

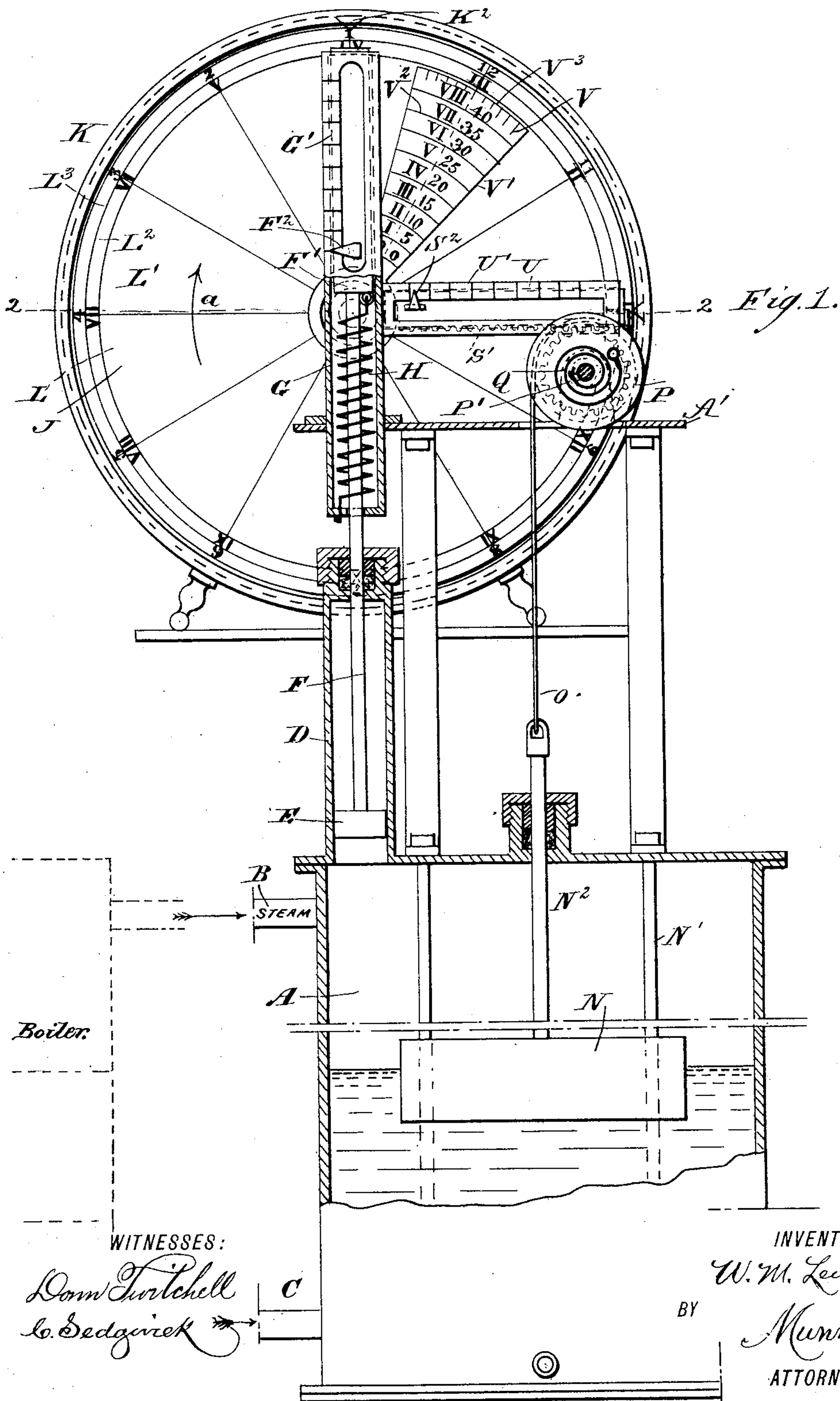
(No Model.)

2 Sheets—Sheet 1.

W. M. LEWIS.
BOILER WATER LEVEL RECORDER.

No. 483,722.

