

Jan. 25, 1966

E. R. BERRIEN
LEVELING ROD

3,230,626

Filed April 5, 1963

2 Sheets-Sheet 1

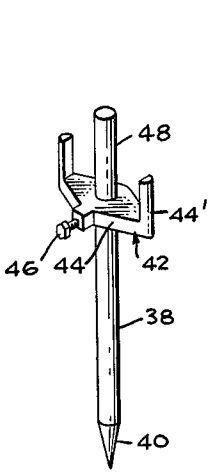
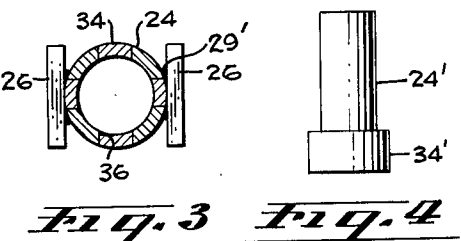
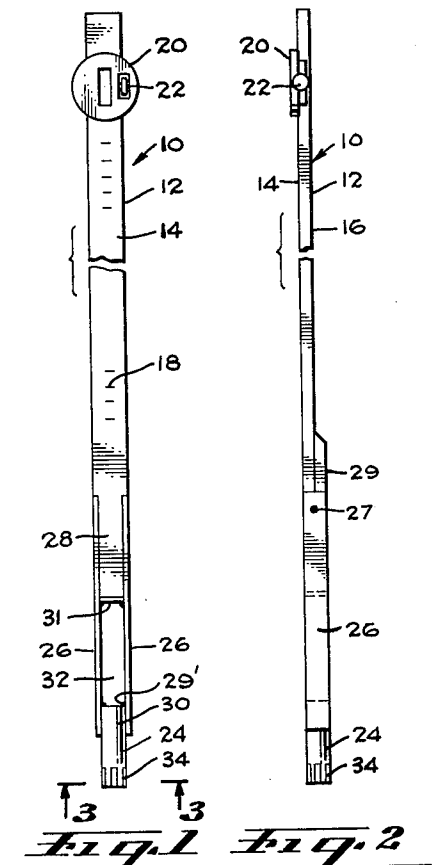


