

No. 675,503.

Patented June 4, 1901.

C. M. VERRILL.

SPIRIT LEVEL.

(Application filed Mar. 26, 1901.)

(No Model.)

Fig. 1.

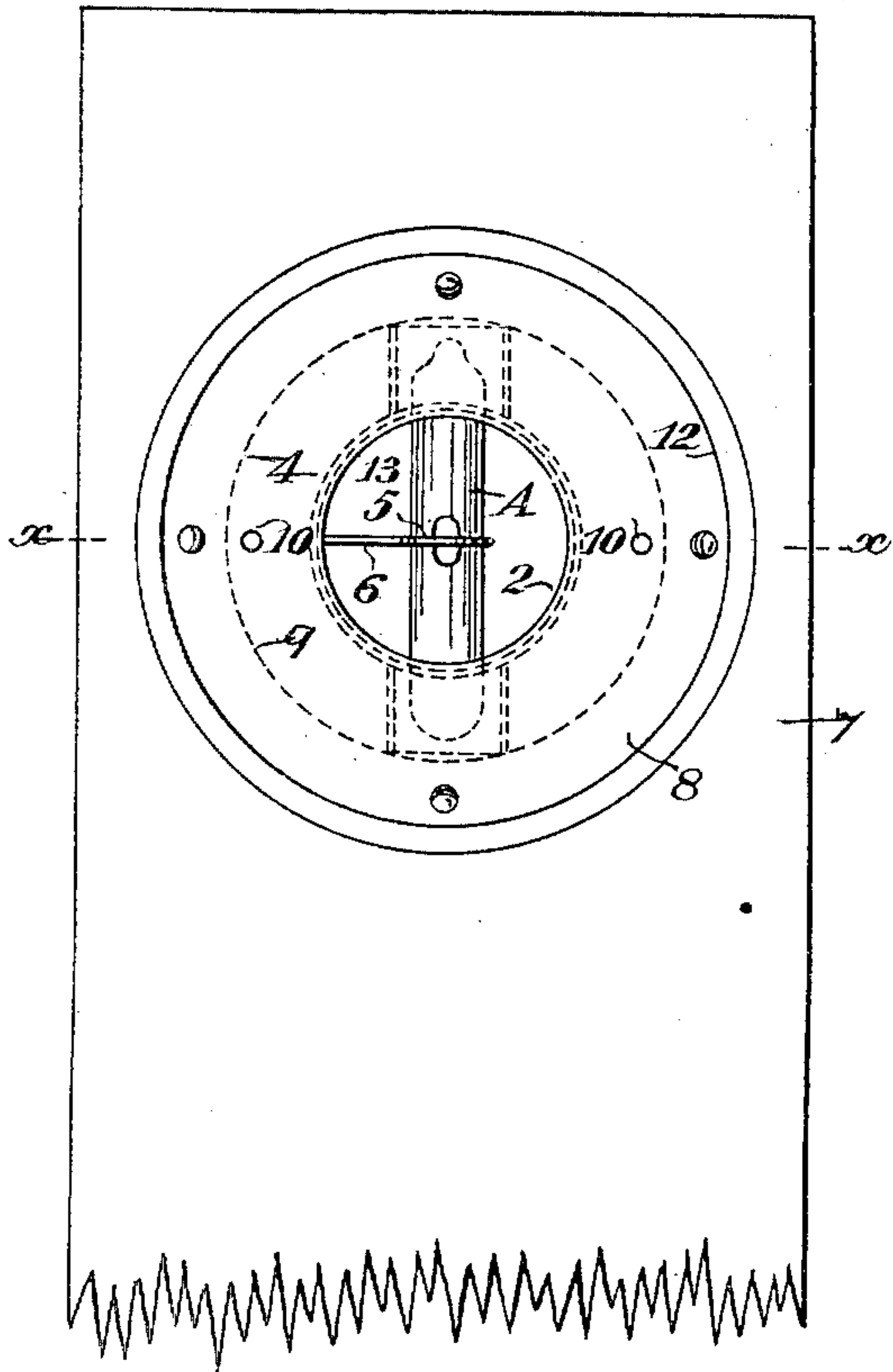


Fig. 3.

