J. J. FUSCO.

DEVICE FOR DETERMINING THE DEPTHS AND FIXING THE GRADES OF TRENCHES.

APPLICATION FILED JULY 7, 1908.

907,329.

Patented Dec. 22, 1908.

2 SHEETS—SHEET 1.

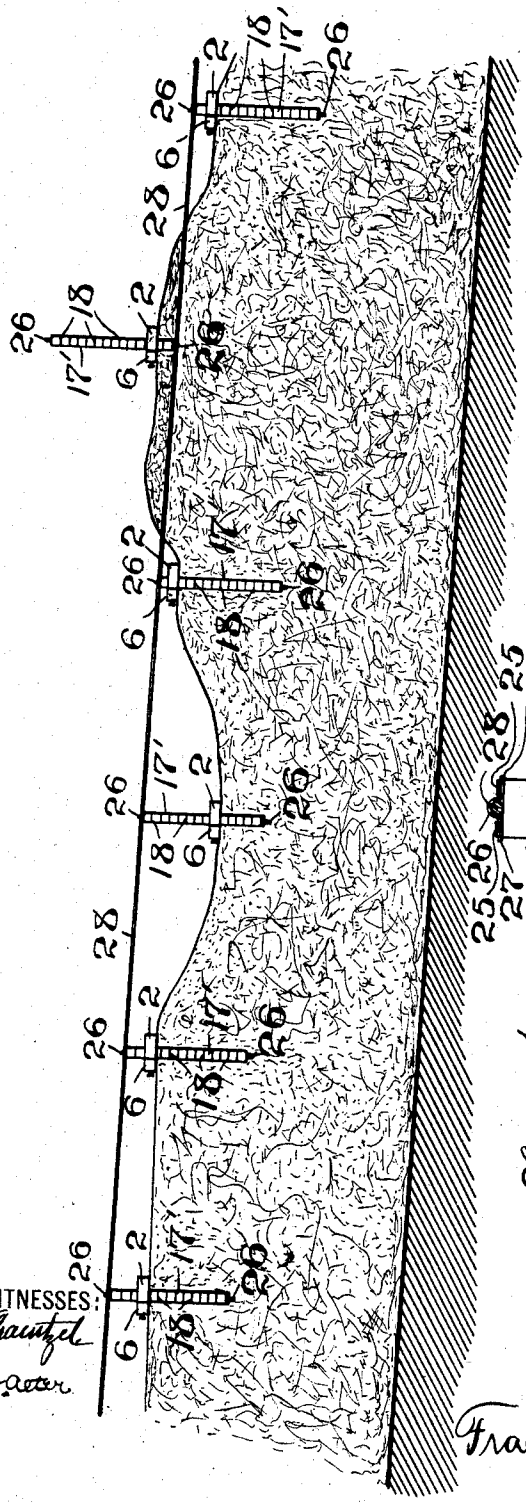

Fig. 1

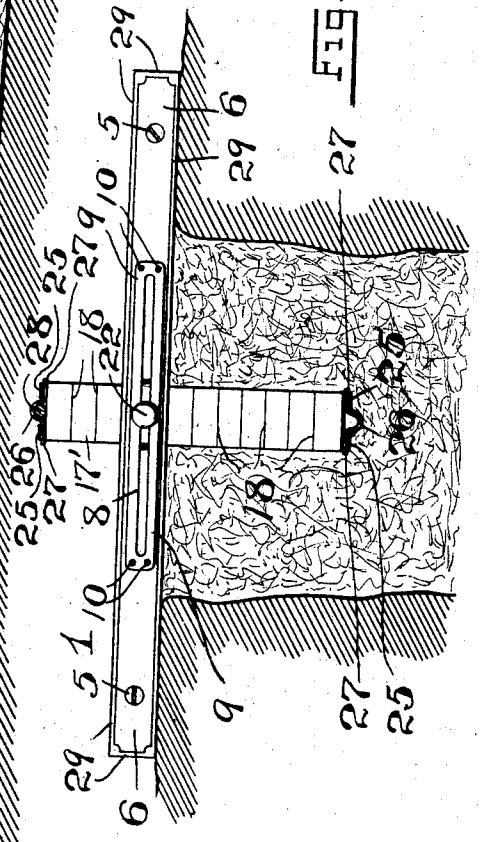

Fig. 2

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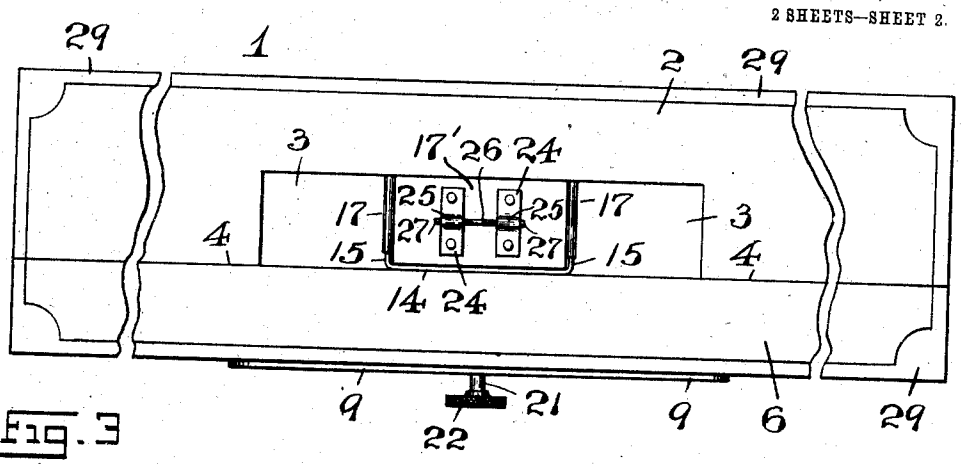

Fig. 3