Fig. 5

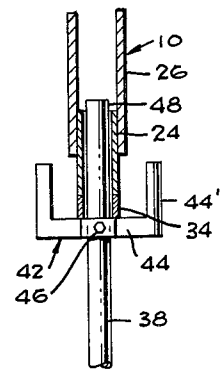


Fig. 6

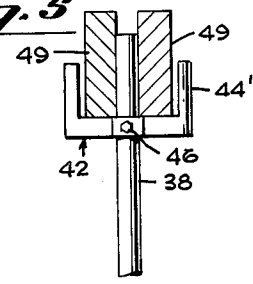


Fig. 7

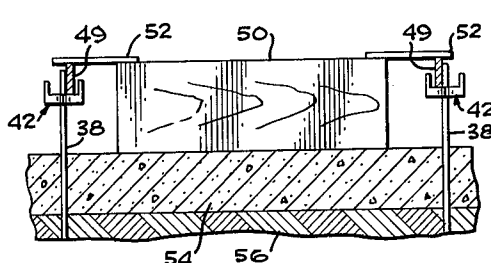


Fig. 9

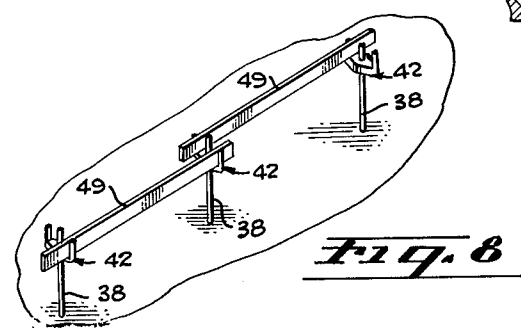


Fig. 8

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2 Sheets-Sheet 2

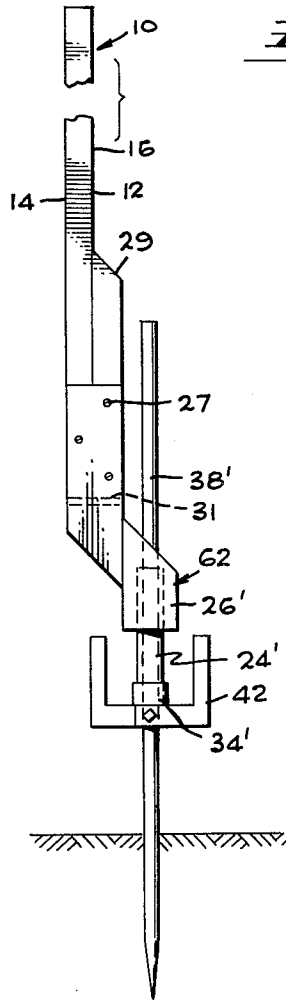


Fig. 9a

Fig. 9c Fig. 9d Fig. 9e

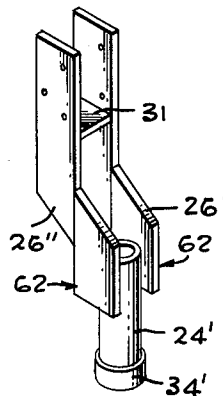
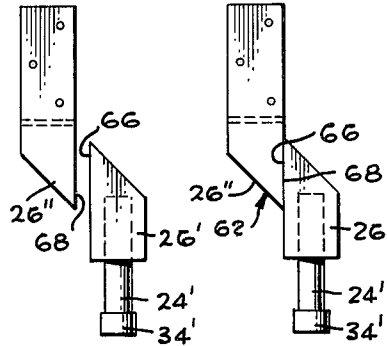
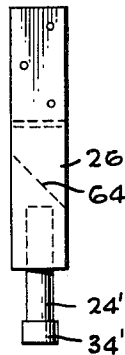


Fig. 9b

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1

3,230,626

LEVELING ROD

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11 Claims. (Cl. 33-74)

This application is a continuation-in-part of my co-pending application Serial No. 139,799, filed September 21, 1961, now abandoned.

This invention relates to a novel leveling rod, and is particularly concerned with a leveling rod especially designed as an implement for use in the surveying process during the operation of setting screed pin clamps to the proper level on screed pins, as is commonly practiced during concrete slab construction and also frequently in placing sub-base material on sub-grades.

In carrying out the procedure for setting screed pin clamps on screed pins, for example in the above noted operations, a leveling rod is employed, such as that known in the art as a Philadelphia rod, or like implement, and the base of the rod is placed in contact with the screed clamp during the setting of the clamp. The leveling rod may be graduated or marked along its surface for sighting by an instrument-man, employing a surveyor's instrument positioned at a distance from the rod, and a rod reading marker can be carried on the rod.

The screed clamp is mounted for slidable movement on the screed pin, and when the lower end of the leveling rod has been positioned at the proper level at which the screed clamp is to be set, as determined by the instrumentman, the clamp is raised into contact with the end of the rod, and tightened or set in this position on the pin, e.g. by means of a set screw carried on the clamp. Parallel rows of such screed pin and clamp units are assembled, with the screed clamps in each row aligned so that a screed bar can be extended between adjacent clamps on adjacent pins in such row. A scraper bar is supported for movement transversely on the opposite screed bars of adjacent rows of such bars, so that movement of such scraper bar along the concrete in the direction of the screed bars produces the desired leveling of the concrete slab being laid.

In the above-described operations, it often occurs that obstruction by the vertical legs of the screed clamp, and wrench clearance required on the set screw side of the clamp restrict directional orientation and positioning of the face of the leveling rod, often rendering it difficult for reading of the leveling rod by the instrumentman. Further, when employing a Philadelphia rod, the relatively narrow seating surface of the clamp base which serves as the bearing contact for the base of the rod causes insecure poising of the rod on the clamp, particularly during setting of the clamp by means of the set screw, and rendering it difficult to maintain the position of the rod at a specified location on the pin while the location of the clamp is being adjusted on the pin against the lower end of the rod, and while the clamp is being tightened in this position.