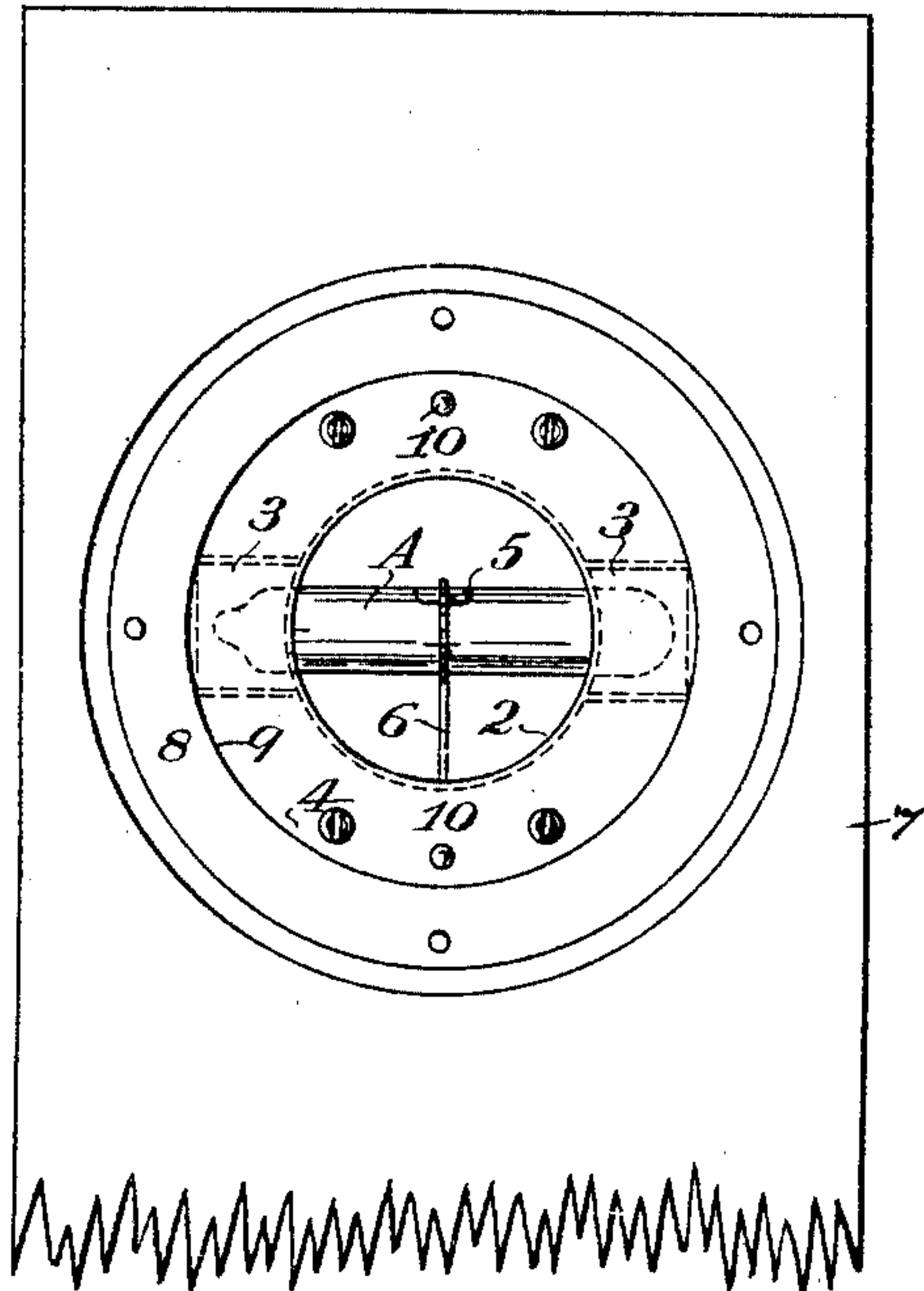


Fig. 4.

