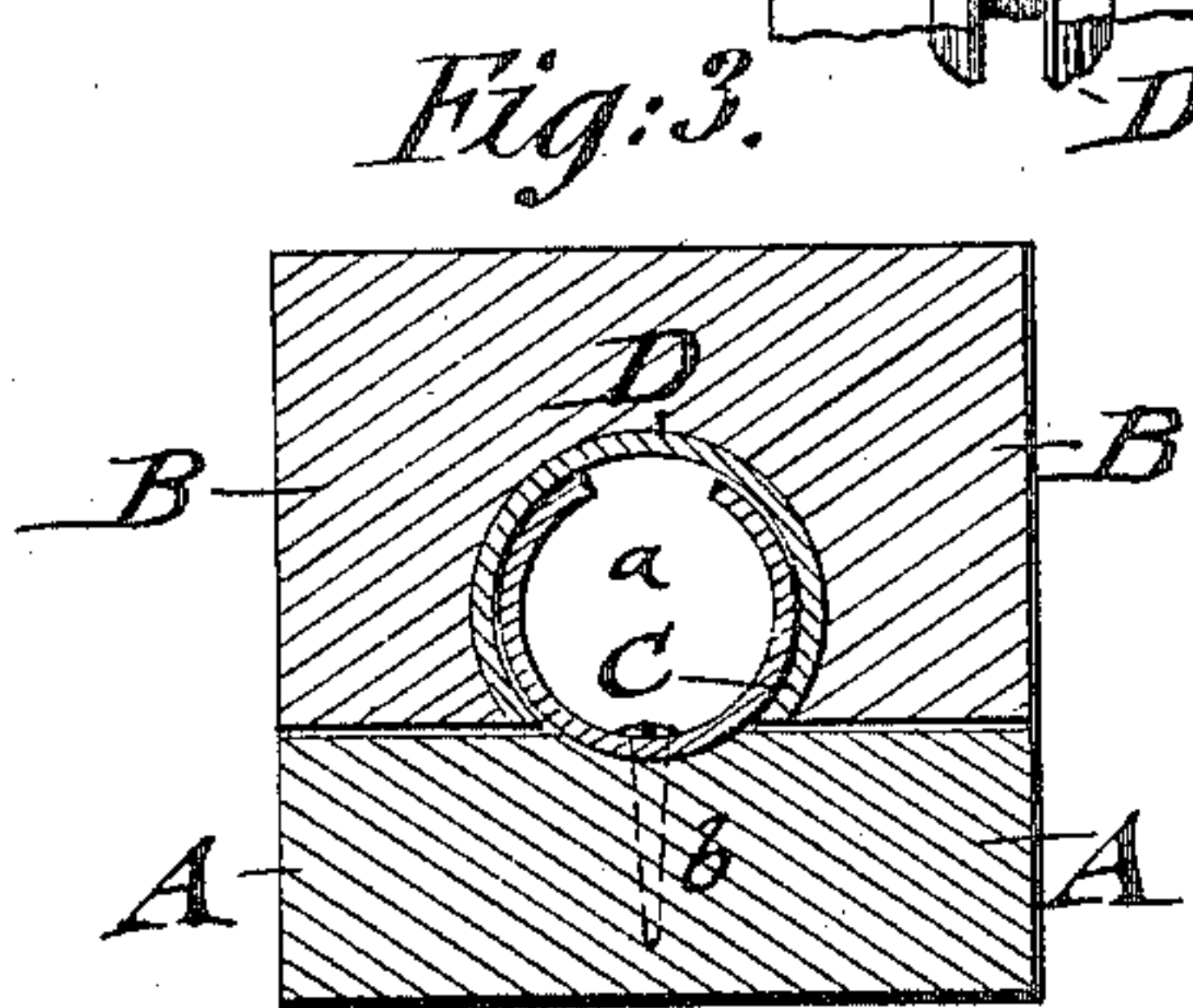
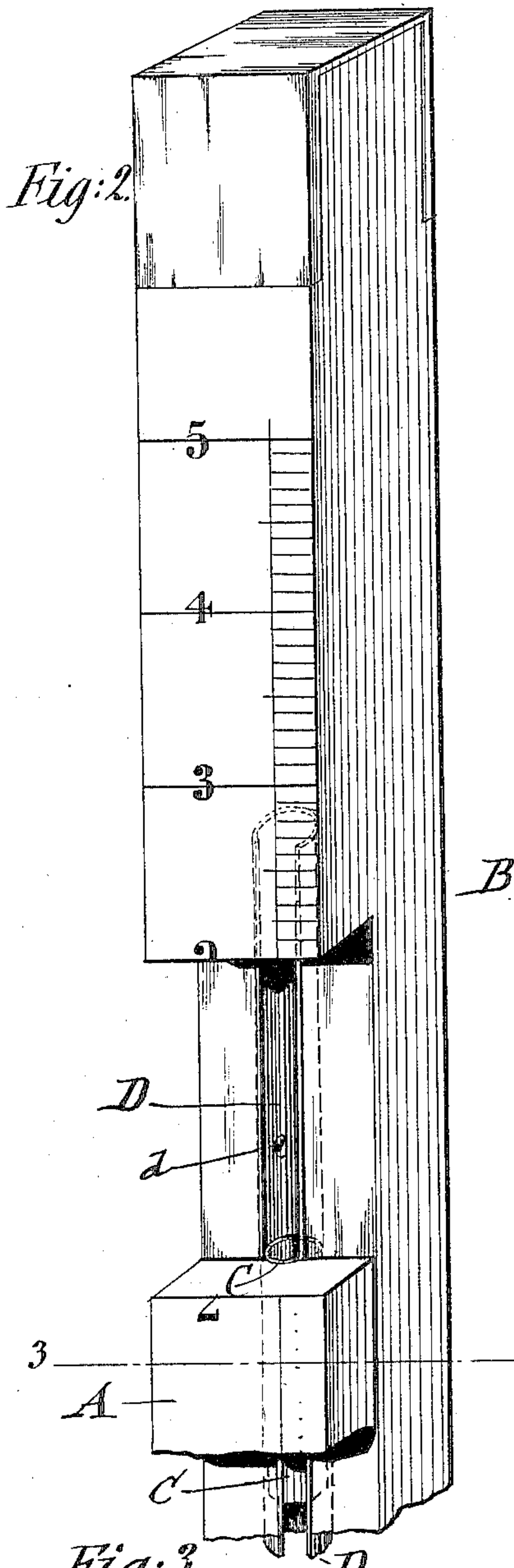
