

(No Model.)

J. D. HAITHCOCK & W. T. SUIT.

LEVELING INSTRUMENT.

No. 333,009.

Patented Dec. 22, 1885.

Fig. 1.

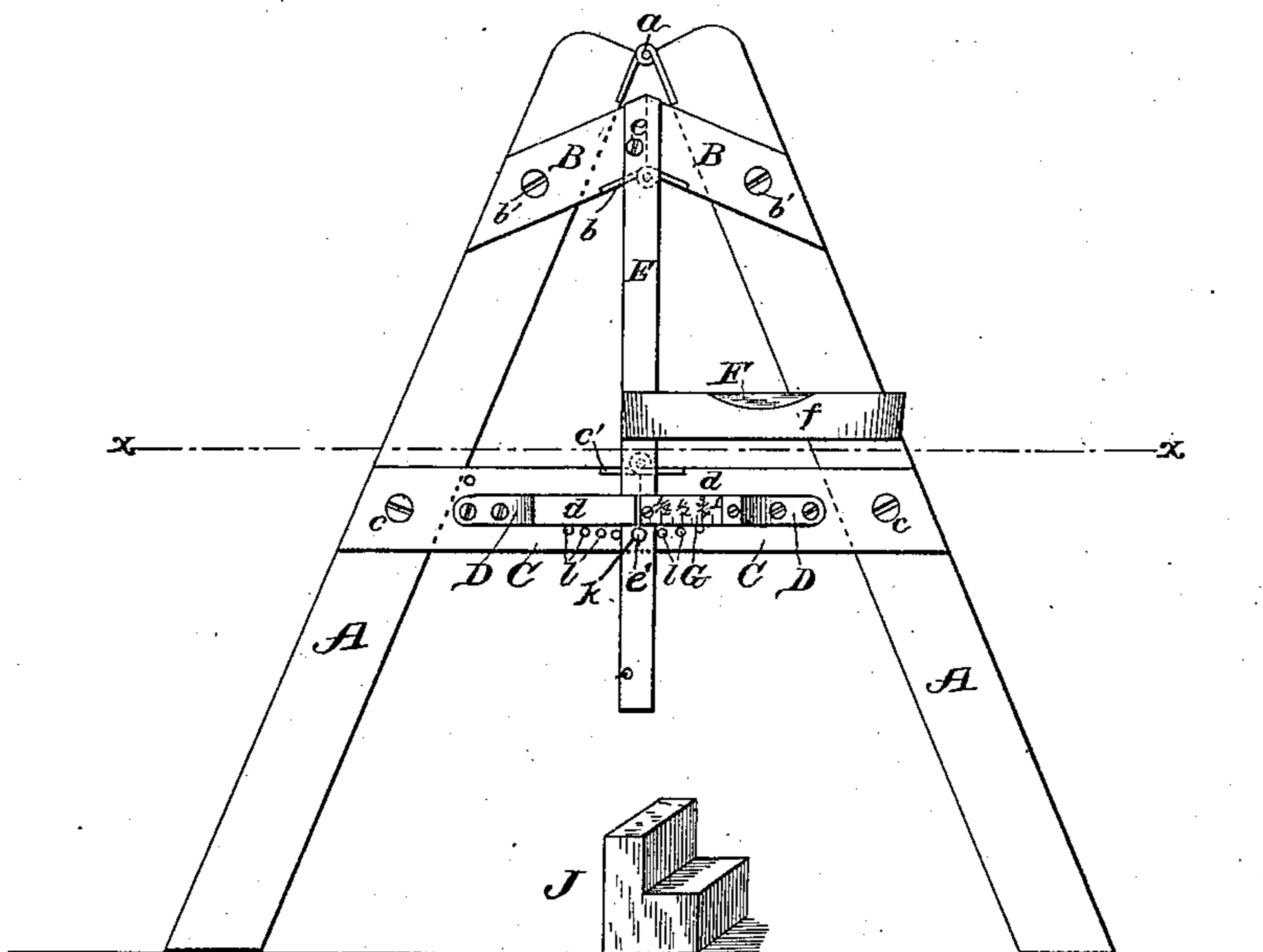


Fig. 5.

