for said blocks, said blocks being adjustably held by the carrying rods.

6. A device of the character described, comprising blocks, each carrying a liquid-containing tube, a flexible tube connecting the aforesaid tubes, one of said blocks being equipped with two endless tapes having certain indicia thereon, rotatable means for said tapes, resilient means for the retention of said rotatable means with said tapes in effective position.

7. A device of the character described, comprising blocks, liquid-containing tubes arranged upon said blocks, a flexible tube connecting the aforesaid tubes, endless tapes having certain indicia thereon, rotatable means for actuating said tapes, a clamp applied to one of said blocks and having adapted to clamp between its members, said tapes.

8. A device of the character described, comprising block members, liquid containing tubes carried by said block members, a flexible tube connecting the aforesaid tubes, tapes having certain indicia thereon, rotatable means carried by said blocks for actuating said tapes, resilient means arranged in connection with one of said blocks, for the retention of said rotatable means and tapes in effective position and a clamp applied to one of said blocks and engaging said tapes.

9. A device of the character described, comprising block members, liquid containing tubes arranged upon said block members, a flexible tube connecting the aforesaid tubes, tapes arranged laterally upon one of said blocks, having marked thereon certain indicia, rotatable means for actuating said tapes, resilient means arranged in connection with one of said blocks for the effective retention of said rotatable means and tapes in effective position, an indicator arranged in connection with said tapes, a clamp receiving between its members said tapes, and means for the retention of said tapes between said members.

10. A device of the character described, comprising block members, liquid containing tubes arranged upon said block members, a flexible tube connecting the aforesaid tubes, endless tapes arranged laterally upon one of said block members, rotatable means encompassed by said tapes, adapted for the actuation thereof, a clamp applied to one of said blocks for the retention of said tape members in position and an indicator arranged in connection with one of said blocks and said tapes, having an intermediate bowed portion, said indicator also having a cam lever for its retention in position with relation to said tapes and the block member equipped with said tapes.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PHILIP GUTWEIN, JR.

Witnesses:
BERT H. THOMPSON,
E. H. MEYER.