

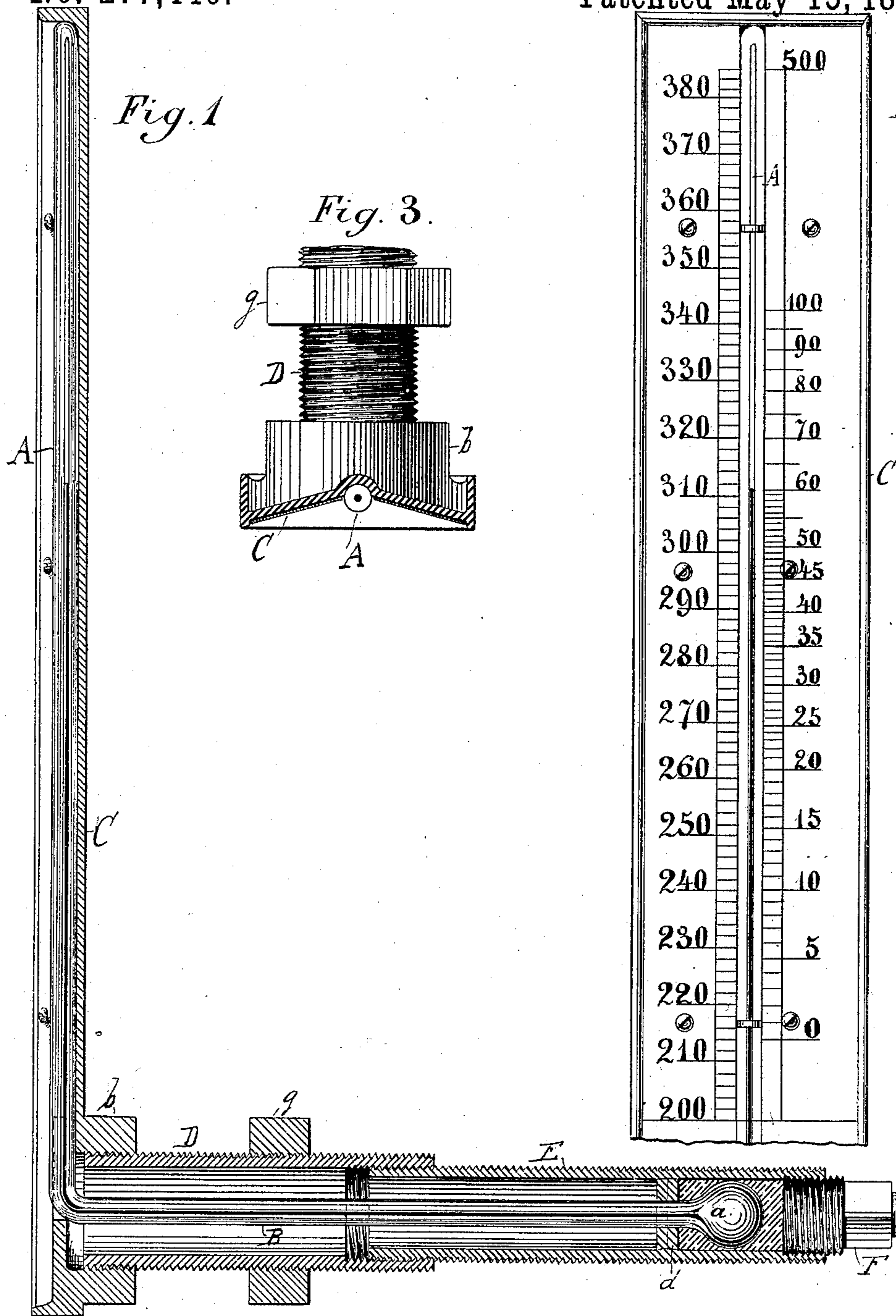
(No Model.)

P. BONTE.

THERMO STEAM PRESSURE GAGE.

No. 277,446.

Patented May 15, 1883.



Witnesses:  
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277,446

# UNITED STATES PATENT OFFICE.

PHILIPP BONTE, OF CHICAGO, ILLINOIS.

## THERMO STEAM-PRESSURE GAGE.

SPECIFICATION forming part of Letters Patent No. 277,446, dated May 15, 1883.