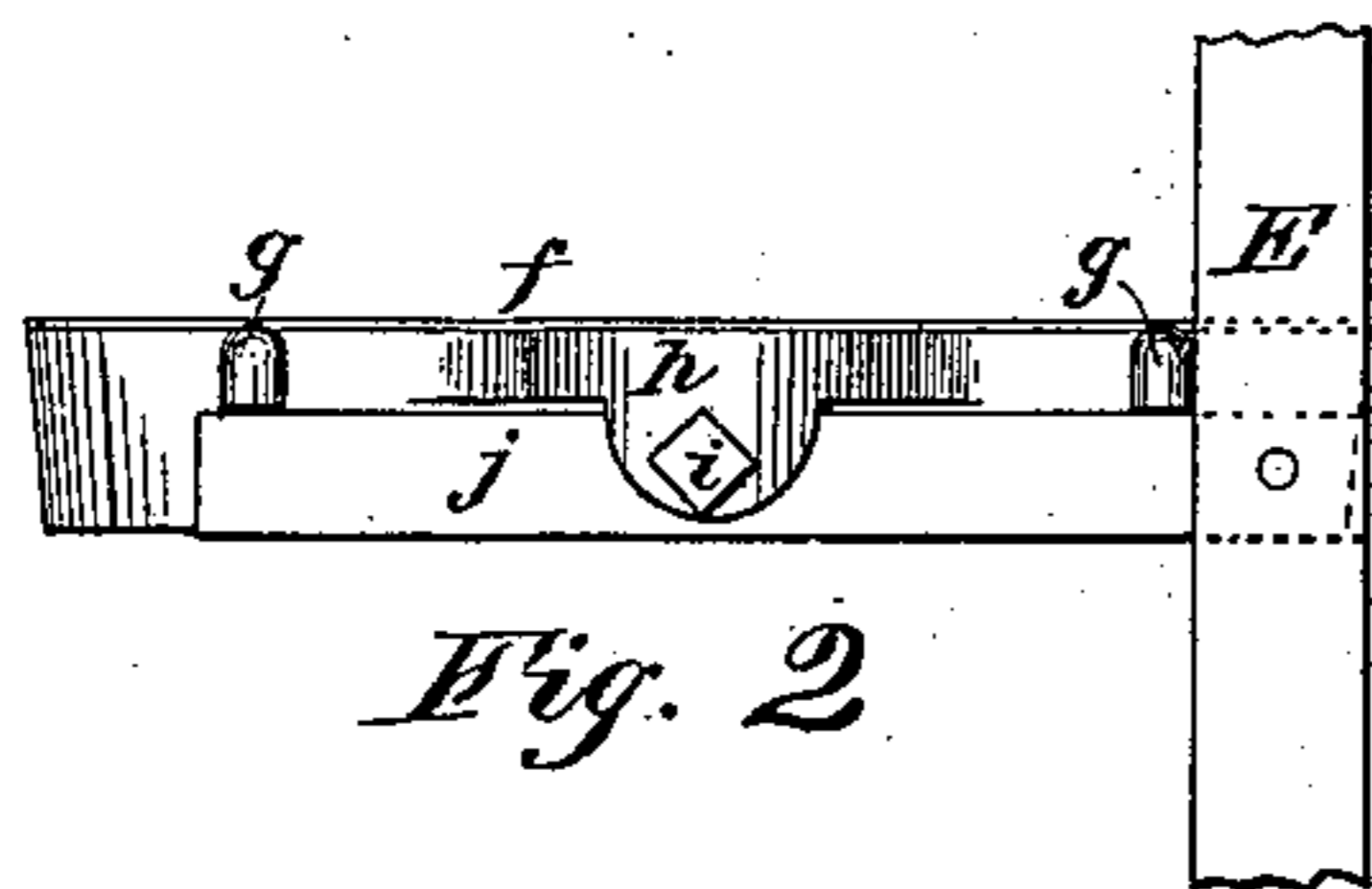
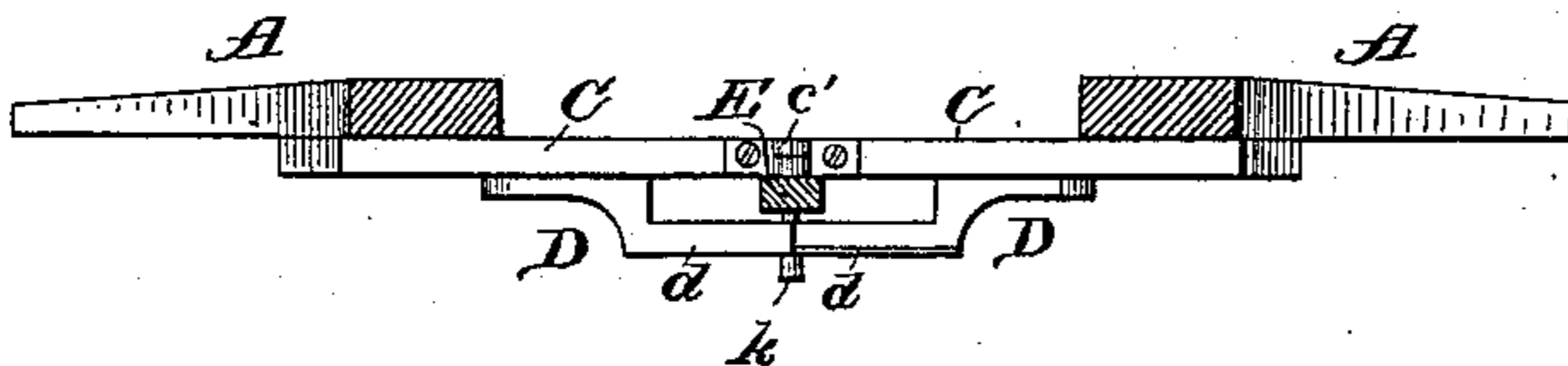


