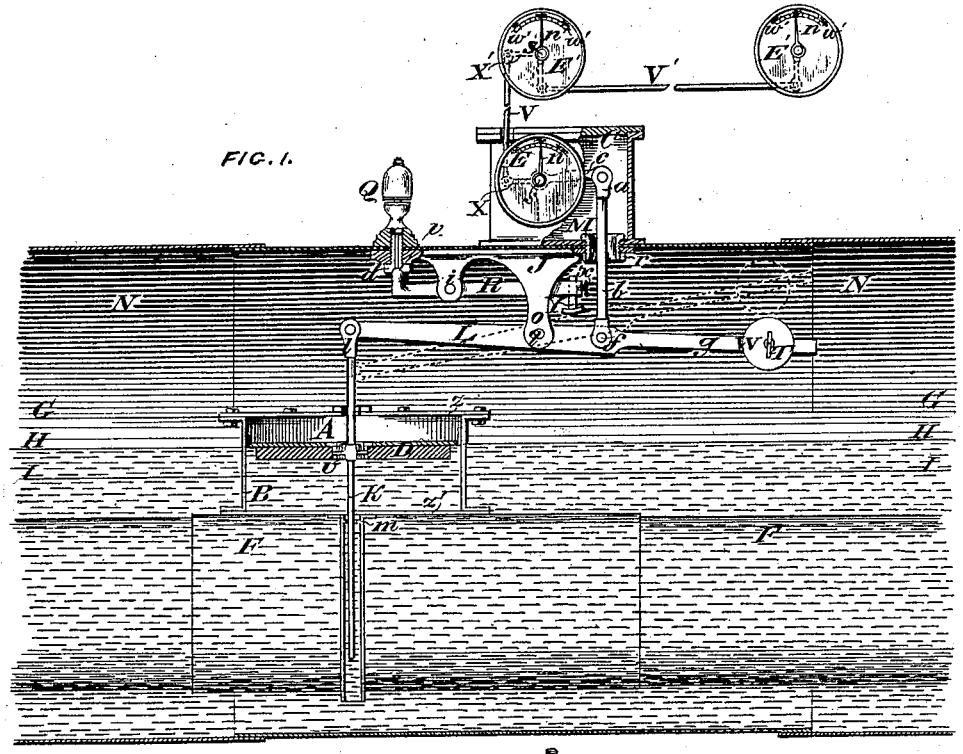
A. MOON

Steam Boiler Indicator.

No. 168,913. Patented Oct. 19, 1875.

FIG. 1.



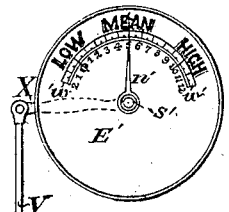


FIG. 3.

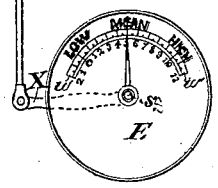


FIG. 4.

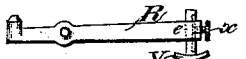


FIG. 5.

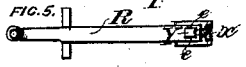
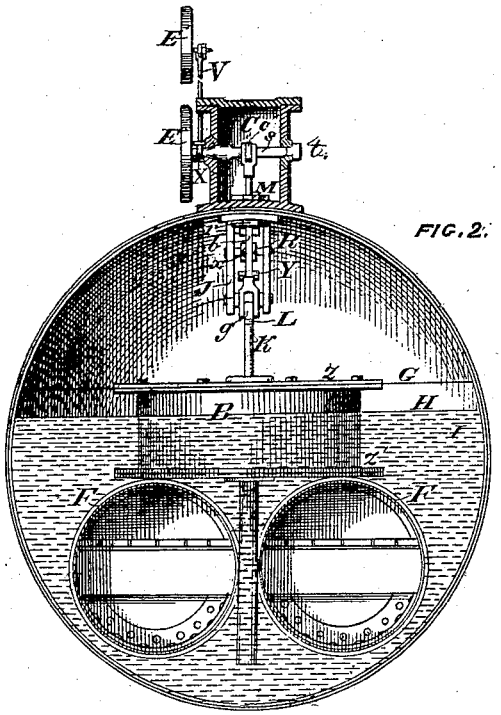


FIG. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ANDREW MOON, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN STEAM-BOILER INDICATORS.

Specification forming part of Letters Patent No. **168,913**, dated October 19, 1875; application filed December 29, 1874.

To all whom it may concern:

Be it known that I, ANDREW MOON, of the city and county of San Francisco, State of California, have invented an Improvement in Steam-Boiler Safety-Gages, of which the following is a specification:

This invention is an improvement on a device patented by me September 1, 1874; and consists essentially of a graduated scale or scales, with readings affixed to one or more dials acting in conjunction with one another, so as to denote between the low, mean, high, or other levels of the water contained in the boiler the exact height of this water at any time at such place or places as may be found most convenient. At low water an alarm is sounded by a whistle, and the lever which carries and operates the whistle-valve embodies an adjustment, so that said valve may be opened at various levels by a proper variation in the setting of the adjustment.

