

A. M. JOHNSON.
CLINOMETRICAL GAGE.
APPLICATION FILED MAR. 31, 1905.

2 SHEETS—SHEET 1.

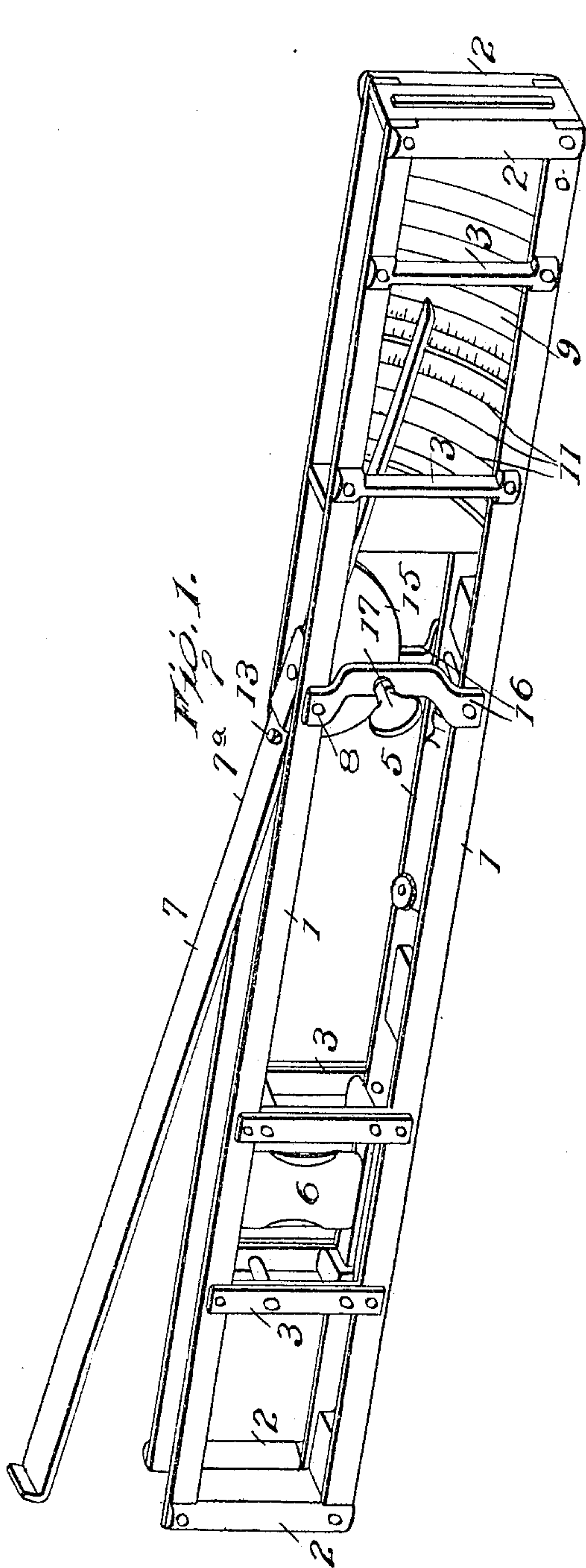


Fig. 3.

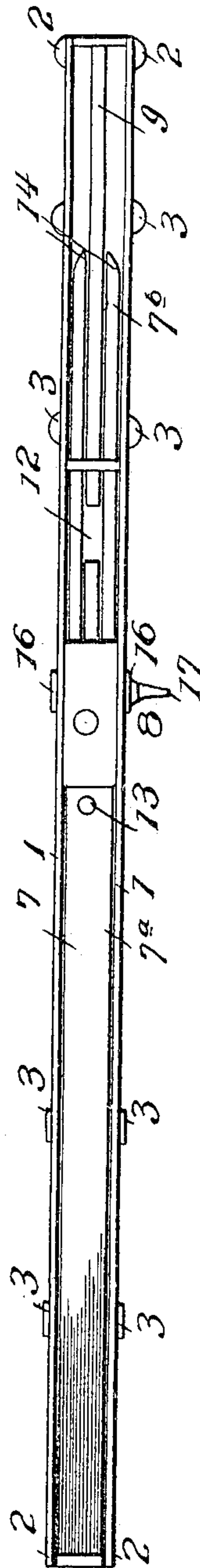
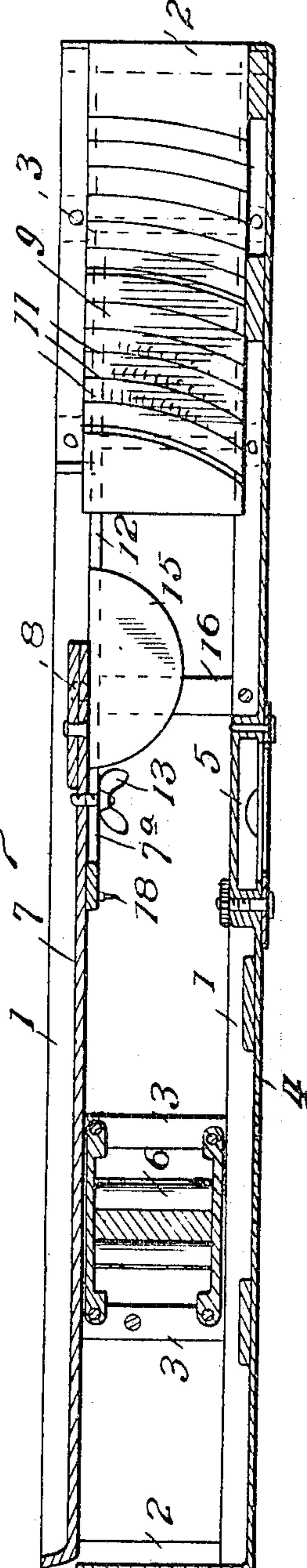