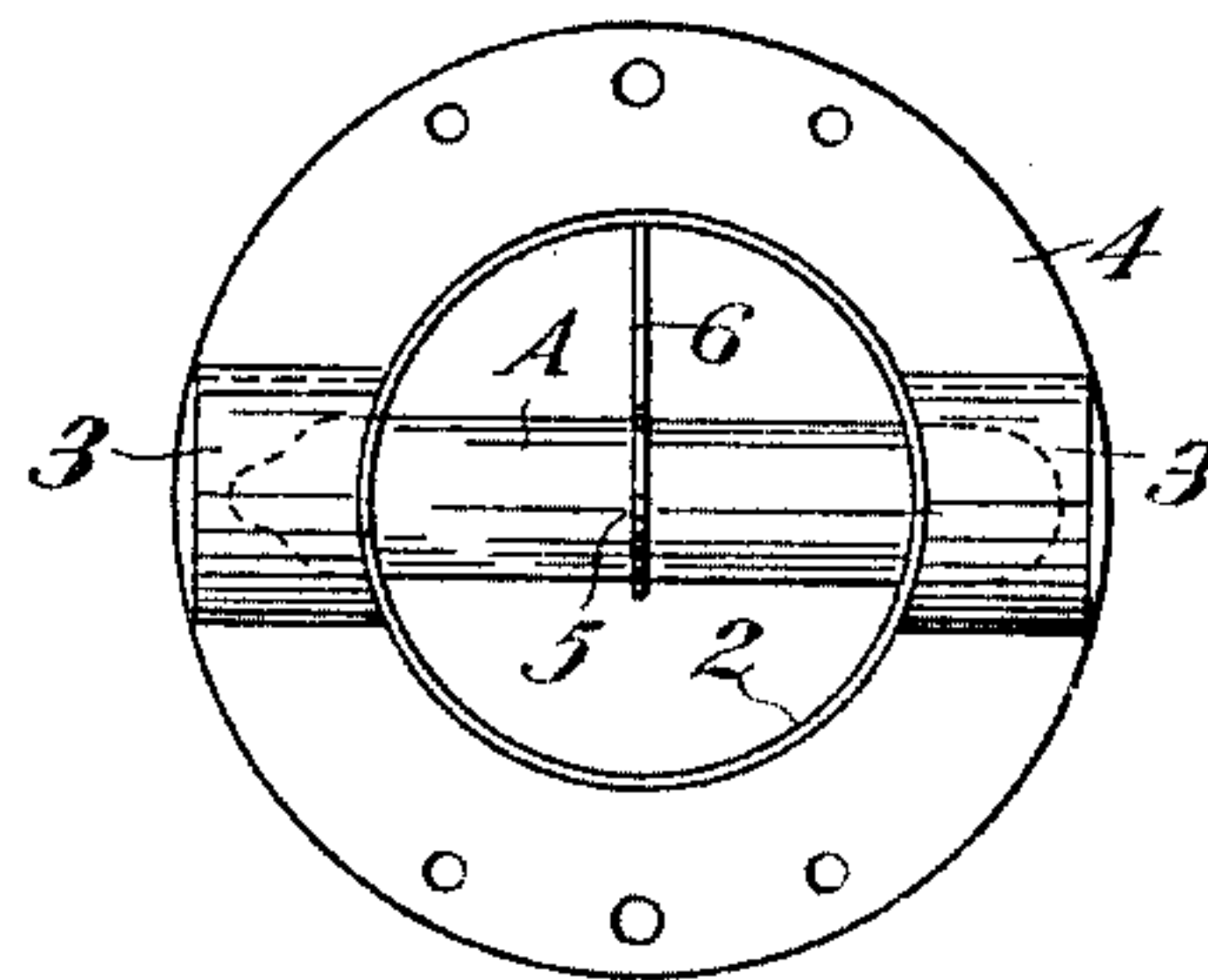


Fig. 5.

