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PATENTED OCT. 23, 1906.

G. HICKS & J. FRANEY.

SPIRIT LEVEL.

APPLICATION FILED AUG. 25, 1905.

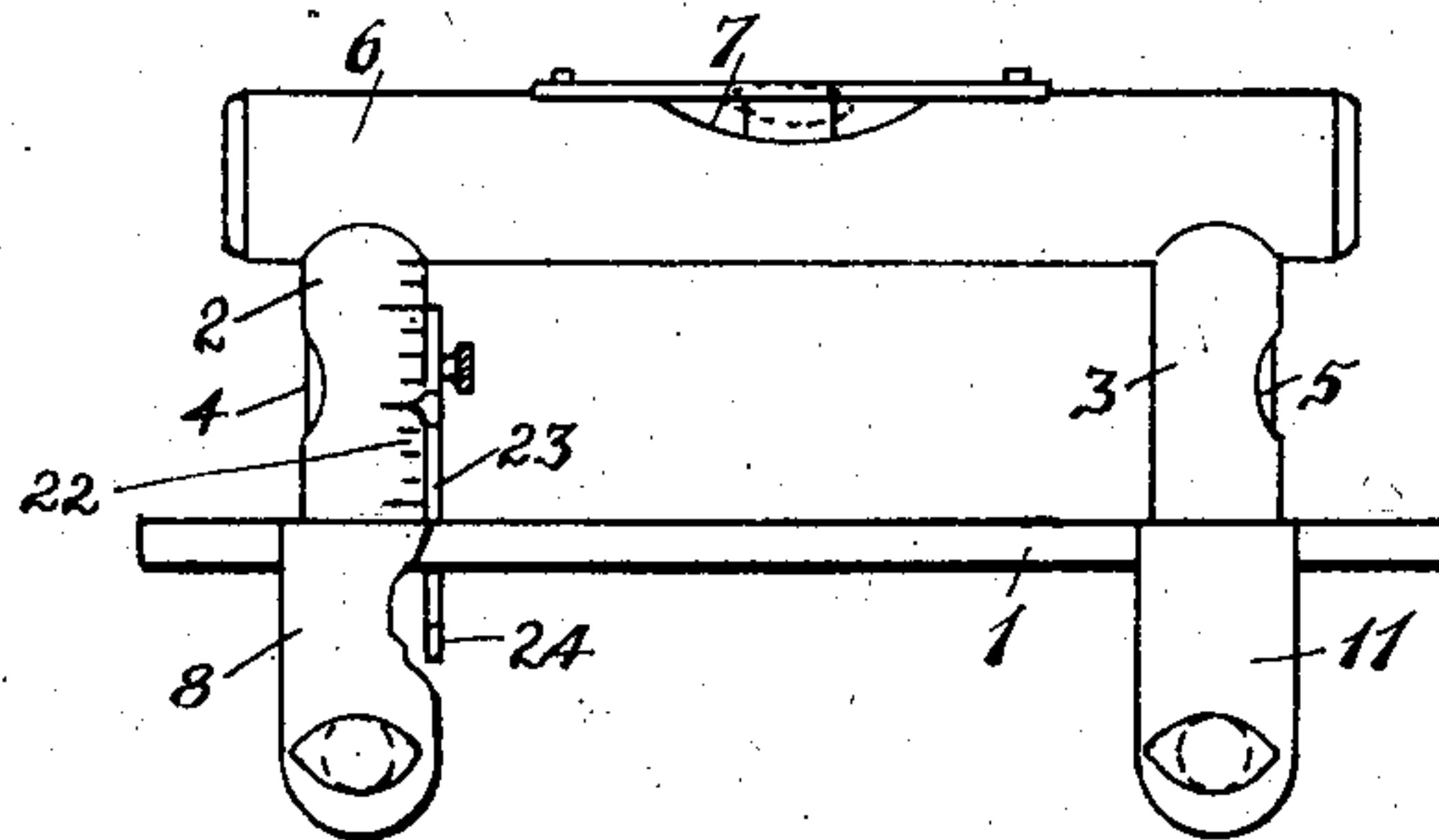


Fig. 1.

