May 4, 1948. R. S. STEPHENS 2,440,921

GROUTING DEVICE

Filed Feb. 20, 1946

FIG. 4.

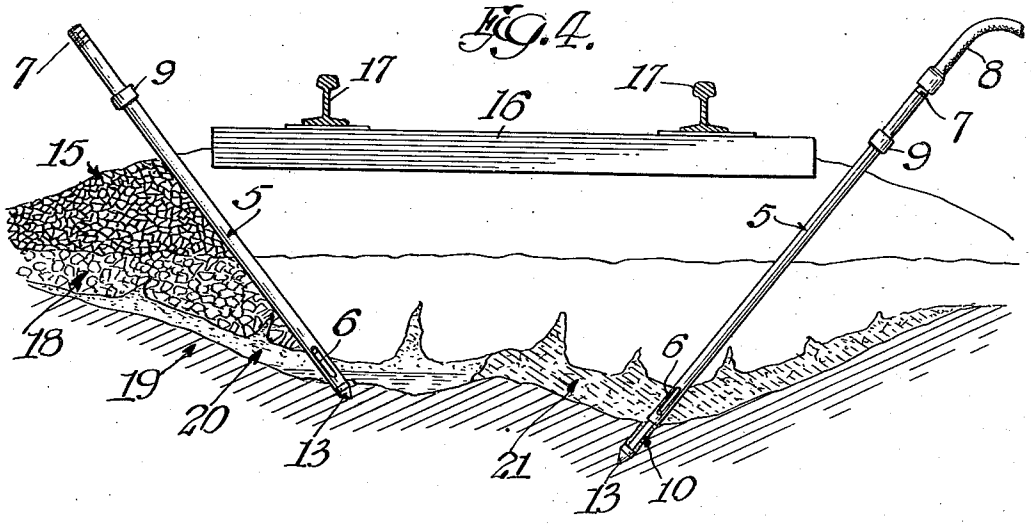


FIG. 1.

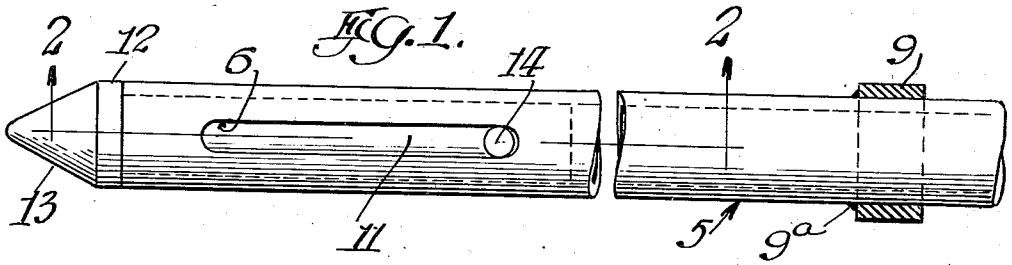


FIG. 2.

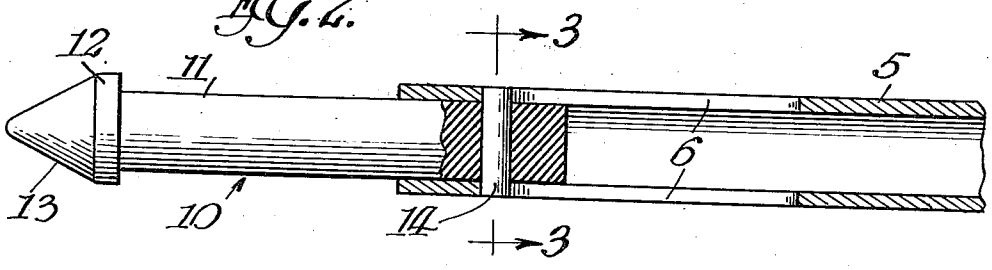
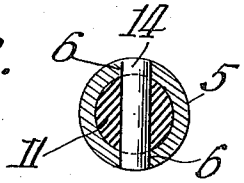


FIG. 3.



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GROUTING DEVICE

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5 Claims. (Cl. 61—36)

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This invention relates to improvements in grouting devices, and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

Pressure grouting of railway track consists of injecting a grout mixture of Portland cement, sand, water and other additives, such as asphalt or fly ash, into water pockets, which have formed in the subgrade of the roadbed.

The purpose of such grouting is to seal up the water pockets which are produced by the action of passing trains, in locations in the roadbed where a relatively impervious subsoil supports the same. By reason of said action, the more pervious ballast is forced downwardly by heavy traffic and after a period of time a definite pocket is formed, in which water accumulates and causes the track to be quite unstable.