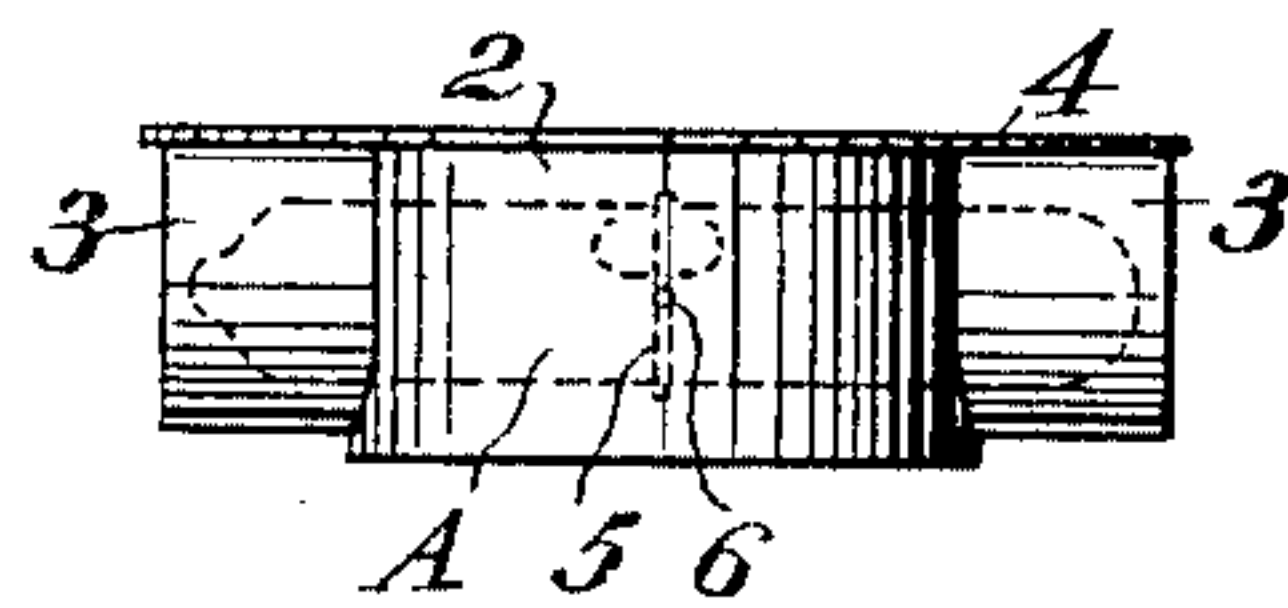
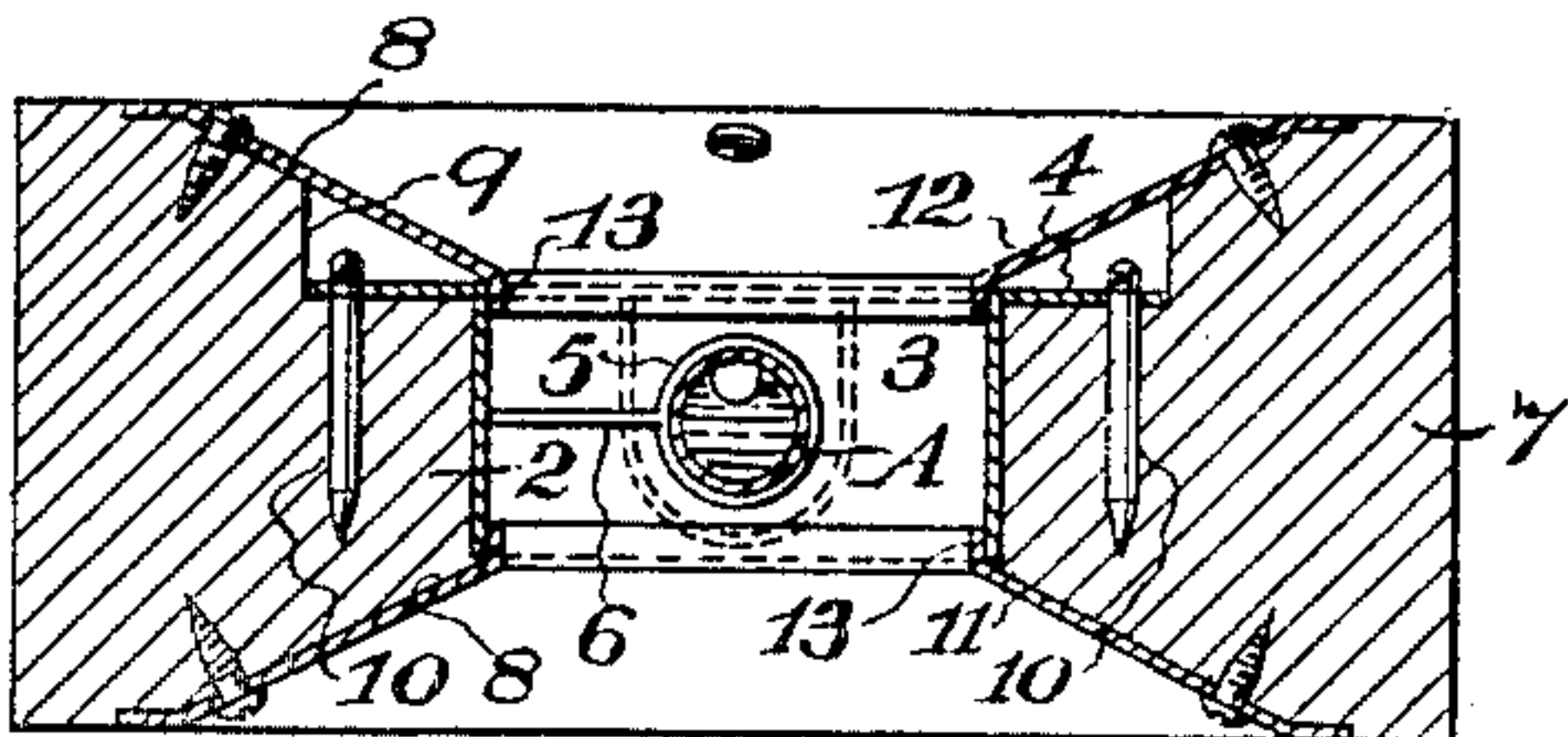


