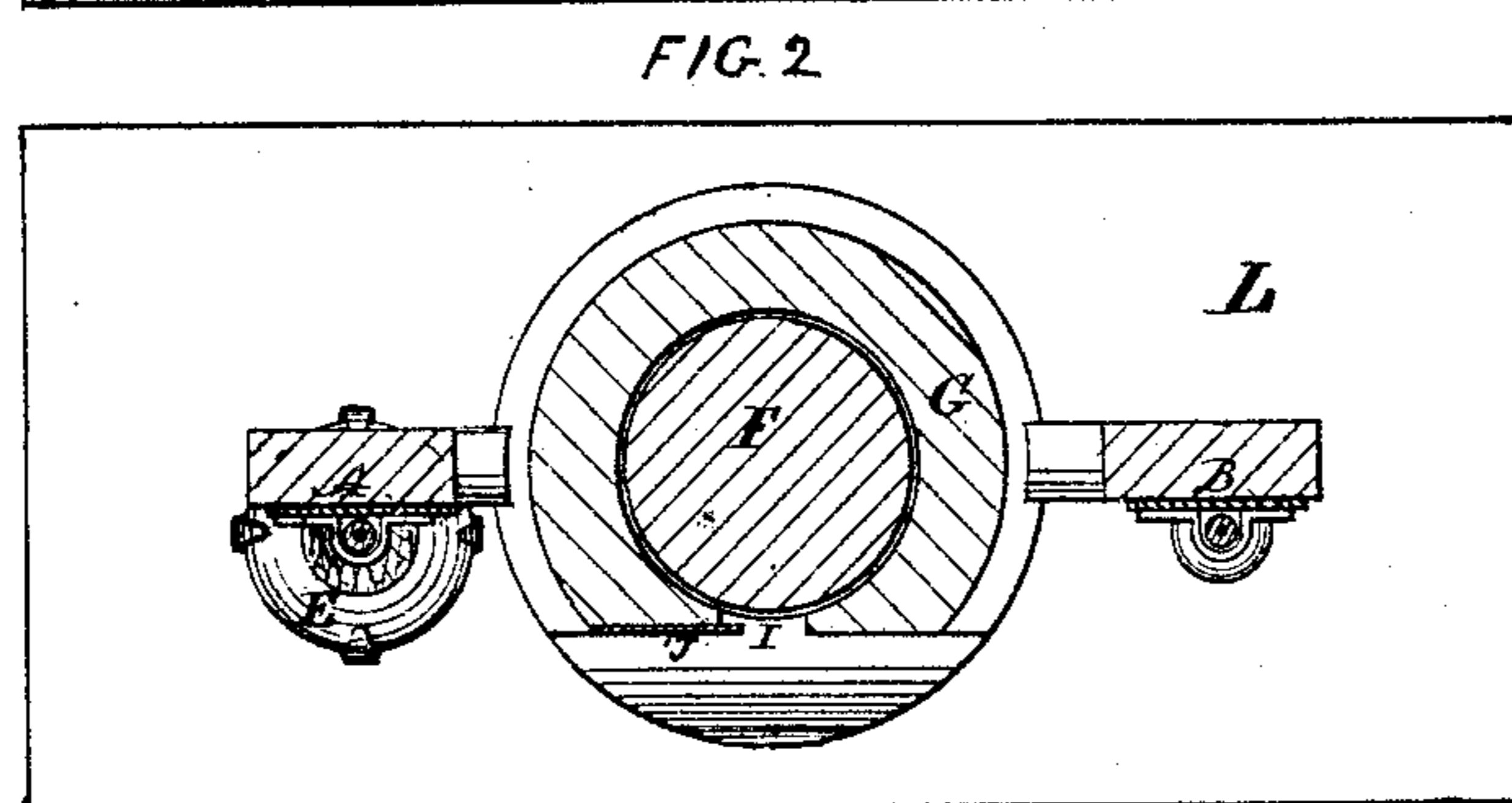