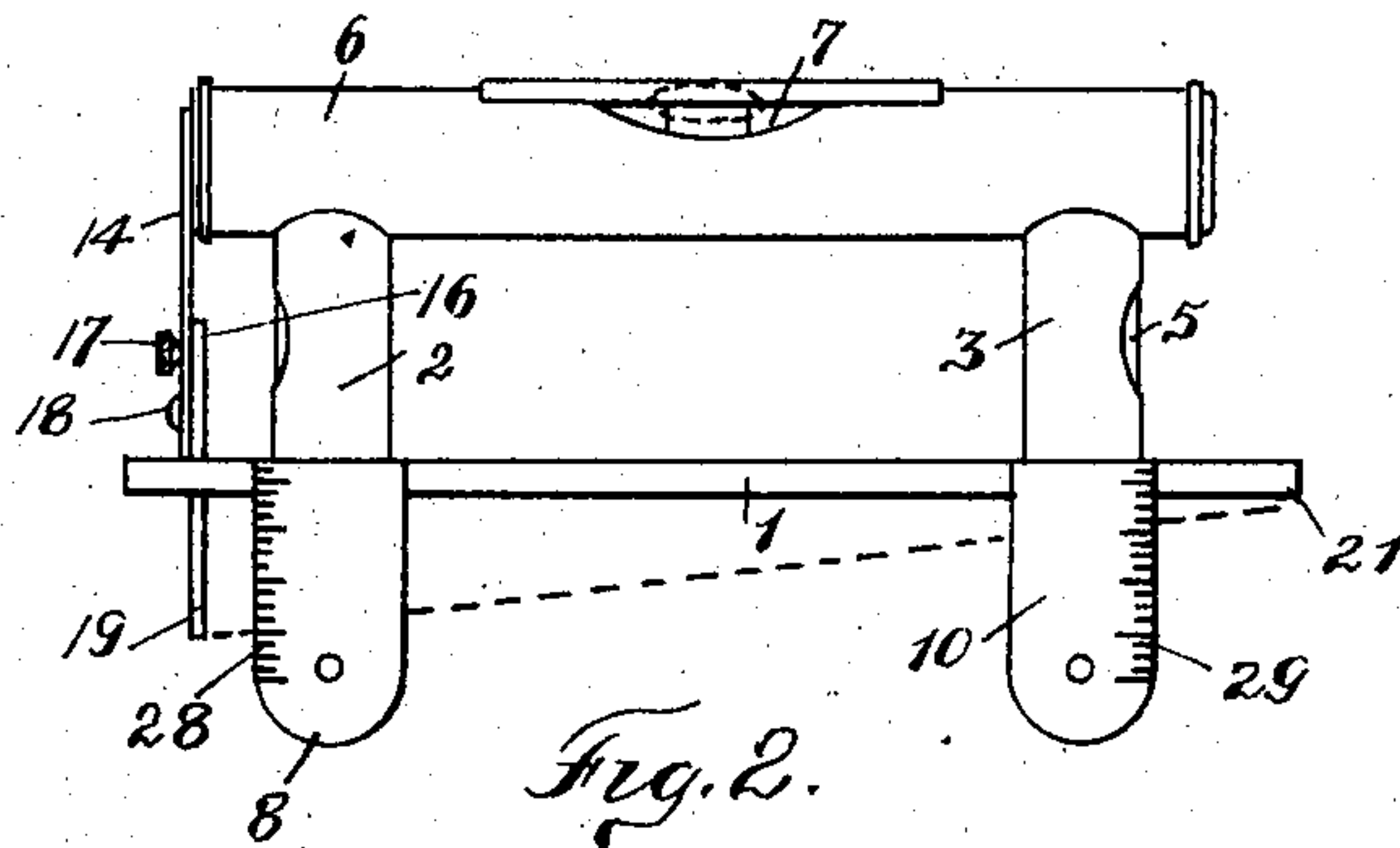


Fig. 2.

