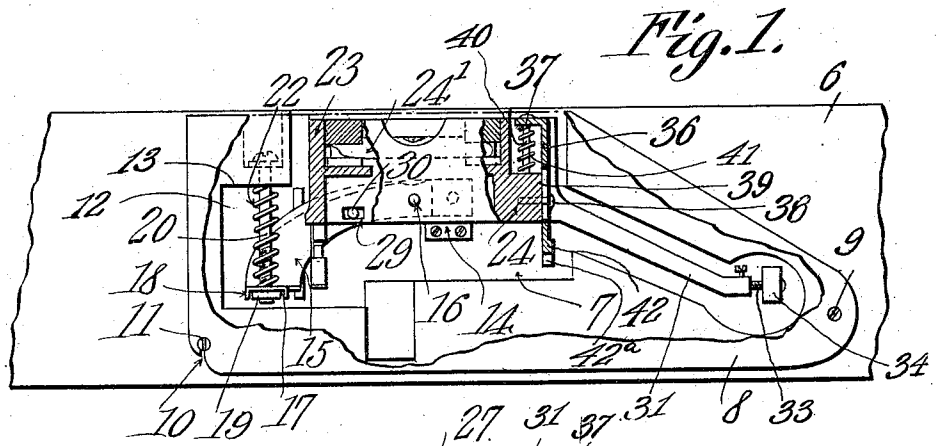
P. EKVALL.

SPIRIT LEVEL.

APPLICATION FILED DEC. 13, 1909.

982,260. Patented Jan. 24, 1911.

Fig. 1.



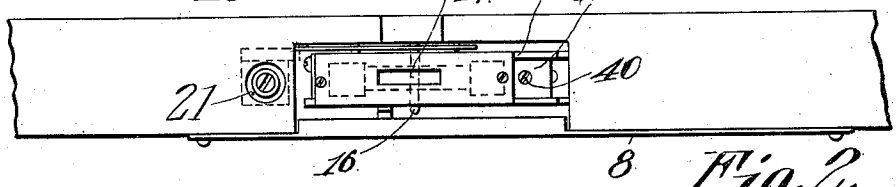


Fig. 2.

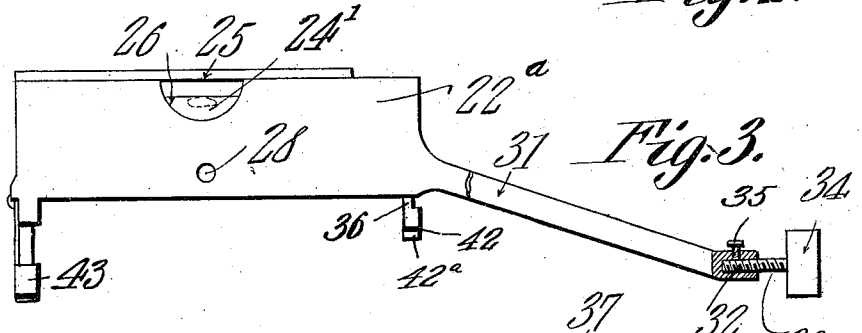


Fig. 3.

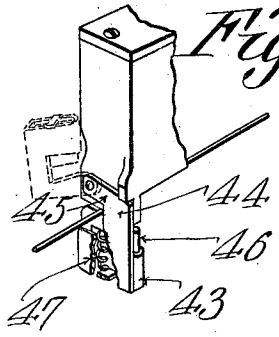


Fig. 4.

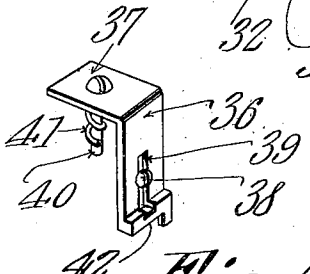


Fig. 5.

Witnesses

E. F. Stewart

F. L. Smith

Inventor

Peter Ekvall.

By C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE.

PETER EKVALL, OF NEW YORK, N. Y.

SPIRIT-LEVEL.

982,260. Specification of Letters Patent. **Patented Jan. 24, 1911.**

Application filed December 13, 1909. Serial No. 532,841.

To all whom it may concern:

Be it known that I, PETER EKVALL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Spirit-Level, of which the following is a specification.

It is the object of the present invention to provide an improved and novel construction of spirit level. Heretofore, it has been customary for carpenters and the like to provide themselves with a block level and also with what is known as a string level, the former being used upon plane surfaces, and the latter being applicable to a cord or string or wire which is to be tested. It has consequently been necessary to purchase two separate and distinct levels, either of which is incapable of the especial use for which the other was intended.

