

No. 764,809.

PATENTED JULY 12, 1904.

E. HELB.
COMBINED LEVEL AND GRADE FINDER.

APPLICATION FILED APR. 12, 1904.

NO MODEL.

Fig. 1.

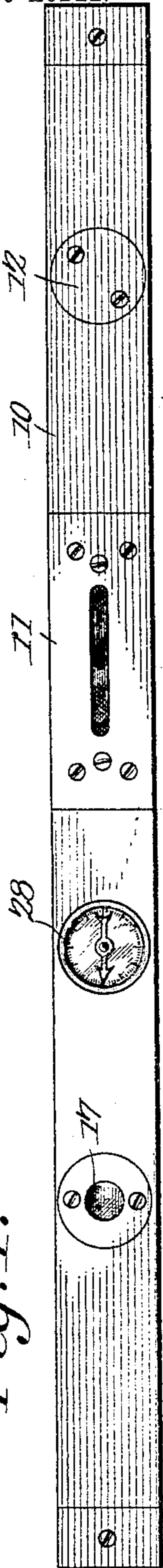


Fig. 2.

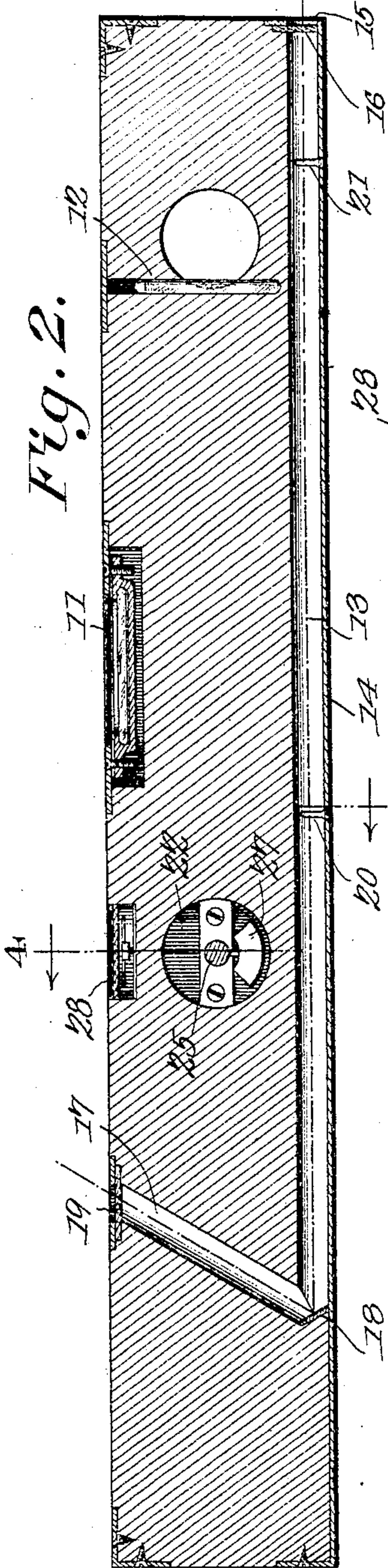


Fig. 3.

