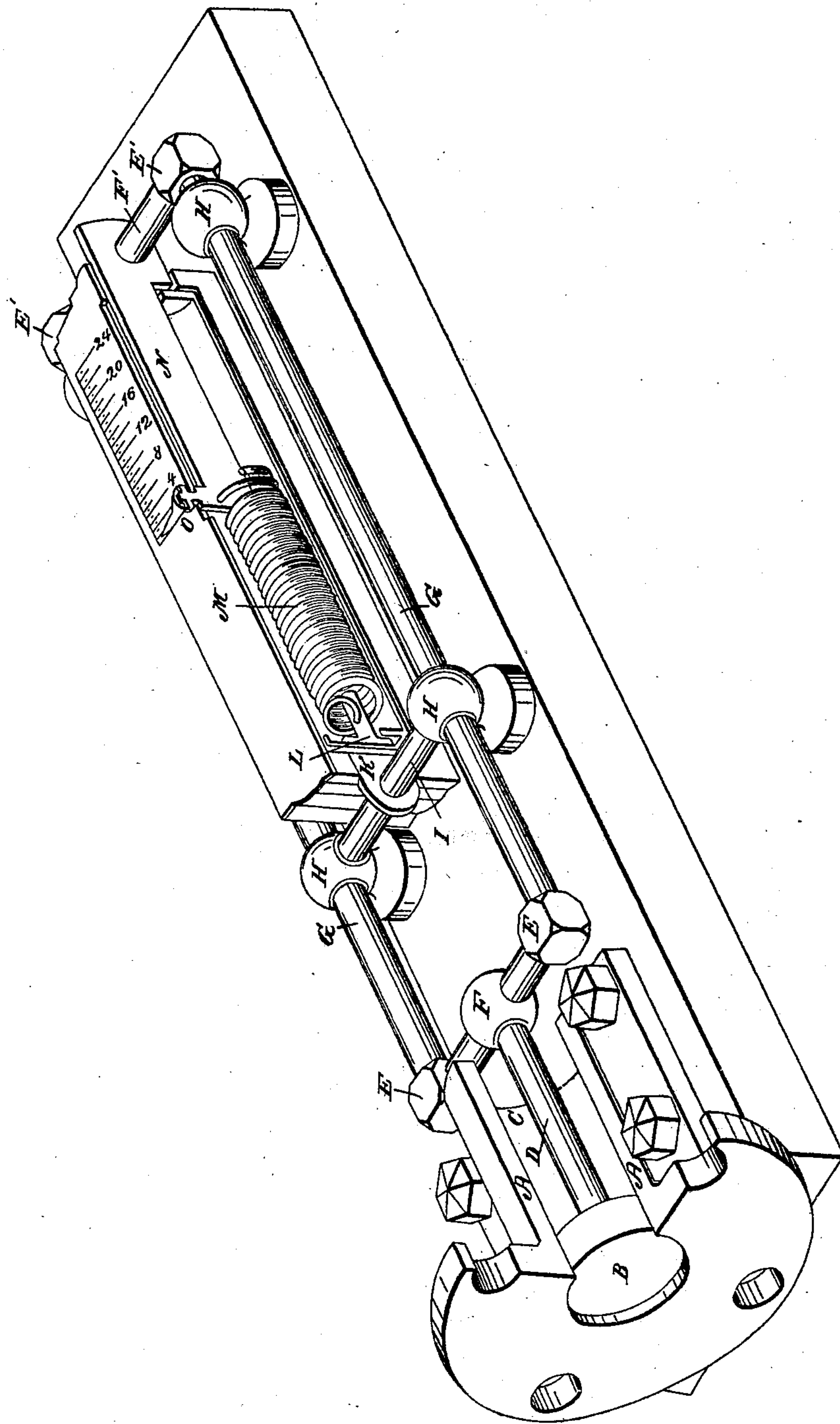


G. BRADLEY.

Pressure Gage.

No. 2,049.

Patented April 16, 1841.



UNITED STATES PATENT OFFICE.

GEORGE BRADLEY, OF PATERSON, NEW JERSEY.