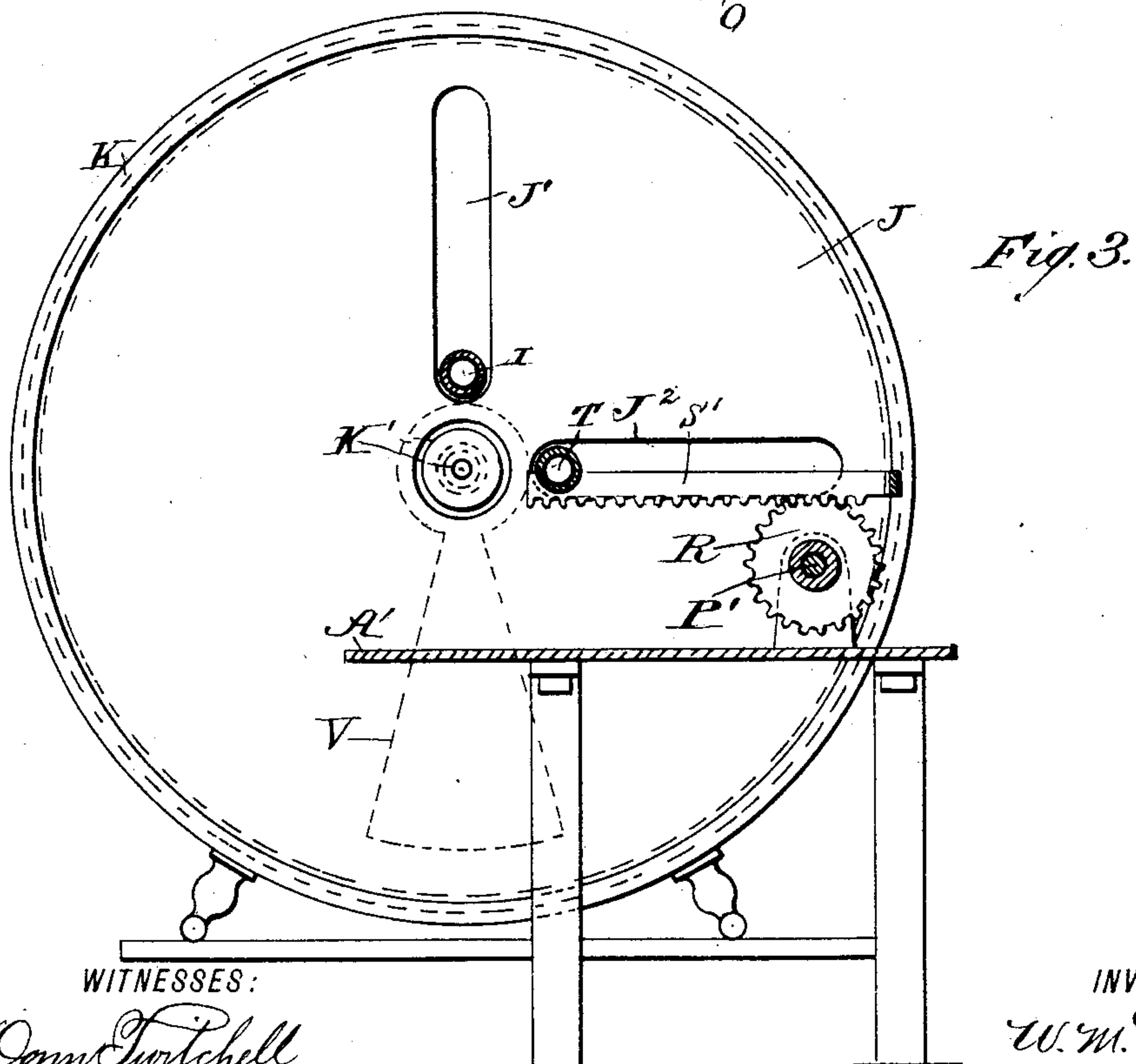