Fig. 2.



Inventor

A. M. JOHNSON

Witnesses

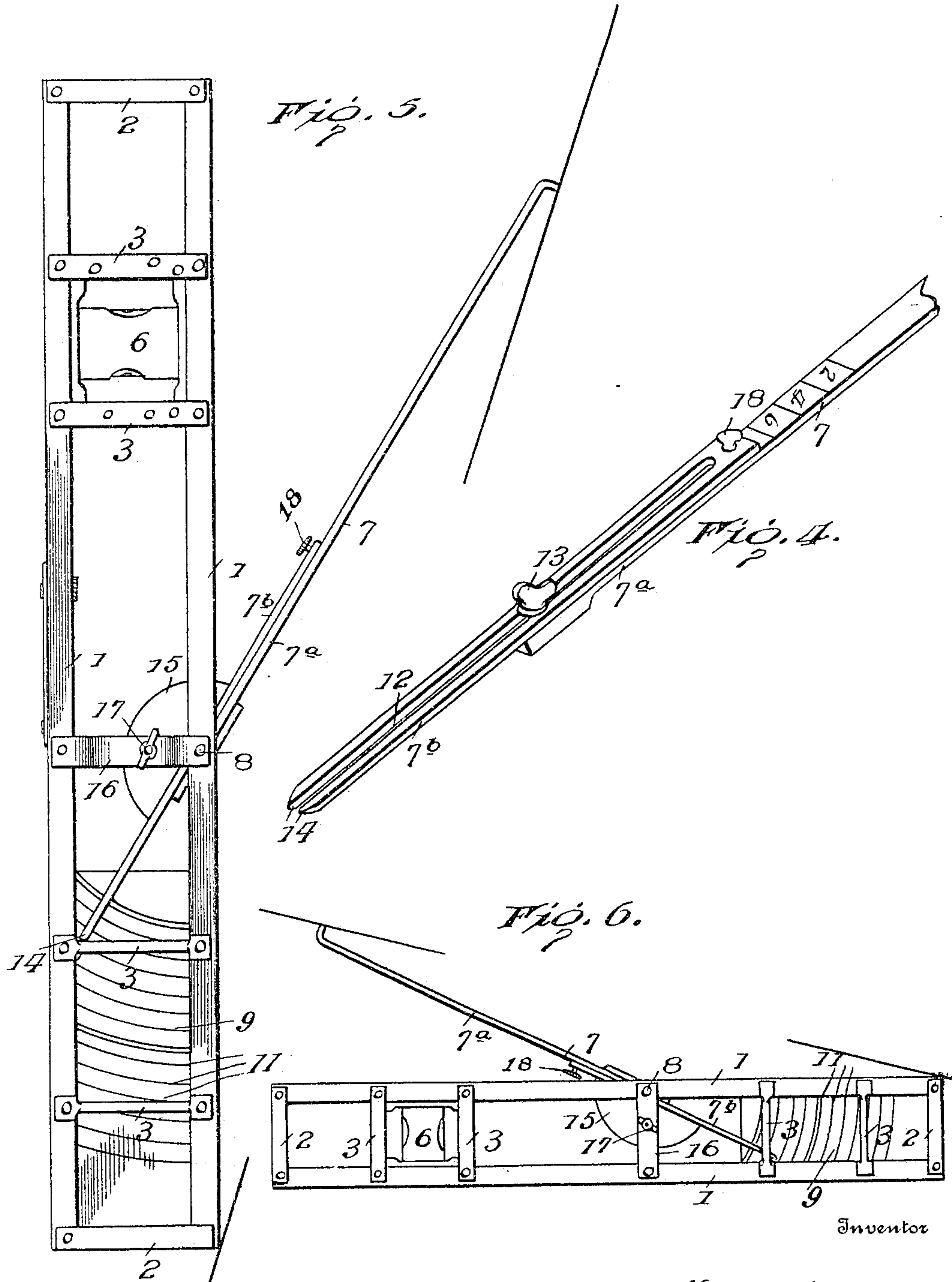
J. M. Morris
J. M. Morris

By

R. A. Racey, Attorneys

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2 SHEETS—SHEET 2.