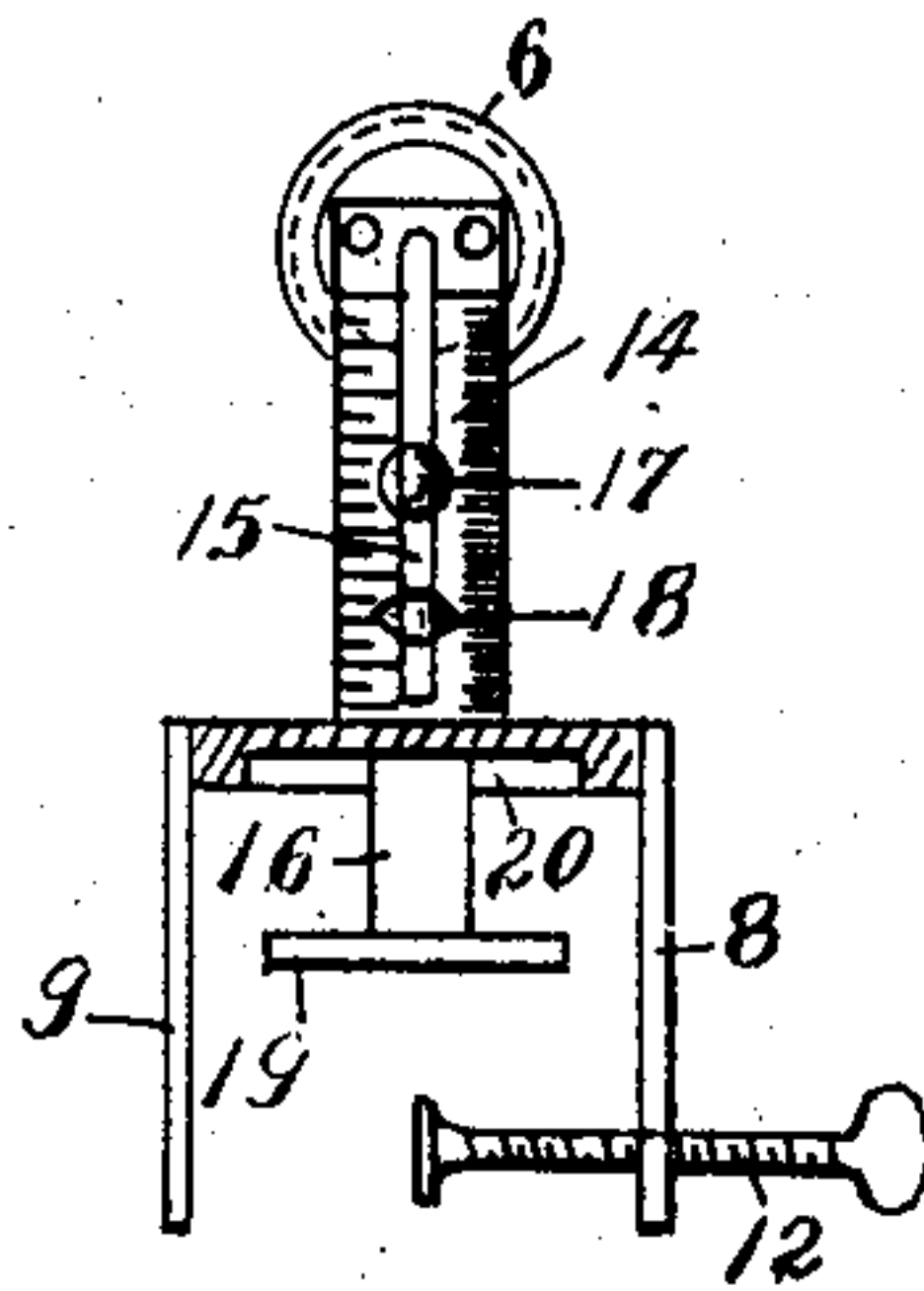


Fig. 3.

