

(No Model.)

J. J. HICKS.
CLINICAL THERMOMETER.

No. 309,050.

Patented Dec. 9, 1884.

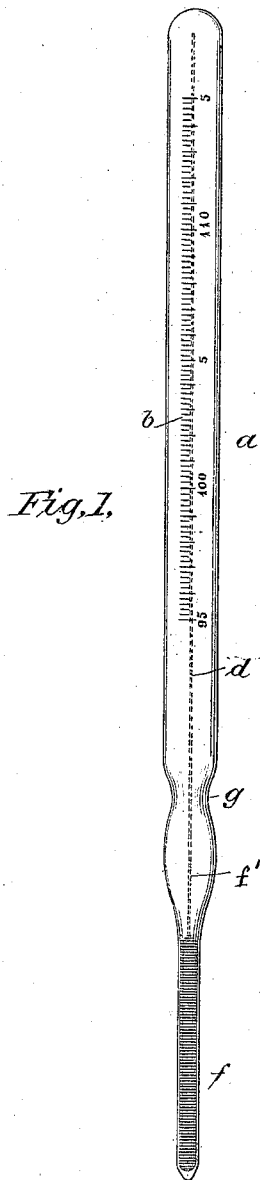


Fig. 4.

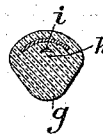


Fig. 2.

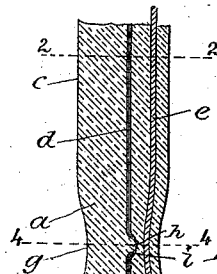
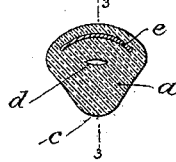


Fig. 3.

WITNESSES:

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JAMES J. HICKS, OF LONDON, ENGLAND.

CLINICAL THERMOMETER.

SPECIFICATION forming part of Letters Patent No. 309,050, dated December 9, 1884.

Application filed June 13, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES JOSEPH HICKS, of 8 Hatton Garden, London, England, have invented a new and useful Improvement in Clinical Thermometers, of which the following is a specification.

Clinical thermometers are necessarily required to register minute changes in temperature, and to this end are required to have a bore very minute relatively to the capacity of the bulb; but in order to adapt the mercury to respond promptly or as quickly as possible to changes in temperature, and to bring the whole instrument within small dimensions, the capacity of the bulb and the entire quantity of mercury employed should be as small as possible. To combine these several important desiderata—namely, a bulb of moderate capacity for sensitiveness, and a bore of small size to indicate and register minute changes, and at the same time provide means whereby the indications of a column of small size can be distinctly read—Luigi Peroni devised the lens-front or magnifying clinical thermometer described and claimed in Letters Patent of the United States No. 222,420, granted to me, as assignee of said Peroni, the 9th day of December, 1879; Reissue No. 10,189, dated 29th day of August, 1882, in which the thermometer-tube is formed with a convex or protuberant front surface serving the purpose of a lens, the center or axis of the cylindrical arc formed by the front surface through which the bore is viewed being between, and preferably about half-way between, the said front surface and the bore, so as to bring the bore at or near the focus of the lens formed by the said convex front surface.

Another requirement of the clinical thermometer is that it shall have a registering-index. This has been formed of a small body of mercury at the top of the column, forming the head of the column, but separated from the main body thereof, so that as the mercury contracts in cooling the said detached head or index will remain at the highest point, thus forming a maximum register. One mode of causing the separation of the registering-index from the body of the column is to introduce a speck of air between them, so that as the mercury expands by heat the detached head or in-

dex will be forced before it, but it will not recede with it as the mercury contracts. A preferable mode is to form in the neck or lower part of the tube, between the bulb and the scale or graduated part of the tube, a knife-edged projection in the bore, so as to form a contracted throat through which the mercury will be forced in expanding, but which will retain so much of the column as has passed above or beyond it, while the body of mercury below contracts in cooling. Another necessity in clinical thermometers is that the bulb shall be always kept full. If the instrument were so made that the entire body of mercury could in the coldest weather retire within the bulb and leave it only partially filled, the motion of the loose body of mercury in handling or transportation would be liable to split the bulb. To prevent this it is customary to form clinical thermometers with a contracted neck above the bulb and a chamber interposed between the bulb and the bore, preventing the whole body of mercury from retiring within the bulb even when most contracted by low temperature, the capacity of the interposed chamber affording ample room for the expansion and contraction, while the bulb remains full at all times. This construction of clinical thermometers as they are now made and used necessitates so large a body of mercury that several minutes are required for the uniform heating and expansion of the mercury, so that the temperature of a patient can be accurately ascertained.

The object of the present invention is to devise a construction of clinical thermometers which will afford extreme sensitiveness and prompt response to changes in temperature, and will at the same time admit of reading the indications with facility. To this end I construct my thermometer with a very small bore, a lens-front for magnifying the column, and an elongated bulb of small diameter extended in line with the bore without any interposed chamber, but with a contracted throat to separate the column and form a maximum register. In the accompanying drawings, Figure 1 is a front view of my improved thermometer, enlarged for clearness of representation. Fig. 2 is a transverse section of the same, on a still larger scale, on the line 2 2, Fig. 3. Fig. 3 is

a longitudinal section of a detail, also on a larger scale, on the line 3 3, Fig. 2. Fig. 4 is a transverse section on the line 4 4, Fig. 2.

The body *a* of the thermometer, on which the scale *b* is engraved, is formed with the convex or protuberant front *c*, (shown in Fig. 2,) constituting an arc with a radius equal to about one-half the distance between the said front surface and the bore *d*, thus bringing the bore at or near the focus of the lens formed by such convex front.

e represents the customary opaque enamel back, to make the mercury column and the scale more conspicuous.

f represents a needle-like bulb, of very small capacity, made in practice about one-third the diameter of the bulb of customary clinical's, thus making it at least six times as sensitive as clinical thermometers heretofore made. This bulb has an extension, *f'*, of the same diameter as the bore and in line with the bore, and is connected therewith through the contracted throat *g*, the form of which is shown in detail and on larger scale in Fig. 3. It will be seen to be made with a projection, *h*, in the form of a knife-edge, producing a contracted throat, *i*, through which the mercury is forced in expanding by heat, but through which it will not pass spontaneously in contracting.

To set the thermometer after using, the whole column must be swung or shaken down through the contracted throat below the bottom graduation of the scale, when it is again ready for use.

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

1. A clinical thermometer having a bore of very small diameter, a bulb of small diameter having an extension of the same diameter as the bore, a knife-edge projection forming a contracted throat to connect the extension with the bore, and a magnifying lens-front integral with the tube.

2. A clinical thermometer formed with a very small bore, a lens-front integral with the tube for magnifying the bore, a needle-like bulb of small capacity—about one-third of the diameter of the ordinary bulb—an extension to the bulb of the same diameter as the bore, and a knife-edge projection to form a contracted throat to separate the column and form a maximum register.

JAS. J. HICKS.

Witnesses:

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