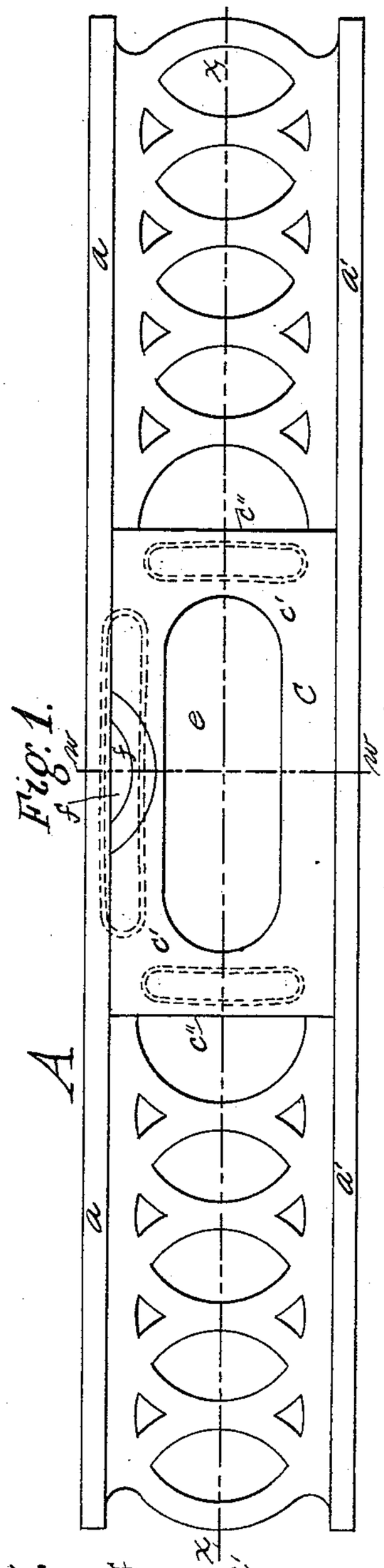
(No Model.)

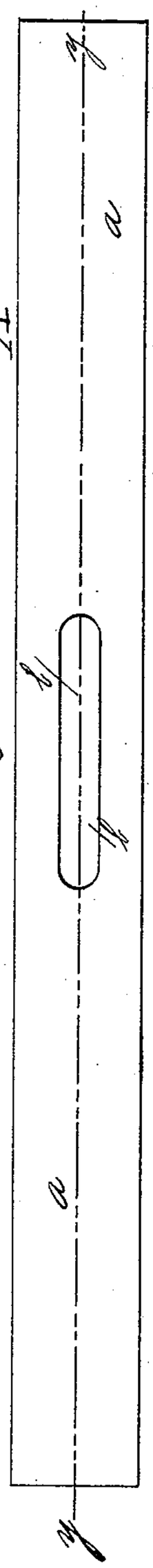
2 Sheets—Sheet 1.

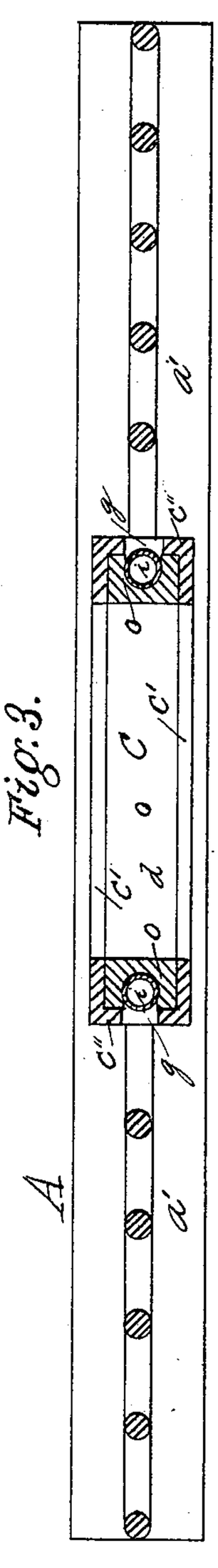
E. E. WEBB.