One aim of the present invention is therefore to provide, in a single instrument, a block and a string level and to so construct the instrument that the string level may be readily removed therefrom when desired for use and may be as readily replaced when it is desired to employ the device as a carpenter's level.

It is a further object of the invention to so construct the string level that while it is intended primarily for such use, it may be also used as in the form of a block level—particularly on surfaces of small dimensions.

With the above and other objects in view, the invention consists in the construction and arrangement of parts shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a spirit level constructed in accordance with the present invention, parts being broken away. Fig. 2 is a top plan view thereof. Fig. 3 is a view in side elevation of the string level removed from the block. Fig. 4 is a perspective view of one end of the string level. Fig. 5 is a similar view of one of the cord engaging devices of the string level.

In the drawings, the block of the level is indicated by the numeral 6 and is of the ordinary form except that it is formed with a recess 7 opening through one side face thereof as well as through the top face. A plate 8 is pivoted as at 9 upon that face of the block through which the recess opens and the plate is formed with a notch 10 at its end opposite its pivoted end for engagement with a headed stud 11 whereby the plate will be held in position to close the recess when swung to the position shown in Fig. 1 of the drawings. One end wall of the recess 7 is cut away as at 12 whereby to afford a shoulder or overhanging portion 13.

A plate 14 is secured upon the back wall of the recess and to this plate is pivoted an arm 15 carrying a pin 16 which projects at right angles therefrom toward the plate 8. As will be presently explained, this pin 16 is designed to support a casing in which is mounted the spirit tube. The arm 15 is in the form of an arcuate strip and its line of extent is a downward curve from its pivoted end as will be observed from inspection of Fig. 1 of the drawings. The free end of the arm is bent forwardly at right angles as at 17 and portions of this forwardly bent part are then struck down as at 18 whereby to inclose and hold a nut 19 and prevent the same from turning. The portion 17 of the arm 15 is formed with an opening through which projects the lower end of a bolt 20, this bolt passing also through the shoulder 13 with its head received in a recess 21 in the upper face of the said shoulder. A spring 22 is fitted upon the bolt 20 and bears against the under side of the shoulder 13 and also against the upper face of the angularly bent lower end 17 of the arm 15 whereby to hold the arm normally in about the position shown in Fig. 1 of the drawings or in other words to prevent the arm swinging up. It will be understood from the foregoing that by adjusting the bolt 20, the arm 15 may be adjusted angularly and with it the pin 16. The function of this adjustment will presently be made clear.

The string level of the device, which level is to be supported within the recess 7 in the block 6 when the device is to be employed as an ordinary carpenter's block level, embodies a body portion 22^a and this body portion includes cheek pieces, a closed end 23, and a partly closed end 24, the ends of the body portion serving to space the cheek portions thereof as will be readily understood. Each end of the body of the string level affords a support for a spirit tube which is indicated by the numeral 24′ and a cap plate 25 closes the upper side of the said body of the string level although the upper edges of the cheek portions are cut away as at 26 to afford a view of the spirit tube 24′, the cap plate 25 being slotted as at 27 also for this pur-

pose. As illustrated in Figs. 1 and 2 of the drawings, the cheek portions of the body of the string level are formed with alined openings 28 receiving the pin 16 and that one of the cheek portions which is next to the back wall of the recess 7, when the string level is in place within said recess, is formed with a short slot indicated by the numeral 29 and receiving a stud 30 which is located upon the arm 15.

The engagement of the pin 16 and stud 30 in the opening 28 and slot 29 respectively, serves to support the string level upon the arm 15 as will be readily understood and inasmuch as this support is of two point character, the string level will be held securely against angular movement with respect to the said arm so that when the arm is adjusted angularly through the instrumentality of the bolt 20, the string level will be correspondingly angularly adjusted also. As a result, the string level assembles with the block 6 and may be adjusted in the recess of the block to render the instrument accurate by disposing the block upon a known level surface and then adjusting the bolt 20. It will further be understood from the foregoing description that by swinging the plate 8 upwardly on its pivot, the string level may be readily bodily removed from the recess in the block 6 or may be properly disposed therein as the case may be.

