

(No Model.)

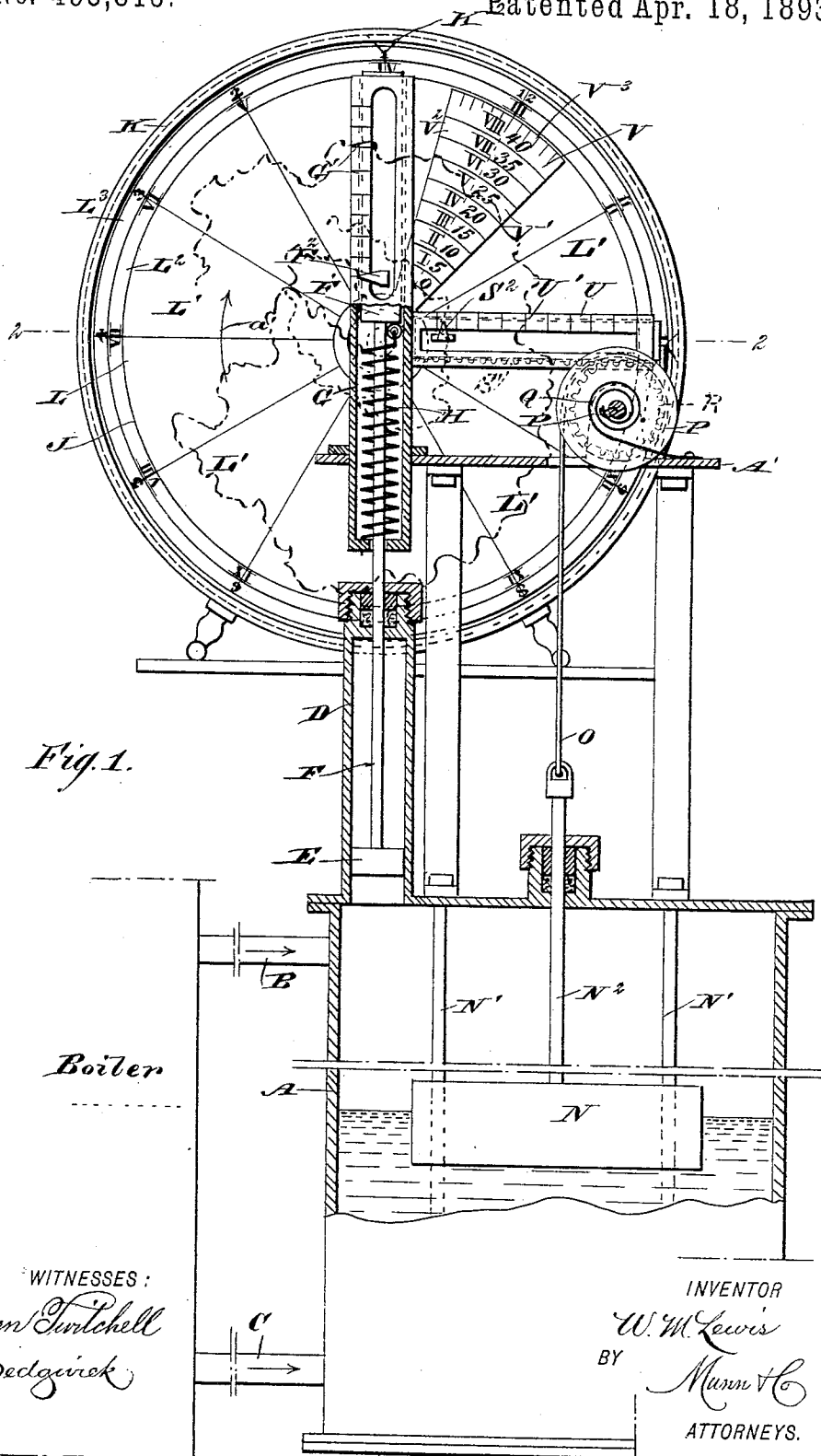
2 Sheets—Sheet 1.

W. M. LEWIS.

STEAM PRESSURE AND WATER LEVEL RECORDER FOR BOILERS.