Witnesses

*James
L. H. Norris.*

Inventor

H. M. Johnson

By

W. A. Lacey, Attorneys

UNITED STATES PATENT OFFICE.

ANDREW M. JOHNSON, OF DETROIT CITY, MINNESOTA.

CLINOMETRICAL GAGE.

No. 799,235.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed March 31, 1905. Serial No. 253,128.

To all whom it may concern:

Be it known that I, ANDREW M. JOHNSON, a citizen of the United States, residing at Detroit City, in the county of Becker and State of Minnesota, have invented certain new and useful Improvements in Clinometrical Gages, of which the following is a specification.

This invention embodies a novel form of gage for giving the degree of inclination of parts.

In its preferred adaptation the invention is used for accurately determining the proper angle of a post, support, or the like to the horizontal or vertical in order to cause such part to assume a position in conformity with a given measurement.

The invention resides particularly in the combination of a suitable level, (preferably, though not necessarily, a spirit-level,) a peculiarly-arranged clinometer or gage bar, and a special scale-indicator for determining the adjustments of the gage-bar according to various conditions of service.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawings.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a gage embodying the invention, the parts arranged as when indicating a predetermined inclination or angle. Fig. 2 is a vertical longitudinal sectional view, parts arranged as when out of use. Fig. 3 is a top plan view of the parts, as when the level is disposed in horizontal position. Fig. 4 is a detail perspective view of the gage-bar alone. Fig. 5 is a side elevation of the device in vertical position in gaging inclination from the vertical or perpendicular. Fig. 6 is a view similar to Fig. 5, the gage in horizontal position.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

As before premised, it is designed to provide a level of approved construction in connection with the invention and forming a part thereof. A spirit-level is preferably used,

and the same consists of a body composed, preferably, of a metal frame.

The frame of the level consists, mainly, of spaced longitudinal bars 1, which are connected at the ends by end plates 2 and at intervals in the length thereof by suitable connecting-plates 3, promoting the general rigidity of the frame structure. A longitudinal plate 4, Fig. 2, is preferably disposed between the spaced longitudinal bars 1 at one edge of the frame of the level, and this plate 4 is provided with a suitable spirit-tube 5 for determining the level of the device when the latter is disposed in a horizontal position. As in many levels of this type the frame or body of the device above described is provided with a second spirit-tube 6, which enables the level to be accurately arranged in a perpendicular position when the device is being used to determine the angular disposition of parts arranged more particularly at an angle to the vertical rather than to the horizontal. The spirit-tube 6, as well as the tube 5, is attached to the frame of the level in any suitable manner, and adjusting means may be provided for adjusting these parts for accurate work should they become inaccurate after a certain amount of service. It is contemplated, however, that the level may be of any conventional construction suitable for the use of the clinometer device, which comprises the essential feature of the invention.

Disposed between the adjacent longitudinal bars 1 at the edge of the level-frame opposite that provided with the plate 4 is located a movable gage or clinometer bar 7, said bar being pivoted to the frame of the level by means of a pivot member 8, carried by the bars 1 just above mentioned. The gage-bar 7 is thus adapted for pivotal movement with relation to the level frame or body, and said gage-bar is arranged to cooperate with a gage-plate 9, located at one end of the frame of the level. The gage-plate 9 is secured substantially between the spaced longitudinal bars 1 of the level-frame, being arranged approximately intermediate corresponding of said bars. The gage-plate 9 is provided upon opposite sides thereof with a scale composed of a plurality of arc-lines 11, having suitable divisions of measurement indicated by numerals or otherwise. The lines 11 are arranged at predetermined intervals and on an arc generated from the pivot 8 as a center, the scales upon opposite sides of the plate 9 being arranged adjacent an end of the gage-

bar 7, so that a predetermined adjustment of said bar may be had by noting the scale-marks upon the plate 9 in a manner which will be pointed out more clearly hereinafter.