Fig. 2



Witnesses,

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# UNITED STATES PATENT OFFICE.

CALVIN M. VERRILL, OF OAKLAND, CALIFORNIA.

## SPIRIT-LEVEL.

SPECIFICATION forming part of Letters Patent No. 675,503, dated June 4, 1901.

Application filed March 26, 1901. Serial No. 52,890. (No model.)

*To all whom it may concern:*

Be it known that I, CALVIN M. VERRILL, a citizen of the United States, residing in Oakland, county of Alameda, State of California, have invented an Improvement in Spirit-Levels; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in the construction of what are known as "spirit-levels," in which a glass tube containing a mobile liquid and sealed at both ends is fitted to a straight-edged strip of wood or metal and serves to show whether the article to which the device is applied is level or plumb by the position assumed by the bubble of air within the tube.

The object of my invention is to provide an improved means for fixing the tube to the straight edge and maintaining it in correct position with relation thereto.

It comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a plan showing the arrangement of my invention for a horizontal level. Fig. 2 is a transverse section on the line  $xx$  of Fig. 1. Fig. 3 is an elevation showing the arrangement for a vertical line, the front convergent plate being omitted. Fig. 4 is a plan of the sleeve. Fig. 5 is an elevation of the same.

A is a short glass tube which is filled with spirits or other mobile liquid sufficient to leave a small bubble of air, and this tube is hermetically sealed. These tubes are so made that when absolutely level horizontally the bubble will seek a central position in the tube, and any little variation from an exact horizontal position will cause the bubble to move to one side or the other.