No. 495,815.

Patented Apr. 18, 1893.



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2 Sheets—Sheet 2.

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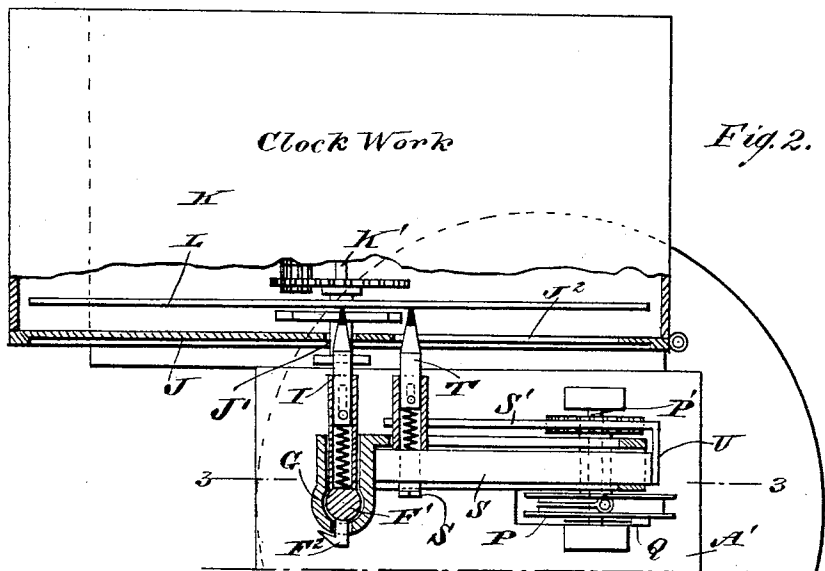


Fig. 2.

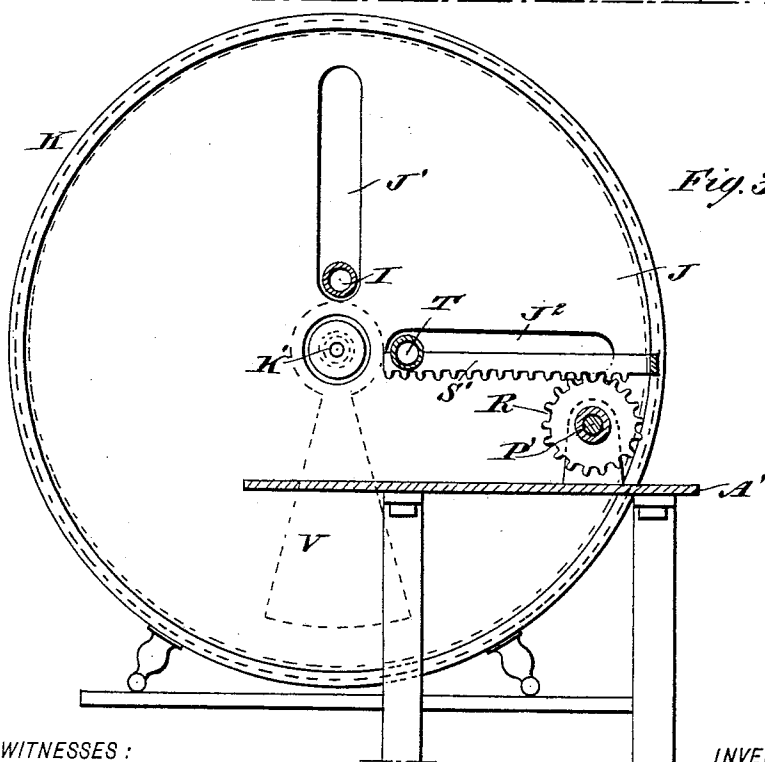


Fig. 3.

WITNESSES:

Donn Fitchell
C. Sedgwick

INVENTOR

W. M. Lewis
BY *Munn & Co.*

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM MORGAN LEWIS, OF THURBER, TEXAS.

STEAM-PRESSURE AND WATER-LEVEL RECORDER FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 495,815, dated April 18, 1893.