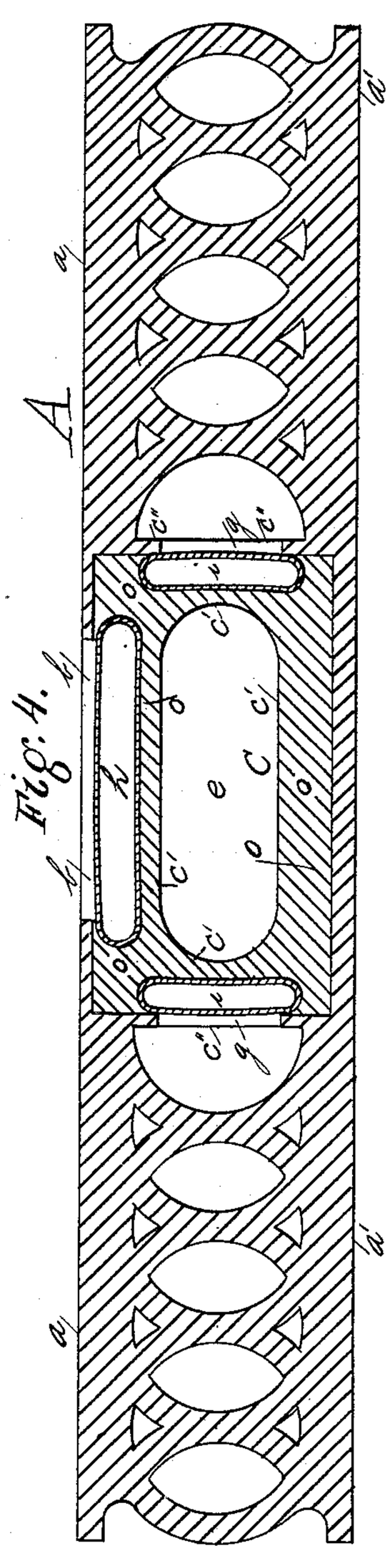
SPIRIT LEVEL.

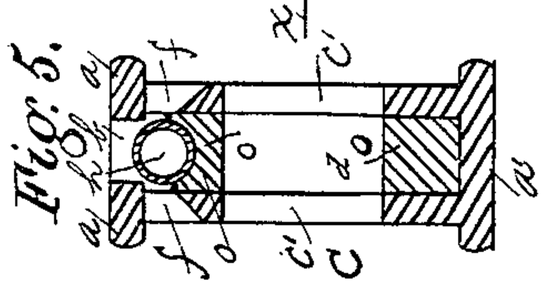
No. 354,076. Patented Dec. 7, 1886.











Witnesses.
Fred. W. Smith
Joseph Kirk

Inventor.
Edward E. Webb.
per John L. Dewey
Attorney.

(No Model.) 2 Sheets—Sheet 2.

E. E. WEBB.

SPIRIT LEVEL.

No. 354,076. Patented Dec. 7, 1886.