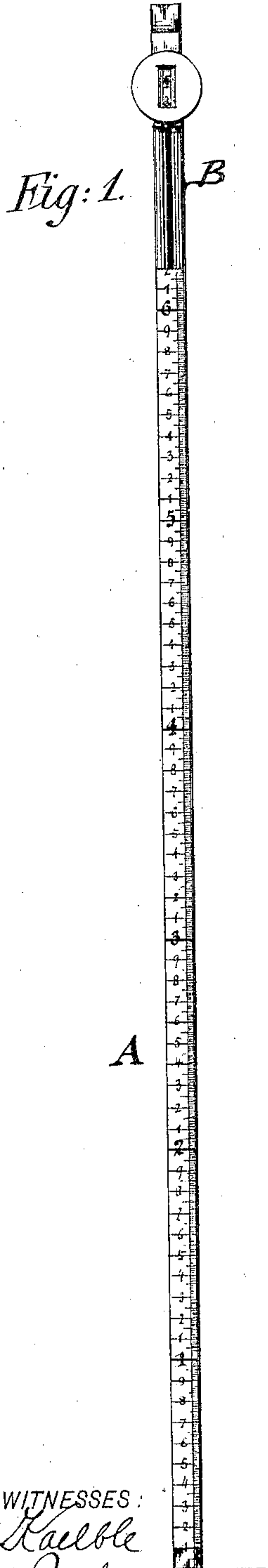