Original application filed September 3, 1891, Serial No. 404,658. Divided and this application filed May 3, 1892, Serial No. 431,627. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MORGAN LEWIS, of Thurber, in the county of Erath and State of Texas, have invented a new and Improved Steam-Pressure Recorder for Boilers, of which the following is a full, clear, and exact description.

This application forms a division of the original application for Letters Patent, Serial No. 404,658, filed by me September 3, 1891, and the device for recording the water level of the boiler hereinafter referred to, forms the subject matter of the said original application.

The object of the invention is to provide a new and improved steam pressure recorder for boilers, which is simple and durable in construction, very effective in operation, and arranged to automatically record the pressure of the steam in the boiler for a given period. The invention consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which the same letters of reference indicate the same or corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a sectional plan view of the same on the line 2—2 of Fig. 1 the springs being removed to show the pencils; and Fig. 3 is a sectional side elevation of part of the improvement on the line 3—3 of Fig. 2.

My improved steam pressure recorder for boilers is provided with a closed vessel A, connected near its upper end by a pipe B, with the steam compartment of the boiler, and at its lower end by a pipe C, with the water compartment of the boiler. The vessel A is so arranged relative to the boiler that the water level in the vessel A corresponds with the level of the water in the boiler, the vessel preferably extending throughout the height of the boiler and forming part of the same or placed a suitable distance therefrom at a convenient point.

On the top of the vessel A is arranged a cylinder D, extending upwardly and in which is fitted to slide a piston E, provided with a

piston rod F, extending through a suitable stuffing box in the top of the cylinder D. The upper end of the piston rod extends into a casing G, supported on a suitable platform A', held on a framework arranged on top of the vessel A. The extreme upper end of the piston rod F is formed with an enlargement F', connected with one end of a spring H, coiled in the lower part of the casing G, said spring being attached to the bottom of the casing.

From the front part of the enlargement F' of the piston rod F extends a pointer F², indicating steam pressure on the graduation G', fixed on the casing G. From the rear part of the enlargement F' extends transversely, a spring pressed pencil I, see Fig. 2, passing through a vertical slot J', formed in a transparent cover J, of a clock-work K, of any approved construction. The hour shaft K', of the clock-work K carries a dial L, arranged to make one full rotation either during twelve or twenty-four hours, the said dial being correspondingly divided into twelve or twenty-four equal sector parts L', and with a double graduation L² and L³, distinguished from one another by Roman and Arabic numerals and both indicating hours of the sector parts L', as hereinafter more fully described. When the clock-work K is wound up, the dial L revolves in the direction of the arrow a' (on Fig. 1). A pointer K², fixed on the casing of the clock-work K indicates the correct hour of the day on the graduation L³, of the said dial. Thus, as shown in Fig. 1, the hour of the day is one o'clock. The pressure of the steam in the vessel A exerts its influence on the piston E so that the latter is moved upward so that the pointer F² indicates the pressure in pounds on the graduation G'. At the same time, the pencil I marks a line on the dial L, which latter, on account of its revolving according to time, notes the pressure at the proper time. The dial L is preferably made of slate, so that the markings can be wiped off whenever desired. The spring H insures a return movement of the piston E and connected parts according to the diminishing pressure of the steam in the vessel A. Within the vessel A is also arranged a float N, adapted to rise and fall with the level of the water in the vessel

A, the said float being guided on suitable guide rods N' , arranged within the vessel A. The float N is provided with an upwardly-extending rod N^2 , passing through a suitable stuffing box in the top of the vessel A, the upper end of the said rod being connected with the end of a band or belt O, passing over the rim of a wheel P, and fastened thereto, the said wheel being secured on a shaft P' and mounted to turn in suitable bearings on the platform A' .

A spiral spring Q, is fastened with one end to the wheel P and with its other end on the platform A' , (see Fig. 1) the said spring serving to rotate the wheel P when the water rises in the vessel A and the float N moves upward. The spring uncoils when the water falls, by the weight of the float N descending with the falling water. On the shaft P' is secured also a gear wheel R, meshing into a rack S' , supported from a horizontally-arranged slide S, mounted to slide in suitable bearings arranged in the casing U, supported by the casing G, as will be readily understood by reference to Fig. 2.