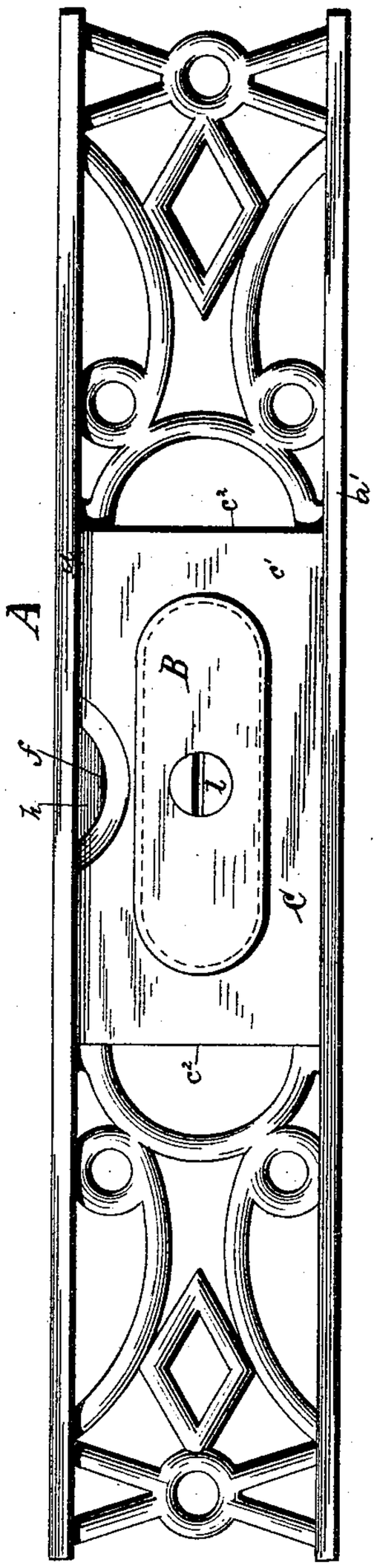


Fig. 6.

Witnesses:

Chas. F. Schmelz

George T. Dewey

Inventor:

Edward E. Webb,

by John C. Dewey

Attorney

UNITED STATES PATENT OFFICE.

EDWARD E. WEBB, OF FITCHBURG, MASSACHUSETTS.

SPIRIT-LEVEL.

SPECIFICATION forming part of Letters Patent No. 354,076, dated December 7, 1886.

Application filed June 23, 1886. Serial No. 205,974. (No model.)

To all whom it may concern:

Be it known that I, EDWARD E. WEBB, a citizen of the United States, residing at Fitchburg, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Spirit-Levels; and I do hereby declare that the following is a full, clear, and exact description thereof, which, in connection with the drawings making a part of this specification, will enable others skilled in the art to which my invention belongs to make and use the same.

My invention relates to spirit-levels and plumbs; and it consists in certain novel features of construction thereof, whereby I am enabled to produce, in the manner to be hereinafter described, a very cheap and durable level, the frame thereof being made in one piece and at one operation, with the level and plumb glasses supported and permanently secured therein, without the intervention of any holding or adjusting screws usually employed in the construction of spirit levels now in general use.

Referring to the drawings, Figure 1 is a side elevation of a spirit-level of my invention, the dotted lines representing the bubble-glasses contained within the central part of the frame of the level, as will be hereinafter described. Fig. 2 is a top or plan view of the level shown in Fig. 1, an oblong slot or "sight-opening" extending through the top thereof, through which to see the level-glass. Fig. 3 is a horizontal cross-section taken on line *x x*, Fig. 1. Fig. 4 is a central longitudinal section taken on line *y y*, Fig. 2. Fig. 5 is a vertical cross-section taken on line *w w*, Fig. 1; and Fig. 6 represents a modification of the level shown in Fig. 1, to be hereinafter fully described.

In the accompanying drawings, A is the level frame or stock, preferably made of cast metal, all in one piece, having its top and bottom *a a'* planed true and straight, and made solid, without any openings or screw-holes therein, except an oblong slot or sight opening, *b*, in the top plate, *a*, through which to see the level-glass, and which slot *b* may be made in casting the frame A.

The central part, *c*, of the frame A is made double, or adapted to receive within it the level and plumb glasses having the sides or divisions *c' c'* and the end divisions, *c'' c''*, extending between the top and bottom edges, *a* and *a'*, of the frame A, to inclose the level and plumb glasses, a space, *d*, being left between said divisions. A central longitudinal opening, *e*, extends through the central part of the frame A, so as to furnish a means of access to the interior of the part *c*, or the body of the frame A, and allow of the glasses being placed within the same and secured therein. Openings *f* extend through the upper part of the side divisions, *c'*, to permit of the level-glass being seen from either side of the level A, and openings *g* extend through the end divisions, *c''*, to permit of the plumb-glasses being seen.

It will be understood that the frame of the level A, provided with the slot *b* in its top edge, and the central part, *c*, for receiving the bubble-glasses, and having the oblong opening *e* through it, and the openings *f* and *g* therein, for the purpose stated, can be all cast or made in one piece and at one operation, it only being necessary to plane or make smooth the top and bottom edges of the frame before the level is ready to receive the level and plumb glasses.

