(No Model.)

W. MARTIN.

INCLINOMETER.

No. 423,484. Patented Mar. 18, 1890.

Fig. 1.

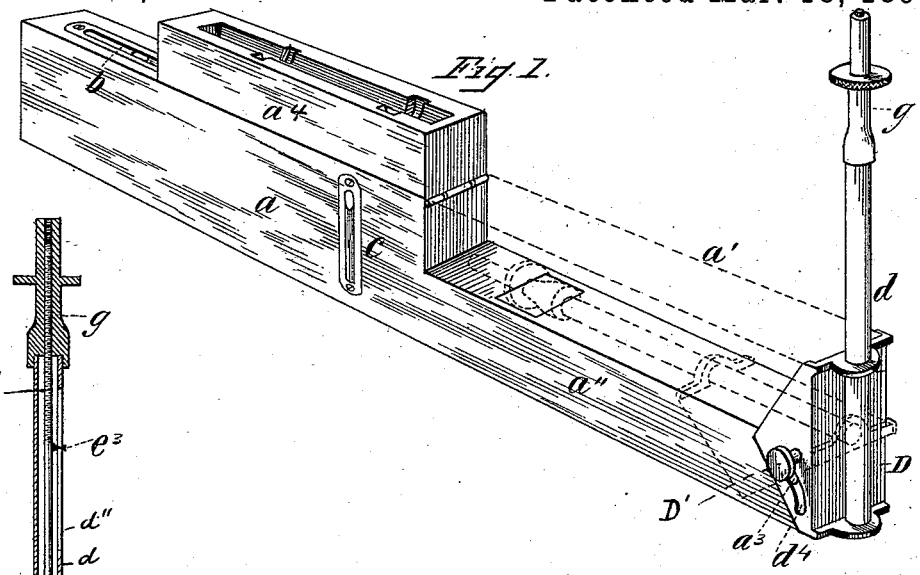


Fig. 2.

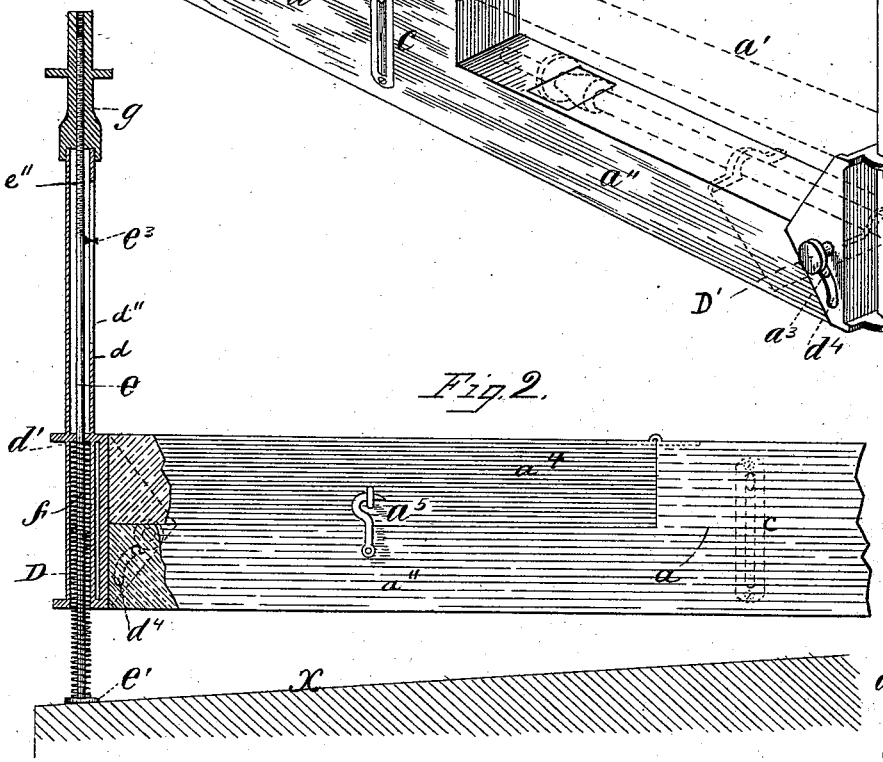


Fig. 3.