On the front of the slide S is arranged a pointer S^2 , indicating the height of the water in the boiler on a graduation U' , formed on the casing U. On the rear end of the slide S is supported a spring pressed pencil T, extending through a horizontally arranged slot J^2 , formed in the cover J. The inner end of the pencil T is adapted to indicate on the dial L, and travels in a horizontal line standing at right angles to the vertical line in which travels the pencil I previously mentioned.

On the shaft K' of the clock-work K is hung loosely an indicator V, made in the shape of a sector corresponding in size to one of the parts L' of the dial L. The indicator V is provided with two sets of graduations V' and V^2 , corresponding to the graduations G' and U' , respectively, of which the former indicates the boiler pressure and the other the height of the water level in feet and subdivisions of feet in the boiler and vessel A. On the indicator V is arranged a graduation V^3 , indicating the subdivisions of five minute spaces of one hour.

It is understood that the graduation V' on the indicator V indicates a boiler pressure corresponding to that of graduation G' , and is used to read off the boiler pressure marked by the pencil I on dial L at any of the sector parts L' so marked by the said pencil. In a like manner, the graduation V^2 indicates height of water level in feet and subdivisions of feet corresponding to that of the graduation U' , and is used to read off the height of the water level on any of the sector parts L' of the dial L in case the latter is already marked by the pencil T. The graduation L^2 is used in connection with the graduation V^3 of the indicator V to read off the hour of the day during which the pencil T marks the corresponding sector part L' , and the graduation L^3 indicates in a like manner, the hour

of the day during which the pencil I made its mark on the corresponding sector part.

As shown in Fig. 1, the Roman numerals on the indicator V and denoted by V^2 represent the height of the water level in feet in the boiler, while the Arabic numerals indicate the pressure of the steam in pounds and are denoted by V' , see Fig. 1.

The operation is as follows: When the boiler is in use and the clock-work K is wound up and set going, then the dial L rotates and the piston E and the float N move up and down, according to the increased or diminished pressure of steam and increased or diminished supply of water in the boiler. The movement of the piston E is indicated by the pencil I on the dial L, and the movement of the float N is also indicated on the said dial by the pencil T. At the same time the pressure of the steam in the boiler can be read on the graduation G' at the pointer F^2 , and the height of the water in the boiler can be read on the graduation U' at the pointer S^2 . Now, when it is desired to read the time of a certain boiler pressure indicated by the pencil I on the dial L, then the operator shifts the indicator V so that its right hand edge intersects the desired point of time on the graduation section L^3 and the amount of boiler pressure can be read on the graduation V' as the latter corresponds with the graduation G' indicating boiler pressure, as above explained. At the same time the center radial line of the indicator indicates the hour of the dial L^3 and subdivisions of the hour are indicated by the graduation V^3 . In a like manner, the height of the water in the boiler at a certain time can be read by the indicator V on the dial L by shifting the said indicator so that the left hand edge intersects the desired point of the line made by the pencil T, the graduation V^2 indicating the height of the water in feet and also the graduation V^3 indicates the time of the dial L^3 . Thus, it will be seen that no single steam gage or water gage is required for the boiler, as the device indicates at sight the steam pressure and the height of the water in the boiler, and it further furnishes indicator diagrams of the steam pressure and the height of the water in the boiler.

By this device the owner of a boiler can at any time find whether proper attendance has been given to the boiler in furnishing the same with the necessary amount of water, and whether the attendants keep the fires under the boiler in proper order to hold a sufficient and constant steam supply. The pencils I and T are preferably of different colors, say red, and blue respectively, to readily trace their markings on the slate dial, the red color line representing the steam and the blue line the water in the boiler.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a device of the class described, the

combination with a dial and a clock-work for driving the said dial, of an indicating pencil adapted to indicate on the said dial means for operating the pencil from the boiler and a graduated indicator hung loosely on the said dial and adapted to indicate the time of the markings by the said pencil on the said dial, substantially as shown and described.

