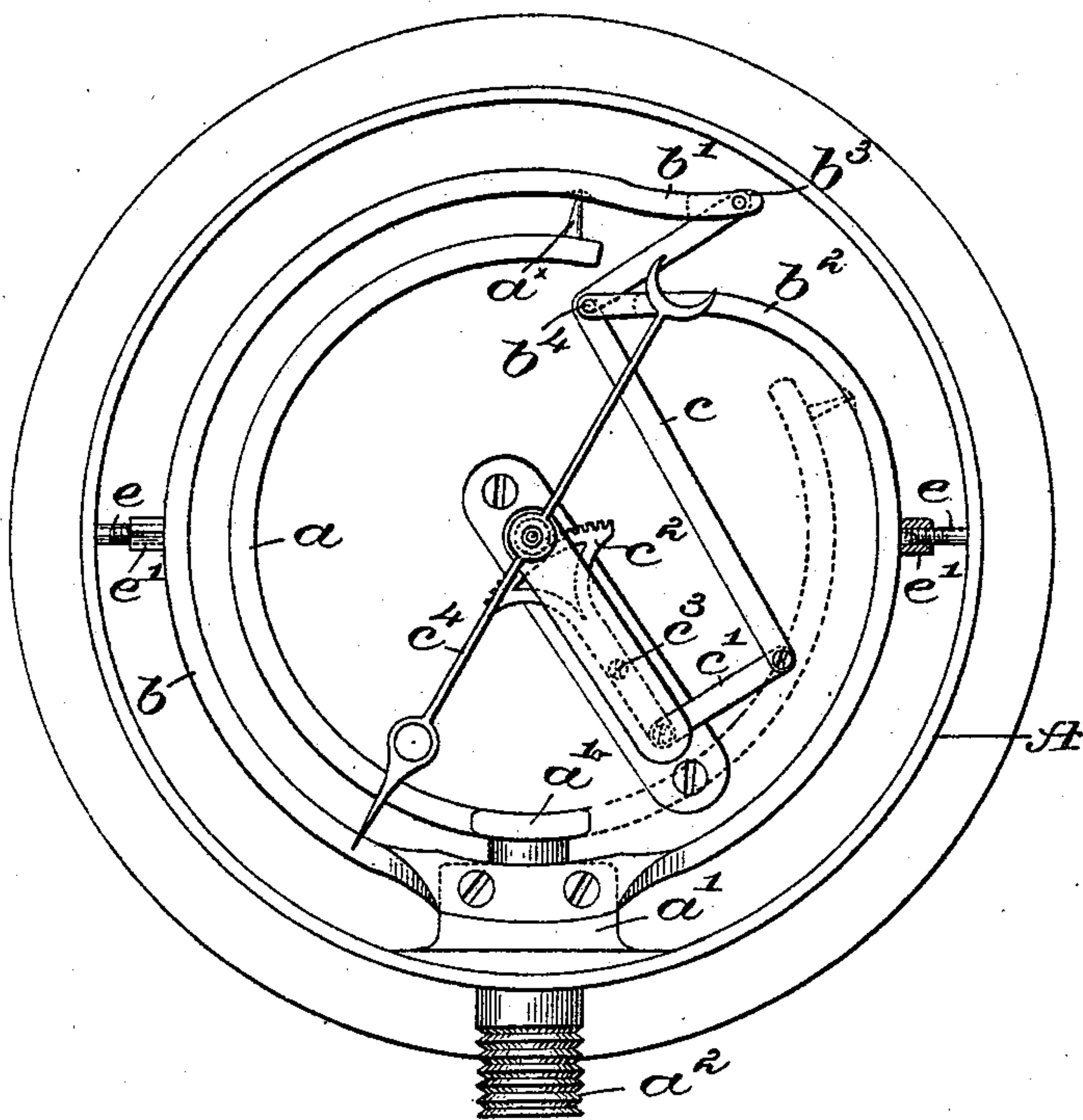


(No Model.)

R. KOHLHEPP.
PRESSURE GAGE.

No. 494,678.

Patented Apr. 4, 1893.



Witnesses.

Fred L. Grunleaf.
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UNITED STATES PATENT OFFICE.

RUDOLF KOHLHEPP, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO MARTIN L. CATE, OF SAME PLACE.

PRESSURE-GAGE.

SPECIFICATION forming part of Letters Patent No. 494,678, dated April 4, 1893.

Application filed June 17, 1892. Serial No. 437,011. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF KOHLHEPP, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Pressure-Gages, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to pressure gages and has for its object to provide devices which will prevent the setting of the pressure tube without affecting the sensitiveness of the gage.

In accordance with this invention I provide a curved metal spring which is attached to the casing at a point adjacent to the point of attachment of the pressure tube, so that its movements shall conform as nearly as possible to the movements of the tube, the said curved spring passing upwardly on the outside of the tube and separated therefrom, terminating at or near the end of the tube at which point it is connected with and moved by the tube. The movements of the tube due to variations in pressure are preferably communicated to the index pointer through the medium of the curved spring all as will be hereinafter described and claimed.

The drawing represents in front elevation a pressure gage embodying this invention.

The casing A contains the usual curved Bourdon spring *a*, closed at one end and attached at its opposite end to the casing at the block *a'*, at which point the interior of the tube opens into the nipple *a²* by means of which the tube is placed in communication with the boiler or other receptacle in which the pressure is maintained all of which are of usual construction and do not form a part of this present invention.