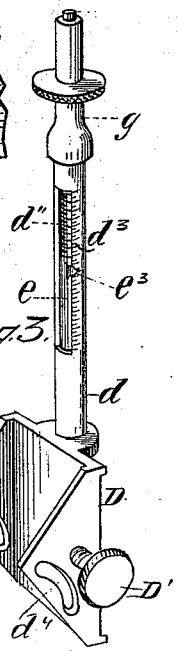
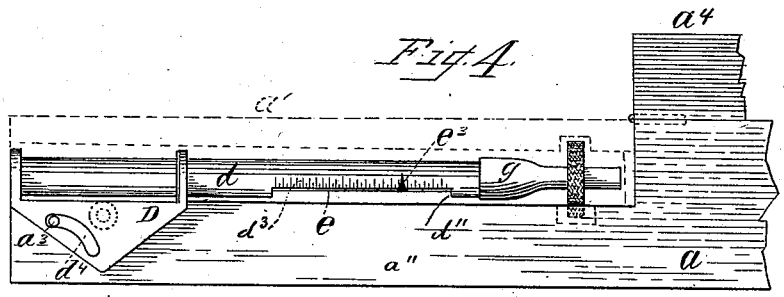


Fig. 4.



Witnesses
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Martha J. Jackson

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by Albert Andrén.
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UNITED STATES PATENT OFFICE.

WILLIAM MARTIN, OF SALEM, MASSACHUSETTS.

INCLINOMETER.

SPECIFICATION forming part of Letters Patent No. 423,484, dated March 18, 1890.

Application filed November 13, 1889. Serial No. 330,121. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MARTIN, a citizen of Canada, and a resident of Salem, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Inclinometers, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in inclinometers for the purpose of measuring the inclination of floors, walls, chimneys, or other objects or surfaces, and it is to be used in connection with a spirit-level, as will hereinafter be more fully shown and described, reference being had to the accompanying drawings, wherein—

Figure 1 represents a perspective view of a spirit-level provided with my improved inclinometer. Fig. 2 represents a vertical section of the inclinometer, showing it as attached to a spirit-level and in position for use in measuring an inclined surface. Fig. 3 represents a perspective view of the inclinometer, showing it as detached from the spirit-level; and Fig. 4 represents a side elevation of the inclinometer, showing it as swung out of operative position relative to the spirit-level when not required for use.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In Figs. 1, 2, and 4, *a* represents a spirit-level of any ordinary form or construction, which is provided with alcohol-filled glass tubes *b* and *c*, one at a right angle to the other, as is common in devices of this kind.

The inclinometer which I have constructed for use in connection with a spirit-level consists of a metal frame D, having attached to it or made in one piece with it a hollow cylinder or tube *d*, within which is arranged the longitudinally-adjustable rod or spindle *e*, (shown in Fig. 2,) which is automatically forced downward by the influence of a spring *f*, surrounding said spindle between a collar, foot, or enlargement *e'* at the lower end of said spindle and a flange or projection *d'* in the tube *d*, as shown in Fig. 2. The spindle *e* may be adjusted up or down within said tube or guide *d* by means of a thumb-nut *g*, resting on the upper end of said tube *d* and having a female screw-thread adapted to receive the upper screw-threaded end *e''* of the rod *e*, as shown in Fig. 2.

d'' is a vertical slot on one side of the tube or guide *d*, through which projects loosely the index-pointer e^3 on the rod *e*, as shown, said pointer serving to prevent the rod *e* from being rotated as it is vertically adjusted, and also to indicate upon a graduated scale d^3 on the tube or guide *d* the inclination to be ascertained or measured.