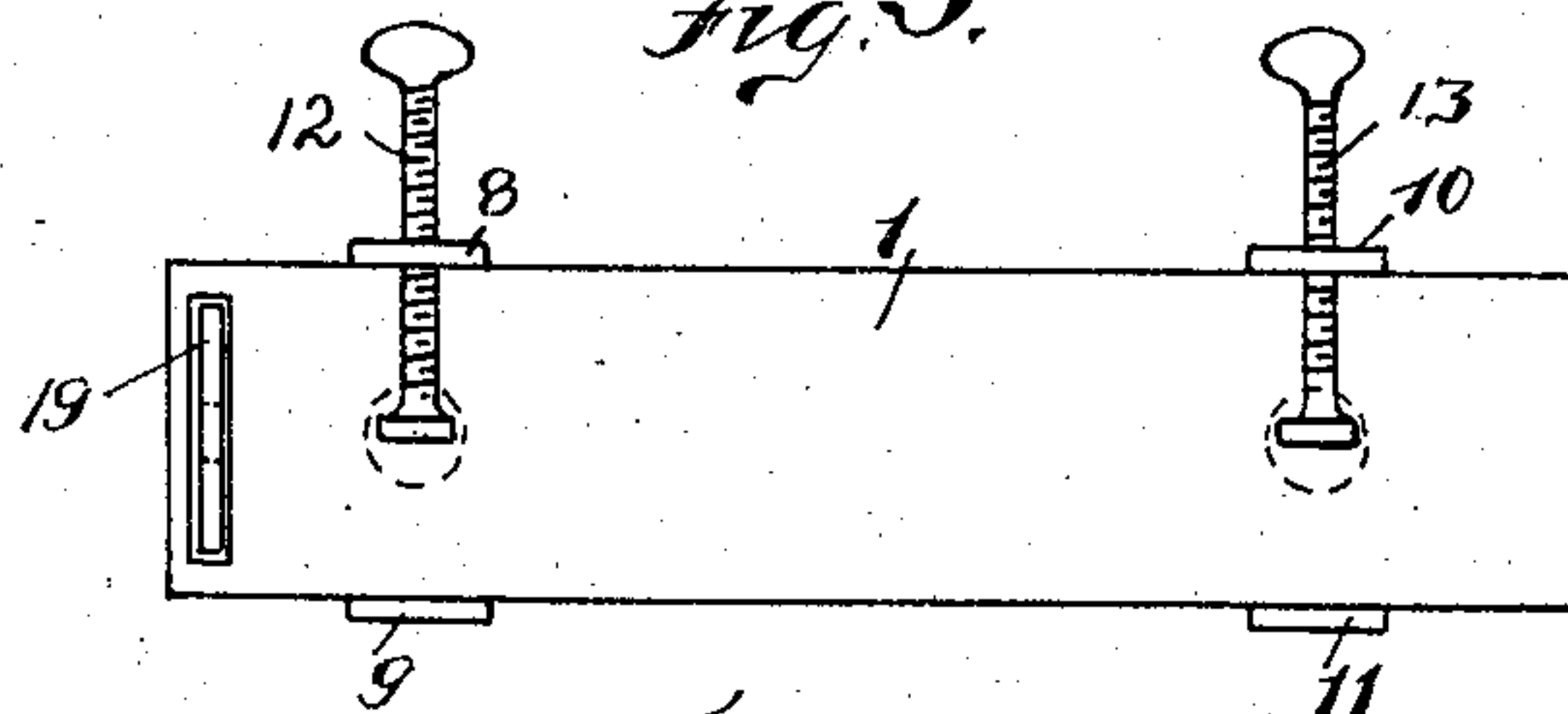


Fig. 4.

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UNITED STATES PATENT OFFICE.

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SPIRIT-LEVEL.

No. 834,132.

Specification of Letters Patent.

Patented Oct. 23, 1906.