Figure 1 is a longitudinal vertical section of a double-flue steam-boiler provided with the improved safety water-gage embodying my invention. Fig. 2 is a transverse vertical section of Fig. 1 through the line *u u*. Fig. 3 is a front view of the dials, acting in connection with one another, and provided with the graduated scales and readings embodying my invention. Figs. 4 and 5 are a side view and plan, respectively, of the lever provided with the adjustable attachment embodying my invention.

With reference to the drawing, the several parts of this improved gage may be described as follows: A is the float, which consists of a spindle, *k*, provided with a cross-head, *l*, at the top, and a compound disk of cork and earthenware, D, adjusted at right angles, near the middle, by a universal joint, U. The float thus constructed is placed in a cylindrical box, B, which is secured to the flues F of a boiler, N, and provided with top and bottom covers *z z'*, the top cover having a central opening provided for the spindle *k* to play within, and to admit of its attachment to the mechanism above that actuates the dial-needle and alarm-whistle, while the bottom cover *z'* has a central pipe fixed thereto, reaching nearly to the bottom of the boiler, and a guide-ring, *m*, to allow of the vertical movements of this spindle within it. To the cross-head *l* of this spindle or float-rod *k* one end of a lever, L, is attached, so that it may pivot onto the bearings *o* of an iron frame, J, at *q*, the other end of this lever being shaped into a slide-bar, *g*, and provided with a sliding weight, W, adjusted by a screw, T, for the purpose of balancing this float and attachments to the required position. At a convenient distance from the pivot *q* of this lever-arm L, near the slide-bar *g*, a rod, *b*, pivots at *f*, and reaches through the top of the boiler N into a small steam-chest, C, by means of an opening in the screw M, which is provided also for securing this steam-chest steam-tight to the boiler by the packing and nut *r*, as well as to partially hold the frame J in position. To the cross-head *a* of this rod *b* the projecting arm *c* of a spindle, *s*, is attached, so that, as the rod *b* is moved up and down, this arm *c* and spindle *s* will have a vertical reciprocating motion, and thus actuate backward or forward an indicating-needle, *n*, fixed to the end of this spindle on a dial-face, E. This dial-face E has a graduated scale, *w w*, provided, by which the high, low, mean, or other readings will serve to denote the exact height of the water within the boiler, as this needle *n* points to each graduated mark on this scale successively, and will thus intimate to the attendant or engineer whether the level determined by him is being preserved or not. To that part of the spindle *s* which projects from the steam-chest C, and between the steam-chest and the dial-face E, an arm, X, is fixed, so as to receive a rod, V, attached to a similar projecting arm, X', for actuating another dial-needle, *n'*, on a similar face, E', the object of this part of my invention being, first, to be able to ascertain the correct height of the water contained in a boiler in inches or fractional parts of an inch; and, secondly, to have such readings, for convenience, placed in several positions for observation, as in the case of a steamboat or factory, where it may be more satisfactory to a captain or superintendent to have such results in his private office under his own supervision, as well as on the boiler itself. One end of the spindle *s* is shaped into a conical form, and operates in a conically-prepared bearing in one of the walls of the steam-chest C, so as to project through it and the fixed dial E, for the attachment

thereto of the needle *n*, while the bearing for the straight end of this spindle is covered by a screw, *t*, made to fit steam-tight. To the bracket J a lever, R, is pivoted at *i*, one end of which is provided with an adjustable inverted T-shaped attachment, Y. This attachment Y is made so as to fit to and slide vertically up and down within a slot prepared in the end *e e* of this lever R, and can be adjusted to the required position by a set-screw, *x*, so that, as the arm of the lever L rises by the fall of the float A, the portion between the pivot *q* and rod *b* will strike the curved part of this attachment, thus lifting it, and causing the other end of the lever R, formed into a conical valve, *v*, to fall from its seating in the screw *d*, containing the duct, to the alarm-whistle Q, so that, when removed from its seating, where it is held by the upward pressure of the steam within the boiler, as described, the steam will rush into this whistle and give the alarm, the object of this part of my invention being to suit the time of giving this alarm to the requirements of those under whom the control of the boiler is placed. Thus some might wish to have an alarm given previous to the chronicling of the low-level mark, while others again might prefer that the alarm should be given at a short interval after the low level has been reached.

I make no claim to the compound float D, as this is covered by my patent No. 154,611, of date September 1, 1874; nor do I make any claim, broadly, for the feature of adjustability in a mechanism of a steam-boiler safety-gage for the purpose of operating the whistle-valve at different water-levels; but

What I claim as my invention, and for which I am desirous of obtaining Letters Patent, is—

The combination of the lever R, provided with the adjustable attachment Y, and valve-plug *v* with the whistle Q and balanced lever L, attached to the float A, and provided with rod *b* for actuating the spindle *s*, projecting arm X, connecting-rod V, and needle *n* on the fixed dial-face E, substantially as and for the purposes herein set forth and specified.

ANDREW MOON.

Witnesses:

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LIONEL VARICAS.