

(No Model.)

H. N. JASPER.

SPIRIT LEVEL.

No. 356,645.

Patented Jan. 25, 1887.

Fig. 2.

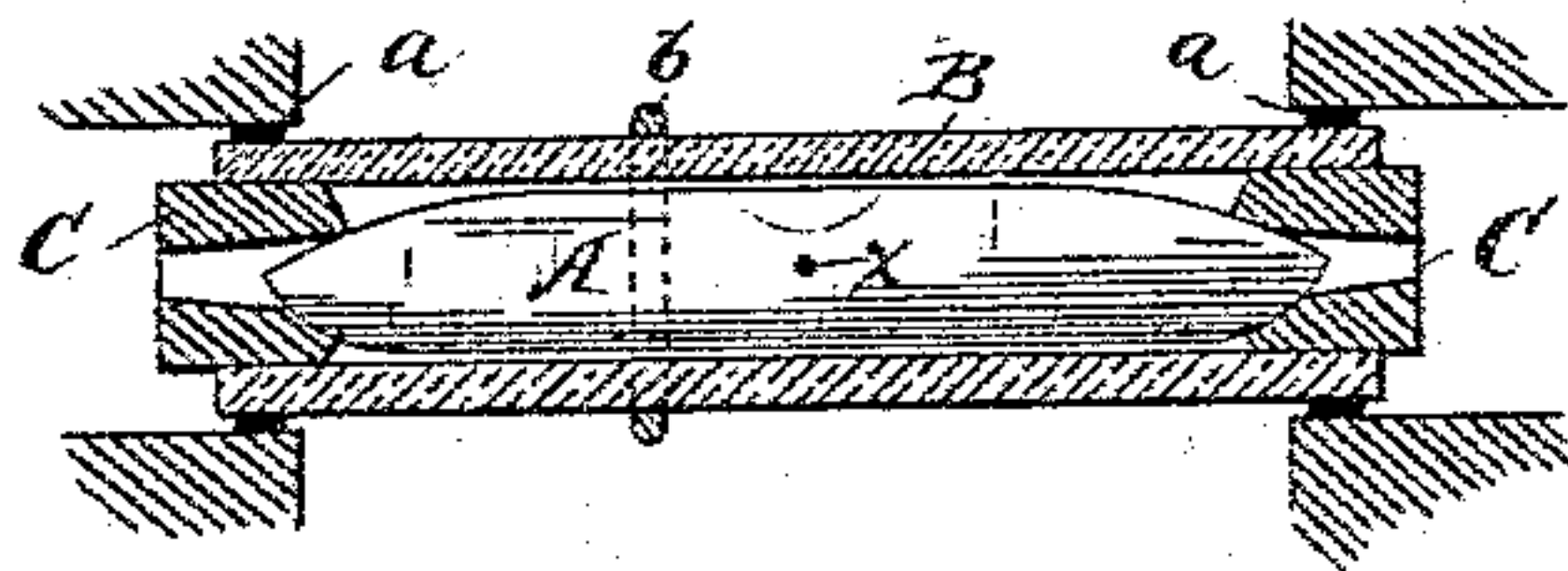


Fig. 1.