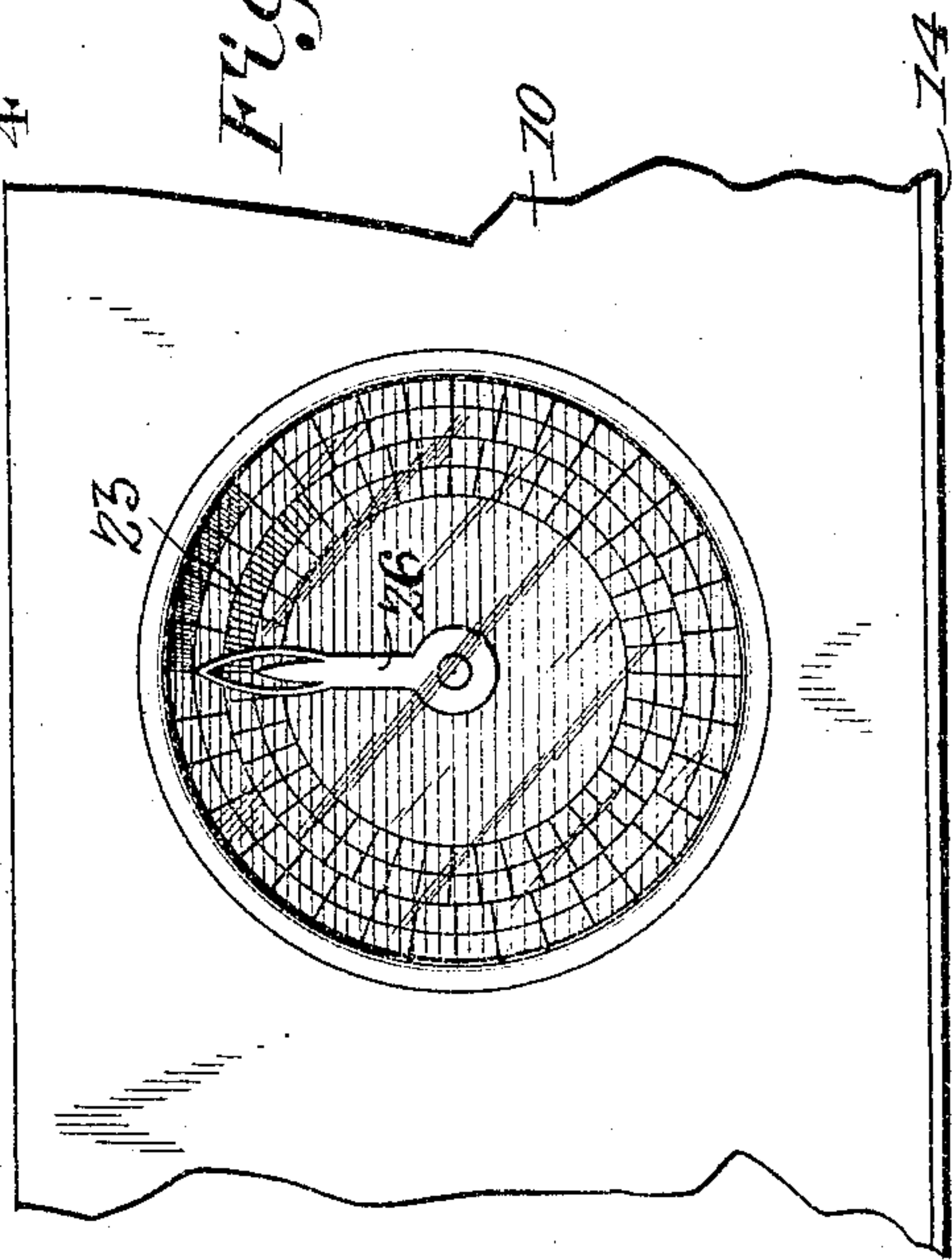
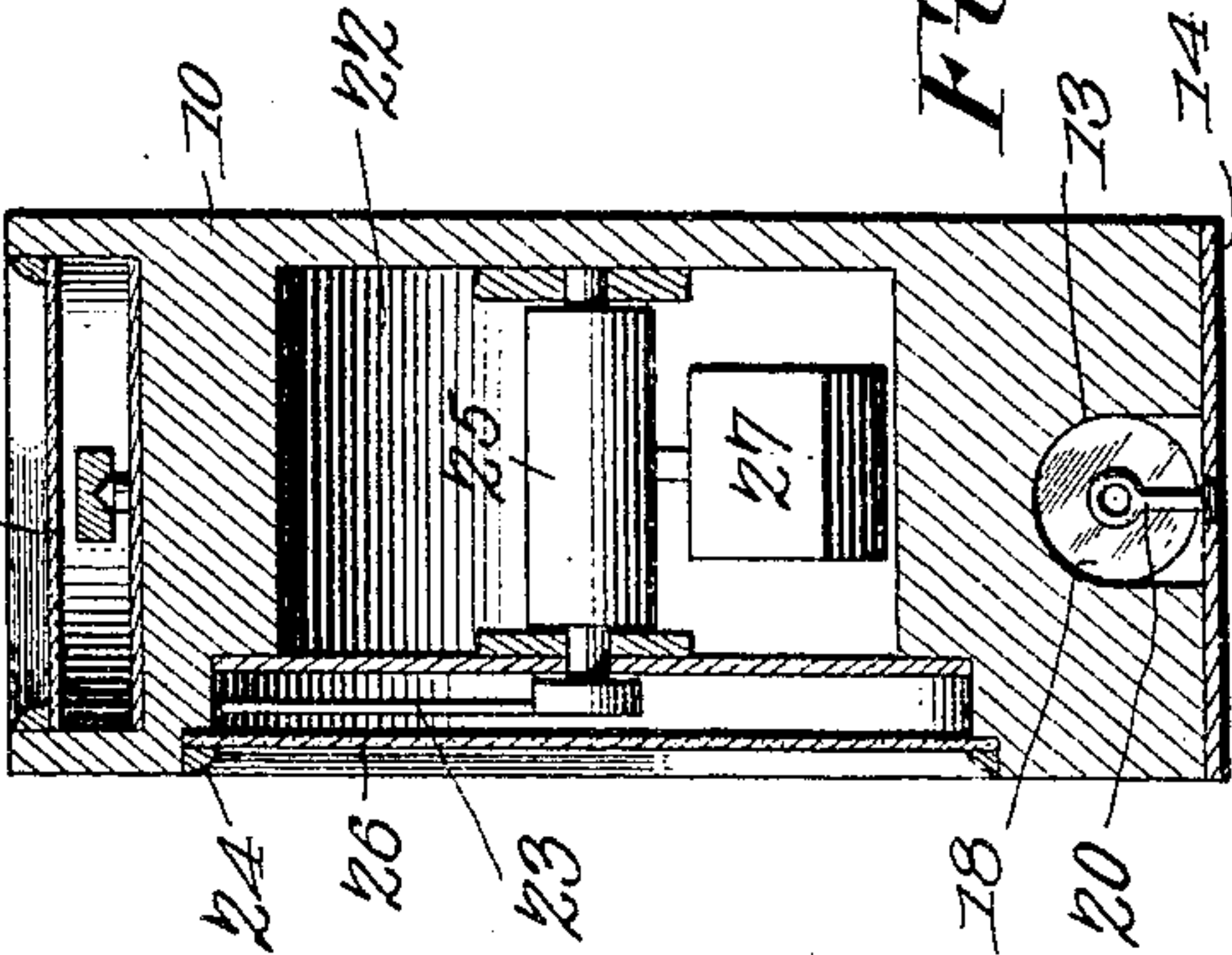