In my invention I make a cylindrical sleeve 2, having holes at diametrically opposite sides of sufficient diameter to admit the ends of the glass tube A, which thus extends across the center of the sleeve and projects through these holes. Outside the holes are segmental cap-pieces 3, and these are fixed to a flange 4, which is formed with or attached to one edge of the cylindrical sleeve, as shown. The cap-pieces serve to receive the plaster-of-paris or other material in which the ends of the tube are embedded, and this material afterward

sets, so as to hold the tube firmly in place in the sleeve.

5 is a ring which encircles the center of the tube, this ring having a stem 6, which is fixed in the side of the sleeve at right angles with the axis of the tube, so that the ring encircles the tube and indicates the center, forming a mark with relation to which the bubble in the level may move and by which the leveling can be more accurately seen.

I have here shown the body of the level made in the form of a rectangular bar of wood 7, of sufficient length, which is the usual construction for levels of this class. This bar has a hole bored through it of sufficient size to receive the cylindrical sleeve 2, and mortises are made in line with the sleeve, into which the caps 3 are seated.

Upon each side of the level 7 and having the same axis with the hole in which the sleeve fits are beveled and conical counterbores 8, having the large diameter at the outside and converging to meet the edges of the hole in which the sleeve fits. Upon one side a flat countersink is bored, as at 9, and this receives the flange 4 of the sleeve 2, which flange is secured in position by pins 10 passing through holes in the periphery of the flange and fitted, after the sleeve has been turned and the glass tube adjusted, so as to stand absolutely true with relation to the body 7.

When the level is to be used for horizontal work, the tube is adjusted to stand parallel with its greatest length. When it is to be used for plumb or vertical work, the tube is made to stand at right angles with the greatest length of the body, and it may be adjusted to either of these positions by turning the sleeve in which it is fitted and afterward securing it by the pins 10, as previously described. When fixed in either position, it remains permanent thereafter.

11 and 12 are funnel-shaped convergent plates adapted to fit the counterbored portions of the body, and each of them has a short cylindrical flange 13 projecting from the inner part of the opening and adapted to enter the tubular sleeve 2, making a fit therein. These plates are secured in the body of the level by pins or screws, and thus fit and protect the woodwork, the sleeve, and the tube,



leaving the latter easily visible, because while it is at the center of the thickness of the body the wide convergent counterbores bring the inner edges very close to the tube. The plate  
5 12 fits into the end of the sleeve which has the securing-flange, and thus covers the flat counterbore which was made to receive that flange.

Having thus described my invention, what  
10 I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a spirit-level of the body portion having a circular opening said body having a counterbore in one of its faces  
15 connecting with said opening, a spirit-tube, a cylindrical sleeve having a diameter approximating the diameter of said opening and having a flange turned at right angles upon one end and fitting the base of the counter-  
20 bore, said flange having caps depending from its under side at points exterior to the periphery of the sleeve, into which the ends of the tube project and wherein they are fixed.

2. The combination in a spirit-level of the  
25 body portion having a circular opening and having a countersink in one face between the opening and the edge of the body, a spirit-tube, a sleeve fitting the opening and having a flat flange turned outwardly at right angles with

one end and lying flat against the bottom of 30 the countersink, caps depending from the under side of this flange at points outside of the periphery of the sleeve, and receiving the ends of the tube, means for securing the flange in the countersink, and a holding ma- 35 terial which sets from a plastic state and inserted in the caps to secure the ends of the tube.

3. The combination in a level of a spirit-  
tube, a sleeve having holes at opposite sides 40 of its periphery, and exterior cap-pieces into which the ends of the tube extend and are secured, a circular flange formed at right angles with one end of the sleeve, a body hav-  
45 ing a hole bored therethrough and a countersink to receive the sleeve and its flange, conical counterbores formed axially with said sleeve from opposite sides of the body, similarly-shaped disks fitting the counterbores and having short flanges extending into the 50 ends of the sleeve substantially as described.

In witness whereof I have hereunto set my hand.

CALVIN M. VERRILL.

Witnesses:

S. H. NOURSE,  
N. F. ASCHECK.