Fig. 2

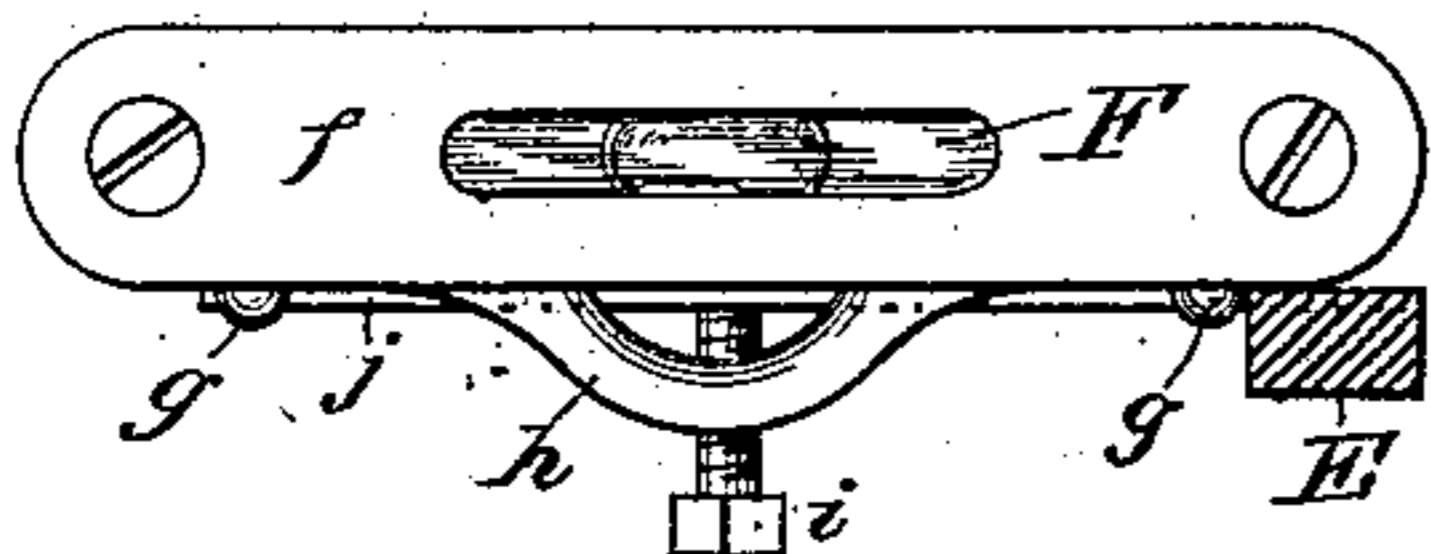


Fig. 3.

