2 Sheets—Sheet 1.

# T. E. McNEILL.

## SELF-ACTING STEAM-TRAP.

No. 185,770. Patented Dec. 26, 1876.

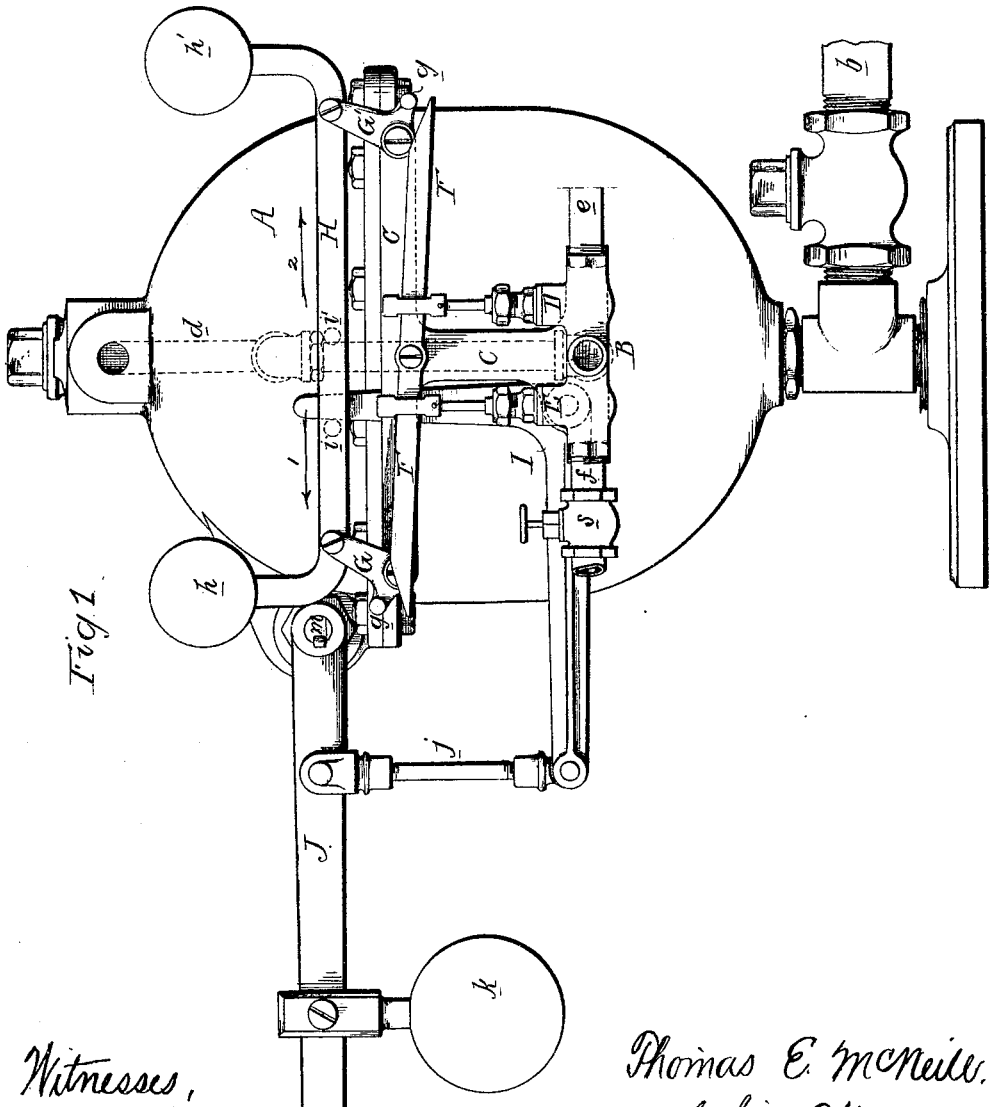

Fig. 1.

Witnesses,
Harry Howson Jr.
Harry Smith.

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by his Attorneys
Howson and Son

2 Sheets—Sheet 2.

# T. E. McNEILL.

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Fig. 2.