(No Model.)

L. KLEIN.
LEVELING ROD.

No. 599,242.

Patented Feb. 15, 1898.



WITNESSES:
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UNITED STATES PATENT OFFICE.

LOUIS KLEIN, OF JERSEY CITY, NEW JERSEY.

LEVELING-ROD.

SPECIFICATION forming part of Letters Patent No. 599,242, dated February 15, 1898.

Application filed October 15, 1897. Serial No. 655,265. (No model.)

To all whom it may concern:

Be it known that I, LOUIS KLEIN, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Leveling-Rods, of which the following is a specification.

The leveling-rods heretofore used by surveyors and engineers were made of wood and in two sections, which were moved alongside of each other by means of dovetailed connections. These leveling-rods have the disadvantage that they are subject to change of the weather, so that the upper movable section could only be slid with great difficulty on the lower stationary section, thereby impeding the use of the same and giving considerable annoyance to the rodmen.

The object of my invention is to furnish an improved leveling-rod which is so constructed that the parts of the same can be moved one along the other with little difficulty in dry or damp weather and without being affected by the swelling of the wood when exposed to the atmosphere and rain, while the rod is at the same time considerably strengthened, with but little increase in its weight.

The invention consists of a leveling-rod the lower section of which is provided with a slotted guide-tube attached to the face of the same and guided in a metallic tube set into a recess of the upper or movable section and open on the side adjacent to the lower section, so that the movable section is guided, metal on metal, on the stationary section, as will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of my improved leveling-rod, showing the same partly extended. Fig. 2 is a perspective view of the upper portion of my improved leveling-rod, drawn on a larger scale; and Fig. 3 is a horizontal section on line 3 3, Fig. 1.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the stationary or lower section, and B the upper or movable section, of my improved leveling-rod. Instead of one section being guided by means of a dovetailed connection on the other, as heretofore, the upper section B is guided on

the lower section A by a metallic slide-joint. For this purpose the lower section A is provided with a guide-tube C, which is preferably made of brass, aluminium, or other suitable metal and which is provided with a longitudinal slot *a* at the side facing the lower stationary section A, so as to "give" slightly and exert a slight spring action in moving in the metal guide-tube D, arranged on a recess of the upper section B. The guide-tube D is made of slightly-larger diameter than the guide-tube C and cut open at that part adjacent to the lower section in a plane with the inner face of the upper section B, as shown clearly in Fig. 3. The guide-tube C is attached by means of screws or other fastening devices *b* to the lower section A, while the guide-tube D is preferably secured tightly into the upper section A and also fastened by screws *d* or otherwise, so as to retain the guide-tubes firmly in position on their respective sections of the leveling-rod and permit the free and easy sliding of the upper section on the lower section when the leveling-rod is in use. As the slide-joint of the sections of the rod is made of metal the metallic guide-tube of one section moves freely on the metallic guide-tube of the other section, so that the leveling-rod can be operated with equal facility in dry or moist weather, it being not liable to warp when wet, and rendered more durable and stronger than the leveling-rods heretofore in use in which a dovetailed wooden slide-joint is used.

The graduation of the leveling-rod, the top and bottom protecting-caps, and the target are made of the same construction as in ordinary leveling-rods and form no part of the present invention.

The advantages of my improved leveling-rod are, first, that the guide-tubes can be readily supplied with a small quantity of lubricating material without saturating the wood, so that the perfectly easy sliding of the upper on the lower rod-section is obtained; second, the sections of the rod can be taken apart with great facility and cleaned from dust; third, as the sections are moved one along the other by means of metallic guide-tubes, which are not liable to the varying conditions of the atmosphere, though the wooden portions of the sections are affected thereby,

the sliding motion of the movable section will not be interfered with in the least for the reason that either guide-tube will give sufficiently and accommodate itself to any change
5 that may take place in the wooden portions of the leveling-rod.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

10 1. A leveling-rod, composed of a lower section provided with a longitudinally-slotted guide-tube attached thereto, and an upper movable section having a metal-lined recess inclosing the guide-tube of the lower section,
15 substantially as set forth.

2. A leveling-rod, in which the lower section is provided with a longitudinally-slotted guide-tube attached to the face of said section, and guided on the upper or movable sec-

tion having a recess and a metallic guide- 20 tube in said recess, open at the side facing the movable section, substantially as set forth.

3. In a leveling-rod, the combination of the lower stationary section, a guide-tube attached thereto and provided with a longitu- 25 dinal slot, and an upper movable section provided with an open guide-tube set in a recess in the face of said section adjacent to the lower section, the guide-tube of the lower section being inserted in the guide-tube of the 30 upper section, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LOUIS KLEIN.

Witnesses:

PAUL GOEPEL,
GEO. W. JAEKEL.