Of particular significance, in present practice, it requires three persons to carry out the above-described operation for setting the screed clamps at the proper level, one instrumentman to establish the line of sight for positioning the leveling rod, one person to position the leveling rod at the proper position against the screed pin corresponding to the proper level of the screed clamp, and a third person to raise the screed clamp against the end of the leveling rod and to tighten the clamp in this position. Since a large number of such screed clamps are required in many large concrete-pouring operations, the labor cost for this screed clamp setting operation constitutes a substantial item of expense.

2

It is an object of this invention to design an improved leveling rod for setting screed clamps, incorporating means to provide a positive connection between the leveling rod and the screed clamp during the setting of such clamps.

Another object is to provide an improved leveling rod for setting screed clamps, designed to provide observation of the upper end of the screed pin after the leveling rod has been positioned thereon, and to permit proper orientation and positioning of the face of the rod for reading by the instrumentman.

Yet another object is to design a leveling rod of the above-noted type having means thereon which simplifies the operation of setting screed clamps, and reduces the number of man hours required for this operation, thus effecting a substantial economy in the cost of this operation.

A still further object is the provision of a leveling rod which is designed particularly for use with extra long screed pins.

The above objects and advantages are achieved, according to the invention, by the provision of a leveling rod having a tubular tip section, preferably relatively short, at the end of the rod, which is designed to be inserted over the screed pin shaft. Such tubular section is designed so that it fits telescopically and relatively snugly over the screed pin shaft but with sufficient clearance to be slidable thereon, the tube functioning to support the leveling rod substantially in axial position on the pin with a minimum of wobbling action. The tubular section also is designed so that it may seat on the base of the clamp without interfering with the legs of the screed clamp, and permitting adjustment of the set screw of the clamp by a wrench without interfering with such operation.

The tubular tip section is connected to the lower end of the rod preferably by two or more connecting members so designed and spaced from each other as to provide easy visibility of the upper end of the screed pin shaft protruding above the tubular section, after the latter has been inserted over the pin shaft. This feature permits rotation and orientation of the leveling rod so as to place it with its face in position to be read easily by the instrumentman.

The lower tubular section can be connected to the lower end of the leveling rod so that such tubular section is axially aligned with the rod, or according to another embodiment, the lower tubular section can be connected to the lower end of the rod by means so as to offset the tubular section from the rod, thus positioning the tubular section out of alignment with the rod. This latter embodiment permits the use of the rod with extra long screed pins, without interference of such pins with the rod, as will be described below.

According to a particular feature of the invention, the lower tubular section of the leveling rod carries magnet means, for example, in the form of one or a plurality of permanent magnets, on the lower portion of the tube, which make contact with the screed clamp base when the tube is positioned over the screed pin and lowered onto the clamp. The magnet means carried on the tubular section attracts the clamp and permits the person holding the leveling rod to raise the clamp while the latter is carried on the tubular section by magnetic attraction, to the proper position as determined by the instrumentman. When the clamp has thus been raised, the same person handling the leveling rod can then tighten the set screw on the clamp to hold it in the set position, after which the rod is pulled free of the clamp and removed from the screed pin. It will be seen that this feature thus only requires one person to handle both the leveling rod and the positioning and tightening of the screed clamp on the screed pin, whereas in prior practice employing conventional leveling rods, two persons were needed to carry out these functions, thereby

providing a substantial saving in the cost of these operations.