When the inclinometer is to be used, it is secured in a vertical position to one end of the spirit-level *a*, as shown in Figs. 1 and 2, and this is preferably done by means of a set-screw D', screwed through one of the sides of the frame D, as shown in Figs. 1 and 3, and against one side of the spirit-level.

The improved inclinometer may be used with any ordinary wood or metal spirit-level; but in practice and for the sake of convenience I prefer to construct the spirit-level in such a manner that the inclinometer is at all times connected to it, as is shown in Figs. 1, 2, and 4. For this purpose I remove or cut away a portion *a'* from the end of the spirit-level *a*, as shown in dotted lines in Fig. 1, leaving a reduced part *a''*, to the end of which the frame D of the inclinometer is permanently pivoted by means of a pin a^3, going through slotted perforations d^4 d^4 in the sides of the said inclinometer-frame D, as shown in Figs. 1, 3, and 4. A hinged or removable cover a^4 is connected to the level *a*, either by means of hinges or equivalent devices, as shown. The said cover, as well as the reduced part *a''*, of the spirit-level is slightly hollowed out, so as to serve as a box or receptacle for the inclinometer when not needed for use, as shown in Fig. 4 and in dotted lines in Fig. 1. After the inclinometer has been swung into the horizontal inoperative position shown in Fig. 4 the cover a^4 is closed upon it and secured to the spirit-level portion *a''* by means of a suitable lock or fastening device a^5, (shown in Fig. 2,) thus concealing from view the inclinometer and allowing the use of the spirit-level for any ordinary purpose. When the inclinometer is to be used, the cover a^4 is released, as shown in Fig. 1, the inclinometer is swung into a vertical position, as shown in

Fig. 1, and the cover a^4 closed and locked in position, as shown in Fig. 2, thus holding the inclinometer in position at the end of the spirit-level ready for use.

In measuring the inclination of a surface x, Fig. 2, the spirit-level is laid on it, and that end of it where the inclinometer is attached is gradually raised by the adjustment of the nut g, and consequent release of the spindle e, until the bar a is placed horizontally, when the amount or degree of inclination of the surface x can readily be ascertained by the position of the index-pointer e^3 relative to the graduated scale d^3 on the tube or guide d.

Another manner of using the inclinometer is to nearly unscrew the nut g from the rod e without detaching said parts from each other, causing the foot e' to be forced downward below the spirit-level a by the influence of the spring f. Inclinations may then be measured by placing that end of the spirit-level that is opposite to the inclinometer on the higher portion of the incline and pressing the other end of said spirit-level that is supported in the rod e downward against the influence of the spring f until the bar a is brought to a level position, when the degree of inclination of the surface to be measured can be read off by the temporary position of the index-pointer relative to the graduated scale d^3 on the guide d. In this latter manner of using the instrument the nut g only serves as a stop for preventing the rod e from dropping out of the tube d.

The invention is useful for measuring or ascertaining the inclinations of surfaces toward the vertical or horizontal to equal advantage.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. The inclinometer, as described, consisting of a frame and graduated tube or guide d secured to it, combined with a longitudinally-adjustable spring-pressed spindle carrying an index-pointer and an adjustable nut g, substantially as and for the purpose set forth.

2. The inclinometer, as described, consisting of a spirit-level and a tube or guide d, adapted to be secured to the same, combined with the longitudinally-adjustable spring-pressed spindle and index-pointer thereon, and the adjustable regulating-nut, substantially as and for the purpose set forth.

3. The spirit-level a and the hinged or removable cover a^4, as described, combined with the frame D, permanently pivoted or connected to said spirit-level, the graduated tube or guide d, secured to said frame, and the longitudinally-adjustable index-carrying spindle e and its regulating-nut g, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 9th day of November, A. D. 1889.

WILLIAM MARTIN.

Witnesses:
ALBAN ANDRÉN,
KARL A. ANDRÉN.