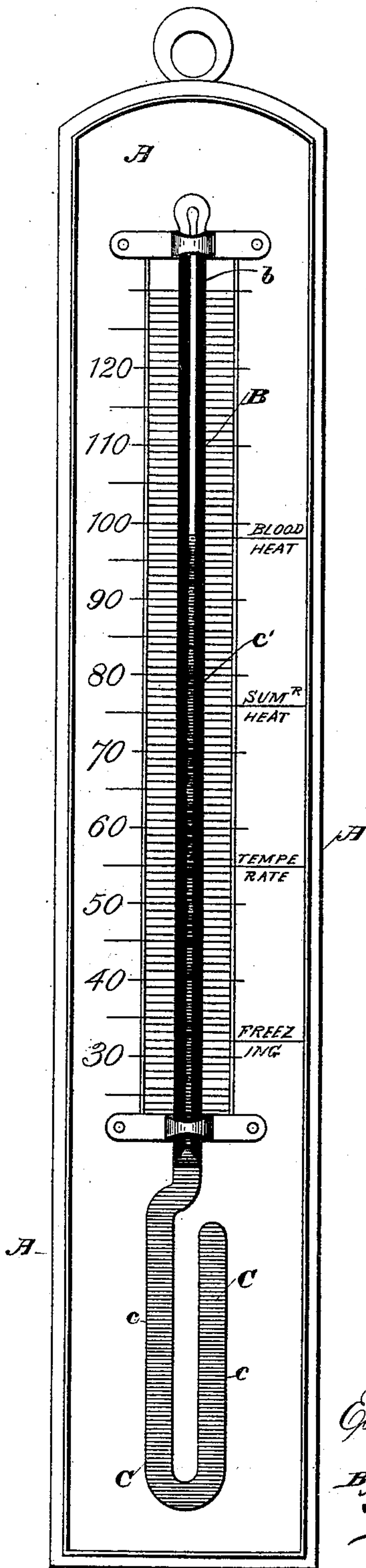


(No Model.)

E. H. T. LIVEING.  
SPIRIT THERMOMETER.

No. 251,371.

Patented Dec. 27, 1881.



Attest:  
Geo. Smallwood Jr.  
Walter Allen

Inventor.  
Edward H. T. Liveing.  
By Knight Bros.  
Atty.

# UNITED STATES PATENT OFFICE.

EDWARD H. T. LIVEING, OF QUEEN ANNE STREET, CAVENDISH SQUARE,  
COUNTY OF MIDDLESEX, ENGLAND, ASSIGNOR TO JAMES JOSEPH  
HICKS, OF SAME PLACE.

## SPIRIT-THERMOMETER.

SPECIFICATION forming part of Letters Patent No. 251,371, dated December 27, 1881.

Application filed August 31, 1881. (No model.) Patented in England September 29, 1880.

*To all whom it may concern:*

Be it known that I, EDWARD HENRY TOR-  
LESSE LIVEING, a subject of the Queen of  
Great Britain, residing at Queen Anne Street,  
Cavendish Square, in the county of Middlesex,  
England, have invented certain new and use-  
ful Improvements in Thermometers, (for which  
I have received Letters Patent in England,  
No. 3,939, dated September 29, 1880,) of which  
the following is a specification.

The invention has for its object improve-  
ments in thermometers, and relates to means  
whereby greater distinctness in reading and a  
novel and more ornamental appearance are ob-  
tained than in thermometers of the description  
heretofore in use. For this purpose, instead  
of supplying the tube with mercury or with  
spirit colored as heretofore, I supply it with  
alcohol colored with a body known to chem-  
ists as "fluorescine," with the addition of a  
small quantity of some alkali, and I employ in  
combination with the same a black or other  
very dark background.

In order that my said invention may be more  
clearly understood and readily carried into ef-  
fect, I will proceed more fully to describe the  
method of carrying the same into effect, refer-  
ring to the accompanying drawing, which rep-  
resents a front view of my improved ther-  
mometer.

A is a thermometer-back; B, the tube, hav-  
ing a dark or black background, *b*; and C, the  
spirit within the tube, colored with fluorescine  
and alkali, so as to present a translucent am-  
ber-colored appearance in the bulb portion *c*  
and an opaque deep-green-colored appearance  
to the column portion *c'*.

The fluorescine (which may be obtained from  
chemical dealers under that name) is to be dis-  
solved in the alcohol (the strength of which is  
not important, and methylated spirit of com-  
merce answers well) in the proportion of about  
one-third of a grain to the fluid ounce of spirit.  
This proportion can, however, be varied con-  
siderably without much alteration in effect.  
The liquid thus produced is scarcely at all flu-  
orescent, but on the addition of a small quan-  
tity of an alkali it becomes intensely so. For  
this purpose I employ strong ammonia solu-  
tion, in the proportion of one drop to the fluid  
ounce of spirit; but other alkalies may be used  
and the exact proportion is not at all mate-  
rial. The fluid thus obtained is introduced

into the thermometer-tubes in the usual man-  
ner, these tubes being preferably made with  
bulbs of various ornamental forms, such as  
spiral, helical, or any other form that may be  
found convenient; but no form is here claimed,  
the object of such bulbs being to display to  
the best advantage the double color possessed  
by the fluid, which reflects a green light but  
transmits a yellow light. Tubes thus made  
and supplied with the colored fluid above de-  
scribed are, according to my invention, to be  
mounted against a black or other very dark  
colored scale (with white figures) as a dark  
background for the fluid; or the dark back-  
ground may be produced by varnishing the  
back of the tube with black or other very dark  
colored varnish, or by a band of black or other  
very dark enamel drawn within the glass of  
the tube or on the back thereof, in place of the  
ordinary white enamel used for this purpose.

If the thermometer be intended for a reg-  
istering one, the index or needles must be  
made of some reflecting material in order to  
show within the fluorescent fluid. In place of  
those of black glass commonly employed, I  
find white enamel-glass answers well for this  
purpose.

Having thus described the nature of my said  
invention and the mode in which I carry the  
same into effect, I would have it understood  
that what I claim is—

1. An indicator-tube having its contained  
spirit colored with fluorescine and alkali, as set  
forth.

2. A thermometer provided with a tube hav-  
ing its contained spirit colored with fluorescine  
and alkali, as set forth.

3. A thermometer-tube having a dark back-  
ground and its contained spirit colored with  
fluorescine and alkali, as and for the purpose  
set forth.

4. A thermometer constructed with a back,  
A, tube B, dark background *b*, and a spirit  
filling, C, adapted to present a translucent  
amber-colored appearance to the bulb portion  
*c* and an opaque deep-green-colored appear-  
ance to the column portion *c'*, as set forth.

EDWARD H. T. LIVEING.

Witnesses:

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C. M. WHITE,  
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