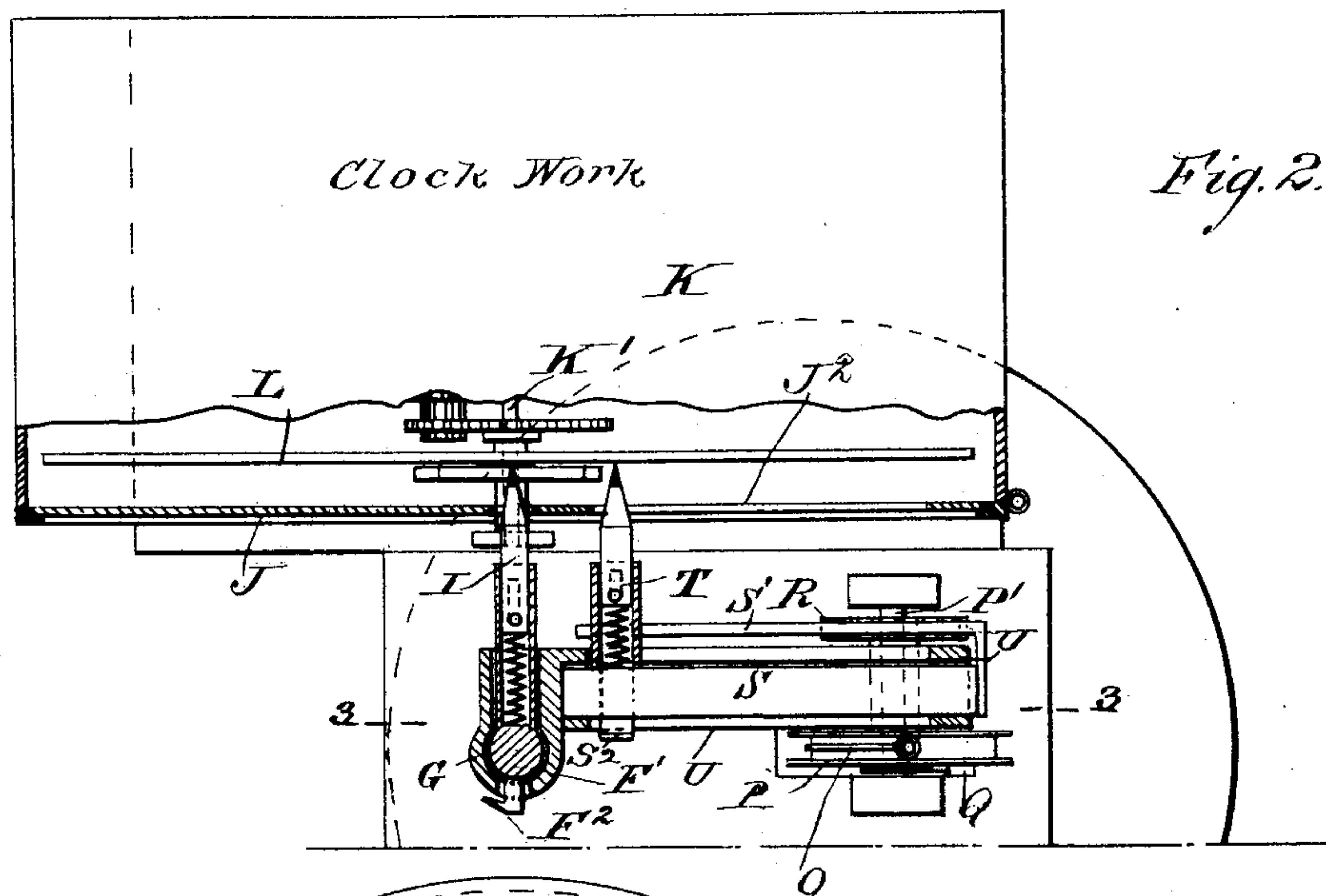
Patented Oct. 4, 1892.



