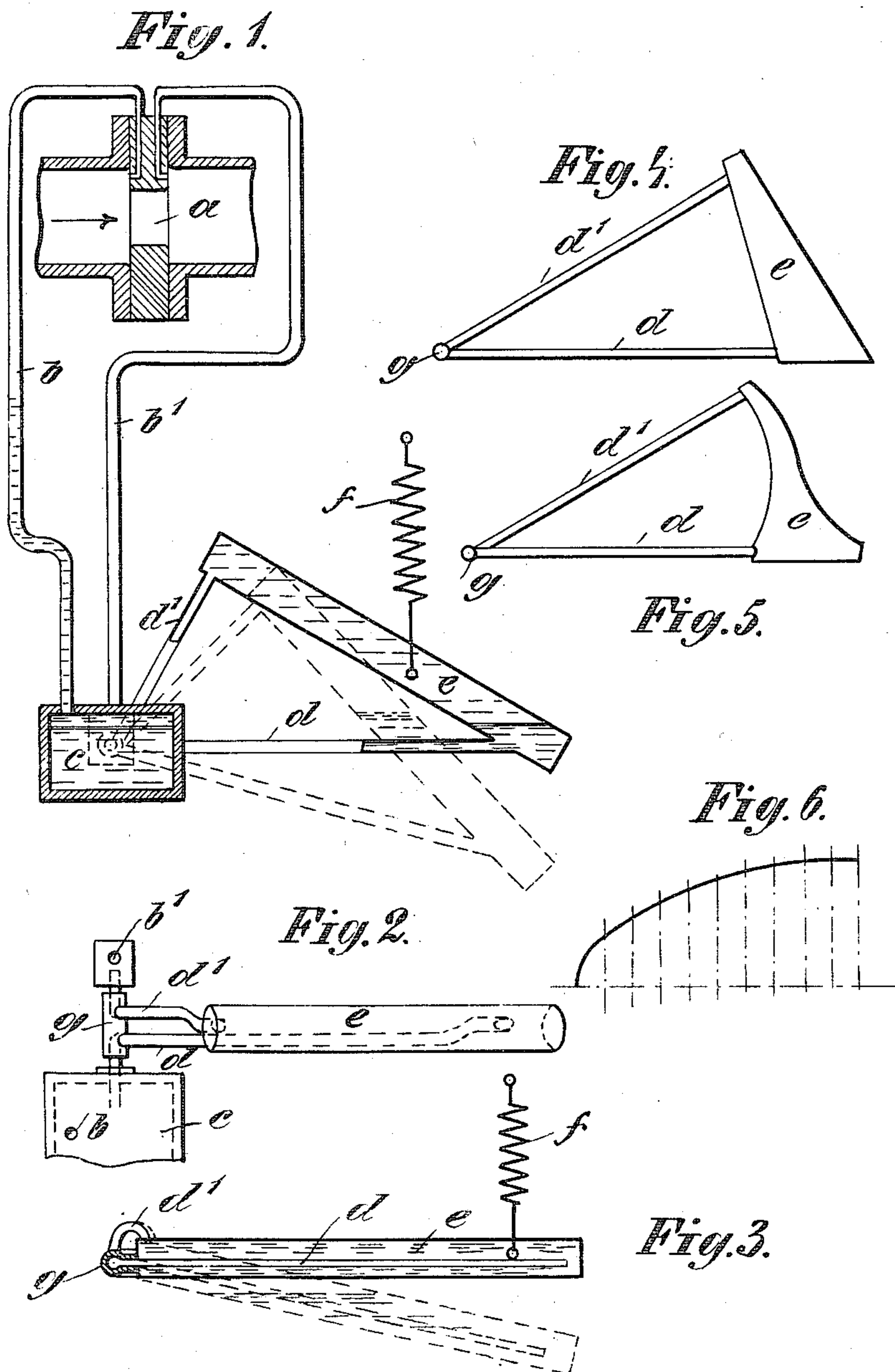


M. GEHRE.  
PRESSURE GAGE.  
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994,669.

Patented June 6, 1911.



Witnesses:  
Georg Otto.  
Albert Grünfeld

Inventor:  
Max Gehre.  
by: William Pataty  
Attorney.



# UNITED STATES PATENT OFFICE.

MAX GEHRE, OF RATH, NEAR DUSSELDORF, GERMANY.

## PRESSURE-GAGE.

994,669.

Specification of Letters Patent.

Patented June 6, 1911.

Application filed December 14, 1907. Serial No. 406,493.

*To all whom it may concern:*

Be it known that I, MAX GEHRE, engineer, citizen of Germany, subject of the King of Prussia and Empire of Germany, residing at Rath, near Dusseldorf, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in Pressure-Gages, of which the following is a full, clear, and exact description.

This invention has relation to pressure gages and has for its object the provision of novel means for measuring a stream of steam by the change of position of a pivoted chamber produced by the changes of pressure in front of and behind a throttle device through which the steam is passing.