The practice generally followed heretofore in grouting a roadbed is to drive a "bull" point bar through a part of the roadbed into the pocket, the bar being occasionally turned during the driving thereof. After driving, said bar is then withdrawn and this leaves an opening tapping the water pocket. Thereafter, one end of a grouting pipe, which has been plugged, as with a track bolt or other convenient part, is inserted into and driven down the opening until the plugged end of the pipe enters the water pocket and reaches that position where the grout is to be applied. When the plugged pipe is in place, a long rod is inserted into the upper and open end of the pipe until it reaches the plug. By means of a suitable tool, such as a hammer, the plug is driven from and out of the lower end of the pipe and is lost for further use. The rod is then removed from the pipe, and the upper end of said pipe is then connected to a suitable duct, such as a hose, leading from a source of grout under pressure. The grout is then forced down the pipe and out of the now open bottom end to fill the pocket and seal the same. Thereafter, the pipe is pulled for use in another grouting operation.

One of the objects of the present invention is to provide a simple and efficient grouting device, which does not require the use of a plug for closing the bottom end of the pipe that is lost therefrom in each driving of the pipe.

A further object of the invention is to provide a device for this purpose wherein the grout is discharged therefrom at opposite sides of the lower end of the pipe instead of from the extremity thereof, thereby affording a better flow and distribution of the grout.

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Also, it is a further object of the invention to provide a device of this kind, which is of a unitary construction and carries its own closure and which device may be used over and over again without providing a plug to be lost during each operation or use thereof.

The above mentioned objects of the invention, as well as others, along with the advantages thereof will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a view in side elevation of a grouting device embodying one form of the invention and shows the parts thereof in a driving position, wherein the grout discharge openings are closed or covered by the point of the device.

Fig. 2 is a longitudinal view through one end of the device when in its operative driven position and when the grout discharge openings are uncovered by the point of the device, the plane of the section being indicated by the line 2—2 on Fig. 1, certain parts being shown in elevation.

Fig. 3 is a transverse vertical sectional view through a part of the device as taken on the line 3—3 on Fig. 2.

Fig. 4 is a transverse vertical sectional view through a railway track roadbed that has been rendered unstable by water pockets, showing the manner of using the improved device for making the bed stable.

Referring now in detail to that embodiment of the invention illustrated in the drawing, the improved device includes a relatively long piece of pipe 5, which forms the tubular body of the device. Adjacent what is the bottom end of the body there is provided a pair of oppositely disposed elongated slots 6—6. The other end of said tubular body is externally threaded as at 7 and whereby a conduit 8 (see Fig. 4) may be detachably connected thereto and which conduit leads from a source of grout under pressure. Spaced a short distance from the threaded end 7 of the body is an external driving collar 9 which may be welded to said body, as indicated at 9a in Fig. 1.

Associated with the first mentioned end of the body is a point member which is indicated as a whole by the numeral 10 in Figs. 2 and 4 respectively. The point member includes a stem or shank 11 having a head 12 at one end thereof. The shank 11 is of a diameter to have a sliding telescopic engagement in the associated end of the tubular body 5 and is of a length somewhat greater than the distance between the extremity of said tubular body and those ends of the slots 6—6 spaced farthest from said extremity. The

head 12 has an external diameter approximating the outside diameter of the tubular body and outwardly from the shank has a point 13. A pin 14 having a diameter approximating the width of the slots 6—6 passes through the shank or stem 11 at a point toward that end of the shank opposite the head 12. This pin has a length approximating the outside side diameter of the body 5 and its ends engage with a sliding fit in said slots 6—6.

When the parts are in the driving position relative to the body 5, as in Fig. 1, the head 12 of the point member abuts the extremity of the slotted end of the body and the shank 11 of said member terminates at a point beyond the associated end of the slots 6—6 with the ends of the pin, substantially disposed at said end of the slots. In this position it will be noted from Fig. 1 that the shank 11 of the point member closes or covers the slots.

When the parts are in their working position, the point member will have been moved relatively to the body to be projected therefrom to a position determined by the engagement of the ends of the pin 14 with those ends of the slots, closest to the extremity of said body. In this position of the parts, which appears in Fig. 2, it is obvious that the greater portions of the slots are uncovered for a passage therethrough of grout under pressure from within the tubular body 5.

In Fig. 4 is illustrated the use of the device in grouting a roadbed that includes a compacted top ballast layer 15 which supports the cross ties 16 and rails 17 of the track and which ballast rests upon a substantially open ballast layer 18 located above the subgrade 19, which when consisting largely of clay, is impervious to water drainage. The above is typical of a conventional railway track bed and in which there frequently forms water pockets 20 that are bottomed by the clayey subgrade.