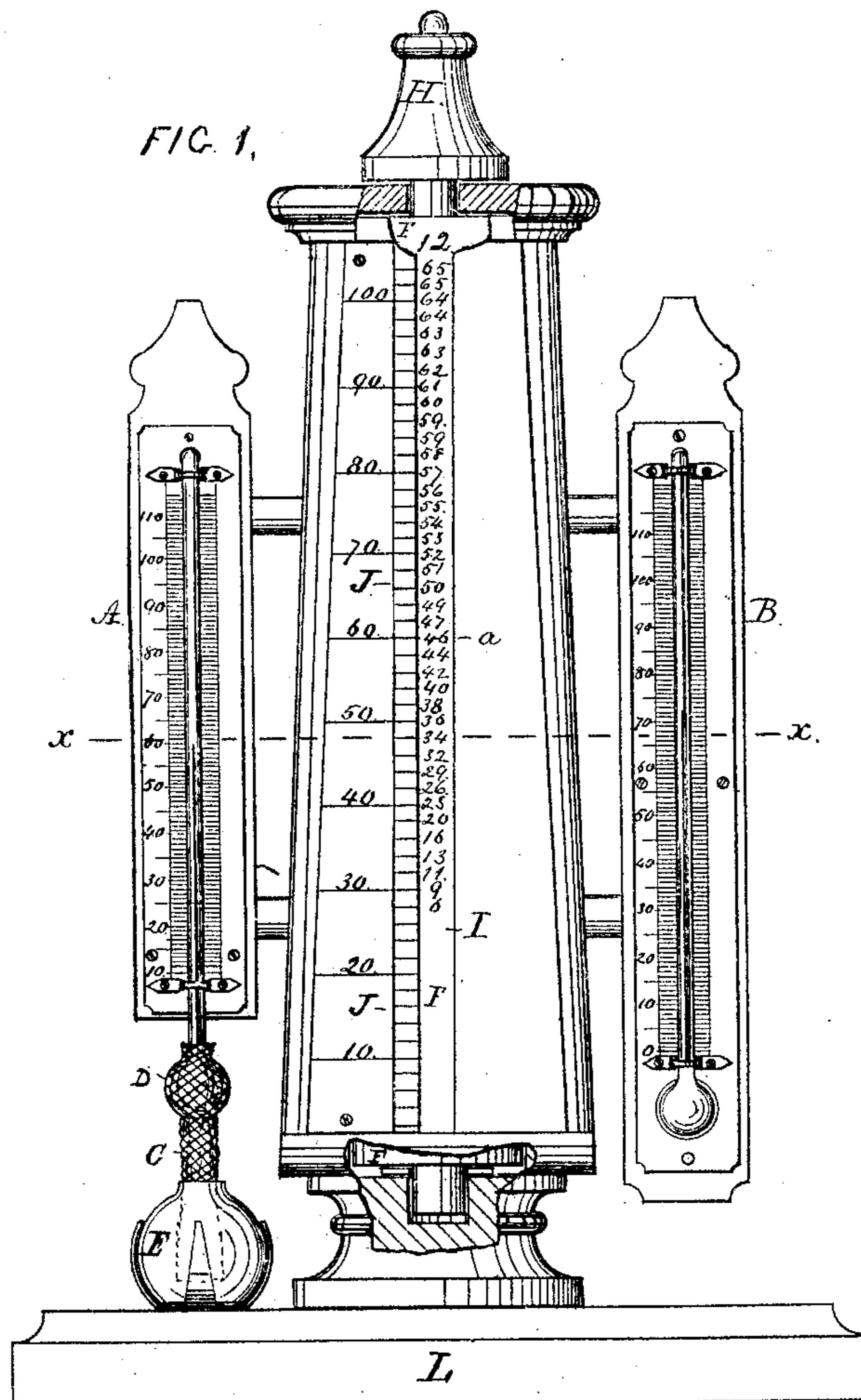