In accordance with this invention a curved spring bar or plate *b*, having substantially the same curvature as the spring tube *a*, is twisted or otherwise formed so as to be attached to the casing preferably to the block *a'*, which is the point of attachment of the tube *a*.

While the tube *a* is shown as semi-circular only, the spring *b* will preferably be nearly circular, its two free ends *b'*, *b²*, being jointed at *b³*, *b⁴*, to the angle lever *c*, having its free end connected by a link *c'* with the usual toothed sector *c²* pivoted at *c³* and actuating the indicating pointer *c⁴*.

The free closed end of the pressure tube *a* is connected with the end *b'* of the spring *b* in suitable manner as through the stud *a^x* so that the movements of the tube due to variations in the pressure within it, or communicated to the end *b'* of the spring *b* and through the lever *c*, and the link *c'* to the sector and indicating pointer.

The ends *b'* and *b²* of the spring *b* are so located with relation to each other, and connected by the upper inclined arm of the lever *c*, that movement of the end *b'* of the spring caused by straightening of the tube *a* acts to move the end *b²* of the upper arm of said lever to the left in the drawing, about its fulcrum *b⁴* into or toward a vertical position. The arm of the lever to which the ends of the spring are attached being normally in an inclined position, as shown, any movement of the arm into or toward a vertical position would separate the ends of the spring one from the other, and therefore as the straightening of the tube *a* causes the end *b'* of the spring to move the arm of the lever into or toward a vertical position, it will itself be compelled to move upwardly in order to permit movement of the arm into a vertical position, or else the end *b²* of the spring will have to be moved downwardly to permit such movement of the arm, for the arm cannot be moved into a vertical position unless the ends of the spring are separated to a greater distance than shown in the drawing. The resiliency of the arms *b'* and *b²* is substantially the same, so that any separation of the ends due to the straightening of the arm of the lever *c* will be borne equally by the two arms, that is, the arm *b'* will be moved outwardly from its position shown and the arm *b²* inwardly from its position shown, and as a greater movement of the lever can be had where both ends *b'* and *b²* move to permit the separation, the upper arm of the lever may be moved nearer into a vertical position than would be the case were the separation to be borne entirely by the upper arm. Therefore, a greater movement of the upper arm and of the lever may be secured and a correspondingly greater movement of the sector and indicator be obtained to indicate a variation in pressure.

If desired the tube *a* may be extended upwardly on the opposite side of its point of

attachment as indicated by dotted lines to act at its opposite end on the end b^2 of the spring b , but in practice I find that by carrying the spring b around and connecting its two ends as shown, a half or semi-circular spring tube a , connected to either end of the spring causes an almost equal movement of the opposite end of the spring thus attaining substantially the same result as though the tube a acted at both its ends upon the spring.

The end b' of the spring b may be connected directly to the sector, in which case a semi-circular spring may be used. An objection to such an arrangement is that the movement of the lever c would be reduced practically one-half and would make the gage more difficult to read.

Suitable adjusting devices are provided to vary the tension of the spring b , and the position of its ends, the same being herein represented as threaded studs e projecting inwardly from the casing A , and upon which are run the nuts e' which act upon the spring b , rotation of the nuts effecting an adjustment of the spring.

By giving the spring substantially the same curvature as the tube a' , a very uniform movement is secured and by separating the spring from the tube and placing it outside the latter it is not affected by the heat radiating from the tube and is better calculated to prevent setting of the tube owing to its greater leverage.

It will be seen that the tube is a means only for moving the spring b which being separated from the tube and independent thereof is not affected thereby.

While I prefer to actuate the indicating pointer through the medium of the spring b , as herein shown, yet the spring may be used simply to reinforce the tube, the latter being connected in the customary manner with and to move the indicating pointer.

This invention is not limited to the particular construction herein shown as the same may be varied without departing from the spirit and scope of the invention, as set forth in the claims.

I claim—

1. In a pressure gage an inclosing case, and a curved pressure tube attached at one end thereto, combined with a reinforcing curved

spring for and independent of said tube and attached to the inclosing case at a point adjacent to the point of attachment of said tube, to be acted upon at its free end by the free end of said tube, and an indicating pointer moved by said tube, substantially as described.

2. In a pressure gage an inclosing case, and a semi-circular pressure tube attached at one end thereto, combined with a circular spring attached intermediate its ends to the said inclosing case and having one of its ends acted upon by the free end of said tube, and a lever connected with both ends of the spring, and an indicating hand moved by said lever, substantially as described.

3. In a pressure gage, an inclosing case, and a curved pressure tube attached at one end thereto, combined with a curved reinforcing spring for and independent of said tube and attached to the inclosing case at a point adjacent to the point of attachment of said tube, to be acted upon at its free end by the free end of said tube, an indicating pointer moved by said tube, and an adjusting device for said spring, substantially as described.

4. In a pressure gage, an inclosing case, and a semi-circular pressure tube attached at one end thereto, combined with a circular spring attached intermediate its ends to the said inclosing case, and having one of its ends acted upon by the free end of said tube, a lever connected with both ends of the spring, an indicating hand moved by said lever, and the adjusting devices e , to operate, substantially as described.

5. In a pressure gage, an inclosing case, and a semi-circular pressure tube attached at one end thereto, combined with a circular spring twisted intermediate its ends and secured to the said inclosing case and having one of its ends acted upon by the free end of said tube, a lever connected with both ends of the spring, and an indicating hand moved by said lever, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RUDOLF KOHLHEPP.

Witnesses:

FREDERICK L. EMERY,
FRANCES M. NOBLE.