In the use of the improved device, holes are formed in the ballast as by means of the "bull" point bar, before mentioned, starting at points beyond the ends of the ties and extending inwardly and downwardly of the roadbed to terminate at and to tap the water pocket or pockets 20.

After these holes are made, one of the improved unitary devices, with the parts in the position shown in Fig. 1, is inserted point end 13 first into each hole. A suitable driving head (not shown) is then applied to the threaded upper end of the tubular body to fit over said end until it engages the collar 9.

By means of a sledge or pneumatic hammer operating on the driving head, the body 5 of the device is driven downwardly into the hole before mentioned. This driving is relatively easy and is continued until it starts to become "hard" and which indicates that the head 12 has reached and entered the hard solid sub-grade material just below and bottoming the pocket or soft spot to be grouted. This position of the parts, wherein the slots 6—6 are closed as in Fig. 1, appears at the left hand side of Fig. 4.

The driving head is now removed from the body and a rod (not shown) of a length greater than that of the body is inserted into the body 5 from its upper threaded end until it engages the end of the shank or stem 11. Thereafter, with a sledge or the like, this rod is driven downwardly of the body and projects the stem to the position shown in Fig. 2 and at the right hand side of Fig. 4 and wherein the slots 6—6 are opened or uncovered.

Said rod is then removed and a conduit leading from a source of grout under pressure, is applied to the threaded end of the body. Grout under pressure now moves down the inside of the body. If the body has been driven into sub-grade material 19 so far as to seal the slots 6—6, grout will not flow out through the same. Under such conditions, the device is backed out of its hole far enough to bring said slots into the area of the pocket or soft spot for the passage of grout through said slots to fill and seal up the said pocket or soft spot.

After the pocket has been sealed, the device is withdrawn and is ready for use in another position.

It is to be noted that the tubular body and the point member form a unitary device, wherein the point member may be used over and over again and is not lost in each grouting operation or use. Also, it is to be noted that the grout is discharged from opposite sides of the body at a point spaced from its extremity and is not discharged from said extremity and a freer flow and better distribution is afforded.

With the relatively long slots 6—6 in the sides of the body 5 of the device, a greater range of accuracy is available and if the pocket or soft spot to be grouted is say only an inch or so deep, the chances for lining up the slots for discharge of grout therethrough and into said pocket or soft spot is considerably improved.

The device is of a simple construction for low cost production and is self-cleaning and efficient in operation.

While in describing the invention I have referred in detail to the form and arrangement of the parts involved, the same is to be considered only in the illustrative sense so that I do not wish to be limited thereto except as may be specifically pointed out in the appended claims.

I claim as my invention:

1. A grouting device embodying therein a tubular body member having at least one side opening toward one end thereof, a point member carried by said end of the body and normally covering said opening, said body member and a part of said point member having a sliding fit engagement and being relatively movable longitudinally without separation therebetween to uncover said opening for the passage of grout therethrough from the interior of said body member.

2. A grouting device embodying therein a tubular body member having at least one elongated opening toward one end thereof, a point member telescopically engaged with said end of the body and normally covering said opening, said body member and a part of said point member having a sliding fit engagement and being capable of a relative longitudinal movement without separation therebetween to uncover said opening for the passage of grout therethrough from the interior of said body member.

3. A grouting device embodying therein a tubular body member, a point member having a telescopic sliding fit engagement with one end of said body member, one of said members having elongated openings in opposite sides thereof and the other of said members carrying means providing pin-like parts engaged in said slots, said openings being covered in one relative position of said members and being uncovered in another relative position of said members to permit the passage of grout through said openings from the interior of said tubular body member.

4. A grouting device embodying therein a tubular body member having oppositely disposed

longitudinal openings toward one end thereof, a point member including a cylindrical body having a telescopic sliding fit engagement in said body and in one relative position covering said longitudinal openings, and means carried by said point member and engaged in said openings for limiting the relative movement therebetween without separation, said point member when in another position relative to said body member uncovering said openings for the passage of grout therethrough from the interior of said body member.

5. A grouting device embodying a tubular body member formed at one end for attachment to a grout carrying conduit and having at least one side opening toward the other end thereof, a point member carried by said other end of the body and normally covering said opening, said

body member and a part of said point member having a sliding fit engagement and being relatively movable without separation therebetween to uncover said opening for the passage of grout therethrough from the interior of the body member, and a driving collar on the outside of the tubular body member toward the first mentioned end thereof.

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