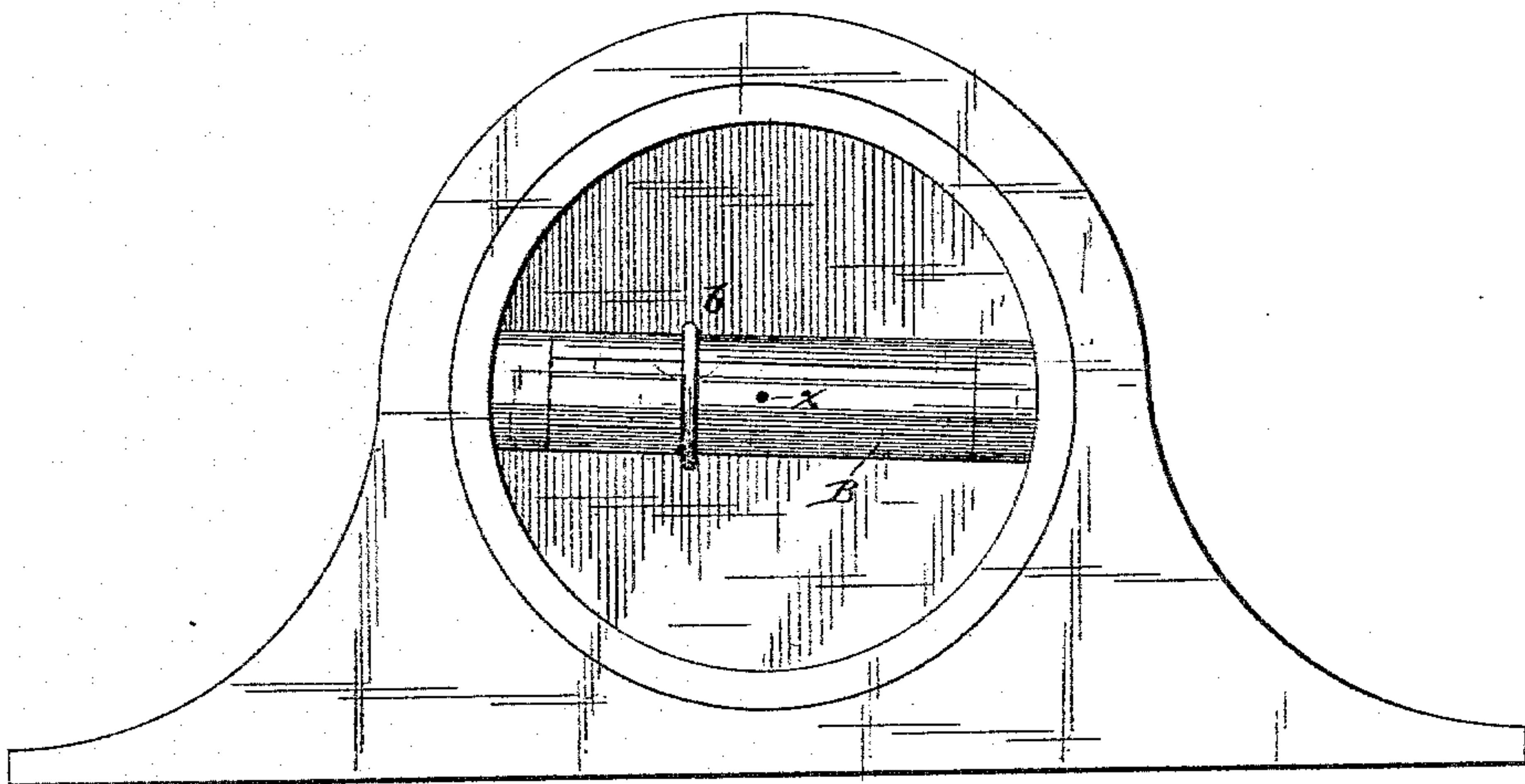
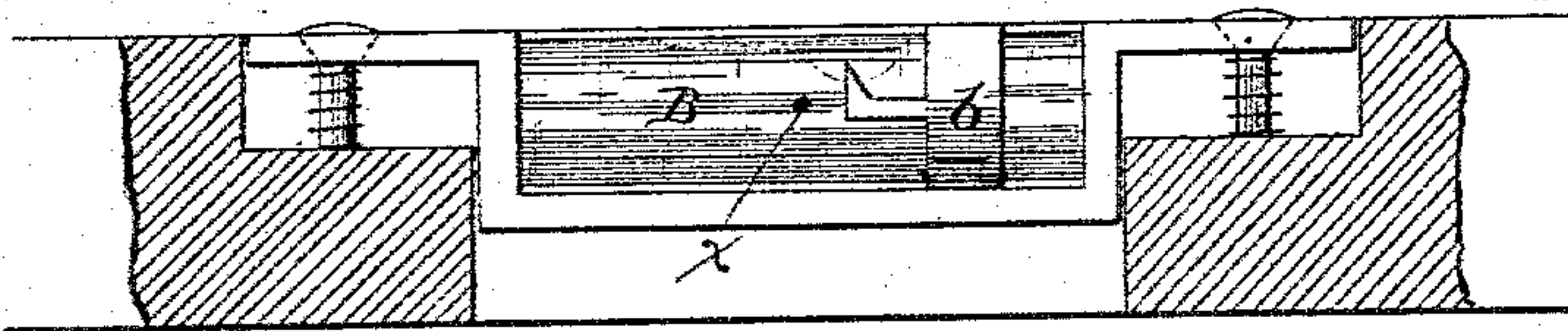


Fig. 3.



