

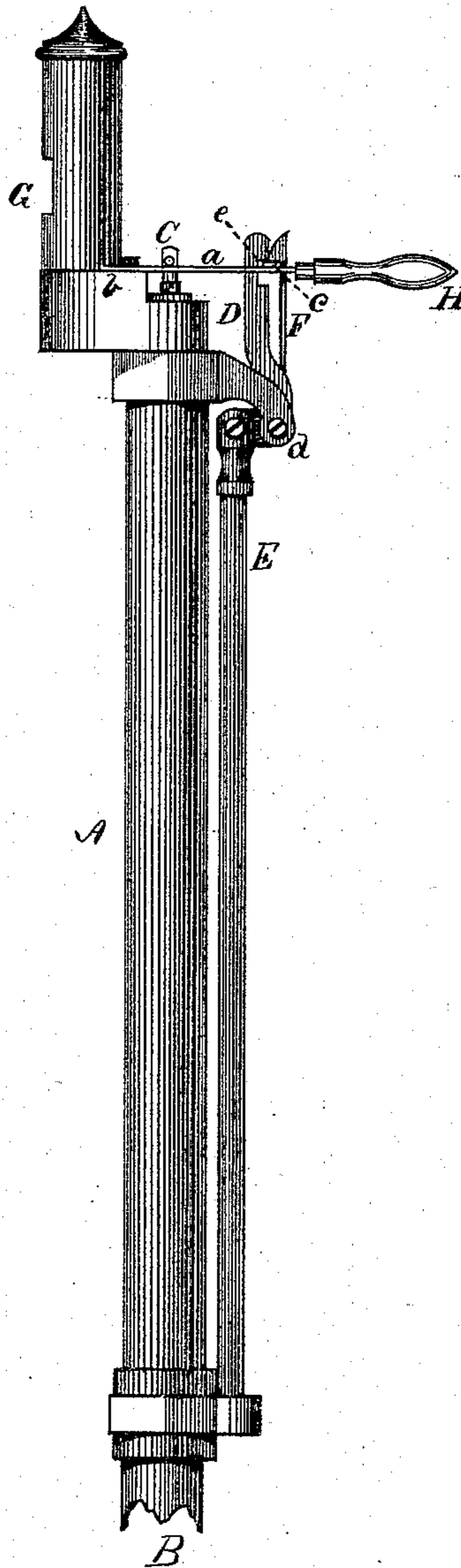
G. M. HOPKINS.

Low-Water Indicators for Steam-Boilers.

No. 156,666.

Patented Nov. 10, 1874.

Fig 1.



Witnesses,
G. S. Allis
G. M. Hopkins

Inventor,
Geo. M. Hopkins

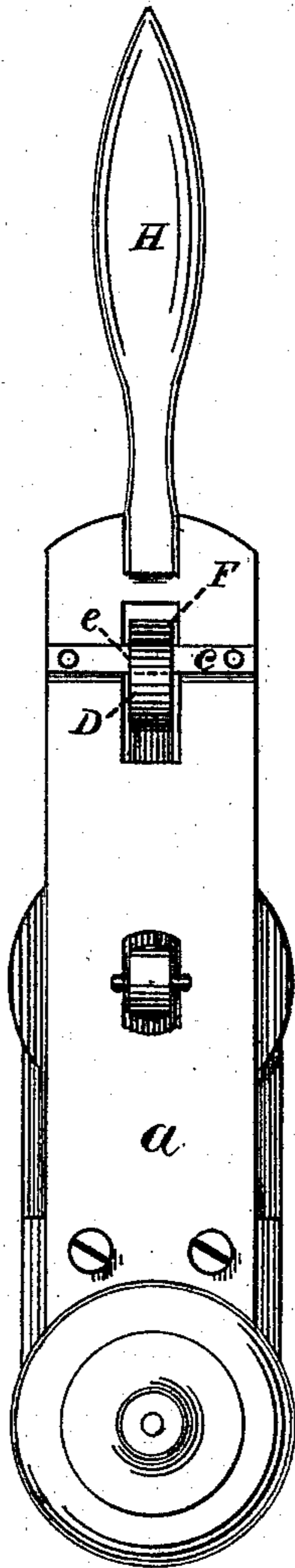
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Fig. 2.