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

EDWARD HELB, OF RAILROAD, PENNSYLVANIA.

COMBINED LEVEL AND GRADE FINDER.

SPECIFICATION forming part of Letters Patent No. 764,809, dated July 12, 1904.

Application filed April 12, 1904. Serial No. 202,851. (No model.)

To all whom it may concern:

Be it known that I, EDWARD HELB, a citizen of the United States, residing at Railroad, in the county of York and State of Pennsylvania, have invented a new and useful Combined Level and Grade Finder, of which the following is a specification.

This invention relates to devices employed by mechanics and others in building operations, road-building, and the like for determining grades and levels and directions of objects or structures, and has for its object to simplify and improve the construction and increase the efficiency and accuracy and at the same time increase its scope and utility.

With these and other objects in view, which will appear as the nature of the invention is better understood, the same consists in certain novel features of construction, as hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which corresponding parts are denoted by like designating characters, is illustrated the preferred form of the embodiment of the invention capable of carrying the same into practical operation, it being understood that the invention is not necessarily limited thereto, as various changes in the shape, proportions, and general assemblage of the parts may be resorted to without departing from the principle of the invention or sacrificing any of its advantages, and the right is therefore reserved of making all the changes and modifications which fairly fall within the scope of the invention and the claims made therefor.

In the drawings thus employed, Figure 1 is a plan view. Fig. 2 is a longitudinal sectional view of the improved implement. Fig. 3 is an enlarged detail view of the improved dial of the balanced grade and angle finder. Fig. 4 is a transverse section, enlarged, on the line 4 4 of Fig. 2.

The improved implement comprises a stock or body member 10, preferably of about the same size and dimensions as an ordinary carpenter's level and may be of wood or metal or a combination of wood and metal, as preferred.

Formed in the stock member are a plurality of recesses and apertures employed for

various purposes, as hereinafter described. In the central upper side a spirit-bubble tube 11 is located, and near one end a plumb-bubble tube 12 is also located in the usual manner. A longitudinal recess 13 is formed in the lower side or edge of the stock, said recess being covered by a metal plate 14, which also serves as a binder to the lower or wearing surface of the stock. The plate 14 is turned up over a portion of the stock at the ends, and the turned-up portion at one end is provided with an aperture 15, covered with glass or other transparent material 16, and through which light is admitted to the covered recess. Extending through the stock 10 is a lateral aperture 17, preferably inclined and intersecting the closed longitudinal recess 13 at its inner end. A mirror 18 is located at the juncture of the recess 13 and aperture 17, said mirror being arranged at an angle to reflect the beams of light passing through the recess upwardly through the lateral aperture. The open end of the lateral aperture is preferably protected by a glass plate 19.

Formed in the plate 14 are threaded apertures adapted to receive correspondingly-threaded studs 20 21, having apertures in their upper free ends disposed in longitudinal alinement with the center of the recess 13 and exactly spaced from the bottom line of the plate 14, so that the central beam of light passing through the recess will be accurately reflected from the mirror 18 centrally through the lateral aperture 17. By this simple means the accuracy of the operation is assured. Thus the observer looking through the glass cover 19 of the aperture 17 may readily place the apertures of the studs in exact alinement with the line of vision, and when that is accomplished any object or sight which appears in advance of the implement and in alinement with the apertures in the spaced studs will be in exact longitudinal alinement with the stock, as will be obvious.