J. WINLOCK & J. S. F. HUDDLESTON.

Psychrometers.

No. 149,176.

Patented March 31, 1874.



Witnesses.

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FIG. 3.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
104	96	93	90	87	84	81	78	75	72	70	68	65	63	61	59	57	55	53	51	49	47	46
102	96	93	90	86	83	80	77	75	72	69	67	65	63	60	58	56	54	52	50	49	47	45
100	96	93	89	86	83	80	77	74	72	69	66	64	62	60	57	55	53	51	50	48	46	44
98	96	93	89	86	83	80	77	74	71	68	66	64	61	59	57	55	53	51	49	47	45	44
96	96	93	89	86	82	79	76	73	71	68	65	63	61	58	56	54	52	50	48	46	45	43
94	96	92	89	85	82	79	76	73	70	67	65	63	60	58	55	53	51	49	47	44	44	42
92	96	92	89	85	82	79	75	72	70	67	64	62	59	57	55	53	51	49	47	45	43	41
90	96	92	88	85	81	78	75	72	69	66	64	61	59	56	54	52	50	48	46	44	42	41
88	96	92	88	85	81	78	75	72	69	66	63	60	58	56	53	51	49	47	45	43	41	40
86	96	92	88	84	81	77	74	71	68	65	62	59	57	55	53	50	48	46	44	42	40	39
84	96	92	88	84	80	77	73	70	67	64	62	59	56	54	52	49	47	45	43	41	39	38
82	96	91	87	84	80	76	73	70	67	64	61	58	56	53	51	48	46	44	42	40	38	37
80	95	91	87	83	79	76	72	69	66	63	60	57	55	52	50	47	45	43	41	39	37	36
78	95	91	87	83	79	75	72	68	65	62	59	56	54	51	49	46	44	42	40	38	36	34
76	95	91	86	82	78	75	71	68	64	61	58	55	53	50	48	45	43	41	39	37	35	33
74	95	91	86	82	78	74	70	67	64	60	57	54	52	49	47	44	42	40	38	36	34	32
72	95	90	86	81	77	73	70	66	63	59	56	53	51	48	45	43	41	38	36	34	32	31
70	95	90	85	81	77	73	69	65	62	58	55	52	49	47	44	42	39	37	35	33	31	29
68	95	90	85	80	76	72	68	64	61	57	54	51	48	45	43	40	38	36	33	31	29	28
66	95	90	85	80	75	71	67	63	60	56	53	50	47	44	41	39	36	34	32	30	28	26
64	94	89	84	79	75	70	66	62	59	55	52	49	46	43	40	37	35	33	30	28	26	24
62	94	89	84	79	74	69	65	61	58	54	50	47	44	41	38	36	33	31	29	26	24	22
60	94	88	83	78	73	68	64	60	56	52	49	46	42	39	37	34	31	29	27	25	22	21
58	94	88	83	77	72	67	63	59	55	51	48	44	41	38	35	32	30	27	25	23	20	18
56	94	88	82	76	71	66	62	57	53	49	46	42	39	36	33	30	28	25	23	20	18	16
54	93	87	81	76	70	65	61	56	52	48	44	40	37	34	31	28	25	23	20	18	16	14
52	93	87	80	75	69	64	59	55	50	46	42	38	35	32	29	26	23	21	18	16	13	11
50	93	86	80	74	68	63	58	53	48	44	40	36	33	29	26	23	21	18	15	13	11	9
48	93	86	79	73	67	61	56	51	46	42	38	34	31	27	24	21	18	15	13	10	8	6
46	92	85	78	72	65	60	54	49	44	40	36	32	28	24	21	18	15	12	10	7	5	
44	92	84	77	70	64	58	52	47	42	38	33	29	25	21	18	15	12	9	7	4		
42	92	84	76	69	62	56	50	45	40	35	31	26	22	19	15	12	9	6	3			
40	91	83	75	68	61	54	48	43	37	32	28	23	19	15	12	8	5	2				
38	91	82	74	66	59	52	46	40	34	29	24	20	16	12	8	5	2					
36	90	81	73	64	57	50	43	37	31	26	21	16	12	8	4							
34	90	80	71	63	55	48	41	34	28	23	17	13	8	4								
32	89	79	70	62	54	46	39	33	27	21	16	11	6									
30	89	79	70	61	53	45	38	31	25	19	14	9	4									
28	89	78	69	59	51	43	36	29	23	17	11	6										
26	88	77	66	57	48	40	32	25	18	12	7											
24	87	75	64	54	45	36	28	21	14	7	1											
22	86	74	62	52	42	32	24	16	9	2												
20	85	72	60	48	38	28	19	11	3													
18	85	70	57	45	34	23	14	5														
16	84	68	54	41	29	18	8															
14	82	66	51	37	24	13	2															
12	81	63	47	33	19	7																
10	80	61	44	28	14																	
8	78	58	40	23	8																	
6	77	55	36	17																		
4	75	52	31	11																		
2	73	48	25																			
0	71	44	19																			

FIG. 4.

	12
90	61 84
88	60 82
86	59 80
84	59 78
82	58 76
80	57 74
78	56 72
76	55 70
74	54 68
72	53 66
70	52 64
68	51 62
66	50 60
64	49 58
62	47 56
60	46 54-a
58	44 52
56	42 48
54	40 47
52	38 44
50	36 42
48	34 38
46	32 35
44	29 33
42	26 30
40	23 28
38	20 25
36	16 20
34	13 18
32	11 16
30	7 13
28	1 11
26	8
24	5
22	3

Witnesses.

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# UNITED STATES PATENT OFFICE.

JOSEPH WINLOCK, OF CAMBRIDGE, AND JOHN S. F. HUDDLESTON, OF  
BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN PSYCHROMETERS.

Specification forming part of Letters Patent No. **149,176**, dated March 31, 1874; application filed  
July 30, 1873.

*To all whom it may concern:*

Be it known that we, JOSEPH WINLOCK, of Cambridge, in the county of Middlesex and State of Massachusetts, and JOHN S. F. HUDDLESTON, of Boston, in the county of Suffolk and State aforesaid, have invented an Improved Psychrometrical Indicator, of which the following is a specification:

The object of the present invention is to provide a simple, efficient, and convenient means of determining the relative humidity of the atmosphere or the dew-point, so called, without calculation. The improvements are fully hereinafter described and claimed.