The invention will be more clearly understood by reference to the description below of certain embodiments of the invention, when taken in connection with the accompanying drawings, wherein:

FIG. 1 is a front elevation of the leveling rod of the invention;

FIG. 2 is a side elevation of the rod shown in FIG. 1;

FIG. 3 is a bottom view of the leveling rod of FIG. 1, taken on line 3—3 of FIG. 1;

FIG. 4 illustrates a modification of the tubular section of the improved leveling rod of the invention;

FIG. 5 shows a screed pin and screed clamp assembly of a type which is particularly adapted for adjustment by the leveling rod of the invention;

FIG. 6 shows the positioning of the leveling rod over the screed pin and clamp assembly of FIG. 5 to set the screed clamp at a desired level;

FIG. 7 shows the manner in which the ends of the screed bars are supported on the screed clamps;

FIG. 8 illustrates the positioning of a row of screed clamps by means of the invention device and the manner in which the screed bars are extended between adjacent clamps to serve as a support for a scraper bar;

FIG. 9 illustrates the manner in which a scraper bar is adapted to be supported on opposite screed bars carried on two parallel rows of screed clamps, for leveling a concrete slab being poured to a desired level;

FIG. 9a is a modified form of leveling rod in which the lower tubular section is offset from the rod;

FIG. 9b is a perspective view of the lower portion of the leveling rod of FIG. 9a; and

FIGS. 9c, 9d and 9e illustrate one method of fabricating the offset form of leveling rod shown in FIG. 9a.

Referring particularly to FIGS. 1 to 3 of the drawing, numeral 10 represents a leveling rod according to the invention, which comprises a main rod shaft 12 having front and rear flat faces 14 and 16 respectively. The rod shaft 12 can be composed of any suitable material such as hard or semi-hard wood, e.g. maple or birch, or may be formed of any suitable metal, such as extruded aluminum. The front face 14 of the rod has a series of graduations indicated at 18 thereon and which may be painted on the surface of the rod, or alternatively, a cloth or metallic tape carrying such graduations may be adhesively secured to the rod, e.g. by means of glue or metal fasteners. If desired, a vernier target accessory 20 can be mounted for vertical slidable movement along the rod 12 and tightened at any particular position thereon by means of a clamp member 22. Such vernier target accessory facilitates sighting by the instrumentman.

According to the invention, carried on the base portion of the rod 12 is a relatively short tubular section 24, which may be formed, for example, from tubular steel. The tubular section 24 is connected to the base of rod 12 by means of a pair of flat metal bars 26, connected as by screws 27 to the lower portion 28 of the rod and to the upper portion 30 of the tube 24 by welding at 29'. A cross member 31 connected to bars 26 serves to further secure the base 28 of the rod 12 in fixed position between bars 26. The lower portion of the rod 12 carries a reinforcing strip 29 to provide a more rigid attachment between the parallel bars 26 and the rod. It will be seen that the bars 26 are positioned parallel to each other, and this arrangement and the placement of the upper end of tube 24 at a distance from the lower section 28 of rod 12 provides a space 32 between the bars 26, having a function described in detail hereinafter. About the periphery of the lower end of the tubular section 24 are positioned a number of spaced permanent magnets 34 mounted in spaced slots 36 formed around the lower periphery of the tube 24. Such magnets may be any suitable commercially available type.

In a modified form of tubular section, indicated at 24' in FIG. 4, such tubular section carries at its lower end a sin-

gle permanent magnet 34' in the form of a cylinder, such cylinder having an inside diameter approximately equal to the outside diameter of the tube 24' and being fitted onto the lower end of tubular section 24'. It will be understood that any equivalent permanent magnetic means can be employed at the lower end of the tubular section 24 in place of the magnets 34 or magnet 34'. Thus, if desired, the entire tubular section 24' itself can be magnetized, and can function as the magnet, or an unmagnetized tubular section 24' can carry an additional short cylindrical magnet at its lower end of approximately the same diameter as section 24' and attached thereto by any suitable means, such as by welding.

In FIG. 5 is shown a screed pin and screed clamp assembly, the clamp of which is particularly adapted for setting by the leveling rod of FIGS. 1 to 3. In this assembly numeral 38 represents a metal screed pin or post having a pointed lower end 40 for insertion into the ground or some other base, for example, a wood or metal form, to support the pins. Where the base is metal or wood, special pin points can be provided. Mounted for slidable and rotational movement on the pin 38 is a metal, e.g. steel, clamp unit 42 having a base 44 and a pair of substantially vertical integral hooks 44' extending upwardly at opposite ends of the base 44. The clamp 42 carries a set screw 46 which can be tightened against the pin 38 to hold the clamp 42 in any selected position against axial and rotational movement of the clamp on the pin 38.