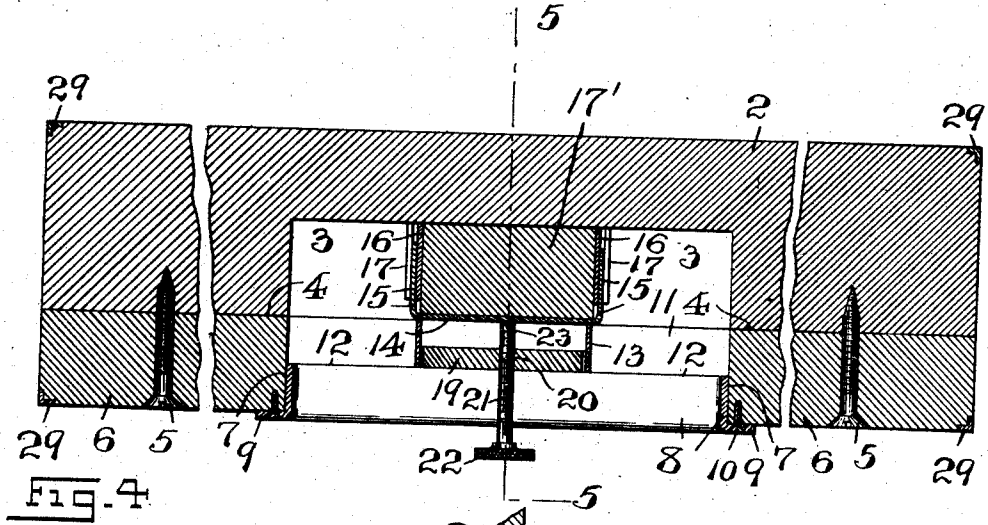

Fig. 4

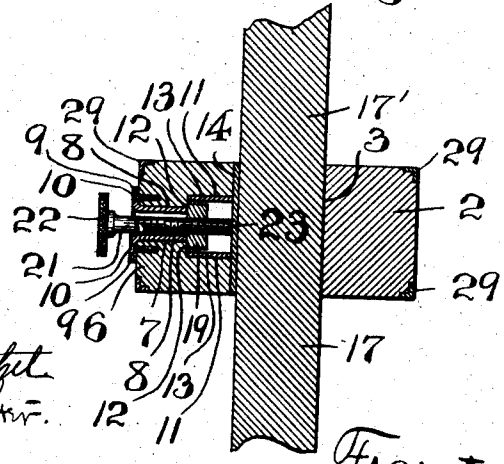

Fig. 5

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UNITED STATES PATENT OFFICE.

JAMES J. FUSCO, OF MONTCLAIR, NEW JERSEY.

DEVICE FOR DETERMINING THE DEPTHS AND FIXING THE GRADES OF TRENCHES.

No. 907,329. Specification of Letters Patent. Patented Dec. 22, 1908.