Application filed June 20, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIPP BONTE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Thermo Steam-Pressure Gages; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an apparatus which will indicate the pressure of steam in a boiler or steam apparatus of any kind by the temperature due to such pressure. Pressure and density of steam that is generated in free contact with water rises with the temperature, and reciprocally its temperature rises with the pressure or density, and there is but one and a corresponding pressure and density for each temperature, and same pressure always exists in conjunction with same temperatures. Therefore an instrument that will accurately indicate the exact degree of heat of the steam in a boiler will be the most reliable steam-pressure gage; and it is the object of this my invention to produce a gage that is based upon the above well-known facts.

For this purpose my invention consists in certain improvements in steam-pressure gages, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a vertical cross-section of my thermo steam-pressure gage; Fig. 2, a front view of the scale, and Fig. 3 a partial sectional plan of the instrument.

Corresponding letters in the several figures of the drawings designate like parts.

A denotes the vertical shank of the glass tube, and B the horizontal shank of the same, having bulb *a* that is filled with mercury. This tube is hermetically sealed after the atmospheric air has been exhausted therefrom in the same manner as in a thermometer after the bulb *a* has been filled with mercury. The vertical shank A of the glass tube is secured by screws to the central flute of a scale-plate, C, which is graduated at both sides, and has engraved on one side the numbers that indicate the degrees of heat and on the opposite side the numbers indicating the pressure of steam

in pounds that correspond with such temperature. The scale-plate C has at its lower rear end an internally-screw-threaded socket, *b*, into which is screwed an externally-screw-threaded pipe, D, which, at its rear end, is also internally screw-threaded, and into this pipe D is again connected an externally-screw-threaded pipe, E, which, at its rear end, is also internally screw-threaded, to be hermetically closed by a screw-block, F. The horizontal shank B of the glass tube, with the bulb *a*, is inserted into the pipes D and E, and a washer, *d*, is passed over the glass tube and into the pipe E, and is backed by plaster-of-paris or cement, so as to confine the compartment in such pipe E containing the bulb of the glass tube. The otherwise empty space in this compartment around bulb *a*, I fill up with mercury or any other metal or metal chips or alloy, or any suitable material that is a good conductor of heat, so as to transport the exact temperature of the steam, water, or other heated fluid that surrounds the pipe E to the mercury-containing bulb *a*. The pipe D is screwed into a tapped hole in the boiler until the socket *b* or an intermediate packing-ring will butt against the exterior surface of the boiler-head, and the nut *g* is screwed on such pipe D against the interior surface of the boiler-head, so as to form a tight joint therewith. By this arrangement the bulb surrounding pipe E is extended a sufficient distance into the steam or water-space of the boiler, and will be heated to the same temperature as the steam, which heat will be conducted to the bulb *a* and to the mercury contained therein. Such mercury will expand through tube B and thence into tube A, where its height will indicate on the scale the exact temperature and the corresponding pressure of the steam in pounds. The pipe E is screw-threaded its entire length for increasing the surface that is in contact with the surrounding steam or water, and thereby increasing its heat-conducting capacity.

I am aware that it is not new to construct steam-pressure gages with a scale graduated to indicate both the degrees of heat and the pressure of steam, and a casing adapted to contain the bulb and to be screwed into the steam or water-space of a boiler; and I am also aware that it is not new to surround the

bulb within such casing with a heat-conducting material, and such I do not claim.

What I claim is—

1. A thermo steam-pressure gage consisting  
5 of a glass tube having vertical shank A, and  
horizontal shank B, having bulb *a*, that is  
filled with mercury, the end A of such tube  
being secured to a scale-plate, C, and the end  
B and bulb *a* being inclosed in a pipe, D E,  
10 that is projected into the steam-space of the  
boiler, all substantially as and for the purpose  
described and shown.

2. In a thermo steam-pressure gage, or in  
thermometers in general, the glass tube hav-

ing vertical shank A, horizontal shank B, and 15  
bulb *a*, scale-plate C, having internally-screw-  
threaded socket *b*, pipe E, externally screw-  
threaded its entire length, and having screw-  
block F, externally and internally screw-  
threaded pipe D, and nut *g*, substantially as 20  
and for the purpose specified.

In testimony that I claim the foregoing as  
my invention I affix my signature in presence  
of two witnesses.

PHILIPP BONTE.

Witnesses:

R. G. SCHMID,  
H. HUEHL.