5 The gage-bar 7 is made in sections designated 7^a and 7^b , the section 7^a being relatively stationary and the section 7^b adjustable thereon. The pivot 8 passes through the end of the section 7^a , and the section 7^b is slidable longitudinally of the section 7^a in order that the length of the gage-bar 7 may be varied to accomplish the desired results. The section 7^b is slotted longitudinally thereof, as shown at 12, and a set-screw 13 passes through the slot 12 into the section 7^a , so that by tightening said screw the sections 7^a and 7^b may be securely positioned relative to one another. The slot 12 extends to one end of the section 7^b of the gage-bar, forming the members 14, which operate upon opposite sides of the gage-plate 9 and which form pointers traversing the plate 9 and cooperating with the scales upon opposite sides of said plate to indicate when the gage or clinometer bar has reached a predetermined angle to the horizontal or vertical, as determined accurately by the level. Projecting from the section 7^a of the gage-bar 7 at the end adjacent the pivot 8 is an arc-plate 15, which extends between spaced connecting-bars 16, attached at opposite ends to the spaced longitudinal bars 1 of the level-frame. The bars 16 are deflected between their ends, curving inwardly toward each other, and one of said bars carries an adjusting-screw 17, which is adapted to engage the arc-plate 15, so that the gage-bar 7 will be held at a predetermined angle.

The section 7^a of the gage-bar 7 is provided upon its under side or upon that side against which the section 7^b operates with a longitudinal scale of measurement, the units of which are in a predetermined ratio with regard to the units of measurement of the scale-lines 11 upon opposite sides of the gage-plate 9. The movable section 7^b of the gage-bar is provided at one end with a finger-piece 18, which may be readily grasped so as to adjust said section with regard to the sections 7^a in an adjustment determined by the scale-marks carried by the section 7^a aforesaid.

Describing one of the uses to which the invention may be put in its practical application, it is designed that the arc-lines of the gage-plate 9 may be spaced from each other a distance representing a unit of two feet, each of the lines being provided with scale-marks in its length indicative of inches as units provided with suitable indicating-numerals at intervals. Twelve of the units longitudinal of the arc-lines will thus represent one foot, &c. The units of measurement of the scale carried by the section 7^a of the gage-bar are likewise indicated and numbered, said units representing feet and having a prede-

termined ratio with regard to the scale-marks upon the plate 9. As an instance of the application of the invention, should it be desired to elevate one end of a timber or support twenty feet long to a distance of four feet if the scale-marks of the scales upon the plate 9 or bar 7 do not run sufficiently high the ratio of the figures may be reduced, say, by half, so that the ratio of the elevation to the length of the timber will be ten feet to two feet. The ratio of ten to two is of course the same as of twenty to four, according to well-known mathematic principles, and by loosening the set-screw 13 the section 7^b of the bar 7 may be adjusted until the inner end of said section is on a line with the scale-mark designated 10 in the length of the scale upon the section 7^a . The length of that portion of the gage-bar 7 at one side of the pivot 8 will now be in a predetermined ratio with regard to the length of the portion at the opposite side of the pivot and the extremities of the members or pointers 14 will be located proximate a predetermined arc in the scales upon opposite sides of the plate 9. Movement of the gage-bar, the level of course having been arranged in a horizontal position until the extremities of the members 14 reach, for instance, the designated two inches in the length of a predetermined arc-line, will cause the opposite end of the gage-bar to be elevated to the horizontal a predetermined distance in ratio as is the length of a portion of the gage-bar upon one side of the pivot 8 is to the length of that portion upon the opposite side. The angle of inclination of a part may thus be accurately determined in order to place such part in a certain position at an angle to the vertical or horizontal, as the case may be.

Having thus described the invention, what is claimed as new is—

1. In a clinometrical gage, the combination of a level, a gage-bar fulcrumed between its ends to the level, means admitting of varying the relative length of those portions of the gage-bar upon opposite sides of its fulcrum, and a scale upon the level composed of a plurality of arc-lines on arcs generated from the fulcrum of the gage-bar as a center and cooperating with an end of said bar to determine the extent of adjustment thereof relative to the level.

2. In a clinometrical gage, the combination of a level composed of a frame embodying the spaced longitudinal bars 1, the bars 16 connecting said spaced longitudinal bars 1, the gage-bar 7 fulcrumed between certain of the bars 1, means admitting of varying the length of said gage-bar, a plate projected from the gage-bar and extending between the bars 16, the set-screw 17 upon one of the bars 16 adapted to engage said plate of the gage-bar, and the gage-plate 9 secured to the frame and cooperating

with the end of the gage-bar to indicate the extent of angular adjustment thereof relative to the level.

3. In a clinometrical gage, the combination
5 of a level, and a gage-bar composed of adjustable sections and fulcrumed between its ends to the level, one of the sections of the gage-bar having a scale for ascertaining the relative adjustment of the sections, the level
10 having a scale composed of a plurality of arc-

lines coöperating with the gage-bar at different adjustments of the sections thereof for determining the extent of angular adjustment of said gage-bar with reference to the level.

In testimony whereof I affix my signature in 15
presence of two witnesses.

ANDREW M. JOHNSON. [L. s.]

Witnesses:

ALFRED ANDERSON,
MAE V. ROBERTSON.