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UNITED STATES PATENT OFFICE.

WILLIAM MORGAN LEWIS, OF NEW CASTLE, COLORADO.

BOILER WATER-LEVEL RECORDER.

SPECIFICATION forming part of Letters Patent No. 483,722, dated October 4, 1892.

Application filed September 3, 1891. Serial No. 404,658. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MORGAN LEWIS, of New Castle, in the county of Garfield and State of Colorado, have invented a new and Improved Boiler Water-Level Recorder, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved boiler-recorder which is simple and durable in construction, very effective in operation, and arranged to automatically record the pressure of steam in the boiler and the water-levels during the time the boiler is in use.

The device for recording the pressure of the steam in the boiler shown in the drawings, and hereinafter described, will form the subject-matter of a separate application, which will be a division of this one.

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 lines 2 2 of Fig. 1, and Fig. 3 is a sectional side elevation of part of the improvement on the line 3 3 of Fig. 2.

My improved boiler-recorder 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 place.

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 outer end of the piston-rod F extends into a casing G, supported on a suitable plat-

form 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 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 clockwork K of any approved construction.

The hour-shaft K' of the clockwork 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 clockwork K is wound up, the dial L revolves in the direction of the arrow a. A pointer K², fixed on the casing of the clockwork 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 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 N², passing through a suitable stuffing-box in the top of

the vessel A, the outer 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
 5 on a shaft P', mounted to turn in suitable bearings on the frame A'. A spiral spring Q is fastened with one end to the wheel P and with its other end on the frame A', the said spring serving to rotate the wheel P when the
 10 water rises in the vessel A and the float N moves upward. The spring Q coils up when the water falls by the weight of the float N, descending with the falling water. On this shaft P' is secured, also, a gear-wheel R, mesh-
 15 ing 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
 20 front of this slide S is arranged a pointer S², 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
 25 through a horizontally-arranged slot J², 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 pencil I, previously men-
 30 tioned.

On the shaft K' of the clockwork 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
 35 provided with two sets of graduations V' and V², 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 subdivi-
 40 sions of feet of the water in the boiler and vessel A. On the peripheral end of the indicator V is arranged graduations V³, indicating the subdivisions of five-minute spaces of one hour. It is understood that the gradua-
 45 tion 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
 50 pencil. In a like manner the graduation V² indicates the height of water-level in feet and subdivisions of feet corresponding to that of graduation N', and is used to read off the height of the water-level on any of the sector
 55 parts L' of dial L in case the latter is already marked by the pencil T. The graduation L² is used, in connection with the graduation V³ of the indicator V, to read off the hour of the day during which the pencil T marks the
 60 corresponding sector part L', and the graduation L³ 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
 65 the indicator V and denoted by V² represent the height of the water-level in feet in the boiler, while the Arabic numerals indicate in

pressure of the steam in pounds and are denoted by V'. (See Fig. 1.)

The operation is as follows: When the boiler
 70 is in use and the clockwork 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 and diminished
 75 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
 80 steam in the boiler can be read on the graduation G' at the pointer F², and the height of the water in the boiler can be read on the graduation U' at the pointer S². Now when it is desired to read the time of a certain
 85 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 graduated scale L³, and the amount of boiler-pressure
 90 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 on the dial
 95 L³, and subdivisions of the hour are indicated by the graduation V³. In a like manner the height of the water in the boiler at a certain time can be read by the indi-
 100 cator 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 V² indicating the height of the water in feet, and also the graduation
 105 V³ indicates the time on the dial L³. 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
 110 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
 115 attendance has been given to the boiler in furnishing the same with the necessary amount of water and whether the attendant keeps 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—
 120 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
 125 Patent—

1. In a boiler-recorder, the combination, with a float controlled by the rising and falling of the water in the boiler, of a pencil controlled by the said float, a dial on which the
 130 said pencil is adapted to mark, a clockwork for driving the said dial, and a graduated indicator hung loosely on the said dial and adapted to indicate the time for the indicat-

ing-line marked by the said pencil on the said dial, substantially as shown and described.

2. In a boiler-recorder, the combination, with a float controlled by the rising and falling of the water in the boiler, of a pencil controlled by the said float, a dial driven by clockwork and on which the said pencil is adapted to mark, 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, and intermediate mechanism, substantially as described, for connecting the said float with the said pencil, substantially as shown and described.

WILLIAM MORGAN LEWIS.

Witnesses:

MAX L. SCHAYER,
HENRY HARRIS.