In employing the rod 12 of the invention for setting a screed clamp of the type shown in FIG. 5, the tube 24 carried on the rod is first inserted over the upper end portion 48 of the pin 38 and the lower end of the tube is brought into contact with the base 44 of the clamp, as seen in FIG. 6. The set screw 46 is loosened, and the force of magnetic attraction between the magnets 34 at the base of the tube 24 and the metal clamp 42 is such that the tube grips the clamp and maintains the clamp in contact with the tube while the clamp is raised or lowered to locate the same in the proper position for setting.

The instrumentman then sights along the graduations of the rod 12 aided by the vernier target assembly 20 when employed, and signals the rodman, that is, the man manipulating the vertical position of the rod 12, when the rod has been placed in the proper position for the setting of the clamp 42. In such position of the rod the clamp 42 is at the desired preselected level. The angular orientation of the clamp 42 is then adjusted so that the face of clamp 42 will be substantially parallel to the face of an adjacent clamp in the row of clamps being set so that the screed bars can be properly supported on adjacent clamps in a manner described more fully below. The rodman then simply tightens the set screw 46 on the clamp 42 to set it in the selected position. The rod 12 is then pulled up and freed from contact with the clamp 42, and the tube is withdrawn over the upper end 48 of the pin 38. The magnets 34 or the magnet 34' mounted on the tube 24 is therefore designed to have sufficient strength to grasp the clamp and pull it upwardly on the pin into the proper position for setting, but permits the tube to be pulled from contact with the clamp by means of a relatively small additional upward force.

It will be seen that during the above noted operations of adjusting the level of the rod 12 and setting the position of the clamp 42 in relation thereto, the space 32 provided between the parallel bars 26 of the rod permits visibility of the pin through a large angle of rotation of the rod 12 around the pin. Further, the provision of the tube 24 aids in supporting the rod 12 in a poised substantially axial position during the manipulation of the rod to the proper level and until the set screw is tightened on the clamp. Also, the snugly fitting relation of the tube 24 around pin 38 provides ample clearance between the tube 24 and the clamp legs 44', and presents no interference for tightening of the set screw 46 by means of a suitable tool such as a wrench.

5

6

In FIGS. 9a and 9b is illustrated a modified form of leveling rod in which the tubular section 24' is offset from, and is not axially aligned with, the main rod shaft 12 of the leveling rod 10. In this embodiment the two bars 62 connecting the base of rod shaft 12 with the tubular section 24' carrying magnet 34', are angled off so that tubular section 24' is offset from the main rod shaft 12 but is positioned parallel thereto.

This offset embodiment can be fabricated, if desired, as illustrated in FIGS. 9c, 9d and 9e, by cutting both vertical bars 26 of the leveling rod shown in FIGS. 1 to 3 along an angle indicated at 64 in FIG. 9c, positioning the lower severed section to one side of the upper remaining section of the rod so that the two sections are offset from each other, as illustrated in FIG. 9d, and butt welding the vertical left edges 66 of the severed lower bars 26' to the vertical right edges 68 of the upper severed bars 26'', as illustrated in FIG. 9e. Although this illustrates one mode of fabricating this offset modification of the leveling rod, it will be understood, of course, that if desired, the offset bars 62 each can be formed or cut as an integral angular offset bar and connected to the base of the leveling rod and to the tubular section 24 or 24' in any desired manner, e.g. as described above with respect to the rod of FIGS. 1 and 4.

In use it will be noted, as seen in FIG. 9a, that the modification of FIGS. 9a and 9b is useful particularly where there are extra long screed pins 38' employed with the screed clamps 42. It will be seen from FIG. 9a that the upper portion of screed pin 38' passes upwardly to the rear, spaced from but parallel to the rod 12 and does not interfere therewith. On the other hand, it will readily be seen that only a limited amount of upward movement of screed pin 38' could be accommodated with the rod of FIG. 1 due to interference of the upper end of rod 38' with cross member 31 in the device of FIG. 1.