WITNESSES

Percy C. Bowen.
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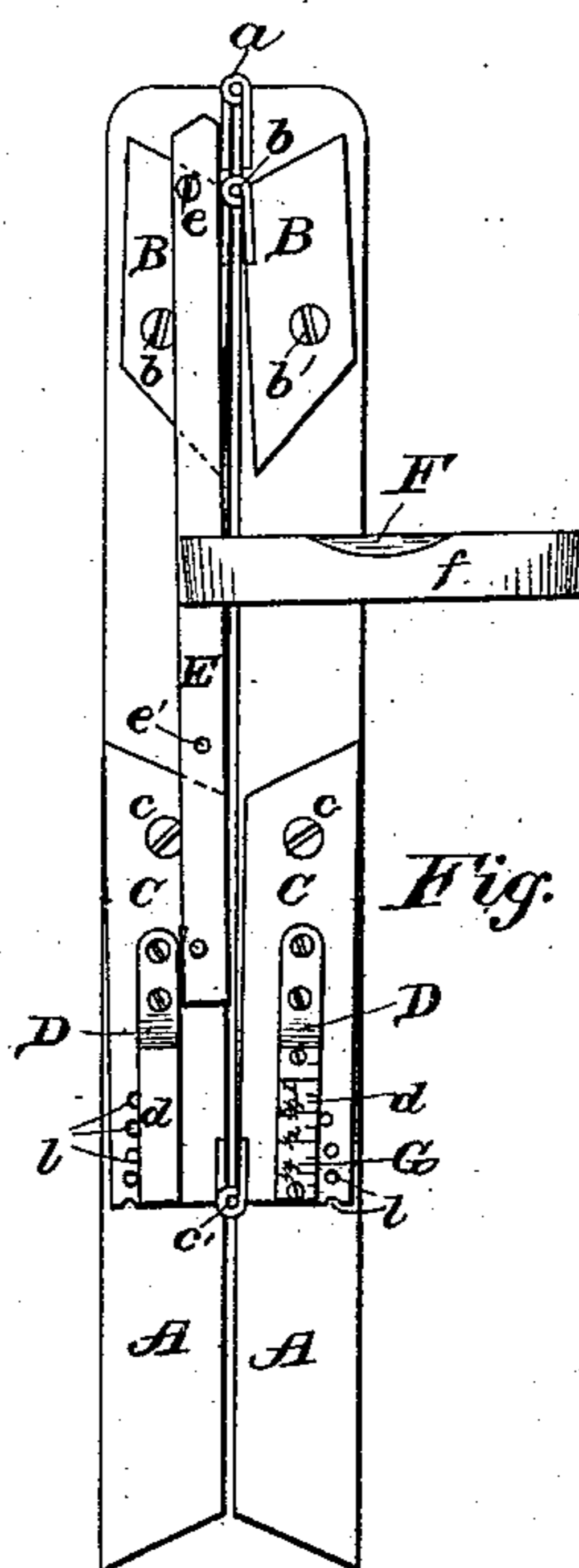


Fig. 4.

INVENTORS

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UNITED STATES PATENT OFFICE.

JOHN D. HAITHCOCK AND WILLIAM T. SUIT, OF WILTON, NORTH CAROLINA.

LEVELING-INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 333,009, dated December 22, 1885.

Application filed September 19, 1885. Serial No. 177,599. (No model.)

To all whom it may concern:

Be it known that we, JOHN D. HAITHCOCK and WM. THOMAS SUIT, citizens of the United States, residing at Wilton, in the county of Granville and State of North Carolina, have invented a new and useful Improvement in Leveling-Instruments, of which the following is a specification, reference being had to the accompanying drawings.

Our invention has relation to improvements in leveling-instruments; and the novelty consists in the construction, combination, arrangement, and adaptation of the various parts for service, substantially as hereinafter fully set forth, and particularly pointed out in the claims.

Our invention has primarily for its object to provide a leveling-instrument which shall compactly fold for transportation; which shall be capable of use in all kinds of weather and not be affected by the wind; which shall combine simplicity, strength, and durability of construction with cheapness and ease of manufacture; which shall dispense with the ordinary plumb at present in use in this class of devices, and which shall be thoroughly effective in operation.

We have shown an embodiment of our invention in the accompanying drawings, in which Figure 1 is a front elevation of our improved leveling-instrument. Figs. 2 and 3 are enlarged detail views of parts of our improvements. Fig. 4 is a view of the device folded and ready for transportation. Fig. 5 is a horizontal sectional view on the line $x x$ of Fig. 1.

Referring by letter to the drawings, in which like letters of reference indicate corresponding parts in all the figures, A A designate the uprights which comprise the supporting-standards to the device, said uprights being hinged together at their upper ends, as at a , to adapt them to lie close together and parallel when they are folded, as shown in Fig. 4, and to be arranged at an angle to each other when in position for use.

B B designate supporting-blocks arranged at or near the upper ends of the standards A, said blocks being hinged together at their lower meeting edges, as at b , and pivoted to the standards A, as at b' . The outer lower ends of said blocks are arranged or cut away to lie

parallel with the outer edges of the standards A, and at their inner ends said blocks are cut away to allow their edges to meet or abut when the standards A are extended, thus preventing them from spreading apart too far.

C C designate transverse bars arranged at or near the middle of the uprights A and pivoted thereto at their outer ends, as at c , said bars being hinged or pivoted together at their inner ends, as at c' , and adapted to lie in a horizontal position when the legs or uprights A are opened and in a vertical position against the outer surfaces of the said standards when they are closed. (See Fig. 4.) The blocks and bars are of the same width as the standards A, and when the device is folded for transportation they lie flush with the side edges of said standards and parallel therewith and with each other.