The invention constitutes the novel construction, combination and arrangement of parts hereinafter described and claimed.

Referring to the accompanying drawing, Figure 1 is a vertical sectional view of the preferred form of gage as applied to a steam pipe having a throttle device. Fig. 2 is a partial top view of the same. Figs. 3, 4 and 5 are side elevations of modified forms of the pivoted chamber shown in Fig. 1 and Fig. 6 is a diagram illustrating the variations in position of the pivoted chamber.

In front of and behind a throttle disk *a* in the steam pipe, auxiliary pipes *b* and *b'* are both connected with a shaft *g* formed with hollow pivots. Said shaft is connected on one side with a chamber *c* attached to the pipe *b* and through the tube *d* with the lower portion of a hollow chamber *e*, on the other side it is connected to the pipe *b'* and through tube *d'* with the upper part of said hollow chamber *e*. The apertures of the pivots of the shaft are not connected with each other, but only with the pipes *b* and *b'* and *d* and *d'*.

The pipe *b* proceeds from the side of the throttle disk facing the stream of steam and then leads into the hollow receptacle *c*, which is partly filled with mercury and then further through one hollow pivot of *g* and through *d* into the chamber *e*. The pipes *b* and *b'* together with the space over the mercury in chambers *c* and *e* are filled with water. The hollow chamber *e* is suspended on a spring *f*. The greater the difference of pressure between the front and back of the throttle disk the more mercury is forced into the chamber *e* and therefore the same sinks downward. The difference of pressure is therefore always shown by the variations in

the position of the receptacle *e*. Now in order that said variations should show correctly the value of the steam current in accordance with the well known formulæ, the quantity of steam should not alter in exact proportion to the difference of pressure, as the quantity alters with the square root of that difference, but it should increase slowly, as for instance according to the curve shown in Fig. 6. The required variations in the position of the receptacle are obtained by having the receptacle obliquely disposed as in Figs. 1 and 2, so that not only the volume of mercury increases more slowly than the difference in pressure but the leverage of the receptacle also becomes shorter. In accordance with such an arrangement one may also adopt, as shown in Fig. 3, a hollow chamber *e* in which the pipe *d* reaches to the outer end, while the pipe *d'* is connected with the side, similarly a greatly decreasing curve may be obtained by forming the chamber *e* so that it is wide at the bottom and narrow at the top, as illustrated in Figs. 4 and 5. In Fig. 5, for instance, the reduction in the volume of the mercury in the chamber would alone operate, to cause the mercury to rise and fall at the proper rate while no alteration in the lever length would occur due to the fact that the chamber is practically vertical. Any reduction in volume and in the lengthening of the lever may act separately or simultaneously as may be desired.

What I claim is:

1. In a pressure gage, the combination with a source of steam supply, a closed chamber containing mercury and water and a conduit leading from said chamber to said source of steam supply, of a pivoted chamber arranged obliquely to the horizontal, a conduit leading from the closed chamber to the pivoted chamber and a steam conduit leading from the pivoted chamber to the said source of steam supply, substantially as described.

2. In a pressure gage, the combination with a source of steam supply and a closed chamber containing mercury and water, a pivoted and spring supported chamber arranged obliquely to the horizontal, a conduit in communication with said pivoted chamber and in communication with said first named chamber, and conduits leading from said chambers respectively to said source of steam supply, a hollow rocking



shaft constituting a portion of the conduits leading from said pivoted chamber to said source of steam supply, and from said pivoted chamber to said first named chamber, respectively, substantially as described.

3. In a pressure gage, the combination with a source of steam supply and a closed chamber containing mercury and water, of a pivoted and obliquely disposed receptacle communicating with said chamber, a conduit connecting said receptacle and said chamber, a hollow rocking shaft constituting a part of said conduit connected with the said receptacle and said source of steam supply and pipes constituting the connections between the hollow rocking shaft and the source of steam supply and between the said shaft and the said receptacle respectively, substantially as described.

4. In a pressure gage, the combination of a source of steam supply and a closed chamber containing mercury and water, a steam conduit leading from the source of steam supply to said chamber and a hollow rocking shaft, of a pivoted spring supported and obliquely disposed chamber and pressure conduits including the rocking shaft connecting said last named chamber with the

first named chamber and with the source of steam supply the hollow rocking shaft constituting a pivoted support for the spring supported chamber, substantially as described and for the purpose set forth.

5. In a pressure gage, the combination with a source of steam supply and a closed chamber containing mercury and water, a steam pipe leading to said chamber from said source of steam supply, a hollow rocking shaft and a pipe connecting said shaft with said source of steam supply, of a pivoted obliquely disposed spring-supported chamber and pressure pipes connecting said last named chamber with the hollow rocking shaft and the hollow rocking shaft with the first named chamber respectively, the hollow rocking shaft constituting a pivoted support for the spring supported chamber substantially as described and for the purpose set forth.

In witness whereof, I subscribe my signature, in presence of two witnesses.

MAX GEHRE.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.