It will be understood that the connections or offset bars such as 62 between the base of the rod and the tubular section can be disposed at any desired angle, and, if desired, such bars can be substantially horizontal bars positioned substantially normal to the rod and to the tubular section.

Referring now to FIG. 7, it will be seen that each clamp 42 is adapted to support one end of each of two screed bars 49. Thus it will be seen that the end of each screed bar is maintained in relatively snug position between the upper end 48 of the screed pin 38 and the adjacent vertical hook portion 44' of the clamp. As seen in FIG. 8, a row of screed clamps 42 is assembled with the faces of each of the clamps 42 substantially parallel to each other. This permits placement of a line of screed bars supported on such row of clamps, with each screed bar 49 supported on a pair of adjacent clamps 42 adjacent screed bars being offset from each other.

Now viewing FIG. 9, it will be seen that a pair of parallel rows of screed bars 49 are supported on a pair of parallel rows of screed clamps 42. A scraper bar 50 is transversely positioned across the two parallel rows of screed bars 49 and is supported thereon by means of the pair of oppositely positioned support members 52 connected to opposite upper ends of the scraper bar 50, and which are positioned on the upper edge of the screed bars 49 for slidable movement along such bars and in the direction thereof. After a concrete slab 54 has been poured, the scraper bar 50 is moved along the screed bars 49, scraping the upper surface of the concrete 54 and leveling the surface thereof to the desired height. After the concrete slab has been so levelled, the screed bars 49 can be removed, followed by removal of the screed pins 38 from the earth 56 or other support such as wood, into which the screed pins have been driven to support same.

From the above description, it is particularly noteworthy that the improved leveling rod of the invention permits much more rapid and efficient setting and orientation of the screed clamps, requiring the services of only

one operator for this purpose, as compared to the substantially more time consuming operation of the prior art requiring two operators for manipulation of the leveling rod and proper orientation and setting of the screed clamps.

As a specific illustration of the invention device, but without intending thereby to limit the invention, a leveling rod of the type shown in FIG. 1 can be constructed wherein the tubular section 24 is about 3'' in length with an internal diameter of about 1'', such tube 24 being positioned with respect to the lower portion 28 of rod 12 so that space 32 is about 4½'' in length, with a width between bars 26 of about 1¼''.

While two bars or straps 26 or 62 are shown connecting the rod 12 and the tube 24, if desired, only one such member may be employed, or a plurality of more than two such members can be utilized.

Further, although the leveling rod described herein has been particularly designed for setting screed clamps to obtain a desired leveling of the surface of a cement slab, or the like, it will be understood that the rod described herein may have other uses, e.g. when it is desired to adjust the position of any movable member which is designed so that it can be grasped by the magnetic means on the tube 24. Also such rod may or may not contain graduations thereon.

While I have described particular embodiments of my invention for purposes of illustration, it should be understood that various modifications and adaptations thereof may be made within the spirit of the invention, as set forth in the appended claims.

I claim:

1. In combination a leveling rod which comprises a main rod shaft, a tubular section carried on and spaced from the lower end of said rod shaft, a connecting member between the lower end of said rod shaft and said tubular section, and magnet means connected to at least the lower end of said tubular section, and a screed pin, a screed clamp positioned on said screed pin, and screed pin telescopically positioned in said tubular section, said magnet means adapted to magnetically engage said screed clamp.

2. In combination a leveling rod which comprises a main rod shaft, a tubular section carried on and spaced from the lower end of said rod shaft, a pair of connecting members between the lower end of said rod shaft and said tubular section, said connecting members being spaced apart and connected to said tubular section at substantially diametrically opposite positions thereon, and magnet means connected to at least the lower end of said tubular section, and a screed pin, a screed clamp positioned on said screed pin, said screed pin telescopically positioned in said tubular section, said magnet means adapted to magnetically engage said screed clamp.