MODE OF ASCERTAINING THE PRESSURE OF STEAM IN THE BOILERS OF STEAM-ENGINES.

Specification of Letters Patent No. 2,049, dated April 16, 1841.

To all whom it may concern:

Be it known that I, GEORGE BRADLEY, of the town of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Machine for the Purpose of Indicating the Pressure of Steam Confined in Boilers; and I do hereby declare that the following is a full and perfect description of the construction and operation thereof.

The construction of the machine is fully exhibited in a drawing accompanying this specification of which it forms a part wherein—

A A is a flanged cylinder to be attached (by means of its flange) to the steam boiler the pressure in which is required to be known; this cylinder contains a piston B working within it by means of the varying pressure of the steam acting against it at B in the same manner as in an atmospheric engine; the steam having always free access at one end of the cylinder and consequently to the piston on one side only viz. on the side B while the end C of the cylinder is open to the atmosphere it is evident that the piston will have an outward tendency whenever the pressure on the side B of the piston is greater than that on the opposite side and that such pressure being equally counterbalanced at all times within the cylinder will allow the piston to oscillate and thereby indicate the pressure of the steam against it above that of the atmosphere. The piston B has a stem or rod D attached to it and connecting it with the rectangular frame marked at the angles E, E, E', E', composed of the two cross heads F, F', and two guide rods G, G, the latter being supported by four guide stands H, H, H', H'; the two guide stands H, H, have a cross bar I passing through the plate K which connects it by means of the pin L with one end of the helical spring M, the other end of which is connected with the cross-head F' by means of the bar N which carries the index O.

The operation of the machine is thus: The steam pressing against the piston at B forces it outward or toward the spring and with it the rectangular frame E, E, E', E', the cross-head F' of which being connected with the bar N causes the spring M to which

it is attached to become elongated and the index O which it carries to move opposite to that part of the scale which indicates the pressure against the piston B; when the ordinary spring balance is used, if the area of the piston at B is one inch, the index will point on the scale to the number of pounds per square inch of pressure in the boiler above that of the atmosphere: the scale however admits of any mode of graduation.

This machine is expected to become a necessary appendage to every steam boiler for the purpose of enabling anyone however ignorant to tell at any time by sight the pressure of steam in the boiler, as well as the most experienced engineer.

It is believed that there is now no instrument in use for this purpose; the ordinary spring balance which is usually attached to locomotive engines is connected to the lever of a safety valve and merely indicates the pressure of the steam at the instant it is capable of lifting the valve and at no other time and even then it requires a nice calculation to ascertain the pressure on the boiler as it depends on the leverage of the safety bar so that to an ordinary traveler it affords no information of the pressure of the steam by looking at it however minutely while by the one now proposed, literally "he who runs may read" and when we reflect on the number of lives that have been lost on board steam boats which such an instrument might have been the means of preventing its value as a life preserver will be apparent to all. I do not propose to confine myself however to the particular mode of operation shown in the drawing although I think it the best in ordinary cases; the principle of operation may be varied and a more simple machine constructed by inserting the piston rod D into the other side of the piston at B and working through a packing, in which case the piston rod D attaches direct to the index bar N; and one yet more simple may be constructed by substituting an open for a close spring and placing it at the open end of the cylinder to act against the piston by its resistance to compression, in which case the piston rod may carry the index being prolonged for that purpose; the spring may also be varied in form to a spiral, a volute or a curved form instead of a helical one

and the steam chamber may be prismatical instead of cylindrical.

I do not claim as my invention any part or parcel of the spring balance represented
5 in the drawing.

What I claim as my invention and not previously known nor used is—

An oscillating piston to which is attached a metallic spring in such a manner as to
10 counterbalance any pressure that may be communicated from the steam boiler to such

piston and at the same time show what that pressure is by means of an index.

Witness my hand this twenty second day of January in the year of our Lord one 15 thousand eight hundred and forty one and of independence sixty-five.

GEORGE BRADLEY.

Witnesses:

JAMES BRADLEY,
THOS. PROSSER.