Witnesses:
H. M. Hopkins
G. S. Allis.

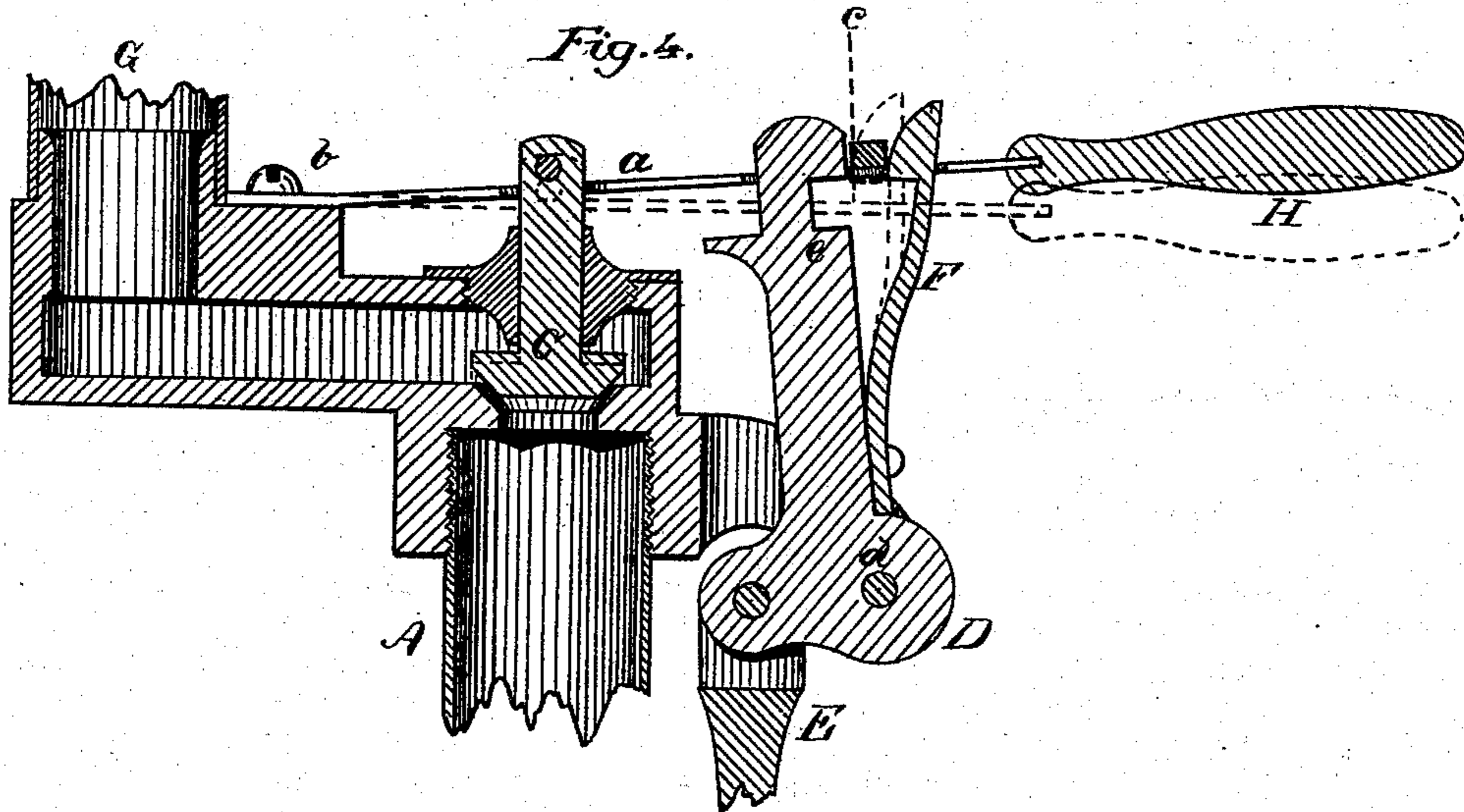