In the accompanying plates of drawings our improved psychrometrical indicator is illustrated.

In Plate 1, Figure 1 is a face view of the dry and wet bulb thermometers with our indicator adapted thereto; Fig. 2, a transverse horizontal section in plane of line *xx*, Fig. 1. In Plate 2, Fig. 3 is a plan view of the diagram of figures adapted for the indicator; Fig. 4, a view showing both the degrees of saturation and the dew-point of the air.

A and B in the drawings represent, respectively, a wet and a dry bulb thermometer, constructed in the usual manner; C, the string or wicking depending from the muslin surrounding the wet bulb D of the thermometer A into the water in the cup E; F, a cylinder, adapted to be freely turned by means of a handle or knob, H, in the casing G. The cylinder F is provided with a series of columns of figures, such as shown in Fig. 3, Plate 2, and these columns are numbered from one (1) to twenty-two (22) inclusive. Each number from one (1) to twenty-two (22) represents the difference between the degree of temperature indicated by the dry-bulb thermometer B and the degree indicated by the wet-bulb thermometer A. The figures of each column of figures are arranged one above another, (see Fig. 3, Plate 2,) and the several figures in each column are the results of calculation, and give, for any degree of the wet-bulb thermometer A, the amount of moisture in the air; or, in other words, the degree of saturation of the air, or both the amount of moisture in or the dew-point of the

air for any difference between the indications of a wet-bulb thermometer and a dry-bulb thermometer, from one (1) to twenty-two (22) inclusive. The casing serves as a support, in the present instance, for the two thermometers, as well as for the cylinder, and is secured to the base L. I, the slit or opening. On the left of this slit I, fixed to the casing G, is the scale J, which, in this instance, conforms to the scale of the wet-bulb thermometer. The figures of the several columns of figures are arranged in parallel horizontal lines, correspondingly to the divisions of the fixed scale J, the number or figure to be produced as showing the amount of moisture in the air or dew-point being each placed in line horizontally with the degree on the fixed scale corresponding to the degree as indicated on the wet-bulb thermometer, in the column of figures having at its head the figure corresponding to the difference in degrees between the degrees indicated by the readings of the dry and wet bulb thermometers.

To ascertain the moisture in the air, having properly prepared the wet-bulb thermometer, observe the height of the mercury, which, for example, suppose to be 60°, and then observe the height of the mercury of dry-bulb thermometer, which, for example, suppose to be 72°. Subtract the former, 60, from the latter, 72, and then turn the cylinder until that column of the columns of figures on the cylinder F comes to the casing-slit I, which, in its number, corresponds to the difference between 60 and 72—that is, bring the column marked 12, with red ink, to the slit, and, opposite the line of division marked 60 of the fixed scale J; observe the number indicated in the said column of figures, which number, 46, is the per centum of moisture in air, as shown at *a*, Fig. 1.

For all degrees of the dry and wet bulb thermometers proceed as above, and the result sought for will be shown by the indicator.

A similar arrangement of indicator may be also adapted by simply a change of figures in the several columns for indicating the dew-point of the air; or, by a double column of figures, as shown in Fig. 4, under each division, the indicator may be adapted to show both

the dew-point and the degree of saturation; or by two separate cylinders, to be used or operated independently.

As in Fig. 4, the left column shows the degree of saturation, and the right column the dew-point, and, carrying out the same illustration, in line to the right of 60° on fixed scale, and with 46, the per centum of moisture in the air will be found 54—the dew-point for the same temperature.

The numbers of the columns, one to twenty-two, are printed in red ink, and the others in black ink, for the purpose of distinction, and of quickly discerning them; but they can all be of the same, or of any two, colors desired.

The fixed scale J, instead of corresponding to the wet-bulb-thermometer scale, can be read as answering to the dry-bulb thermometer. Of course, the columns of figures relatively so much higher on the scale—that is, the forty-six degrees ascertained, as above—in lieu of being opposite to 60 would then be against or in line of 72; but we find it better and more convenient to use the wet-bulb-thermometer scale.

In lieu of having a separate scale for the cylinder, it could be so adapted that the cylinder could revolve in connection with the wet or dry bulb thermometer scales.

The frame or standard to support the cylinder and thermometer can be made from any kinds of woods or metal, and of any form or shape, ornamented as desired.

The cylinder F could revolve horizontally, in lieu of vertically, as described.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

The instrument herein described, the same consisting of the wet-bulb thermometer A, the dry-bulb thermometer B, the cylinder F, provided with the tabulated columns of figures, and revolving within a casing, G, having a slit, I, and scale J, all arranged in the relation to each other, substantially as shown and described.

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JOHN S. F. HUDDLESTON.

Witnesses:

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