Application filed July 7, 1908. Serial No. 442,309.

To all whom it may concern:

Be it known that I, JAMES J. FUSCO, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Devices for Determining the Depths and Fixing the Grades of Trenches; 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, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention has reference, generally, to improvements in that class of engineers' implements or devices which are designed for use in the digging of trenches of the various kinds; and, the present invention relates, more particularly, to a novel implement or device which is to be used with trenches, and especially with sewer-trenches, for properly designating the depth and grade of the trench irrespective of the uneven or other surface of the ground in which the trench is being made.

My present invention, therefore, has for its principal purpose to provide an implement or device of the general character hereinafter more particularly set forth, any number of such devices being used, as may be found necessary, and each device comprising a grade-board and a grade-stake which is adjustable both laterally and vertically with relation to the grade-board, and the several grade-stakes being adjusted by the engineer, by means of the transit and level, laterally to designate the longitudinal center-line of the trench, and vertically to determine or fix the grade of the bottom of the trench, so as to provide for the proper angular relation or fall of the sewer.

Another principal purpose of this invention is to provide a simply and cheaply constructed device of the character specified which can be easily and quickly manipulated, and which can be used over and over many times, without any detriment to the device itself.

Other objects of this invention not at this time more particularly enumerated will be clearly evident from the following detailed description of my present invention.

With the various objects of my present invention in view, the said invention consists, primarily in the novel implement or device for determining the depths and grades of trenches; and, the invention consists, furthermore, in the various novel arrangements and combinations of the devices and parts, as well as in the details of the construction of the same, all of which will be hereinafter more fully described, and then finally embodied in the clauses of the claims which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a longitudinal vertical sectional representation of a trench, and an arrangement of a number of depth-determining and grade fixing implements or devices, the latter being shown in end-elevation, and showing their use with the uneven surface of the ground in which the trench is being made. Fig. 2 is a transverse vertical section of a portion of the trench and a front elevation of one of the depth-determining and grade-fixing implements or devices, said view being made on an enlarged scale. Fig. 3 is a bottom view, full size, of one of the depth-determining and grade-fixing implements or device, showing one arrangement of grade-board and its adjustable grade-stake; Fig. 4 is a horizontal sectional representation of the same; and Fig. 5 is a vertical cross-section, taken on line 5—5 in said Fig. 4, the grade-stake having its upper and lower end-portions shown broken away.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to the said figures of the drawings, the reference-character 1 indicates one of the complete depth-determining and grade-fixing implements or devices, the same comprising what will be hereinafter termed a grade-board. This board usually consists of a rectangular or other suitably shaped main bar or rod 2, of any suitable length, and of any desirable material, being usually made of wood. In its central portion, the said bar or rod 2 is made with a recessed or cut-away part, as 3, extending from one of the faces, as 4, and across the depth of the said bar or rod, substantially as shown. Suitably arranged upon said face 4 of the bar or rod 2, preferably by means of screws 5, or other suitable fastening means, is a face-plate or bar 6, conforming to the general conforma-

tion of the bar or rod 2, and being made of any suitable material, preferably wood. The said face-plate or bar 6 is made with a longitudinally extending opening or slot 7, into which is preferably fitted a correspondingly formed casing or shell 8 of metal which is open at the top and bottom, and is provided with a surrounding marginal flange 9, said flange being provided with suitably disposed holes or perforations for the reception of screws, as 10, for securing the casing or shell 8 in place, substantially as shown in Figs. 2, 4 and 5 of the drawings. As shown, the said face-plate or bar 6 is made with another longitudinally extending opening or slot 11, directly back of the opening or slot 7, said opening or slot 11 being of greater width than that of the opening or slot 7, so as to provide a pair of longitudinally extending shoulders 12, as clearly illustrated in Figs. 4 and 5 of the drawings.

Slidably arranged within the said opening or slot 11 is a box 13 which is made of metal, said box having the upper marginal edge-portions thereof resting slidably upon said shoulders 12, as illustrated, and suitably secured or connected with its lower marginal edge-portion is a plate 14, formed at its respective ends with angular retaining or holding portions 15, which extend into the recessed or cut-away part 3 of the main bar or rod 2. Spring-plates or clamps 16 provided with their marginal edge-portions 17 beaded or rounded about the marginal edges of said holding portions 15 are arranged upon the inner faces of said holding-portions 15, substantially as shown in Figs. 3 and 4 of the drawings. Slidably disposed between the said spring-clamps or clamps 16 is a grade-stake 17′, which is preferably made of wood, and is usually provided with graduations 18, substantially as illustrated in Figs. 1 and 2 of the drawings.