A relatively large recess 22 is formed in one side face of the stock 10 and covered on its open side with a dial 23, the latter being supported in a suitable frame 24. A shaft 25 is mounted for rotation in the recess 22, said shaft extending transversely through the dial and carrying a pointer 26 on the outer end

thereof for movement over the dial. The shaft 25 has a weight 27 suspended therefrom to maintain the pointer in a vertical position. The dial is provided with a plurality of concentric graduations of different values for use in determining various levels and angles.

The outer circle of the dial is divided by radial lines to represent the degrees of a circle and the second circle by lines representing ten degrees of a circle to facilitate the reading, and the third circle is divided by radial lines representing fractions of a foot to indicate the grades, while the inner circle is divided into larger fractions of a foot to facilitate the reading of the grades. For illustration, the third circle of the dial is divided to represent grades of one-fourth of an inch to the foot and the inner circle to represent grades of one inch to the foot; but these proportions may be varied to suit the requirements of the work. It will thus be obvious that by noting the position of the pointer relative to the graduations on the dial it is a very simple matter to determine the degree of vertical angularity or the extent of the grade of a distant object or portion of a structure.

Inserted in a cavity in the upper face of the stock 10 is a magnetic compass 28, by which the horizontal direction of an object may be determined.

By this means a very complete, simply-constructed, and accurate implement is provided, which may be inexpensively manufactured and furnished at only a small increase in price over an ordinary spirit-level.

Having thus described the invention, what is claimed is—

1. In a combined level and grade finder, a stock or body portion having a longitudinal recess in one edge thereof, a plate forming a closure for said recess, a lateral aperture formed in the stock and intersecting said longitudinal recess, a mirror disposed at the juncture of the aperture and recess for reflecting beams of light centrally through said lateral aperture, and alined perforated members disposed within said longitudinal recess.

2. In a combined level and grade finder, a stock or body portion having a longitudinal recess in one edge thereof, a plate forming a closure for said recess, a lateral aperture formed in the stock and intersecting said longitudinal recess, an inclined mirror disposed at the juncture of the aperture and recess for reflecting beams of light centrally through said lateral aperture, and alined perforated members spaced apart and extending from said closure-plate into the longitudinal recess.

3. In a combined level and grade finder, a stock or body portion having a longitudinal recess in one edge thereof, a plate forming a closure for said recess, a lateral aperture formed in the stock and intersecting said longitudinal recess, an inclined mirror disposed at the juncture of the aperture and recess for

reflecting beams of light centrally through the lateral aperture, alined perforated members spaced apart and extending from the closure-plate into said recess, a graduated dial secured to the stock, a pointer movable over said dial, and a swinging weight arranged within a transversely-disposed recess in the stock and operatively connected to the pointer.

4. In a combined level and grade finder, a stock or body portion having a longitudinal recess in one edge thereof, a lateral aperture formed in the stock and intersecting said recess, a mirror disposed at the juncture of the aperture and recess for reflecting beams of light through the lateral aperture, a dial having a plurality of concentric graduations of different values, a pointer mounted on a shaft and movable over said dial, said pointer being provided with a plurality of fingers for denoting the position relative to said graduations, and a weight swinging upon said shaft.

5. In a combined level and grade finder, a stock or body portion having a plurality of recesses formed therein, a covering-plate forming a closure for one of said recesses, a lateral aperture in said stock intersecting the recess covered by said plate, an inclined mirror disposed at the juncture of the aperture and covered recess for reflecting beams of light passing through said closed recess centrally through said lateral aperture, alined perforated members spaced apart and extending into said covered recess, a spirit-bubble tube in one of said plurality of recesses, a graduated dial over another of said recesses, a shaft mounted for rotation in the dial-covered recess and carrying a pointer for movement over said dial, said shaft having a weight suspended therefrom, and a compass disposed in another of said recesses.

6. In a combined level and grade finder, a stock or body portion having a longitudinal recess in one edge thereof, a plate forming a closure to said recess and provided with threaded apertures spaced apart in longitudinal alinement with said recess, studs having transverse apertures at one end and threaded at their opposite ends for engagement with the threaded apertures, said studs extending into the longitudinal recess with their apertures in longitudinal alinement centrally of the same, a lateral aperture formed in the stock and intersecting said longitudinal recess, and an inclined mirror disposed at the juncture of said aperture and recess for reflecting beams of light passing through the alined apertured studs centrally through said lateral aperture.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

EDWARD HELB.

Witnesses:

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