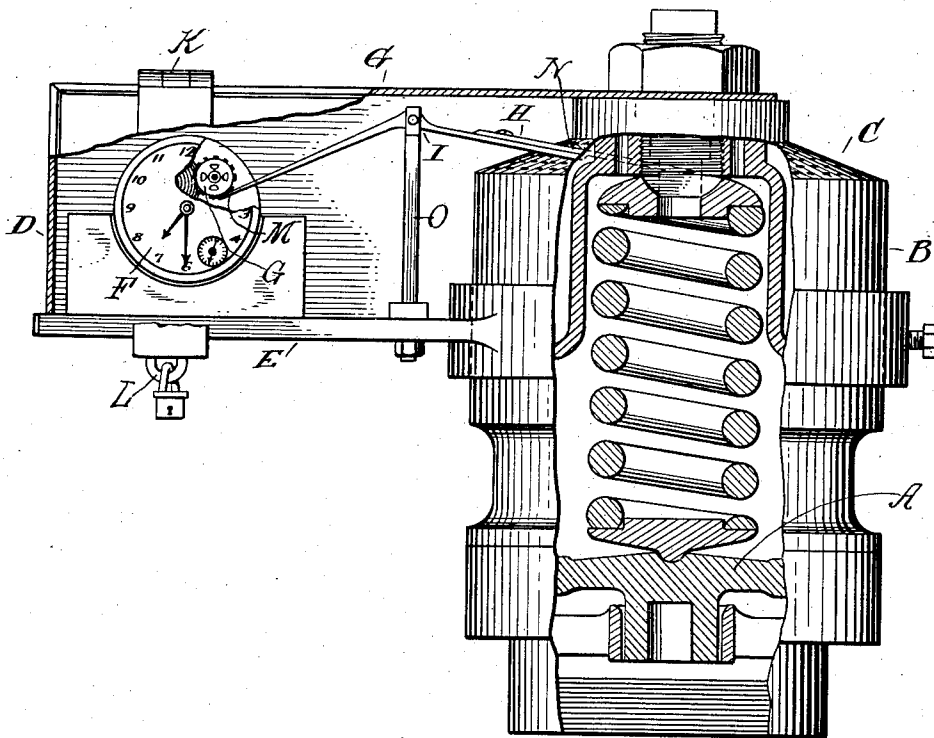


F. J. ZERBEE.
WASTE STEAM DETECTOR.
APPLICATION FILED JAN. 20, 1911.

1,027,368.

Patented May 21, 1912.



Frank J. Zerbe.

Witnesses:

Edward K. Campbell
Emma E. Campbell

Inventor:

By E. D. Campbell, Atty.

UNITED STATES PATENT OFFICE.

FRANK J. ZERBEE, OF BELLEFONTAINE, OHIO.

WASTE-STEAM DETECTOR.

1,027,368.

Specification of Letters Patent.

Patented May 21, 1912.

Application filed January 20, 1911. Serial No. 603,752.

To all whom it may concern:

Be it known that I, FRANK J. ZERBEE, a citizen of the United States, residing at Bellefontaine, in the county of Logan and State of Ohio, have invented a new and useful Waste-Steam Detector, of which the following is a specification.

My invention relates to devices for registering the length of time a fluid under pressure, as for example steam in a steam boiler, is allowed to remain above normal.

The invention, has for its primary object to provide an improved device of this class which shall be capable of registering the length of time the escape valve, commonly called the safety valve, on a steam boiler, and more particularly the boiler of a locomotive or the like is allowed to remain open, or blow off superfluous pressure of steam, whereby, the extent of improper firing, and the consequent waste of fuel, and water will be registered.

A further object of my invention is to provide an improved device of this class which shall be simple in construction and operation, inexpensive, and efficient, and easily applied to valve structures of standard, or common form.

My invention consists in certain features of novelty in the construction, combination, and arrangement of the various parts designed for the attainment of the foregoing ends, as shown in the accompanying drawings, and described in this specification, and more particularly pointed out in the claims thereof.

In the said drawings which illustrate an example of my invention, the figure is a side view of my device attached to an escape valve, or vent on a steam boiler, the valve or vent tube being shown in section.

Referring to the drawing, A represents an escape valve or vent proper; B the jacket or casing containing the same; C the perforations in the top of the jacket, or casing for escapement of the steam, when the valve A is raised or open.

D is a casing secured to support E, in which a clock or time registering device F is mounted.

E is a support which terminates in any suitable means for fastening it to the casing, or jacket B.

H is a lever pivoted at I, in suitable bearings on standard O, the lower, or inner end of lever H, bears against the escapement

wheel G of the clock F. The upper or outer end of lever H terminates in a blade N, located immediately above perforations C of the jacket B, and being of sufficient weight to hold brush M against the escapement wheel G of the clock F, by reason of the rocking movement of lever H, while there is no escapement of steam through the escapement valve or vent A.