To firmly retain the vertically adjustable grade-stake 17′ in its adjusted position, there is arranged within the slidable box 13 a nut 19 which is provided with a screw-threaded hole 20, in which is arranged a screw 21 provided with a suitable head or fingerpiece, as 22, for operating the same. This screw 21, as shown, extends into and through the casing or shell 8 and through the nut 19, the end-portion 23 of said screw bearing directly upon the face of the plate 14, and it will be clearly evident, that when the screw 21 is turned in one direction, the nut 19, which on account of its arrangement within the box 13 can not turn, will be firmly brought in binding engagement with portions of the shoulders 12, while the end-portion 23 of the screw firmly binds upon the plate 14, so that the grade-stake or rod 17′ is immovably held in its adjusted position between the spring-plates or clamps 16. By turning the screw 21 in the opposite direction, the parts are sufficiently loosened, so that the grade-stake 17′, which is now lightly held by friction between the spring-plates or clamps 16, can be moved up or down, as may be desired, and then again fixed in another adjusted position.

Upon each end of each grade-stake or rod 17′ are suitable plates 24, each plate being made with pintle-receiving portions 25, in which are arranged the end-portions 27 of pieces of wire, which are bent so as to provide receiving loops or eyes 26 upon each end of the grade-stake or rod 17′ for the reception of a trench or grade-line 28, substantially as shown in Figs. 1 and 2 of the drawings, and the purposes of which will be clearly evident from an inspection of said Fig. 1. The angular edges and corners of the main bar or rod 2 and the bar or rod 6 may be protected by metal bindings, as 29.

From the foregoing description and from an inspection of the several figures of the drawings, it will be clearly evident, that on account of the lateral adjustment of the box 13 and the parts connected therewith, where the grade-boards are arranged across the trench as indicated in Fig. 2, each grade-stake or rod can be properly adjusted so that it will be located centrally between the sides or banks of the trench, and by means of the level, the engineer can quickly locate the vertical adjustments of the several stakes with relation to the respective grade-boards, irrespective of any irregularities in the surface of the ground. The previously mentioned line 28 is then inserted through the loops or eyes 26 of the variously adjusted stakes and pulled taut, so as to assume the position indicated in Fig. 1 of the drawings, the said line indicating the grade of the bottom of the trench which is to be dug, and from which line the depth of the trench as well as the grade of its bottom are readily determined, as will be clearly evident.

Of course, I am aware that changes may be made in the various arrangements and combinations of the devices and parts without departing from the scope of my present invention as described in the foregoing specification and as defined in the appended claims. Hence I do not limit the invention to the exact arrangements and combinations of the devices and parts as set forth and described in the said specification, nor do I confine myself to the exact details of the construction of the said parts as illustrated in the accompanying drawings.

I claim:—

1. A device for determining the depth and fixing the grade of a trench comprising a grade-board, a grade-stake slidably connected with said grade-board for the adjustment thereof, means for securing said grade-stake in its adjusted position, and line-receiving loops upon the ends of the grade-stake for the arrangement therein of a grade-line.

2. A device for determining the depth and fixing the grade of a trench comprising a grade-board provided with a recessed or cut-away portion, a grade-stake slidably arranged in said recessed or cut-away portion longitudinally with relation to the grade-board for centering the stake, said grade-stake being also capable of vertical adjustment, means for securing said grade-stake in its adjusted position, and line-receiving loops upon the ends of the grade-stake for the arrangement therein of a grade-line.

3. A device for determining the depth and fixing the grade of a trench comprising a grade-board provided with a recessed or cut-away part, a retaining plate provided with holding portions extending into said recessed or cut-away part, a grade-stake slidably arranged between said holding portions, means connected with said retaining plate for securing said grade-stake in its adjusted position, and line-receiving loops upon the ends of the grade-stake for the arrangement therein of a grade-line.

4. A device for determining the depth and fixing the grade of a trench comprising a grade-board provided with a recessed or cut-away part, a retaining plate provided with holding portions extending into said recessed or cut-away part, spring-plates mounted upon said holding portions, a grade-stake slidably arranged between said spring-plates and in frictional holding engagement therewith, and means connected with said retaining plate for securing said grade-stake in its adjusted position.