2. In a device of the class described, the combination with an indicating pencil controlled by the steam pressure in the boiler, of a revoluble dial on which the said pencil is arranged to mark, a clock-work for driving the said dial, and a spring retracted piston, substantially as described, for imparting motion to the said pencil by the increasing or diminishing pressure of the steam in the boiler, substantially as shown and described.

3. In a device of the class described, the combination with a vessel connected with the boiler, of a cylinder opening into the said vessel and containing a piston, and a spring pressed piston rod, of a pencil held on the said spring pressed piston rod, a revoluble dial on which the said pencil is arranged to mark, and a graduated indicator to indicate the time of the markings by the pencil on the dial and a clock-work for driving the said dial, substantially as shown and described.

4. In a device of the class described, the combination with a vessel connected with the boiler, of a cylinder opening into the said vessel and containing a piston, and a spring-pressed piston rod carrying a pointer, of a pencil held on the said spring-pressed piston rod, a revoluble dial on which the said pencil is arranged to mark, and a clock-work for driving the said dial, and a graduated indicator hung loosely on the said dial and adapted to indicate the time of the markings by the said pencil on the said dial, substantially as shown and described.

5. In a device of the class described, the combination with a spring-pressed piston controlled by the steam pressure in the boiler, of a pointer held on the outer side of the upper end of the piston rod of the said piston, a fixed casing having a vertical transversely graduated surface on which the said pointer indicates, a pencil supported on the inner side of the upper end of said piston rod, a dial mounted to turn and on which the said pencil is arranged to mark, and a clock-work for driving the said dial, substantially as shown and described.

6. In a device of the class described, the combination with a spring-pressed piston controlled by the steam pressure in the boiler, of a pointer held on the piston rod of the said piston, a fixed casing having a graduation on which the said pointer indicates, a pencil supported on the said piston rod, a dial mounted to turn and on which the said pencil is arranged to mark, a clock-work for driving the said dial, and a graduated indicator hung loosely on the said dial and adapted to indicate the time for the indicating line marked

by the said pencil on the said dial, substantially as shown and described.

7. The combination with the clock-work the graduated dial rotated thereby and the steam pressure and water level pencils working on the face thereof and operated from the steam and water space of the boiler respectively, of the indicator hung loosely on the axis of the dial and having two sets of graduations, one for each pencil, substantially as set forth.

8. The combination with the clock work the graduated dial rotated thereby and the steam pressure and water level indicating pencils movable on the face of the dial in planes at right angles to each other and controlled respectively from the steam and water space of the boiler, of the indicator hung loosely and provided with two sets of graduations, one for each pencil, substantially as set forth.

9. The combination with the clock work, its casing having a pointer K^2 and the dial on the hour shaft provided with radial graduations and two sets of numerals, the outer set of which is read in connection with the said pointer, of the two pencils working on the face of the dial and operated respectively from the steam and water space of the boiler, and the loosely hung indicator having three sets of graduations reading as described, substantially as set forth.

10. A steam pressure and water level recorder for boilers, comprising a vessel connected at its upper and lower ends with the upper and lower portions of the boiler and provided with a steam cylinder communicating with its upper portion above the water level, a framework above the vessel, a clock-work having a vertically rotating graduated dial, a piston in said steam cylinder provided with an upwardly extending rod provided with a pencil to work on the dial, a horizontally sliding pencil also marking on the dial, and a float in the water space of said vessel and connected with the horizontally working pencil; whereby the steam pressure and water level will be simultaneously recorded on the dial, substantially as set forth.

11. The combination with the dial, and its clockwork, of two graduated surfaces projecting vertically and horizontally across the dial from its axis, and two pencil carriers each sliding parallel to said surfaces and provided with pointers working thereon and with pencils marking on the dial, operative connections between the said pencils and the steam and water spaces respectively of the boiler, and the loosely hung indicator; whereby the steam pressure and water level may be read from the pointers and graduated surfaces and the times of the pencil markings be read in connection with the indicator, substantially as set forth.

WILLIAM MORGAN LEWIS.

Witnesses:

M. LEWIS,

THOMAS PARKER.