K is a hinge to door of casing D.

L is a lock for locking the door of casing D.

This device is designed to determine the waste of fuel, and water in running engines, especially locomotives.

A great many firemen on locomotives labor under the impression that the hotter they keep their fires the better firemen they are, and thereby force their steam up to such a pressure as to keep their escape vents constantly "popping, or blowing off" superfluous steam which results in an absolute and unnecessary waste of fuel and water.

Scientific calculation has shown that it takes one quarter of a pound of coal to produce the amount of steam which escapes through an escape vent three and one half inches in diameter for each second of such escapement or fifteen pounds of coal per minute, or approximately one half of a ton of coal per hour, and with larger escapement vents the waste is proportionally greater. Heretofore there has been no way of determining how much coal is wasted in a given time in the operation of an engine, or how long the escape vent has been allowed to "pop or blow off". By the use of my device the length of time an escape vent has been open, or allowed to "pop or blow off", is definitely and accurately registered on the dial of a time-registering device, and the amount of fuel wasted can be readily computed. When the engineer and fire-man on a locomotive, for instance, know that when they get to the end of their run that an inspector can unlock the casing of my device and that the time-registering device therein will show the exact number of minutes their escape vent has been allowed to "pop or blow off", they will endeavor to keep their steam just below the "popping or blowing off" point which will result in a great saving of fuel.

From experiments so far made by using my device a waste of an average of over two

tons of coal have been saved in a ten ton run, which shows that out of every ten cars of coal consumed over two cars are wasted by improper firing.

- 5 When a locomotive is ready to start on a run, the clock F is wound and the hands set at any given point on the dial, for instance, at 12 o'clock by an inspector who then locks the casing D, to prevent its being tampered
10 with by any one except the person who is to inspect it at the end of the locomotive's run to determine the length of time the escape vent has been allowed to be open "pop or blow off", during the run.
- 15 The operation of my device is, as follows: The lower, or inner end of lever H normally holds a brush M against the escapement wheel G of the clock F, thus holding the mechanism of the clock at a standstill, there-
20 by preventing the hands moving from their positions, as fixed by the inspector before the start of the locomotive on its run. If the steam is forced up to the "popping or blowing off" point during the run, it will come in
25 contact with the blade N of lever H in its passage through the jacket, or casing B to the open, and force the said blade upward thereby rocking lever H on its pivot at I, and causing the lower end to draw away the
30 brush from contact with the escapement wheel G of the clock F, which will result in the release of the mechanism of the clock, which will immediately start to run and register by its hands upon its dial until the
35 steam pressure is lowered to such a point as to allow the escapement valve A to close and the upper or outer end of lever H to fall to its normal position, thereby raising the lower, or inner end, of the said lever and
40 bringing the brush H, in contact with the escapement wheel G of the clock F, thereby stopping the movement of the hands of the clock, thus indicating on the dial of the clock the exact length of time the escape vent has
45 been allowed to be open, or to "pop" or "blow off".

What I claim is:

1. In combination with the escape valve of a boiler, and a clock adjacent thereto, of
50 a pivoted lever, one end of which is directly

operated by the escaping steam from the escape valve, the other end governing the movements of the clock, as and for the purpose set forth.

2. The combination with the escape valve 55 of a boiler, of a clock that registers the time that steam escapes, a clock-controlling lever pivoted between the two, and operated directly by escaping steam from the boiler, having operating connections through which it affects the running of the clock, and
60 an inclosing case, as and for the purposes set forth.

3. In combination with the escape valve of a steam boiler, and a registering device, of mechanism actuated directly by the full pres- 65 sure of the escaping steam from the boiler, having operating connections through which it affects the running of the registering device, as and for the purpose set forth.

4. An escape-steam registering device for 70 escape valves comprising a time register having actuating mechanism, stopping and releasing means controlling said time register, and a steam-impact member in operative relation to said stopping and releasing means, 75 and adapted to lie in the path of the steam issuing from the escape valve.

5. An escape-steam registering device for escape valves comprising a time register hav- 80 ing actuating mechanism, stopping and releasing means controlling said time register, and a steam-impact member in operative relation to said stopping and releasing means, and an attaching means for mounting the device upon the escape valve casing, and 85 holding the steam-impact member in the path of the steam issuing from the escape valve.

6. In a device of the class described, the combination of an escape vent for fluid un- 90 der pressure, means arranged to be in the current of the fluid escaping from said vent and adapted to be influenced thereby, and means operatively related to the first said means for registering the duration of such 95 influence.

FRANK J. ZERBEE.

Witnesses:

EMMA E. CAMPBELL,
EDWARD K. CAMPBELL.