It is not necessary to make any screw-holes or openings in the frame of the level to receive the glasses or the cases containing them, or the screws or pins usually used for supporting and adjusting the glasses, or the cases in which they are contained, for by the manner of construction of my level no screws or adjusting devices are used.

After the frame A, constructed as above described, has been made, it is only necessary to apply the level-glass *h* and the plumb-glasses *i* to it before it is ready for immediate use. Said glasses are applied and attached to the frame A and secured therein in the following manner: The frame A is first placed upon a perfectly true and level plane. The level-glass *h* is then placed within the central part, *c*, of the frame A, in the upper part thereof, between the sides *c' c'*, so that it will be directly under the opening or slot *b*, as shown in Figs. 4 and 5. It is held and secured in place by means of calcined plaster, cement, or equivalent material, *o*, which is packed in around it and extends between the sides *c' c'*,

and is held in place within the central part, *c*, or the body of the frame A, by means of the sides *c' c'* and the ends *c'' c''*.

It will be understood that in securing the level-glass *h* in place by means of cement, plaster, or equivalent material, *o*, the level-glass is properly adjusted by the hand of the operator, and after the cement has been applied it requires no further adjustment, but is held permanently in one fixed position. The plumb-glasses *i* are held and secured in position in the same manner as the level-glass *h*, being first placed directly under the openings or sight-holes *g*, as shown in Figs. 3 and 4, and then cement or equivalent material, *o*, being packed in around them within the central part, *c*. The lower part of the central part, *c*, may also be filled in with cement or equivalent material, as shown in Figs. 4 and 5, thus combining the settings of the three bubble-glasses, one supporting the other, and making them substantially one single setting, but still allowing of the setting of any one of them being removed without disturbing the others.

It will be readily observed by reference to the drawings that the glasses are fully protected from any liability to accidental breakage by means of the cement *o* and the frame of the level A inclosing them; and in case of any breakage or any necessity of readjustment of the glasses it is only necessary to remove the cement and replace it with fresh cement, or equivalent material.

Any ornamental design extending between the top and bottom of the frame A may be employed in lieu of that shown.

The level-frame may be made in any suitable shape and of any size, and may be provided with side pieces or covers, B, made separate therefrom, and adapted to be fitted over the oblong opening *e*, through the central part, *c*, of the frame, and held in place by a screw, *l*, or bolt and nut, in any usual manner, as clearly shown in Fig. 6 of the drawings.

The essential feature of my invention is the construction of a spirit-level frame, of metal, complete in one piece and at one operation, adapted to receive within the body thereof the level and plumb glasses, which are secured in place by means of cement or equivalent material, without the use of any holding or adjusting screws, or any cases or tubes for holding the level and plumb glasses.

If preferred, the plumb-glasses *i* may be left out and only a level-glass used, which would be desirable in making small spirit-levels, and in which case the form of the central part, *c*, might be changed somewhat and the sight-openings *g* dispensed with without departing from the principle of my invention.

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

1. A metal spirit-level having its central part made double and provided with sight-openings and a central opening, and adapted to receive within it through said central opening the level and plumb glasses, which are supported in place by means of cement or equivalent material, substantially as shown and described.

2. The combination, with the metal frame A, having its central part, *c*, made double, and provided with sight-openings, and a central opening, *e*, extending through the same, for the purpose stated, of the level and plumb glasses inserted through the opening *e*, and supported within the central part, *c*, by means of cement or equivalent material, in the manner substantially as shown and described.

3. A metal spirit-level frame, A, having the central part, *c*, made double, with the sides *c' c'* and ends *c'' c''*, adapted to receive the level and plumb glasses within the same, and provided with sight-openings *b*, *f*, and *g*, and a central opening, *e*, substantially as described and shown.

4. The combination, with the frame A, having its central part, *c*, made double and provided with a central opening, *e*, for the purpose stated, of the covers B, adapted to fit over and close the opening *e*, and means for holding said covers in place, substantially as set forth.

EDWARD E. WEBB.

Witnesses:
JOHN C. DEWEY,
FRED. W. SMITH.