3. The rod as defined in claim 1, wherein said magnet means is in the form of a cylindrical magnet mounted on the lower end of said tubular section.

4. The rod as defined in claim 2, wherein said magnet means is in the form of a cylindrical magnet mounted on the lower end of said tubular section.

5. In combination a leveling rod which comprises a main rod shaft, a tubular section carried on and spaced from the lower end of said rod shaft, a connecting member between the lower end of said rod shaft and said tubular section, and a plurality of magnets positioned about the periphery of the lower end of said tubular section, and a screed pin, a screed clamp positioned on said screed pin, said screed pin telescopically positioned in said tubular section, said magnets adapted to magnetically engage said screed clamp.

6. In combination a leveling rod which comprises a main rod shaft, a tubular section carried on and spaced from the lower end of said rod shaft, a pair of connecting members between the lower end of said rod shaft and said tubular section, said connecting members being spaced

7

apart and connected to said tubular section at substantially diametrically opposite positions thereon, and a cylindrical permanent magnet positioned about the outer periphery of the lower end of said tubular section, and a screed pin, a screed clamp positioned on said screed pin, said screed pin telescopically positioned in said tubular section, said magnet adapted to magnetically engage said screed clamp.

7. In combination a leveling rod which comprises a main rod shaft having flat front and rear faces, a relatively short tube carried on and spaced from the lower end of said rod shaft, a plurality of bars connecting the lower end of said rod shaft and said tube, the upper ends of said bars being connected to said main rod shaft, the lower ends of said bars being connected to the upper portion of said tube, and magnet means positioned on the lower end of said tube, and a screed pin, a screed clamp positioned on said screed pin, said screed pin telescopically positioned in said tube, said magnet means adapted to magnetically engage said screed clamp.

8. In combination a leveling rod which comprises a main rod shaft having flat front and rear faces, a relatively short tube carried on and spaced from the lower end of said rod shaft, a pair of flat parallel bars connecting the lower end of said rod shaft and said tube, the upper ends of said bars being connected to opposite sides of said main rod shaft, the lower ends of said bars being connected to the upper portion of said tube at substantially diametrically opposite positions thereon, and permanent magnet means positioned on the lower end of said tube, and a screed pin, a screed clamp positioned on said screed pin, said screed pin telescopically positioned in said tube, said magnet means adapted to magnetically engage said screed clamp.

9. In combination a leveling rod which comprises a main rod shaft having flat front and rear faces, a graduated scale on said front face, a relatively short tube carried on and spaced from the lower end of said rod shaft, a plurality of flat parallel bars connecting the lower end of said rod shaft and said tube, the upper ends of said bars being connected to opposite sides of said main rod shaft, the lower ends of said bars being connected to the upper portion of said tube at substantially diametrically opposite positions thereon, and a cylindrical permanent magnet positioned about the periphery of the lower end

8

of said tube, and a screed pin, a screed clamp positioned on said screed pin, said screed pin telescopically positioned in said tube, said magnet adapted to magnetically engage said screed clamp.

10. In combination a leveling rod which comprises a main rod shaft, a tubular section carried on and spaced from the lower end of said rod shaft, a connecting member between the lower end of said rod shaft and said tubular section, said tubular section being offset from said rod shaft but positioned substantially parallel thereto, and magnet means connected to at least the lower end of said tubular section, and a screed pin, a screed clamp positioned on said screed pin, said screed pin telescopically positioned in said tubular section, said magnet means adapted to magnetically engage said screed clamp.

11. A leveling rod which comprises a main rod shaft having flat front and rear faces, a graduated scale on said front face, a relatively short tube carried on and spaced from the lower end of said rod shaft, a plurality of angular offset bars connecting the lower end of said rod shaft and said tube, the upper ends of said bars being connected to opposite sides of said main rod shaft, the lower ends of said bars being connected to the upper portion of said tube at substantially diametrically opposite positions thereon, said tube being offset from said rod shaft but positioned substantially parallel thereto, and a cylindrical permanent magnet positioned about the periphery of the lower end of said tube.

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