Attests:

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# UNITED STATES PATENT OFFICE.

HENRY N. JASPER, OF AKRON, OHIO.

## SPIRIT-LEVEL.

SPECIFICATION forming part of Letters Patent No. 356,645, dated January 25, 1887.

Application filed April 6, 1886. Serial No. 197,971. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY N. JASPER, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Spirit-Levels, of which the following is a specification.

My invention relates to that class of leveling-instruments known as "spirit-levels;" and my invention consists in combining with the holder for the spirit an incasing-tube, which protects it from injury, and in supporting one or both tubes upon elastic bearings, to prevent the breaking of the tubes from the jarring of the instrument, and in combining with the tube or tubes a permanent leveling-mark and an adjustable index, all as set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a leveling-instrument illustrating my improvements. Fig. 2 is a section showing the arrangement of the tubes and their bearings, and Fig. 3 a section showing a modification.

As ordinarily constructed, the tubular holders of spirit-levels are very apt to be broken by sudden blows either upon the vitreous holders themselves or upon the frame or bar of the level, against which the holders have positive bearings. It is also common to set the holders in a frame in such manner that the levels of the holder may be altered for the purpose of testing or building faces at angles to the perpendicular or horizon; but it is difficult with the instruments as ordinarily constructed to determine accurately the position of the bubble, as the index or finger, when once moved to indicate the position of the bubble when the faces are at an angle, cannot always be placed with certainty in position to indicate the place of the bubble when the faces are horizontal or vertical.

In my improved leveling-instrument I make use of the ordinary glass holder, A, slightly curved, as usual, and partially filled with spirit, and inclose this holder in an outside straight tube, B, of heavy glass—such, for instance, as the tube used in steam-gages; and I support the inner tube within the outer tube by means of end bearings or blocks, C C, of wood, rubber, or other material of a similar character, in such

manner that the inner tube will have no direct contact with the outer one.

The outer tube I secure in the ordinary manner to the ring-frame or other support of the leveling-instrument, in some instances interposing a band or strip, *a*, of rubber or equivalent material, so as to prevent a direct contact of the tube B with the frame. The incasing-tube B, owing to its superior strength, will resist blows which would destroy the holder-tube; but should the outer tube be broken the inner tube will still be preserved, owing to the intermediate space and the absence of contact between the tubes. By supporting the tube—either the inner tube or the incasing-tube, or both—upon a bearing material which is somewhat elastic—as wood, rubber, compressed felt, &c.—shocks and jars are absorbed and prevented from being transmitted to the tubes, so that heavy blows or the jarring of the frame will have no effect either to fracture the tube or tubes or to displace them, or either of them.

In my improved level I make a positive mark or index-point, *x*, to indicate the position of the bubble when the instrument is absolutely level, and I prefer to put this mark upon the inner tube or holder, so that it cannot be tampered with or be displaced, the integrity of the instrument being thus maintained; and for the purposes of indicating the position of the bubble in trying faces which are at an angle I use an adjustable pointer or indicator, which may be a ring, *b*, sliding upon the outer tube and easily moved by hand, as shown in Figs. 1 and 2; or it may be a band sliding upon the outer tube and carrying a pointer, *b*, as shown in Fig. 3.

It will be evident that the arrangement of parts above described may be used in connection with leveling-instruments of different forms, and that the tubes may be inserted directly in the body of the material composing the instrument, or may be secured to adjustable rings or frames, as in levels in common use.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination of the transparent holder A of a spirit-level and a transparent incasing-tube, B, substantially as and for the purpose set forth.



2. The combination of the spirit-holder A, transparent incasing-tube B, and end bearings supporting the spirit-holder concentric with but free from contact with the incasing-tube, 5 substantially as described.

3. The combination of the transparent spirit-holder A, transparent incasing-tube B, and interposed elastic bearings for the holder, as and for the purpose set forth.

10 4. The combination, with the frame of a leveling-instrument, of a glass tube holding a body of spirit and a heavier glass tube inclosing the spirit-holder, and elastic bearings interposed 15 between said holder and tube and maintaining them free from contact with each other, substantially as and for the purpose described.

5. The combination, in a leveling-instrument, of a spirit-holder having an indicating-mark fixed thereon, a transparent tube inclosing said holder, and an adjustable index upon 20 said outer tube, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY N. JASPER.

Witnesses:

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ALFRED G. WILSON.