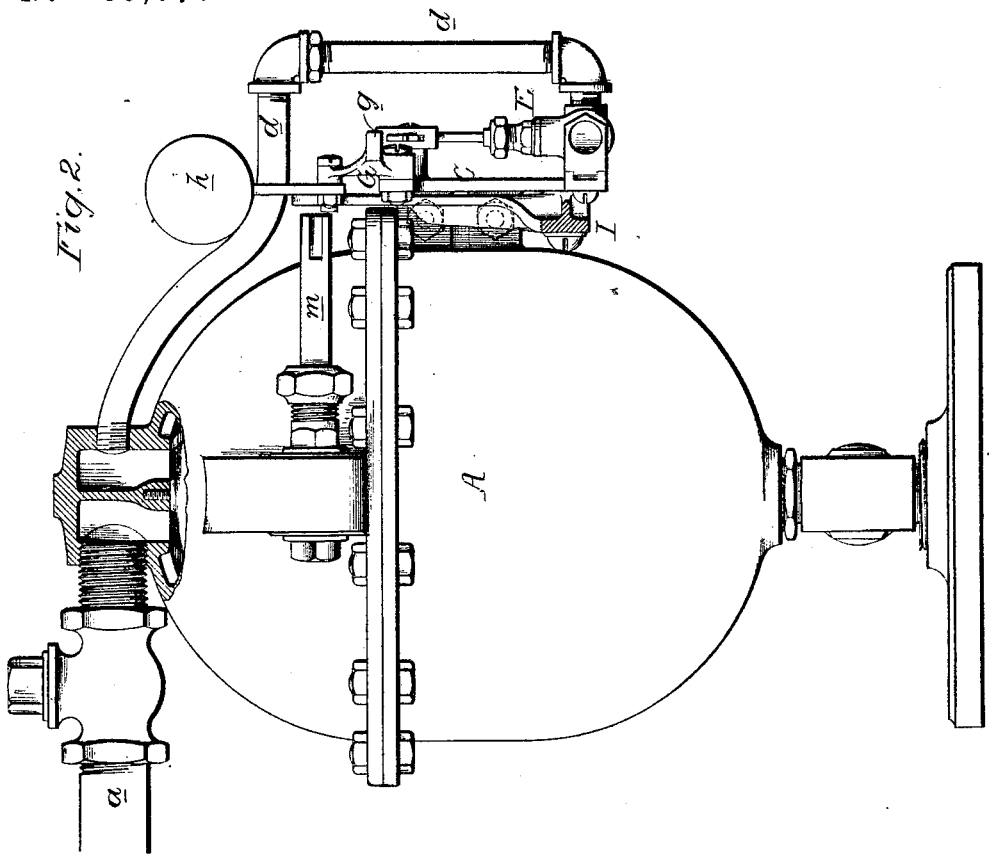
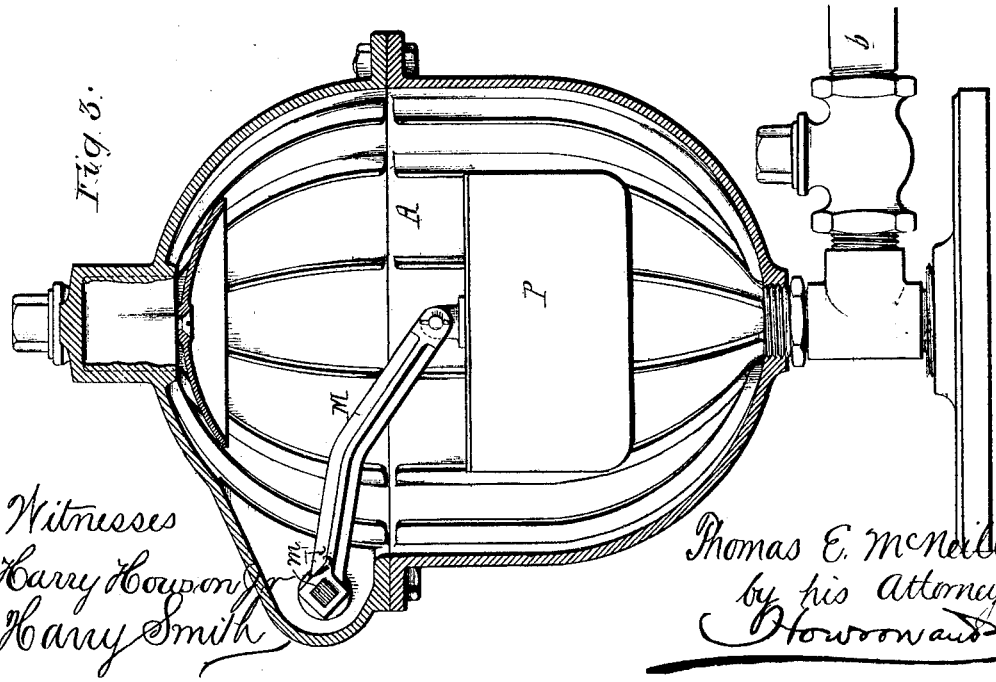



Fig. 3.




Witnesses
Harry Howson Jr.
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Howson and Son

# UNITED STATES PATENT OFFICE.

THOMAS E. McNEILL, OF NEW YORK, N. Y.

## IMPROVEMENT IN SELF-ACTING STEAM-TRAPS.

Specification forming part of Letters Patent No. **185,770**, dated December 26, 1876; application filed May 18, 1876.