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To all whom it may concern:

Be it known that we, GEORGE HICKS and JOHN FRANEY, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Spirit-Levels; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in combined spirit-levels and plumbs, its object being to condense the frame carrying the bubble-tubes into a close compass to enable it to be carried in the pocket and at the same time providing such frame with means for the removable attachment thereto of a straight-edge to complete the level and plumb.

Another object of our invention is to provide means attached to the bubble-tube frame for enabling the spirit-level and plumb to adjust any object to a given angle other than the vertical or horizontal.

To these ends our invention consists in certain details of construction, which will be fully hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of our improved level and plumb. Fig. 2 is a modification thereof. Fig. 3 is an end elevation, partly in section, of Fig. 2; and Fig. 4 is an under side view of Fig. 2.

Referring to the drawings, 1 is a metal plate, at each end of which is rigidly mounted the vertical casings 2 and 3, which carry the inclosed plumb bubble-tubes 4 and 5.

6 is a horizontal casing which carries the level bubble-tube 7 and which is rigidly supported on the vertical casings 2 and 3, which, with the casing 6 and plate 1, form the bubble-tube frame. This frame is condensed, as shown, into a close compass to enable it to be carried in the pocket when not in use. To adapt it for the removable reception of a straight-edge, so that it can be effectively employed in leveling and plumbing objects, we have provided the lugs 8 and 9, depending from opposite sides of one end of the plate 1, and the lugs 10 and 11, depending from oppo-

site sides of the other end of plate 1. 12 and 13 are screw-clamps in adjustable engagement with the lugs 8 and 10. A metal or wood straight-edge of any suitable length can be temporarily secured between the lugs to complete the spirit-level and plumb. The advantage of this construction is apparent, as it avoids the necessity of carrying about a cumbersome instrument.

In order to correctly establish the angle of an object other than a true vertical or horizontal angle, we have provided the bubble-tube frame with the following means: 14 (see Figs. 2, 3) is a graduated plate secured to one end of the casing 6 and the plate 1. This plate is provided with the central longitudinal slot 15.

A strip 16 back of the plate 14 is slidably engaged to such plate 14 and can be locked in the position desired by the thumb-screw 17, reciprocating in the slot 15 of plate 14. A pointer 18 on the strip 16 and extending through the slot 15 is employed in connection with the graduations on the plate 14 to fix the position of the strip 16, which extends down through the frame-plate 1 and is provided at its lower end with the right-angled cross-arm 19, which when not in use rests in the countersunk recess 20 in the under side of the frame-plate 1.

To establish the angle or gradient of an object, the cross-arm 19 is fixed in its proper position, and when the instrument is plumbed by means of the bubble-tubes 4 and 5 the proper angle of the object, as shown in dotted lines in Fig. 2, is obtained by causing the straight-edge to be placed in contact with the cross-arm 19 and the corner 21 of the plate 1 and clamped in such position. A modified form of the above construction is shown in Fig. 1, in which the casing 2 is graduated, as at 22, and the strip 23 and its cross-arm 24 is adjustable on such casing.

Still another modification is shown in Fig. 2, in which the lugs 8 and 10 are both provided with the graduations 28 and 29, by means of which the proper angle of the straight-edge is determined.

We claim—

A spirit-level comprising the plate 1, the vertical casings 2 and 3 mounted on the plate, the bubble-tubes 4 and 5 in the vertical casings 2 and 3, the horizontal casing 6 mounted

on the vertical casings 2 and 3, the bubble-tube
7 in the horizontal casing 6, the lugs 8, 9, 10, and
11 on the plate 1 and the screw-clamps 12 and
13 for removably securing a straight-edge be-
5 tween the lugs, a graduated plate 14 secured
to the horizontal casing 6 and the plate 1 and
a strip 16 passing through the plate 1 and
provided at its outer end with a cross-arm 19,
the strip and cross-arm being slidably ad-
10 justable upon the graduated plate, all com-

bined and operating as and for the purpose
stated.

In testimony whereof we have signed our
names to this specification in the presence of
two subscribing witnesses.

GEORGE HICKS.
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Witnesses:

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