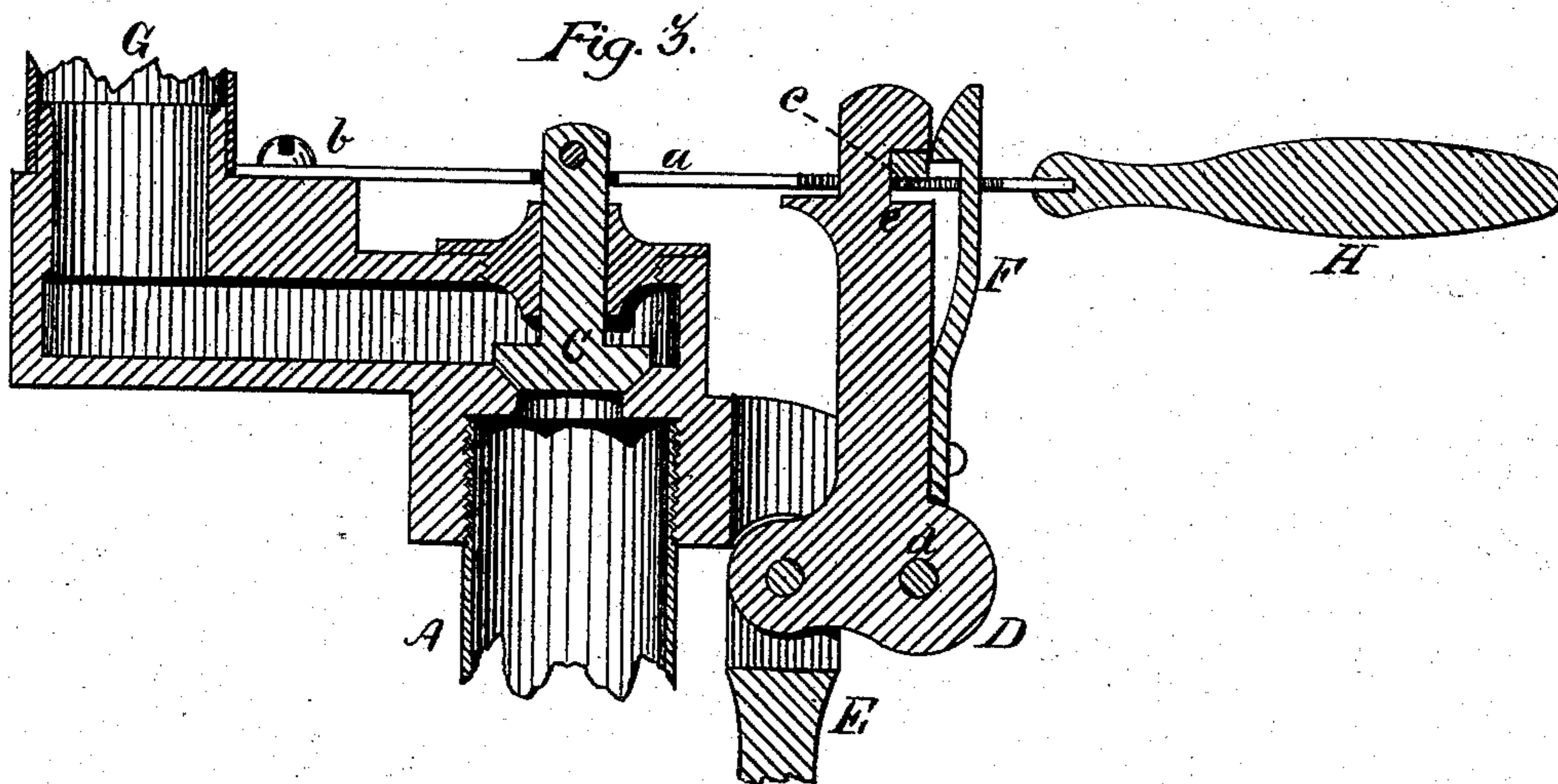
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Inventor:

Geo M. Hopkins.

UNITED STATES PATENT OFFICE.

GEORGE M. HOPKINS, OF ALBION, NEW YORK, ASSIGNOR OF ONE-HALF
HIS RIGHT TO A. D. TYTLER, OF SAME PLACE.

IMPROVEMENT IN LOW-WATER INDICATORS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **156,666**, dated November 10, 1874; application filed
February 21, 1874.

To all whom it may concern:

Be it known that I, GEORGE M. HOPKINS, of Albion, in the county of Orleans and State of New York, have invented certain Improvements in Low-Water Indicators for Boilers, of which the following is a specification:

The object of my invention is to furnish an indicator, which shall report low water in steam-boilers with certainty.

My invention consists in an expansion-tube of brass or other expansible metal connected with the boiler at the alarm-line, combined with a valve placed at its outer end, and a spring which shall assist in opening and holding the valve open, a detent to confine the spring when it is depressed, thus holding the valve to its seat, an iron rod placed parallel with the expansion-tube to operate the detent, a spring-catch to hold the spring down temporarily after an alarm, and a steam-whistle or other suitable device for sounding an alarm.

In the drawings, Figure 1 represents a side elevation of my invention; Fig. 2, Sheet 2, a top view of the same; and Figs. 3 and 4, Sheet 3, partial sectional elevations.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully its construction and manner of operation.

A is an expansion-tube connected at B with the boiler at the alarm-line. C is a valve, the stem of which runs through the spring *a*, shouldering against it below, and having a pin through it above the spring. One end *b* of the spring is fixed. *c* is a cross-bar placed across a slot in the spring *a*. D is a detent or a right-angle lever, which is pivoted at *d*, the short arm of which is connected with the rod E. The long arm extends upward through the slot in the spring, and is notched at *e* in such a way that when the expansion-tube is cold the cross-bar *c* rests in the notch which retains the spring *a* when depressed, and consequently holds the valve C to its seat. F is a spring-catch, which is fixed to the lower part of the lever D, and has its nib a very small distance below the notch *e* in the lever D. The rod E is fixed in the casting at the

lower end of the expansion-tube. G is a whistle placed beyond the valve C. H is a handle attached to the free end of the spring *a*.

The operation of the indicator may be described as follows: When the water is at its proper height, the tube A remains cool, the cross-bar *c* rests in the notch *e*, the spring-catch F rests against the side of the cross-bar. The water becoming low—*i. e.*, below the mouth of the tube which connects the indicator with the boiler—the water contained in the expansion-tube runs by its own gravity into the boiler, steam takes its place, and heats and expands the tube which carries up the lever D. The short arm of this lever being held by the rod E, the long arm is thrown over; the notch *e* slips off from the cross-bar *c*; the spring *a* raises the valve C, shown in Fig. 4, Sheet 3, and the alarm is given.

The alarm can be instantly stopped by depressing the spring *a* by means of the handle H; or should the indicator be placed too high to be conveniently managed in this way a wire or chain may be attached. On depressing the spring *a*, the catch F engages with the cross-bar *c* and retains the spring *a*, and consequently holds the valve to its seat, as shown by the dotted lines in Fig. 4, Sheet 3. When the water is again up to the proper level, the tube A quickly cools, and in contracting throws the lever D over, so that the notch *e* engages with cross-bar *c*, and at the same time displaces the catch F, which, by reason of its being shorter than the lever D, allows the spring *a* to raise enough to allow the cross-bar *c* to engage with the notch *e*, when it will be seen that the catch F must rest against the side of the cross-bar *c* until the spring *a* is again depressed after another alarm.

If it is desired to blow dry steam through the whistle, the upper end of the pipe A can be plugged, and steam taken in through a separate pipe just below the valve C.

This indicator may be placed in a horizontal position, and the whistle dispensed with and a nozzle used in its place when it may be used as an automatic gage-cock.

The advantages claimed for the indicator

are the instantaneous opening of the valve when the spring *a* is released, the facility with which the alarm can be stopped, the impossibility of having the indicator out of condition to alarm.

I claim as my invention—

The combination of the tube A, valve C,

spring *a*, lever D, catch F, the cross-bar *c*, and rod E, substantially as specified.

GEO. M. HOPKINS.

Witnesses:

W. J. ENGLISH,
GEO. P. HOPKINS.