*To all whom it may concern:*

Be it known that I, THOMAS E. McNEILL, of the city, county, and State of New York, have invented certain Improvements in Self-Acting Steam-Traps, of which the following is a specification:

The objects of my invention are to simplify the construction and increase the efficiency of self-acting steam-traps; and this object I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1, Sheet 1, is a front view of my improved steam-trap; Fig. 2, Sheet 2, a side view; and Fig. 3, a vertical section of a portion of the same.

A is the reservoir of the steam-trap, the interior of which communicates at the top, through a pipe, *a*, provided with a suitable check-valve, with the coils of steam-pipes to be drained, and at the bottom, through a pipe, *b*, also having a check-valve, with the steam-boiler, above which the trap is situated. The interior of the reservoir also communicates, through a pipe, *d*, with the center of a chamber contained within a casing, B, arranged in front of the reservoir A, and secured to the lower end of a frame, C, which is attached to lugs formed in the reservoir A, and carries all the operating parts at the front of the machine. The casing B is provided at one end with a pipe, *e*, leading to the steam-space of the boiler, and at the other end with a pipe, *f*, communicating with the atmosphere. Between the center of the casing B and the end communicating with the pipe *e* is arranged a balanced valve, D, and between the center and the end communicating with the pipe *f* a similar valve, E, the stems of these valves being carried upward and terminating in yokes, which embrace a lever, F, on either side of the central pivot of the same. Hung to the opposite ends of the frame C, at points adjacent to the opposite ends of the lever F, are two bell-crank levers, G G′, the short arms of which have pins *g* projecting over the ends of the lever F, while their long arms are connected to a bar, H, turned up at the ends, and provided with weights *h h′*. On the rear side of this bar H are pins *i i′*, (shown by dotted lines in Fig. 1) and between these pins extends the upper end of the short arm of a bell-crank lever, I, hung to the frame C, and having a long arm, connected by means of a rod, *j*, to an arm, J, carrying an adjustable weight, *k*, and connected to a shaft, *m*, passing through the reservoir A at one corner of the same, and provided within the reservoir with an arm, M, attached to a float, P, of suitable construction.

The operation of the above-described apparatus is as follows: Supposing the parts to be in the position shown in Fig. 1, the check-valve in the pipe *a* is open and the check-valve in the pipe *b* closed, owing to the back pressure from the boiler. As the reservoir becomes filled with water from the pipe *a* the float P rises, causing the partial rotation of the shaft *m* and the depression of the arm J, thereby causing the short arm of the lever I to press against the pin *i* of the arm H and move the latter in the direction of the arrow 1. This movement is continued until the long arm of the lever G is moved beyond the perpendicular, when the weight *h* causes it to turn suddenly on its pivot, the pin *g* on its short arm striking the end of the lever F, and causing the latter to turn on its pivot, so as to close the valve E and open the valve D. Communication between the interior of the reservoir and the atmosphere is thus cut off, and live steam from the boiler enters the reservoir through the pipes *e* and *d*. The pressure of steam in the reservoir closes the check-valve in the pipe *a*, and as the pressure in the reservoir and boiler is now equalized, the water opens the valve in the pipe *b*, and passes by force of gravity into the boiler. As the water escapes, the float P descends and throws the short arm of the lever I over against the pin *i′* of the bar H, and exerts a pressure upon the same, so as to move the said bar in the direction of the arrow 2. When the reservoir is empty, or nearly so, the long arm of the lever G′ will have been moved beyond the perpendicular, and the lever will be turned by the weight *h′*, so that the pin *g* on its short arm strikes the adjacent end of the arm F and causes its descent, and the consequent closing of the valve D and opening of the valve E. The supply of live steam being thus cut off, the pressure in the pipe *b* closes the check-

valve, while the pressure of steam and water in the pipe *a* causes the opening of its valve. Any steam which remains in the reservoir, or which enters the same from the pipe *a*, passes out through the pipes *d* and *f*, so as not to interfere with the free accumulation of water in the reservoir. In order, however, that this passage of steam may be regulated so as to govern the speed with which the trap works, I provide the pipe *f* with a stop-valve, *s*, by operating the spindle of which the passage through the pipe *f* may be enlarged or diminished at pleasure, and the freedom with which the steam is allowed to escape from the reservoir A thus controlled.

The above-described arrangement forms a simple and compact device by which the automatic action of the trap is insured, the entire apparatus being self contained and applicable to positions where an ordinary steam-trap could not be placed.

I claim as my invention—

1. The combination of the reservoir A with the frame C, secured to the side of the reservoir, and carrying mechanism for operating valves D and E in a casing, B, also carried by the frame C, and communicating at one end with the boiler, at the other end with the atmosphere, and in the center, through a pipe, *d*, with the top of the reservoir A, as set forth.

2. The combination of the pivoted lever F, for operating the valves, and the arm J on the bucket-shaft *m*, with the bell-crank lever I, weighted bar H, its pins *i* and *i'*, and bell-crank levers G G', as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS E. McNEILL.

Witnesses:

JOHN MOFFET,

W. KUFFNER.