The body of the string level is formed with a downwardly angularly directed extension at one end and this extension includes spaced portions 31 which are in reality extensions or continuations of the cheek portions and these portions 31 are connected at their outer ends by a portion 32 through which is threaded a stem 33 carried by a weight 34 which is to be rotated whereby to adjust it with respect to the end of the extension, for a purpose which will be presently set forth. It will be observed that a set screw 35 is also threaded through the portion 32 of the extension but at right angles to the pin 33 and serves to hold the stem in adjusted position. One of the string engaging members of the string level is in the form of a plate 36 which has its upper end portion bent at right angles as at 37 and this plate is disposed against the end 24 of the body of the level with its bent upper end 37 overlying this end of said body. The plate is held in position against the end 24 through the medium of a screw 38 which engages through a slot 39 in the plate 36 and into the said end of the body. This manner of mounting the plate upon the body admits of adjustment as will be apparent and in order that such adjustment may be had, an adjusting screw 40 is engaged through the said upper end of the plate and is adjustably threaded into the end 24 of the body, a spring 41 being disposed upon the said screw and between the said upper end of the plate and the upper face of the end 24, whereby to hold the plate normally in an upward direction. Below the lower end of the slot 39 in the plate 36, the said plate is formed with an opening 42 through which is to be passed the string or cord to be tested, it being understood that the string level is held in upright position or in other words the position shown in Fig. 3 of the drawings, upon the said string or cord by reason of the weighted extension 31 and that the level may be adjusted bodily with respect to the string and more specifically speaking angularly by adjusting the screw 40 so as to raise or lower that end of the body of the level at which the said screw is located. At its other end, the level rests with the end 23 of its body upon the string and is held in this position by a device which will now be described.

A band 43 has a plate extension 44 including an angularly extending portion 45 and this portion 45 is pivoted at its extremity to the end 23 of the body of the string level whereby to connect the band 43 with the said end for swinging movement so that it may underlie the same as illustrated in Fig. 4 of the drawings or may be swung to dotted line position as shown in said figure of the drawings, it assuming this latter position when the device is being adjusted. Mounted to slide within the band 43 is an inverted U-shaped block 46 beneath which is arranged a spring 47 located within the band 43 and supporting the block in upright position. The string to be tested may be readily engaged between the lower side of the end 23 of the body of the level and the upper edge of the block 46 in the manner shown in Fig. 4 of the drawings and when so engaged, the proper adjustment having been previously secured, the level is in position for observation.

It will be observed from an inspection of Fig. 3 of the drawings that the under side of the weight 34 and the under side of the band 43 are in the same plane and in a plane parallel to the plane of the axis of the spirit tube 24′, so that where a surface of small dimensions is to be tested, the string level may be employed for this purpose in the same manner as the block level 6 although of course it cannot be well used on surfaces of considerable area.

What is claimed is:—

1. In a device of the class described, a casing having a downwardly directed weighted extension, cord-engaging guides upon the under side of the casing, and a spirit tube mounted in the casing, said weighted extension and one of said cord-engaging guides affording also a rest for the casing whereby the same may be used as a level for testing plane surfaces.

2. In a device of the class described, a casing having a weighted extension projecting downward from one end thereof, cord-engaging guides upon the casing, one of said guides being adjustable with respect to the casing and the other said guide affording, in conjunction with the lower end of the said weighted extension, a rest for the casing adapting the same for use in testing plane surfaces.

3. In a device of the class described, a block formed with a recess, an arm pivoted in said recess, said arm having a plurality of projections, a casing having sockets receiving said projections and supported rigidly thereby upon the said arm for angular adjustment in the recess in said block, the said arm at its extremity being bent at an angle, a bolt inserted through the said bent portion of the arm and through the upper wall of the recess in the block and adjustable to raise or lower the arm upon its pivot, and a spirit tube mounted in the casing.

4. In a device of the class described, a block formed with a recess, an arm pivoted upon one wall of the recess and having an angular bent extremity, the said arm being provided with projections, a casing having sockets receiving said projections and supported rigidly upon the arm by said projections, a spirit tube mounted in the casing, an adjusting screw threaded through the upper wall of the recess in the block and having its head seated in a countersink in the said upper face of the block, a nut held rigidly beneath the angularly bent extremity of the arm, the said adjusting screw being threaded through said nut, and a spring upon the screw bearing at its upper end against the upper wall of the recess in the block and at its lower end against the said angularly bent end of the arm.

5. In a device of the class described, a casing, a slotted plate pivoted to the casing at one end thereof and having an integral band, a block mounted in the band, a spring mounted in the band beneath the block and normally holding the same elevated, the upper edge of the block and the under edge of the casing at its said end coöperating to afford a string guide, an adjustable string guide at the other end of the casing, and a spirit tube mounted in the said casing.

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

PETER EKVALL.

Witnesses:
GUNNAR JOHNSON,
HARRY M. GLADE.