D D designate brackets secured at or near the middle of one of the bars C near their inner hinged ends. The brackets D are each secured to one of the bars C and provided with an inwardly-projecting arm, d , which are adapted to abut or meet and provide a space or opening between the arms d and the arms C, through which opening a rod or bar, E, is adapted to pass when the device is unfolded. The arm E is pivoted at its upper end preferably to one of the stop-blocks B, as at e , and is arranged in a vertical position and free to oscillate or move back and forth in the space between the arms d of the brackets and the bar C.

F designates a spirit-tube secured on the rod E a little above the brackets D, said tube being arranged in a horizontal plane and at right angles to the pivoted bar or arm E. The tube F is arranged in a case, f , which is provided on its rear surface with projecting lugs $g g$ at each end, and a middle lug, h , having a threaded aperture in which an adjusting tightening-nut, i , works, and is adapted to bear on a horizontal plate or arm, j , secured at one end to the rod or bar E. The lugs $g g$ and h bear on the plate j and serve to prevent the case of the spirit-tube from movement. The spirit-tube is provided with the usual air-bubble and spirits of any preferred well-known character.

The frame of the device is first rested on the hillside, and the fall or inclination thereof

can be ascertained by adjusting the pivoted carrying-arm until the desired level in the spirit-tube has been secured and noting the figure on the scale. The level in the tube and "fall" or inclination of the ground can also be ascertained by elevating the lowermost upright of the frame until the bubble in the spirit-tube indicates the horizontality thereof, and inserting a block, J, of the required thickness under such elevated unsupported upright of the frame, the thickness of the block indicating the fall or inclination of the ground on which the frame is rested.

To illustrate the use of the scale, suppose it indicates that the pivoted carrying arm and tube has been moved one-eighth of an inch to secure a level in the tube, a fall or inclination of one-half of an inch of ground is indicated, and if the scale indicates that the pivoted arm has been moved one-fourth of an inch a fall or inclination of one inch is indicated, and so on in proportion, these proportions being employed for convenience on the device shown herein, owing to the limited extent of the scale and the ordinarily steep inclination or fall of the hillside, and we will proceed to describe its operation in connection with work of this character; but it is obvious that it can be used in other relations with equal advantages. It is frequently a difficult matter in work of this character to find a level place, but we obviate this difficulty by using a series of graduated blocks, one of which is represented at J in Fig. 1. The frame is held until a level has been secured and established, when a block of the required thickness is inserted under one of the uprights of the frame—i. e., the upright which rests above the ground. The oscillating pivoted spirit-tube-carrying arm is then adjusted to the required degree until the fall has been ascertained. To illustrate, suppose one of the legs is elevated half an inch above the other, a block of that thickness is inserted under the elevated leg, and the bar E is adjusted an eighth of an inch, thus showing that the fall is one-half an inch, and if the arm or bar is moved one-fourth of an inch the fall is one inch, and so on in proportion.

To fold the device for transportation, pressure is exerted downward on the hinged pivoted bars C and upward on the hinged pivoted blocks B or on the rod E, which will permit the uprights A to be brought together and the blocks and bars to lie parallel with the uprights, as shown.

It will be observed that the device is very simple, strong, and durable in construction, is efficient in operation, entirely dispenses with the employment of a plumb-line, compactly and readily folds for transportation and storage, is light and portable, and cheap and easy of manufacture.

Various changes in the form and proportion of parts and details of construction may be made without departing from the spirit or sacrificing the advantages of our invention, the essential features of which will be readily understood from the foregoing description taken in connection with the drawings.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the hinged uprights, supporting-bars pivoted to the uprights and hinged together at their inner meeting ends, and a pivoted spirit-tube-carrying arm, substantially as described.

2. The combination, with the pivoted uprights, transverse horizontal bars pivoted thereto, brackets secured to said bars, a pivoted oscillating bar, and a spirit-tube secured thereon, substantially as described.

3. The combination, with the hinged uprights, horizontal bars pivoted thereto and hinged together at their meeting edges, brackets having inwardly-extending arms, a pivoted bar, and a spirit-tube mounted thereon above the plane of the bars, substantially as described.

4. The combination of the hinged uprights, blocks D, pivoted to said uprights and hinged together, bars C, arranged below the blocks B and pivoted to the uprights at their outer ends and hinged together at their meeting edges, one of said bars having a series of apertures, brackets D, having arms d, and secured to the bars C, and one provided with a scale, a vertical bar pivoted to the blocks D, and a spirit-tube secured to said bar, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

JOHN D. HAITHCOCK.
WILLIAM T. SUIT.

Witnesses:

R. W. LASSITER,
T. M. WASHINGTON.