5. A device for determining the depth and fixing the grade of a trench comprising a grade-board provided with a recessed or cut-away part, a retaining plate provided with holding portions extending into said recessed or cut-away part, spring-plates mounted upon said holding portions, a grade-stake slidably arranged between said spring-plates and in frictional holding engagement therewith, means connected with said retaining plate for securing said grade-stake in its adjusted position, and line-receiving loops upon the ends of the grade-stake for the arrangement therein of a grade-line.

6. A device for determining the depth and fixing the grade of a trench comprising a grade-board provided with a recessed or cut-away part, a retaining plate provided with holding portions extending into said recessed or cut-away part, a grade-stake slidably arranged between said holding portions, a box connected with said retaining plate, a nut in said box, a tightening screw connected with said nut and having a finger piece, and line-receiving loops upon the ends of the grade-stake for the arrangement therein of a grade-line.

7. A device for determining the depth and fixing the grade of a trench comprising a grade-board provided with a recessed or cut-away part, a retaining plate provided with holding portions extending into said recessed or cut-away part, spring-plates mounted upon said holding portions, a grade-stake slidably arranged between said spring-plates, and in frictional holding engagement therewith, a box connected with said retaining plate, a nut in said box, and a tightening screw connected with said nut and having a fingerpiece.

8. A device for determining the depth and fixing the grade of a trench comprising a grade-board provided with a recessed or cut-away part, a retaining plate provided with holding portions extending into said recessed or cut-away part, spring-plates mounted upon said holding portions, a grade-stake slidably arranged between said spring-plates, and in frictional holding engagement therewith, a box connected with said retaining plate, a nut in said box, a tightening screw connected with said nut and having a fingerpiece, and line-receiving loops upon the ends of the grade-stake for the arrangement therein of a grade-line.

9. A device for determining the depth and fixing the grade of a trench comprising a grade-board consisting of a main bar provided with a recessed or cut-away part, a face-plate arranged over said bar, said face-plate being provided with a longitudinally extending opening of greater width at the rear of the face-plate than at the front thereof, so as to provide longitudinally extending shoulders, a box slidably arranged within the enlarged portion of said opening in the face-plate, a retaining plate connected with said box, said retaining plate being provided with holding portions extending into the recessed or cut-away part of said main bar, a grade-stake slidably arranged between said holding portions, a nut in said box, and a tightening screw connected with said nut and having a fingerpiece for producing a binding engagement between the free end-portion of said screw with said holding plate, and of the said box with said shoulders, substantially as and for the purposes set forth.

10. A device for determining the depth and fixing the grade of a trench comprising a grade-board consisting of a main bar provided with a recessed or cut-away part, a face-plate arranged over said bar, said face-plate being provided with a longitudinally extending opening of greater width at the rear of the face-plate than at the front thereof, so as to provide longitudinally extending shoulders, a box slidably arranged within the enlarged portion of said opening in the face-plate, a retaining plate connected with said box, said retaining plate being provided with holding portions extending into the recessed or cut-away part of said main bar, a grade-stake slidably arranged between said

holding portions, a nut in said box, a tightening screw connected with said nut and having a fingerpiece for producing a binding engagement between the free end-portion of said screw with said holding plate, and of the said box with said shoulders, and line-receiving loops upon the ends of the grade stake for the arrangement therein of a grade-line.

11. A device for determining the depth and fixing the grade of a trench comprising a grade-board consisting of a main bar provided with a recessed or cut-away part, a face-plate arranged over said bar, said face-plate being provided with a longitudinally extending opening of greater width at the rear of the face-plate than at the front thereof, so as to provide longitudinally extending shoulders, a box slidably arranged within the enlarged portion of said opening in the face-plate, a retaining plate connected with said box, said retaining plate being provided with holding portions extending into the recessed or cut-away part of said main bar, spring-plates mounted upon said holding portions, a grade-stake slidably arranged between said spring-plates, a nut in said box, and a tightening screw connected with said nut and having a fingerpiece for producing a binding engagement between the free end-portion of said screw with said holding plate, and of the said box with said shoulders, substantially as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 1st day of July, 1908.

JAMES J. FUSCO.

Witnesses:

FREDK. C. FRAENTZEL,

ANNA H. ALTER.